U-8226S-ACCU1

Cold thermoshock test controller

Instruction Manual

DRAFT

For Safety Using

Thank you for purchasing our U-8226 cooling ang heating shock Controller. For proper and effective use of full functions of this instrument, please read and understand this instruction manual well before use.

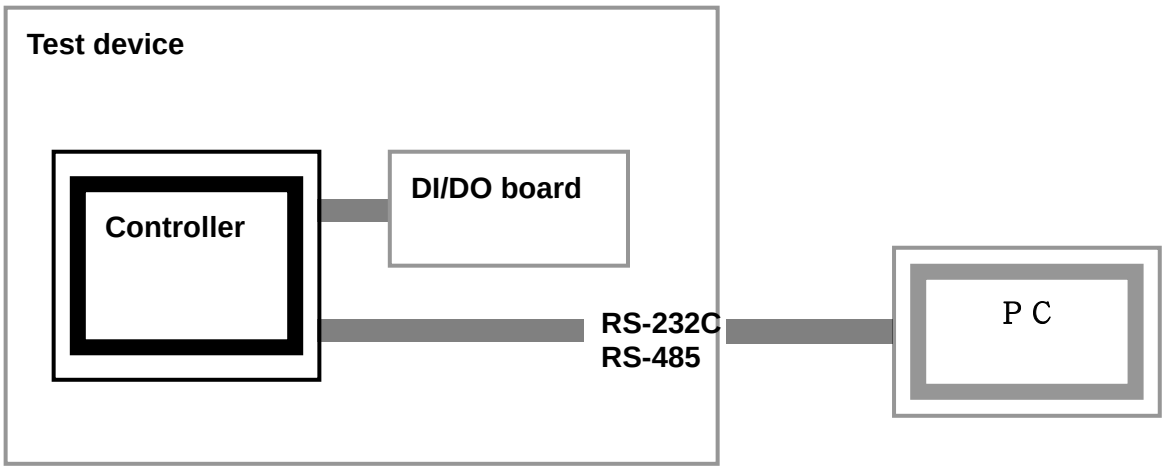
To ensure safety in handling the instrument, please be sure to observe the following warnings/cautions as well as the precautions in this manual.	
⚠ ***Warning***	
General	To prevent an electric shock, be sure to disconnect this instrument from the main power supply when wiring it.
Protective grounding	(1)To prevent an electric shock, be sure to provide protective grounding before providing power supply to this instrument. (2)Do not cut off the protective grounding conductor or disconnect protective grounding.
Power supply	Check that the power supply voltage of this instrument matches that of the supply source. Rated power voltage range ： 100-240VAC Rated power frequency ： 50/60Hz
Environment	Do not operate this instrument in atmosphere containing inflammable, explosive or corrosive gas, or in environments where water or steam may be splashed on the product.
Input/output wiring	To prevent electric shock, be sure to provide wiring after turning off the power.
⚠ ***caution***	
Input/output wiring	Do not use the open terminals for other purposes such as relay.
Inside of instrument	Do not disassemble the inside of the main unit.

[caution]	
Instruction manual	(1)Please deliver this instruction manual to the final user. (2)Be sure to read this instruction manual before handling the instrument. (3)If you find any questions, errors or omissions, please inform our sales representative. (4)When you have read this instruction manual, store it safely near the instrument. (5)If it is lost, stained or damaged by accident, please inform our dealer where you purchased the instrument or our sales representative. (6)It is forbidden to reprint or copy all or part of this instruction manual without permission.
Installation	(1)Please be sure to attach to a panel so that the operator who operates it cannot touch the back of this instrument. (2)Please attach to the point distant from what burns easily. Please do not install what burns especially easily under an instrument base. (3)When installing this instrument, put on a protective gear such as safety shoes, helmet, etc. for your safety. (4)Do not put your foot on the installed instrument or get on it, because it is dangerous.
Maintenance	(1)It is prohibited to remove or disassemble the unit, printed circuit board, etc. by anyone except our serviceman or persons with our approval. (2)When protection against dust and waterproofing performance are not needed, and when not making shakiness between an inner unit and a case into a problem, there is no problem on the performance even if it removes packing between an inner unit and a case.
Disposal	To dispose of this instrument, consign to the special agent as an industrial waste.
Cleaning	(1)Clean the surface of this instrument with a dry cloth. (2)Do not use organic solvents. (3)Cleaning the instrument after turning off the power.
Revisions	This instruction manual may be revised without prior notice.

Table of Contents

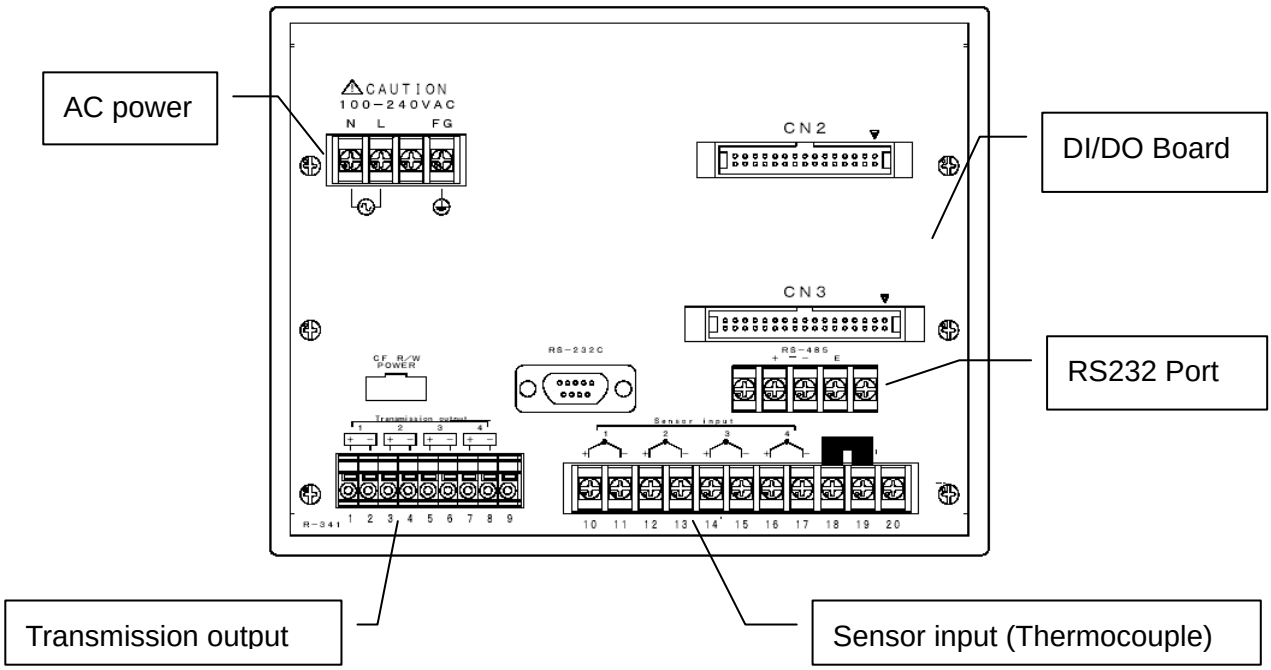
1. Installation

1.1 System diagram

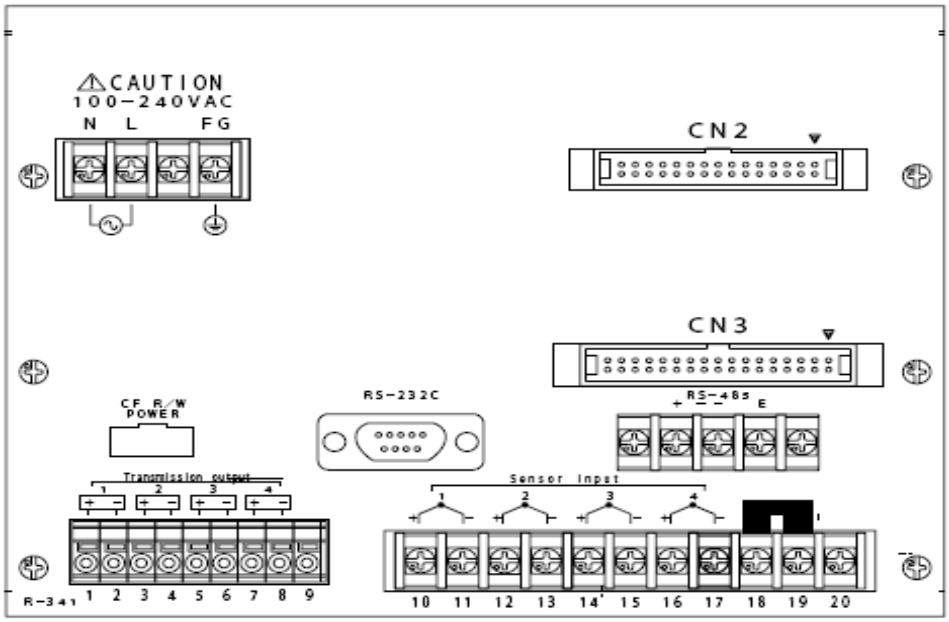


1. Controller body connect to DI/DO board.
2. Com port connect to PC.

1.2 Wiring



1.3 Relay board wiring



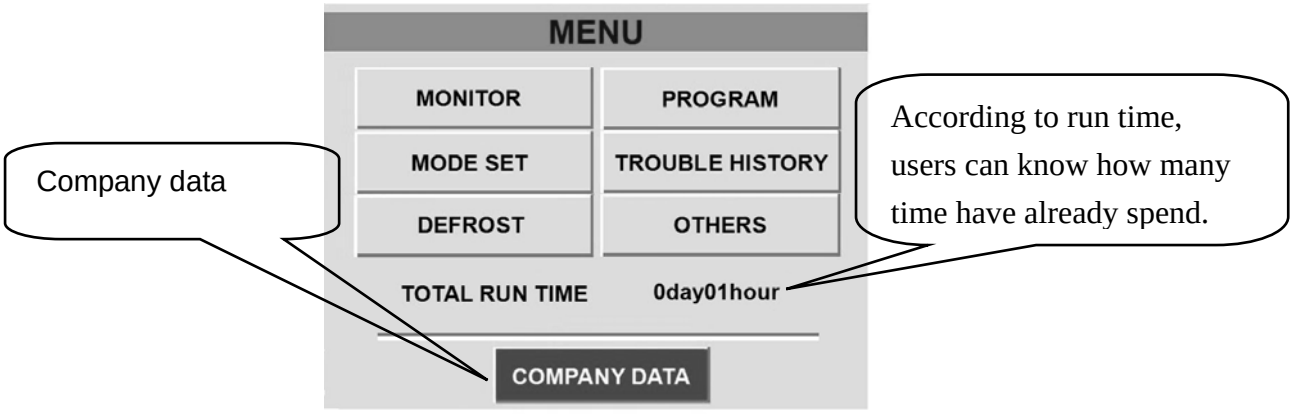
Number	CN2
	COM
1	TROUBLE1
2	TROUBLE2
3	TROUBLE3
4	TROUBLE4
5	TROUBLE5
6	TROUBLE6
7	TROUBLE7
8	TROUBLE8
9	TROUBLE9
10	TROUBLE10
11	TROUBLE11
12	TROUBLE12
13	TROUBLE13
14	TROUBLE14
15	TROUBLE15
16	TROUBLE16
17	H.DAMP. OP
18	H.DAMP. CL
19	R.DAMP. OP
20	R.DAMP. CL
21	L.DAMP. OP
22	L.DAMP. CL
23	RUN
24	STOP

Number	CN3
	COM
1	H.DUMP. OP
2	H.DUMP. CL
3	R.DUMP. OP
4	R.DUMP. CL
5	L.DUMP. OP
6	L.DUMP. CL
7	H.FAN
8	R.FAN
9	L.FAN
10	TS1
11	TS2
12	CONT
13	REF.1
14	REF.2
15	N2 GAS
16	WINDOW
17	DEFROST
18	TROUBLE
19	RUN
20	END
21	EXHAUST
22	NONE
23	L.CONTORL
24	H.CONTORL

Number	Back side of product	
1	(+)	H.ROOM CONV
2	(-)	-2~3.2VDC
3	(+)	L.ROOM CONV
4	(-)	-2~3.2VDC
5	(+)	T.ROOM CONV
6	(-)	-2~3.2VDC
7		NC
8		
9		
10	(+)	H. ROOM
11	(-)	TEMP(T)
12	(+)	L. ROOM
13	(-)	TEMP(T)
14	(+)	TEST ROOM
15	(-)	TEMP(T)
16	(+)	REF.
17	(-)	TEMP(T)
18		After adjust TC, it's short
19		in a short bar.
20		NC

2. Menu Overview

The menu provides all basic operation and setting, It is conventient to choose any function that users need.



2.1 Monitor

A. SV, PV, a program type status.

B. Operate RUN,PAUSE,HOLD,ADVANCE,STOP,VIEW button.

C.VIEW button can saw present temp, output percent ratio, spend time.

2.2 Mode set

A. Choose program number（2 ZONE/3 ZONE/ STEP/LINK）.

B. reserved start time, reserved stand by time, return ambient temperature, black out resume.

2.3 Defrost

Setup auto defrost function, defrost temperature, defrost time, end defrost.

2.4 Program

A. Create a new program (2 ZONE/3 ZONE/ STEP/LINK).

B.Test name type in, operate cycle, start from high temp or low temp, wait temp, setup temp, spend time, pre wait, time signal.

C.Delete a program,run a program.

D. View or change stored programs.

E. Link(Combine) programs.

2.5 Trouble history

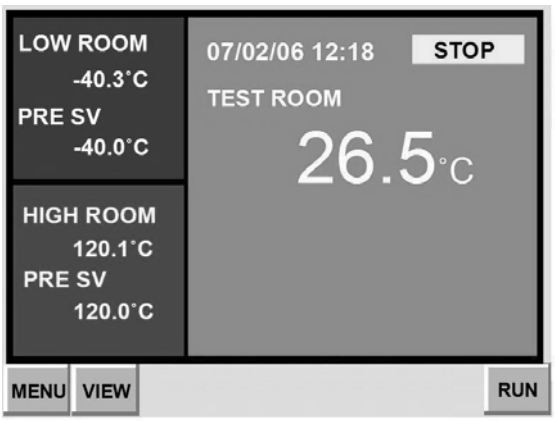
Trouble message ever happened in the past.

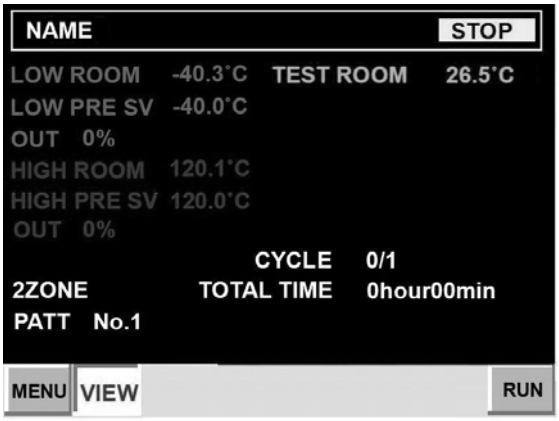
2.6 Others

Adjust system clock, change language, setup back light, adjust LCD contrast, record maintenance, change machine ID, view firmware version.

3. MONITOR screen explaining

When users have already setup program, the monitor screen provide users to (RUN),(STOP),(ADVANCE), (PAUSE),(HOLD) the programs. The users can see three areas, It includes Low room, High room, Test room. Also can see the present output percent ratio and more the others details.



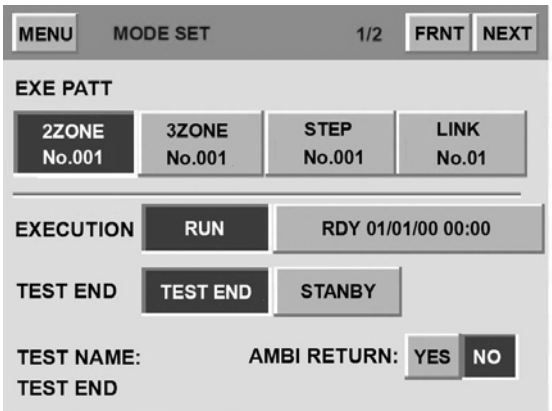


4. MODE SET Screen explaining

When users have setup the programs function, MODE SET screen provide the others detail settings for users. Such as execute reserved start time or not, execute reserved stand by time or not, execute return ambient temperature or not, power down(Black out resume)or not. Remember to choose execute patterns(programs).

4.1 Choose execute pattern

Before setup mode set , must choose execute pattern, such as 2 zone, 3 zone, step, link. then continue next setup.

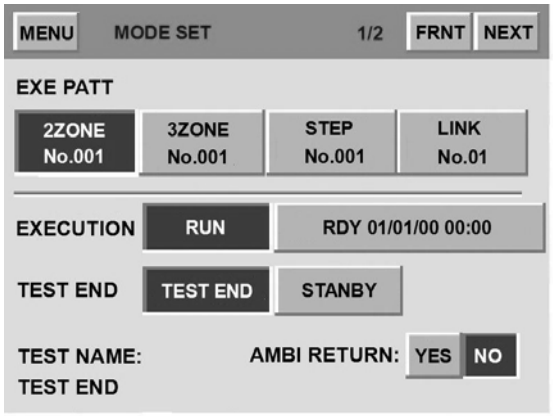


4.2 Execute reserved start time or not

There have two execute methods in reserved start time.

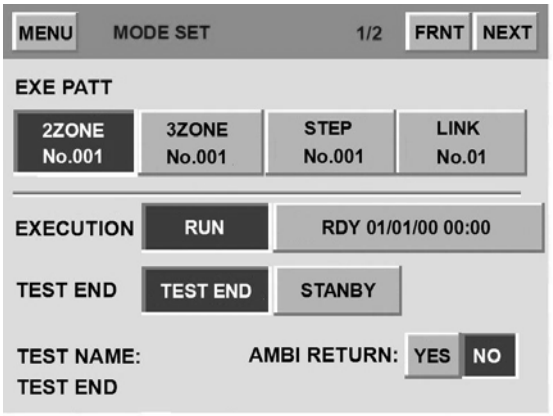
RUN: Normal setting, give up reserved start time.

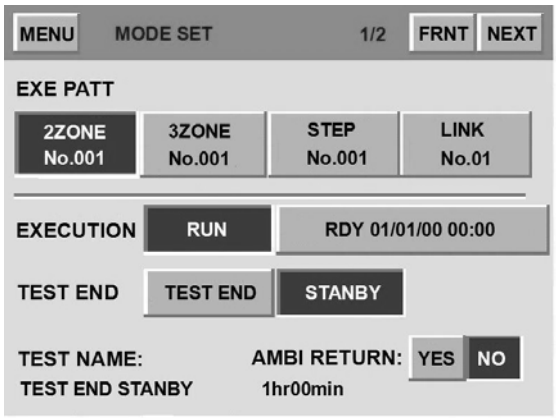
Ready: Reserved start time, Month/Day/Hour/Minute.



4.3 Execute reserved stand by time or not

When a program have finished running , users can choose TEST END or STANBY . If a user choose TEST END ,when a program have finish running, then a program will test end. If a users choose STANBY , when a program have finish running, then a program will stand by, after stand by time, a program will turn off. Time setup range:00hr00min~99hr59min.

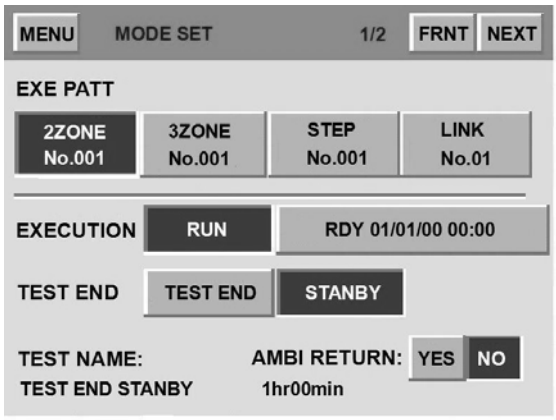


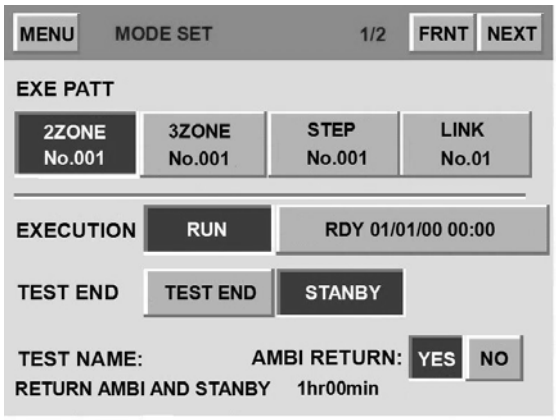


4.4 Execute return ambient tempature or not

When a program have finished running , depend on a user demand, back to ambient temp or not.

Ambient temp setup range:0~50˚C.Factory default:15~35˚C.





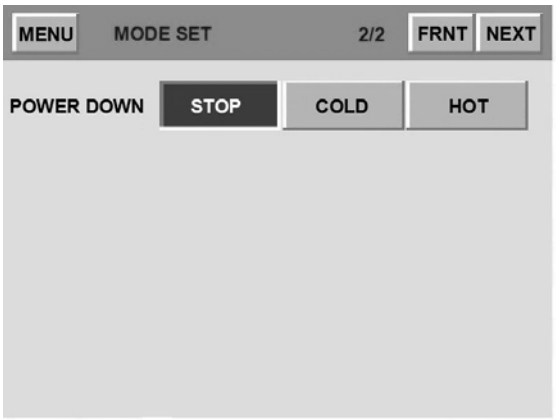
4.5 Execute Power down(Black out resume) or not

When a controller is running a program, because unknown factors then a controller power off, after restarting, there are three situations can be selected.

STOP: When users turn on the power, appear RST button, then push it. The program is stop.

COLD: When users turn on the power, the system give up normal process, return back to the first process.

HOT: When users turn on the power, a controller continue the present process.



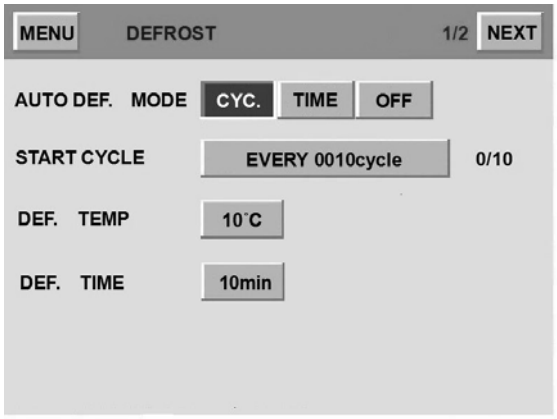
5. DEFROST screen explaining

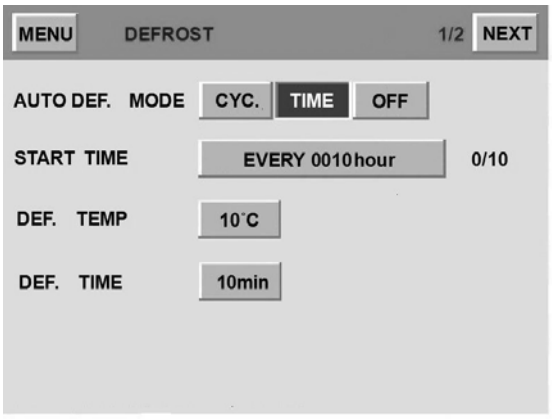
Setup auto defrost function, defrost temperature, defrost time, end defrost.

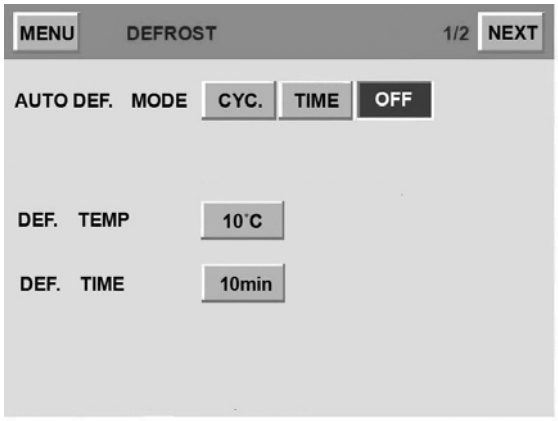
Notice: Auto defrosts or manual defrost is only exist in high temp.

5.1 Auto defrost function

Cycle: Calculate auto defrost by cycle. **Time** : Calculate auto defrost by time. **Off** : Turn off auto defrost function. Suggest auto defrost select cycle will be great, 120 cycle is maximum, if cycles is too more, low temp performance will be bad.

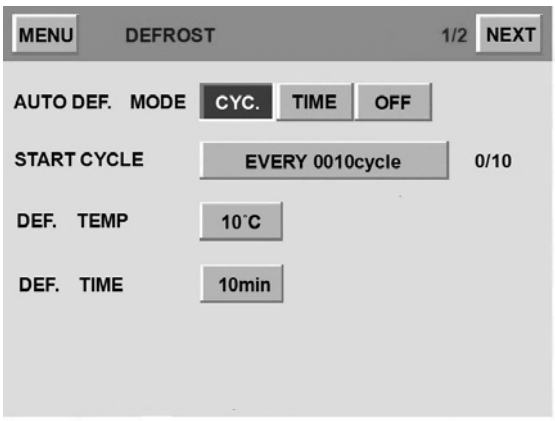






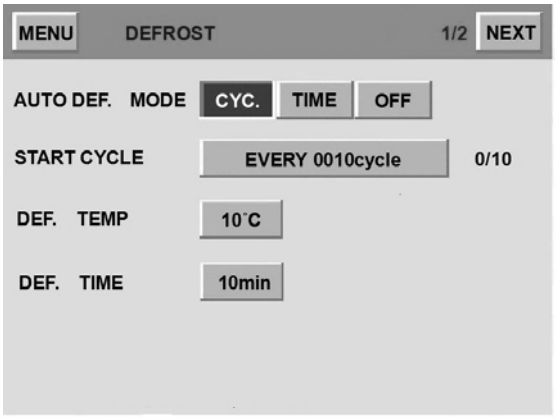
5.2 Defrost temperature

Setup defrost temperature more high, it need more time to finish defrost. Suggest temperature will be 10˚C.



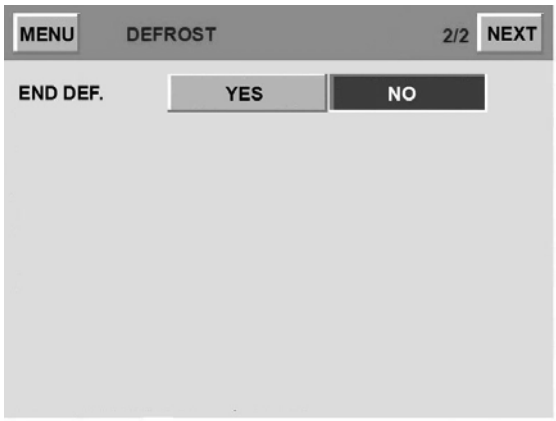
5.3 Defrost time

When defrosts the temperature to arrive, defrosts the delay time only then to start to calculate, generally suggested that the time is 5~10 minutes.



5.4 End defrost

Users may suppose when the settled experiment ended, whether needs once more to carry out one time to defrost the movement.

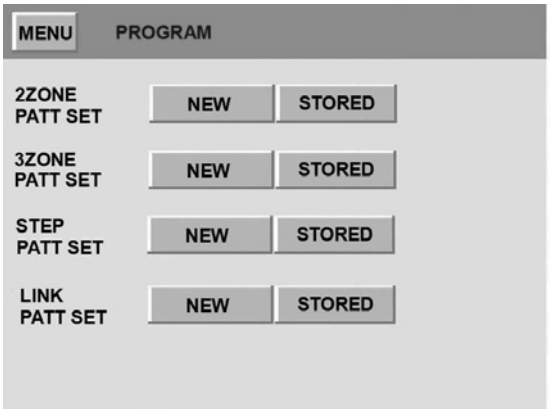


5.5 Manual defrost

In the low temperature area, if users have a demand, they can choose manual defrost, this screen only exist when a program is running.

6. PROGRAM screen explaining

There are four kinds of program to be selected. such as 2Zones,3Zones,Step,Link.



Program screen

6.1 Special items for Programs setup

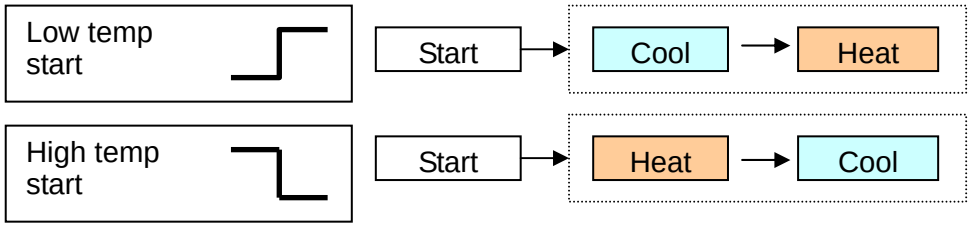
6.1.1 When a program is running, get into stored program can't change a running program(Red color).

6.1.2 After setup a new program, remember back to MODE SET screen, setup all of function that you need. Then back to Program screen to push (RUN) button. If you neglect MODE SET screen, push(RUN)button directly, it's also fine, all setup according to your demand.

6.2 Program type

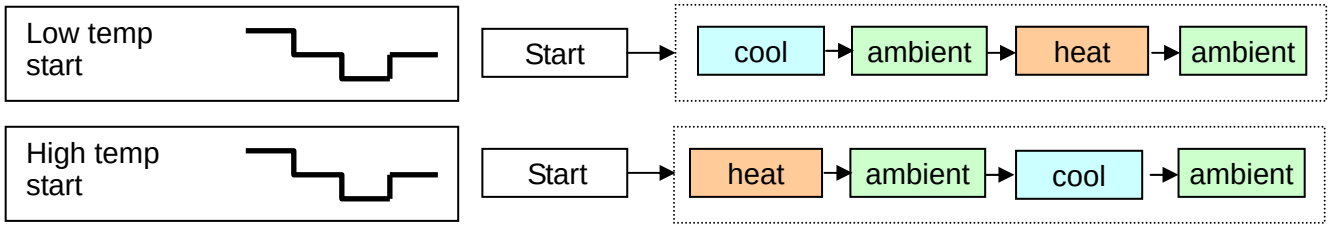
6.2.1 2 ZONE Pattern(Program)

When test condition between heating and cooling, please choose 2ZONE Pattern(Program).



6.2.2 3 ZONE Pattern(Program)

When test condition between heating and ambient temp and cooling, please choose 3ZONE Pattern(Program).



6.2.3 Step Pattern (Program)

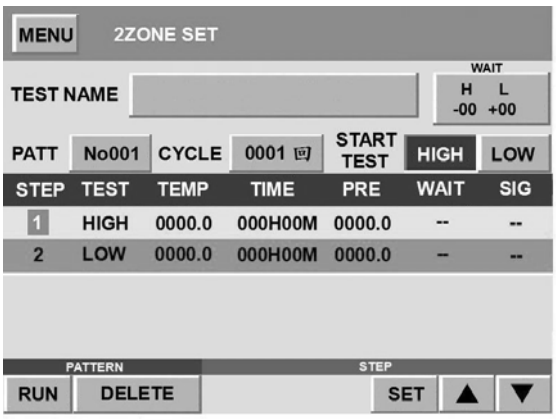
Users can setup program flexibly, no limit.

6.2.4 Link Pattern(Program)

Link pattern combine 2 zone, 3zone,step.It provide users more flexibility.

6.3 2 Zone pattern set

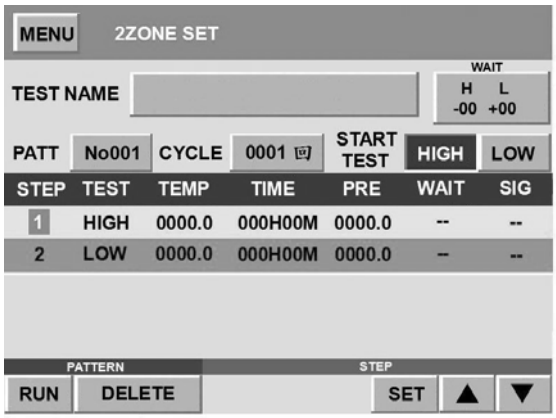
When test condition between heating and cooling.

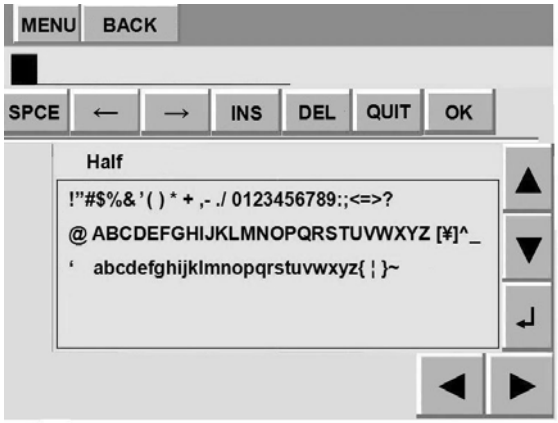


2Zone setup

6.3.1 Test name type in

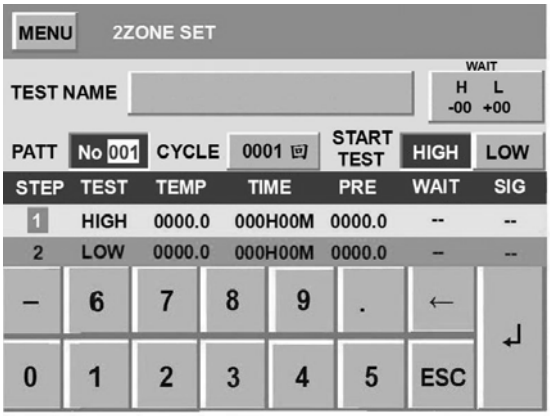
Users can type in any test name that they like. Test name make a program easy to remember.





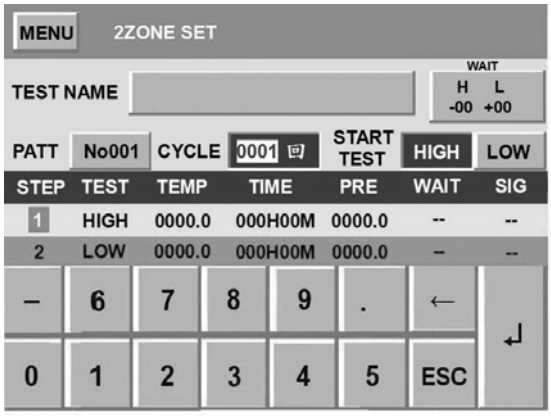
6.3.2 Patterns number

Choose Patten number before others setup, because pattern number is different, then setup will be different. Each type of programs can setup 120 programs. so it mean that will be 120 number can be choose.



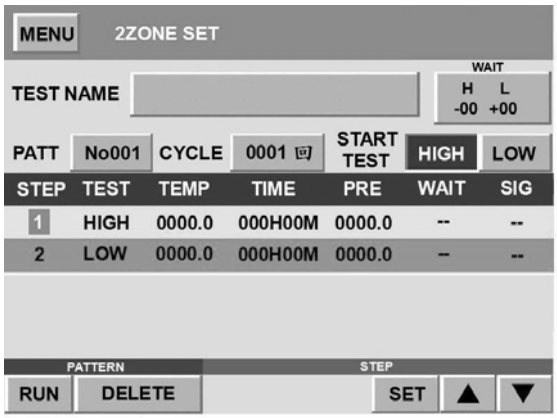
6.3.3 Patterns cycle

Pattern cycle that mean how many times in running, range limit in 1~9999.



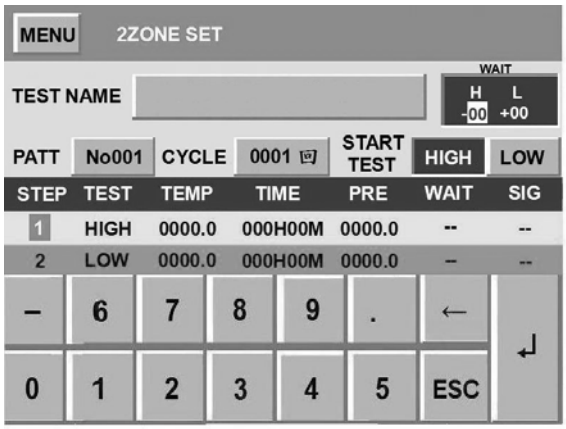
6.3.4 Start test from…

Start according to the demand by high temperature or low temperature starts to test.



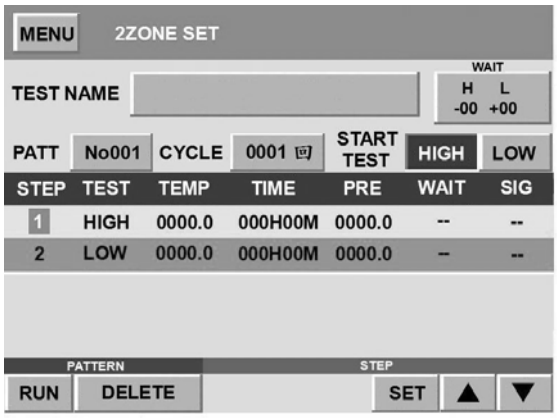
6.3.5 Wait temp

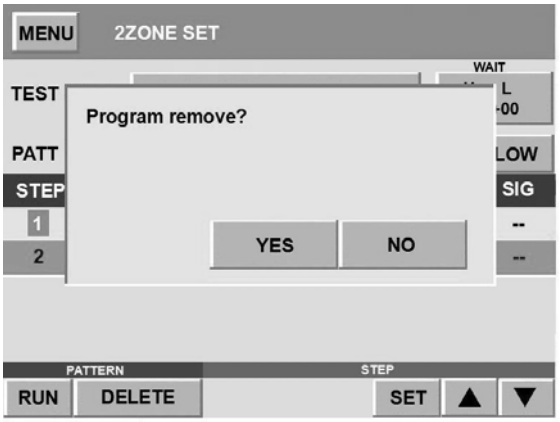
Setup wait temp in high temp or low temp, when temp achieve wait temp, a controller will get into wait mode. Range:1~99˚C.



6.3.6 Delete a pattern

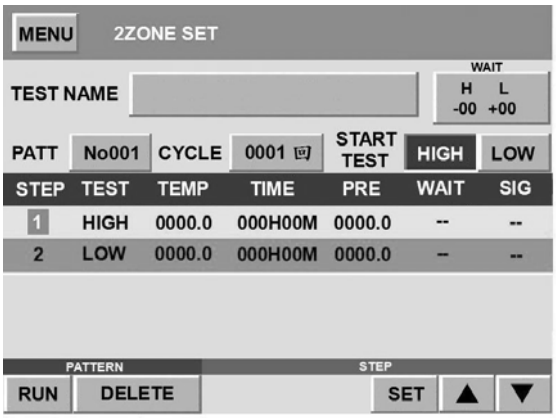
Delete a pattern according to user's demand.

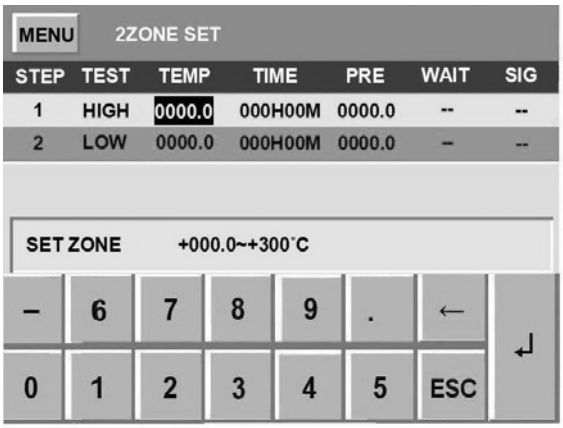




6.3.7 setup a pattern operate condition

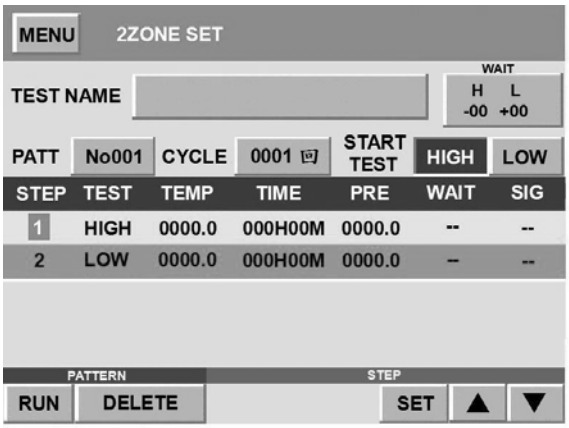
Setup pattern operate condition, it include test temperature, spend time, pre wait range, wait mode on/off,time signal on/off.

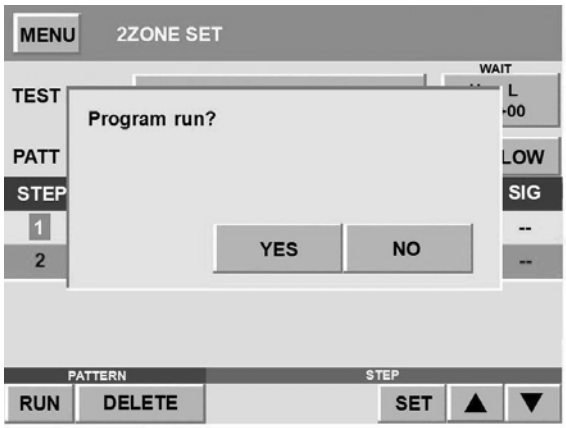




6.3.8 Running a pattern

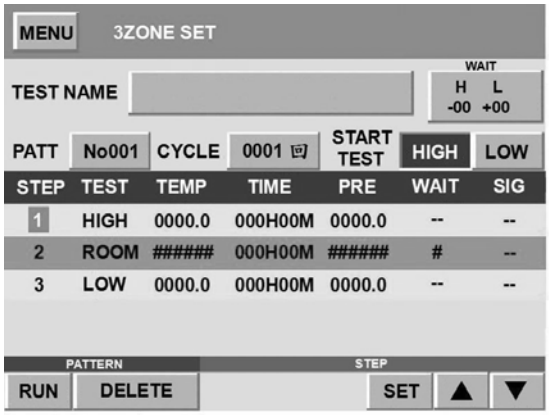
After setup all the others settings, then push RUN button, the screen will jump to MONITOR screen, start running a program.



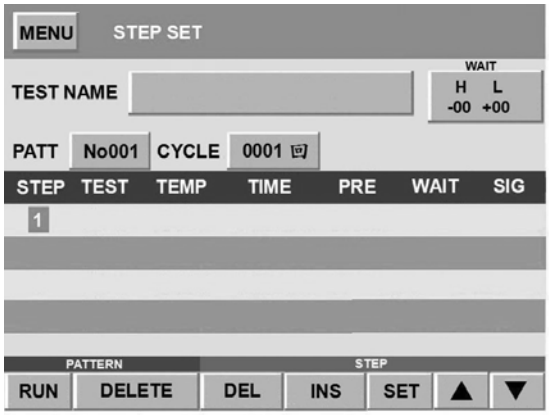


6.4 3 Zone and Step

Because 3Zone and Step, their setup are the same with 2Zone, so we don't explain them in here, only show photos in below.



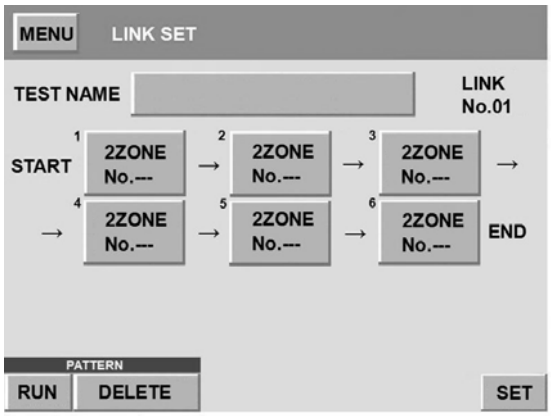
3Zone setup

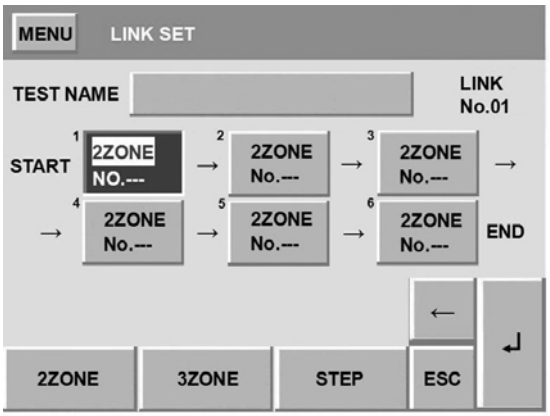


Step setup

6.5 Link pattern

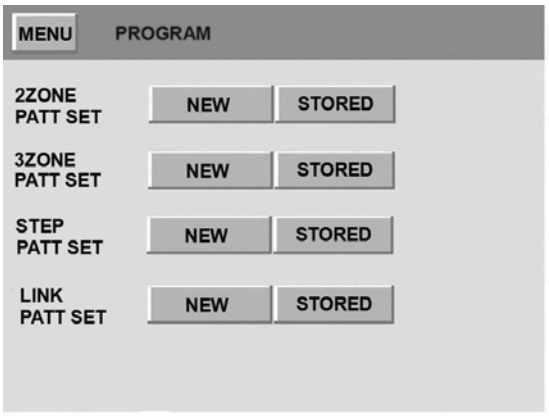
Link pattern combine 2 zone, 3zone,step.In Link pattern screen have six block, provide users to input 2 zone,3zone,step programs. Test name type in by users.



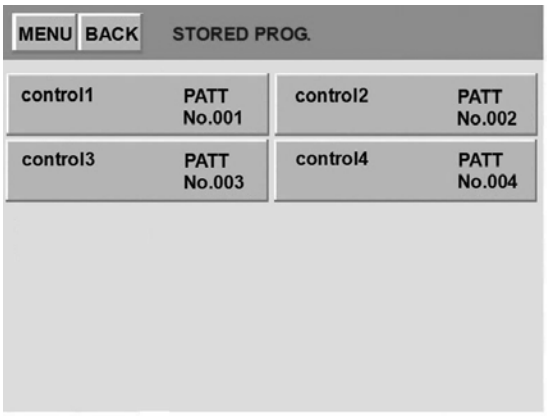


6.6 Stored pattern

Each type of patterns have their stored patterns, all stored in system memory, users can change or view patterns that have already be created.



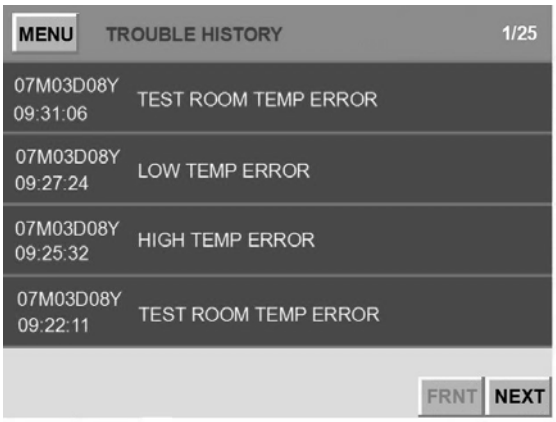
Program setup



Stored program

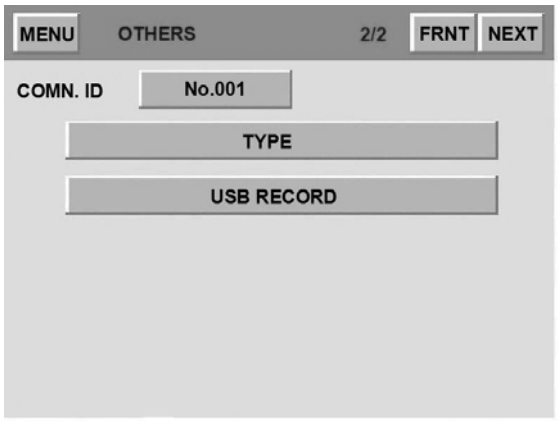
7.TROUBLE HISTORY screen explaining

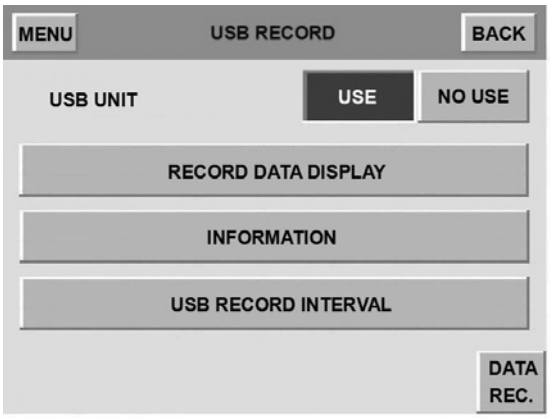
In the screen, you can see trouble message that ever happen in the past. Trouble message include trouble name and date/time. When a controller has an error, it will appear a trouble message, and then users can push RST button back to normal system. That trouble message will save to trouble history.



8.OTHERS screen explaining

This screen provide users to adjust system clock, change language, setup back light, adjust LCD contrast, record maintenance, change machine ID, view firmware version.





8.1 Time adjust

Adjust a system clock, YY/MM/DD/HH/MM.

8.2 Language change

Change language between Chinese and English.

8.3 Back Light on

Back light means if users don't touch panel too long time, the screen will get into dark. This function will protect a controller .

8.4 LCD contrast

Adjust LCD contrast to the best display,16 level.

8.5 Maintenance

Maintenance message can be recored by users everyday. when users push RSET button, it will record date/time immediately.

8.6 Machine ID

Sometimes RS232 communication needs some different machine ID. That will help to recognize different Communication port.

8.7 Type

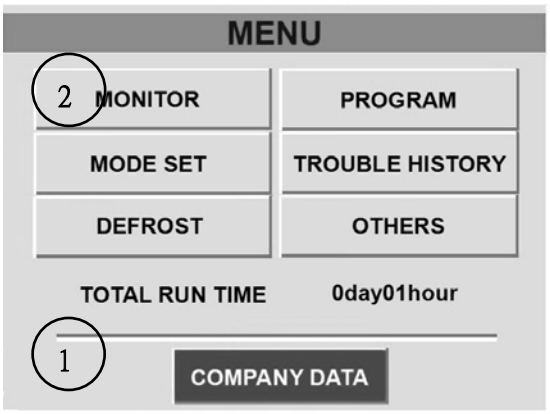
This screen provides product type, firmware version, character version.

NOTE:USB RECORD only appear when you have already setup in initial period setup 6.

9. Parameter explanation and setup

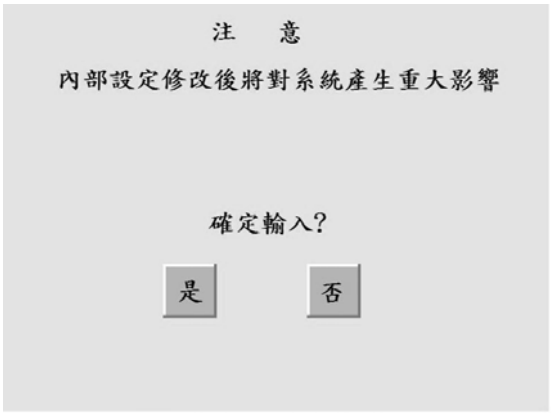
9.1 How enters “the initial period setup”

The following chart, after 1, 2 orders will hold back touches controls the screen to appear the password picture, after this time please input the password to press the enter key to enter.



Picture 1

Picture 2



Picture 3

※ Suggest the password should be protect.

9.2 How to change a password

In the OTHERS screen, after 1, 1, 2, 3, 4, 1, 4 orders will hold back touches controls the screen to appear the password picture.

1. Picture left bottom corner
2. Picture left top corner
3. Picture Right top corner
4. Picture Right bottom corner

Enters “the password setup” in front of the picture, the controller can request please first to input the old password first, after waits the input to finish presses the enter key then enters “the password setup” the picture again.

The password input wrong namely returns to “Other” picture.

After enters “the password setup” the picture, the controller can again request to input group of passwords, this password namely password of for the pre-renewal, after waits the input to finish presses the enter key again, namely completes the revision password the operational procedure.

10. Initial period setup 1

10.1 控制周期-The high low temperature control cycle setup (in 01-99 second scope may establish)

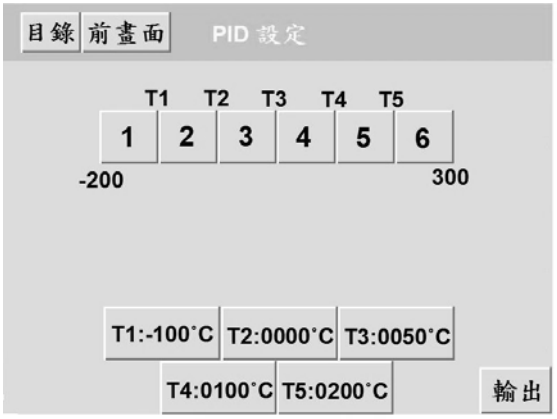
This part will involve the control sensitivity, the controller rests on gap time of cycle decision output the hypothesis.

Example 1: SSR (voltage) outputs, the temperature control cycle is 1 second, the controller demonstration output percentage is 40%, its significance is: SSR output ON 0.4 second, OFF 0.6 second.

Example 2: SSR (voltage) outputs, the temperature control cycle is 2 seconds, the controller demonstration output percentage is 50%, its significance is: SSR output ON 1 second, OFF 1 second.

10.2 PID 設定- PID Setup

Of contains the PID sub-area to cut P of the cut point hypothesis, various areas, I, D, ARW, the LMT parameter hypothesis, this controller are most may plan 6 group of PID to utilize . After will press down “the PID setup” the key to appear following picture:

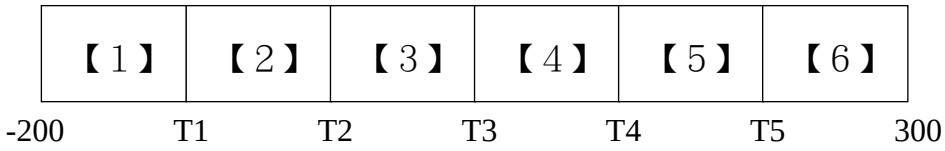


1. Underneath click T1~T5, may defer to the systems control condition the demand, plans the temperature to cut the cut point voluntarily (T1~T5).
Temperature setup scope bound: - 200℃~300℃
2. The setup break point are more and PID of region use more, the control is also stabler.

10.2.1 PID control movement direction

Fixes for the counter movement (heating) [REVERSE]

10.2.2 PID ZONE division chart and case



【1】: SV < T1
【2】: T1 ≦ SV < T2
【3】: T2 ≦ SV < T3
【4】: T3 ≦ SV < T4
【5】: T4 ≦ SV < T5
【6】: T5 ≦ SV

Case

1 ZONE =【1】
T1=T2=T3=T4=T5=300℃
2 ZONE =【1】、【2】
T1＝0℃ T2=T3=T4=T5=300℃
3 ZONE =【1】、【2】、【3】
T1=0℃ T2=100℃ T3=T4=T5=300℃
4 ZONE =【1】、【2】、【3】、【4】
T1=-100℃ T2=0℃ T3=100℃ T4=T5=300℃
5 ZONE =【1】、【2】、【3】、【4】、【5】
T1=-100℃ T2=0℃ T3=100℃ T4=200℃ T5=300℃
6 ZONE =【1】、【2】、【3】、【4】、【5】、【6】
T1=-150℃ T2=-50℃℃ T3=0℃ T4=100℃ T5=200℃ 【6】= T5~300℃

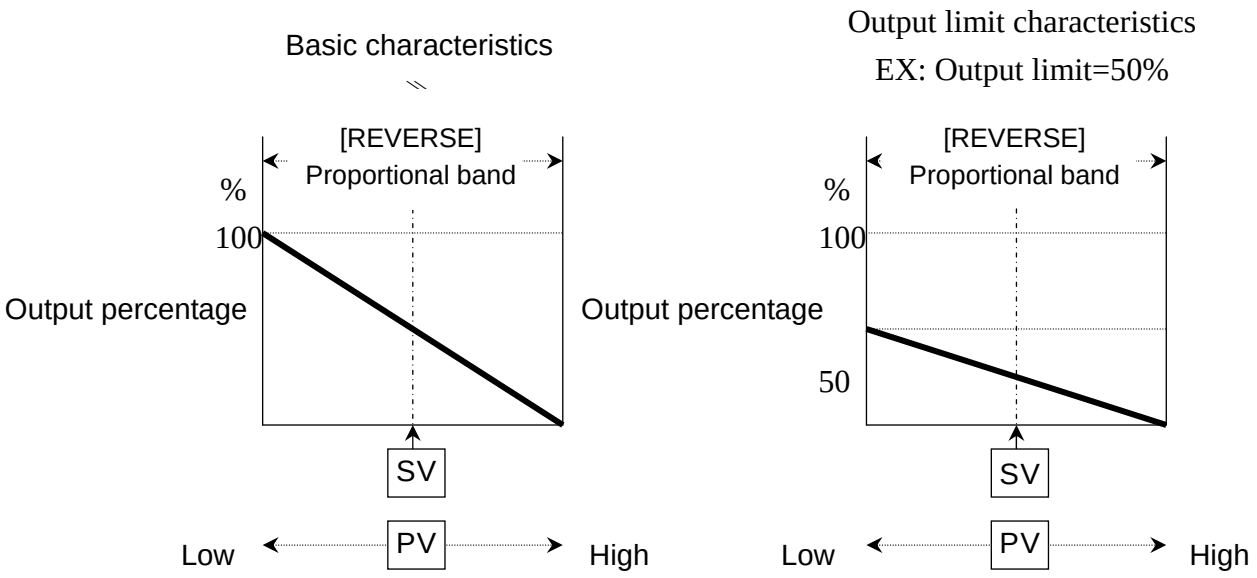
10.2.3 PID setup project scope

Proportional band (P):0.0 ~ 99.9℃
Integration time (I):0 ~ 3600 seconds
Differential time (D):0 ~ 3600 seconds
ARW：0 ~ 100%
Output limit: 0 ~ 100%

10.2.4 AUTO TUNING method

In carries out the high temperature test perhaps the low temperature test, after 1, 2 orders holds back touches controls the screen, namely can in the picture white block place appearance “TUNING and the start” string; So long as clicks starts the key, then the controller acts according to the system immediately the condition, makes PID the self regulating to decide the movement; After the execution finished, the controller automatic can calculate obtains P, I, the D value registers to PID ZONE in.

10.2.5 PID movement characteristic chart



10.3 線性回歸- Linear adjust

This function supplements and corrects for temperature SENSOR, may revise gets older SENSOR the error or revises the non-linear curve for the linear curve; The preheating area temperature, the precooling area temperature, the test area temperature, the freezer temperature have 5 adjusting points individually.

Setup scope: -99.99 ~ 325.00˚C

Corrected values and hope value relations:

-210˚C< set value 1≦ set value 2≦ set value 3≦ set value 4≦ set value 5≦325˚C

Revision case 1: Hope controller present demonstration value 50.00˚C revision for demonstration 48.00˚C; So long as then the adjusting point hypothesis for 50.00˚C, hoped that an hypothesis for 48.00˚C, then changes the demonstration temperature.

Revision case 2: We discovered that when sends in the standard signal 0˚C controller demonstration 2˚C, when sends in the standard signal 100˚C controller demonstration for 98˚C, deviation of the controller obviously for non-grade condition; This time like must revise this error only to in the temperature column, adjusting point “000.00” the position enters “002.00”; Adjusting point “100.00” the position enters “098.00” then with ease to complete the revision.

10.4 出力 RELAY No. 設定 – Relay output number setup

The RELAY output, the altogether 22 spots (No.1 ~ 22), may change the output position willfully.

May cut the function to be as follows: DAMPER HIGH OPEN、DAMPER HIGH CLOSE、DAMPER ROOM OPEN、DAMPER ROOM CLOSE、DAMPER LOW OPEN、DAMPER LOW CLOSE、FAN HIGH、FAN ROOM、FAN LOW、TIME SIGNAL 1、TIME SIGNAL 2、CONT、REF. 1、REF. 2、N2GAS、WINDOW、DEFROST、TROUBLE、RUN、END、EXHAUST、T1、T2、T3、PRESSURE TIME、NONE。

※Chooses NONE: Expressed that this contact does not have the function.

10.4.1 Output delay time setup:

This function is refers to this output contact to retard period of time to act again the hypothesis.

But of time horizon hypothesis: 0 ~ 99 seconds

10.5 待機設定- Wait function setup

1. 預熱待機溫度-Preheating waiting temperature

You may depend on condition or the system ability of the experimental establish the preheating area to wait for an opportunity the temperature. May establish the temperature range: - 00 ~ - 99˚C.

2. 預冷待機溫度- Precooling waiting temperature

You may depend on condition or the system ability of the experimental establish the precooling area to wait for an opportunity the temperature. May establish the temperature range: + 00 ~ + 99˚C.

11. Initial period setup 2

11.1 N2GAS 延遲時間設定- N2GAS delay time setup

Setup scope: 0 ~ 99 minutes

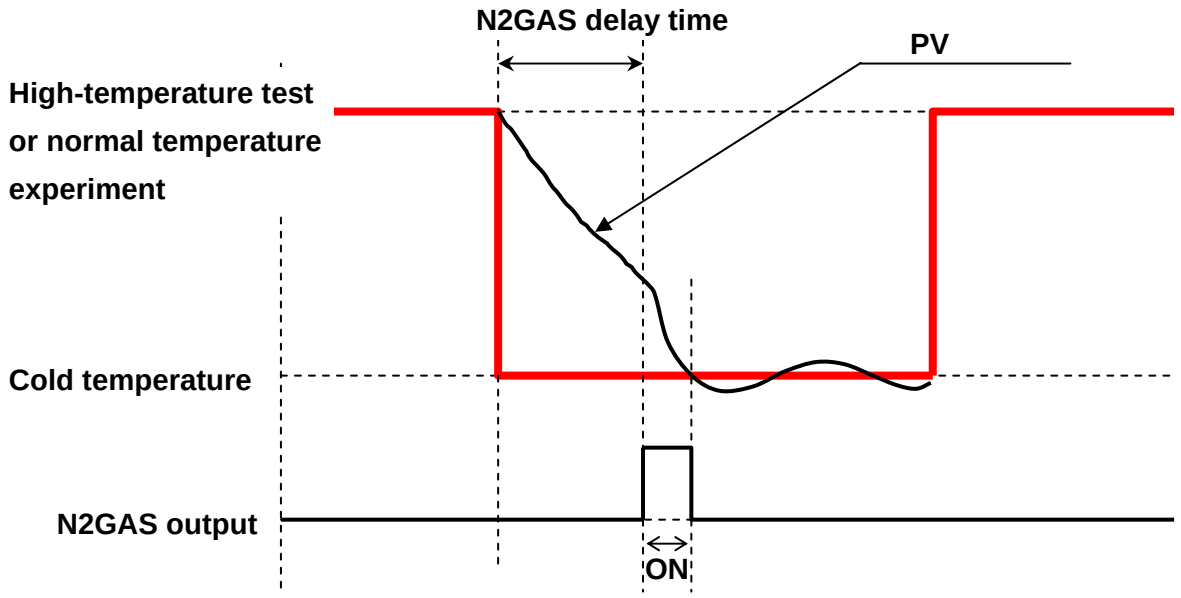
11.1.1 Acts the condition

The high-temperature test or the normal temperature experiment ended, carried out toward the cold temperature test, “N2GAS” the output was only then effective.

1. transforms for the cold temperature test, the controller starts the delay time which calculates establishes; After the time arrives, if the test area temperature's actual value has not achieved the cold temperature test the setting value (note one), N2GAS output “ON”.
2. The test area temperature's actual value achieves the cold temperature test setting value time (note one), N2GAS output “OFF”.
3. Outside the above two control requirement, the N2GAS output has maintained at “OFF” condition.

Note 1 : If has the hypothesis “to wait for an opportunity” the temperature, must wait for an opportunity the condition to relieve is only then effective.

11.1.2 Acts the characteristic chart



11.2 防汗開始溫度- Against perspiration initial temperature setup

Setup scope: - 9 ~ + 9˚C.

11.2.1 Acts the condition

1. Cold temperature test condition

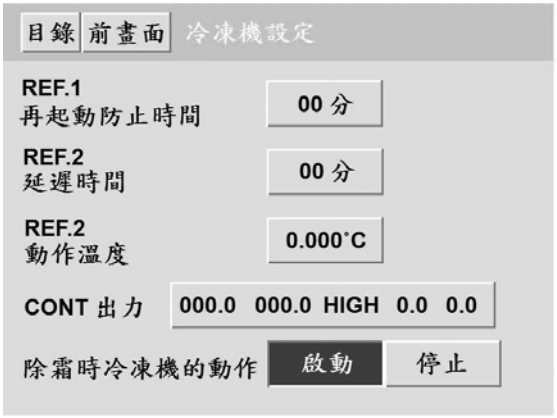
   REF.1 output contacts ON time, against perspiration output contact “ON”

2. High-temperature test or normal temperature experiment condition

   The test area PV value < [against perspiration initial temperature], against perspiration output to contact ON.

   The test area PV value ≧ [against perspiration initial temperature], against perspiration output to contact OFF.

11.3 冷凍機設定- Freezer setup



11.3.1 Freezer revolution setup scope and definition

1. REF.1 再啟動防止時間- REF.1 again starts prevents the time

1-1. Setup scope: 0 ~ 99 minutes.

1-2. Definition: After the freezer 1 output contacts OFF, has not surpassed the time which establishes, the freezer 1 is unable again to start.

2. REF.2 動作溫度-REF.2 movement temperature

2-1. Setup scope: - 50.0 ~ 50.0˚C.

2-2. Definition: Freezer 2 output contacts “ON” start temperature.

3. REF.2 延遲時間-REF.2 delay time

3-1. Setup scope: 0 ~ 99 minutes.

3-2. Definition: Retards the freezer 2 output contacts “ON” time.

11.3.2 Freezer movement condition

The freezer output1(REF.1):Starts from the controller starts, the output contact has maintained at "ON" condition.

The freezer strives .2(REF.2): After freezer .1 output contacts "ON", the freezer temperature's PV value is equal to when or is smaller than "REF.2 the movement temperature SV value", the freezer .2 output contacts have maintained at "ON" condition.

Note 1: "REF.1 starts again prevents the time" works, freezer 1 output contacts "OFF".

Note 2: "The REF 2 delay time" works, freezer 2 output contacts "OFF".

Note 3: The execution defrosts (DEFROST) movement time, the freezer 1 outputs and the freezer 2 output contacts all maintain at "ON" condition.

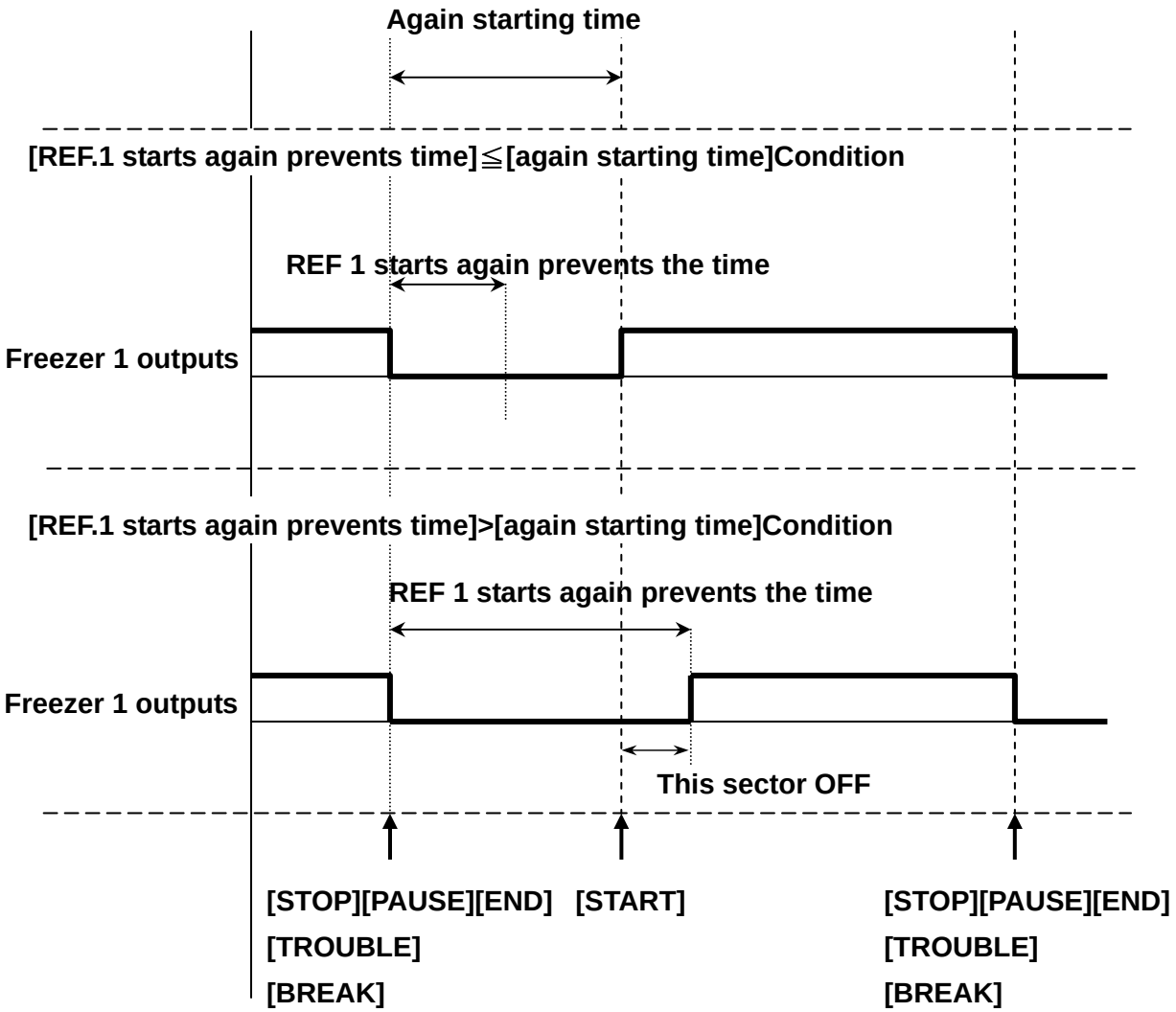
11.3.3 Defrosts when freezer's movement condition: Start/stop choice

This function is when refers to carries on defrosts the movement, setup of the freezer whether revolution.

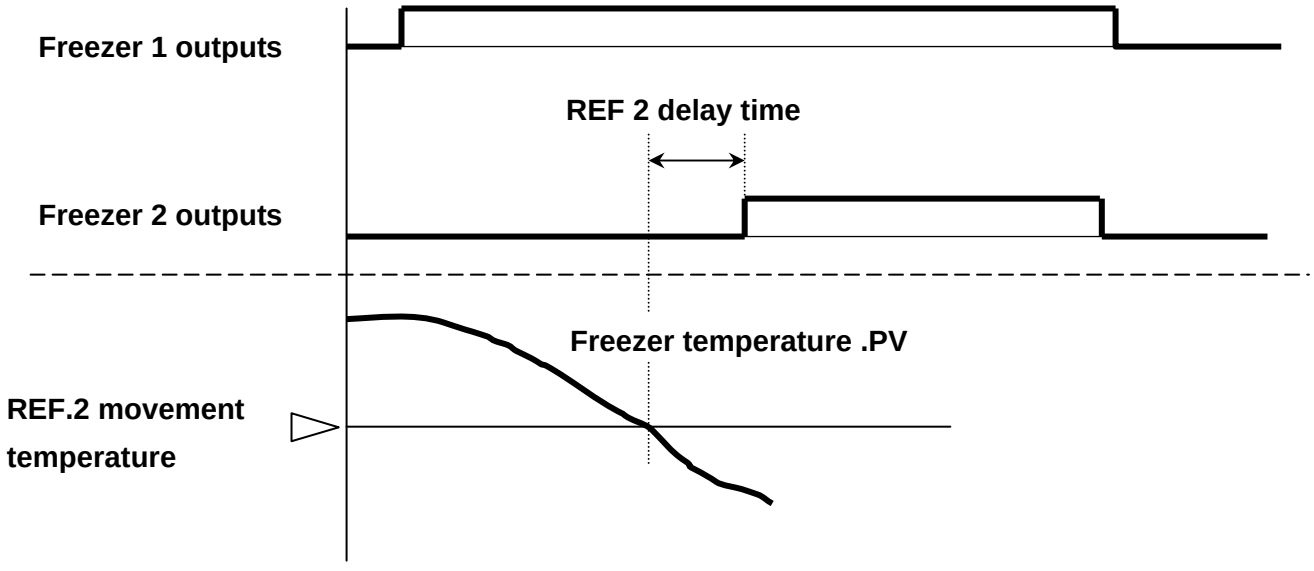
1. Choice [start]: Defrosts when the freezer maintains at the movement condition.
2. Choice [stop]: Defrosts when the freezer stops the movement, after treating defrosts finishes, started again.

11.3.4 Freezer movement characteristic chart

【Freezer 1 output】



【Freezer 2 output】



11.3.5 CONT 出力- CONT output

1. Setup

1-1. Controls the range of validity.

LSV ：-99.9 ~ 99.9˚C.

MSV：-99.9 ~ 99.9˚C.

1-2. Operating point (almost) scope

Lu：0.0 ~ 9.9˚C.

Hd：0.0 ~ 9.9˚C.

1-3. Movement choice of direction

HIGH or LOW

2. Control requirement

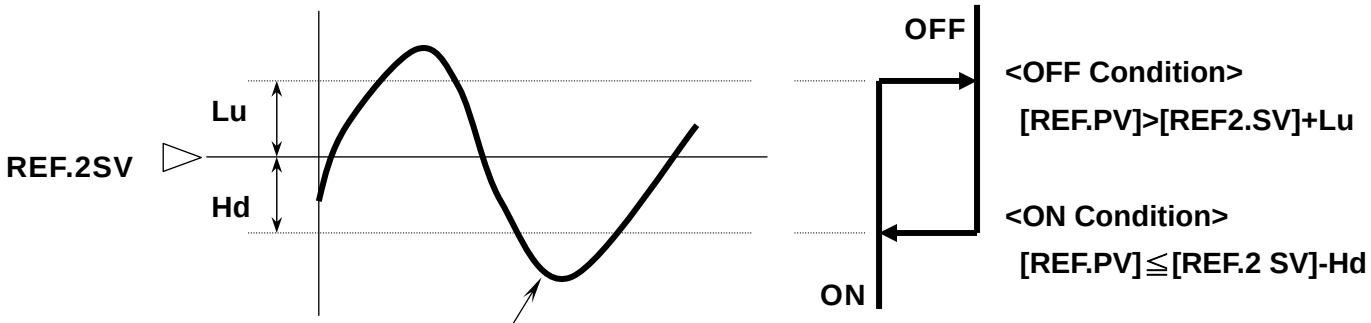
“CONTROL” the output concerns with the freezer 2 output contact's setting value.

2-1. [LSV ≦ REF.2 SV ≦ MSV]Time, the comparison movement condition makes ON/OFF change.

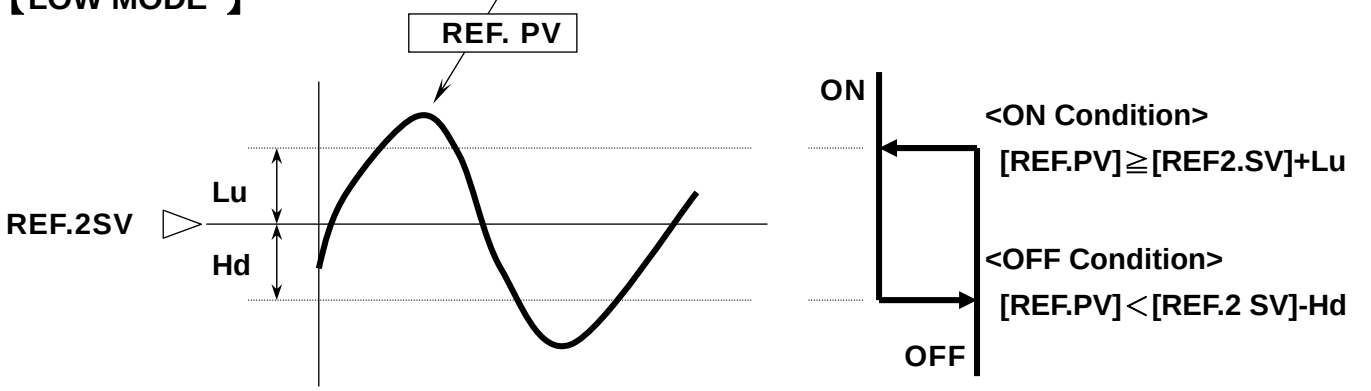
2-2. [LSV > REF.2 SV]or[MSV < REF.2 SV]Time, CONT output maintains OFF.

11.3.6 Acts the characteristic chart

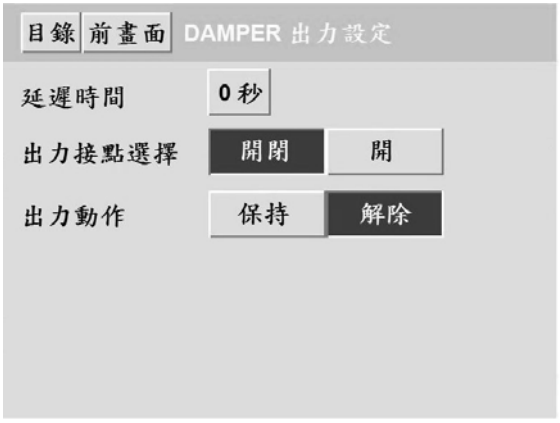
【 HIGH MODE 】



【LOW MODE 】



11.4 DAMPER 出力設定- DAMPER output setup



11.4.1 延遲時間- Delay time

1. May scope of the setup: 0 ~ 9 seconds
2. Movement definition: DAMPER output in cut time (i.e. when experimental cut), output of contact after the corresponding must wait till establishes the delay time which arrives, only then output "ON".

※"OFF" the movement is when the DAMPER cut also carries on.

11.4.2 出力接點選擇 - Output contact ON/OFF

DAMPER output contact's OPEN or CLOSE and the DAMPER input signal's make and break condition concerns.

1. 開閉- ON/OFF

1-1 OPEN processing

OPEN output =**[ON]**, CLOSE output=**[OFF]**.

1-2 CLOSE processing

OPEN output =**[OFF]**, CLOSE output=**[ON]**.

1-3 OPEN and CLOSE input

OPEN: OPEN contact input **[ON]**

CLOSE: CLOSE contact input **[ON]**

2. 開- ON

1-1 OPEN processing

OPEN output = **[ON]**

1-2 CLOSE processing

OPEN output = **[OFF]**

1-3 OPEN and CLOSE input

OPEN: OPEN contact input **[ON]**

CLOSE: CLOSE contact input **[OFF]**

11.4.3 出力動作- Output movement :Maintains or relieves

Output contact choice “ON/OFF” time, this function is only then effective; If chooses “ON” time, then the output movement maintains at “maintains” the condition.

1.保持- Maintenance

The correspondence enters the strength contact arrives locates, the output movement maintains “ON” invariable.

2.解除- Relieving

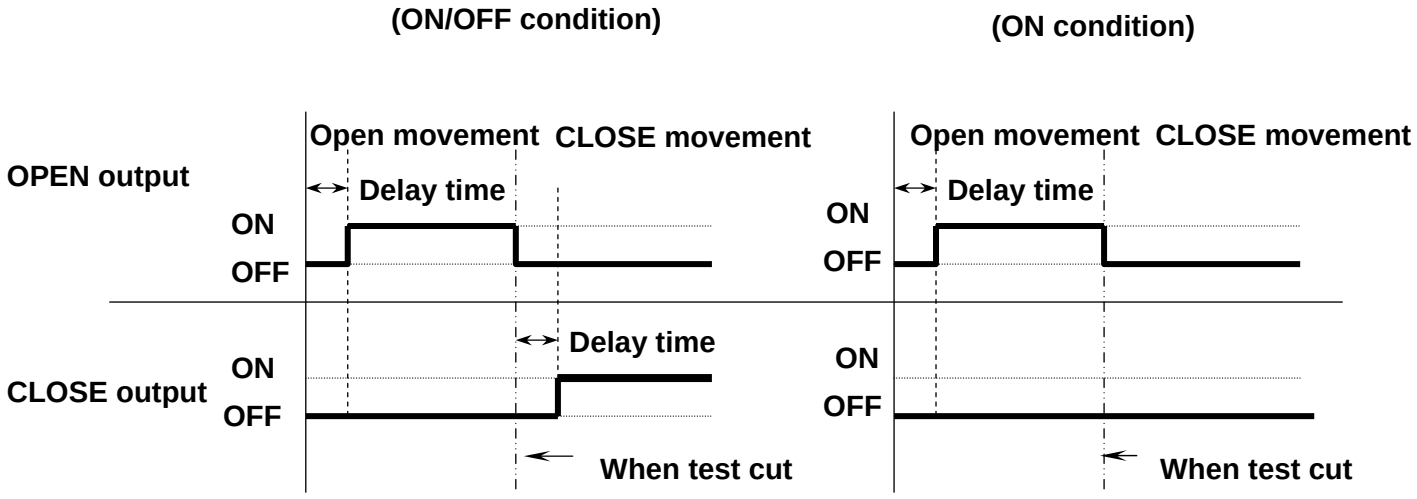
The correspondence enters the strength contact arrives locates, output movement immediately “OFF”

11.4.4 DAMPER movement and characteristic chart

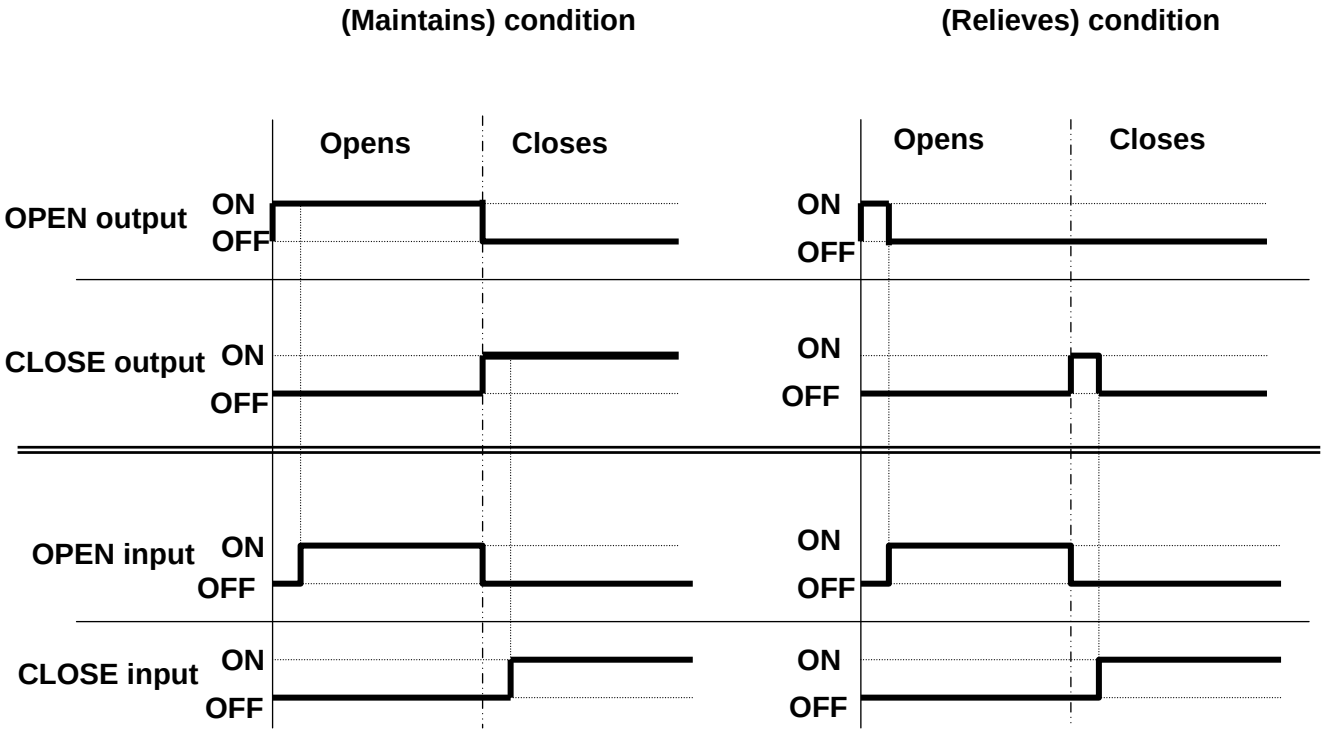
(●=OPEN，X=CLOSE)

Revolution / output	In stop	Pre warm waiting	High temp test	Normal temp test	Low temperature test	Maintains the waiting	DEFROST
DAMP. 1 (H)	×	×	●	×	×	×	In high temperature test ●
DAMP. 2 (R)	×	×	×	●	×	×	In normal temperature test ●
DAMP. 3 (L)	×	×	×	×	●	×	×

<Output contact choice elementary action>



< Movement choice elementary action> Above-mentioned, output contact choice[ON/OFF]Time, this function is only then effective.



※Figure above expression delay time = 0 second condition, experimental cut at the same time DAMPER output “ON”.

FAN movement

The FAN movement and the DAMPER output setup related association, acts the data sheet to be as follows:

<Output contact choice: “ON/OFF”/output movement: “relieves”>

1. In STOP

2 ZONE / 3 ZONE / STEP		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
			OFF	OFF	OFF	OFF	OFF	OFF
In STOP / In PAUSE / In FINISH / In INTERRUPT	FAN HIGH	CLOSE / NEUTRAL / OPEN	OFF					
	FAN ROOM	CLOSE / NEUTRAL / OPEN			OFF			
	FAN LOW	CLOSE / NEUTRAL / OPEN					OFF	

2. In REVOLUTION

2 ZONE / 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
				OPEN		OPEN		OPEN
			ON	OFF	ON	OFF	ON	OFF
Pre-warm waiting	FAN HIGH		ON					
		NEUTRAL / OPEN	OFF					
Maintains the waiting	FAN ROOM	CLOSE / NEUTRAL / OPEN			OFF			
	FAN LOW						ON	
		NEUTRAL / OPEN					OFF	

(ON): DAMPER moves after the normal position, output “OFF”.

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE			OPEN		OPEN
			OFF	ON	ON	OFF	ON	OFF
High temp test Test wait	FAN HIGH	CLOSE	OFF					
		NEUTRAL						
			ON					
	FAN ROOM				OFF			
		NEUTRAL						
		OPEN						
	FAN LOW						ON	
		NEUTRAL					OFF	
		OPEN						

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
				OPEN		OPEN	CLOSE	
			ON	OFF	ON	OFF	OFF	ON
Low temp test Test wait	FAN HIGH		ON					
		NEUTRAL	OFF					
		OPEN						
	FAN ROOM				OFF			
		NEUTRAL						
		OPEN						
	FAN LOW	CLOSE					OFF	
		NEUTRAL						
							ON	

3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
				OPEN	CLOSE			OPEN
			ON	OFF	OFF	ON	ON	OFF
Normal Temp test	FAN HIGH		ON					
		NEUTRAL	OFF					
		OPEN						
	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
					ON			
	FAN LOW						ON	
		NEUTRAL					OFF	
		OPEN						

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
			ON	OFF	ON	OFF	ON	OFF
Defrosting ` High Temp Pre-heating	FAN HIGH	CLOSE	ON					
		NEUTRAL	OFF					
		OPEN						
	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
		OPEN						
	FAN LOW	CLOSE					ON	
		NEUTRAL					OFF	
		OPEN						

<Output contact choice: “ON/OFF”/output action: “maintains”>

1. In STOP

2 ZONE 3 ZONE STEP		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
			OFF	OFF	OFF	OFF	OFF	OFF
In STOP In PAUSE In FINISH In INTERRUPT	FAN HIGH	CLOSE	OFF					
		NEUTRAL						
		OPEN						
	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
		OPEN						
	FAN LOW	CLOSE					OFF	
		NEUTRAL						
		OPEN						

2. In REVOLUTION

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
			ON	OFF	ON	OFF	ON	OFF
Pre-warm waiting	FAN HIGH	CLOSE	ON					
		NEUTRAL	OFF					
		OPEN						
Maintains the waiting	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
		OPEN						
	FAN LOW	CLOSE					ON	
		NEUTRAL					OFF	
		OPEN						

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
			OFF	ON	ON	OFF	ON	OFF
High temp test	FAN HIGH	CLOSE	OFF					
		NEUTRAL						
		OPEN	ON					
	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
		OPEN						
Test wait	FAN LOW	CLOSE					ON	
		NEUTRAL					OFF	
		OPEN						

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
				OPEN		OPEN	CLOSE	
			ON	OFF	ON	OFF	OFF	ON
Low temp test	FAN HIGH		ON					
		NEUTRAL	OFF					
		OPEN						
	FAN ROOM				OFF			
		NEUTRAL						
		OPEN						
Test wait	FAN LOW	CLOSE					OFF	
		NEUTRAL						
							ON	

3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
				OPEN	CLOSE			OPEN
			ON	OFF	OFF	ON	ON	OFF
Normal temp test	FAN HIGH		ON					
		NEUTRAL	OFF					
		OPEN						
	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
					ON			
	FAN LOW						ON	
		NEUTRAL					OFF	
		OPEN						

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
				OPEN		OPEN		OPEN
			ON	OFF	ON	OFF	ON	OFF
Defrosting、High Temp Pre-heating	FAN HIGH		ON					
		NEUTRAL	OFF					
		OPEN						
	FAN ROOM				OFF			
		NEUTRAL						
		OPEN						
	FAN LOW						ON	
		NEUTRAL					OFF	
		OPEN						

<Output contact choice: “opens”>

1. In STOP

2 ZONE / 3 ZONE / STEP		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE	OPEN	CLOSE	OPEN	CLOSE	OPEN
				OFF		OFF		OFF
In STOP / In PAUSE / In FINISH / In INTERRUPT	FAN HIGH	CLOSE	OFF					
		NEUTRAL						
		OPEN						
	FAN ROOM	CLOSE			OFF			
		NEUTRAL						
		OPEN						
	FAN LOW	CLOSE					OFF	
		NEUTRAL						
		OPEN						

2. In REVOLUTION

2 ZONE / 3 ZONE		DAMPER LIMIT	DAMP.HIGH		DAMP.ROOM		DAMP.LOW	
			CLOSE					
				OFF		OFF		OFF
Pre-warm waiting	FAN HIGH		ON					
		NEUTRAL	OFF					
		OPEN						
Maintains the waiting	FAN ROOM				OFF			
		NEUTRAL						
		OPEN						
	FAN LOW						ON	
		NEUTRAL					OFF	
		OPEN						

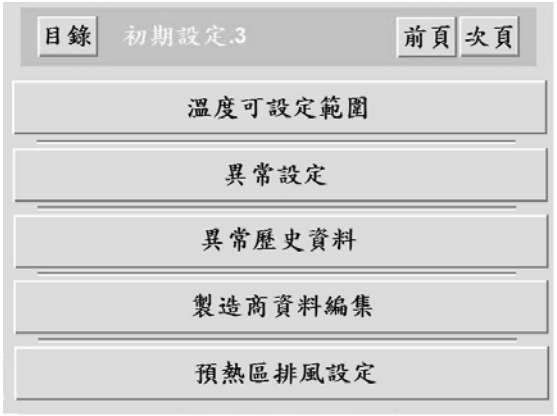
2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH	DAMP.ROOM	DAMP.LOW
			CLOSE / ON	OFF	OFF
High temp test	FAN HIGH	CLOSE NEUTRAL	OFF		
		ON	ON		
	FAN ROOM	NEUTRAL OPEN		OFF	
	FAN LOW	NEUTRAL OPEN			OFF
		CLOSE			ON

2 ZONE 3 ZONE		DAMPER LIMIT	DAMP.HIGH	DAMP.ROOM	DAMP.LOW
			OFF	OFF	CLOSE / ON
Low temp test	FAN HIGH	NEUTRAL OPEN	OFF		
		ON	ON		
	FAN ROOM	NEUTRAL OPEN		OFF	
	FAN LOW	CLOSE NEUTRAL			OFF
		ON			ON

3 ZONE		DAMPER LIMIT	DAMP.HIGH	DAMP.ROOM	DAMP.LOW
			OFF	CLOSE / ON	OFF
Normal temp test	FAN HIGH	NEUTRAL OPEN	OFF		
		ON	ON		
	FAN ROOM	CLOSE NEUTRAL		OFF	
		ON		ON	
	FAN LOW	NEUTRAL OPEN			OFF
		ON			ON

<table>
<tr><td colspan="2" rowspan="2">2 ZONE
3 ZONE</td><td rowspan="2">DAMPER
LIMIT</td><td colspan="2">DAMP.HIGH</td><td colspan="2">DAMP.ROOM</td><td colspan="2">DAMP.LOW</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="9">Defrosting
、
High
Temp
Pre-heating</td><td rowspan="3">FAN
HIGH</td><td></td><td colspan="2">ON</td><td colspan="2" rowspan="3"></td><td colspan="2" rowspan="3"></td></tr>
<tr><td>NEUTRAL</td><td colspan="2" rowspan="2">OFF</td></tr>
<tr><td>OPEN</td></tr>
<tr><td rowspan="3">FAN
ROO
M</td><td></td><td colspan="2" rowspan="3"></td><td colspan="2" rowspan="3">OFF</td><td colspan="2" rowspan="3"></td></tr>
<tr><td>NEUTRAL</td></tr>
<tr><td>OPEN</td></tr>
<tr><td rowspan="3">FAN
LOW</td><td></td><td colspan="2" rowspan="3"></td><td colspan="2" rowspan="3"></td><td colspan="2">ON</td></tr>
<tr><td>NEUTRAL</td><td colspan="2" rowspan="2">OFF</td></tr>
<tr><td>OPEN</td></tr>
</table>

12. Initial period setup 3

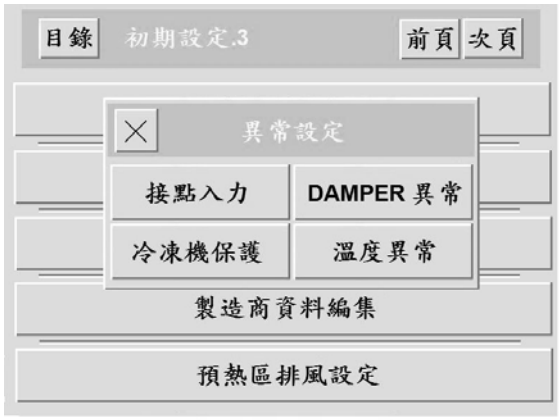


12.1 溫度可設定範圍- The temperature may establish the scope

高溫試驗-High-temperature test: 0.0 ~ 320.0˚C ※Default factory setting value: 0.0 ~ 300.0˚C

低溫試驗-Cold temperature test: - 200.0 ~ 100.0˚C ※Default factory setting value: - 199.9 ~ 0.0˚C

12.2 異常設定- Unusual setup



接點入力- Contact input

1. 編集−Arranges the collection (unusual name hypothesis)

Choice “half-angle” time, may edit 28 writing most greatly (British digit/symbol); Choice “double-byte” time, may edit 14 writing most greatly (Japanese Chinese character/UK digit/symbol); May also “the half-angle” and “the double-byte” the blending edition.

2. 動作−Movement

The choice “A contact”, the input contacts ON time, unusual condition occurrence;

The choice “B contact”, the input contacts OFF time, unusual condition occurrence.

3. 重輕-Caution

The choice “**警報**−the warning”, the unusual condition occurs, revolution interrupt;

The choice “**注意**−the attention”, the unusual condition occurs, the revolution continues.

4. 條件-Condition

The choice “**常時**-constantly”, after controller power transmission, namely starts to make the input unusual condition;

The choice “**注意**-the attention”, the controller only then makes the input unusual condition in the revolution.

5. 時間-Time

Unusual condition delay time setup scope: 0 ~ 99 seconds.

DAMPER 異常- Damper unusual condition

In this project the function has done fixedly for the heating chamber, the test chamber and the low greenhouse DAMPER movement unusual condition distinction.

1. Movement principle: “ON” starts from the DAMPER output to calculate, in establishes in the time horizon, DAMPER has not arrived at the localization, is TROUBLE occurs time.
2. Setup project : Divides into “arranges the collection” and “the time” and so on two items. (“enters strength with contact” standard)

Note: When establishes 0 seconds, this function is invalid.

溫度異常- Temperature unusual condition

In this project the function has done fixedly for the heating chamber, the test chamber and the low greenhouse DAMPER movement unusual condition distinction.

1. Movement principle: When this area temperature surpasses the hypothesis scope the zero computing time, in the hypothesis delay time, the temperature has not returned to the scope which establishes, namely TROUBLE condition occurrence.
2. Setup project : Divides into “編集-arranges the collection”, “重輕-Caution”, “範圍-the scope” and “時間-the time” and so on four items; The scope condition is as follows: Various rooms PV < temperature normal range < various rooms SV Time, unusual condition occurrence.

   Note: The temperature may establish the scope (i.e. to refer to temperature normal range): - 220.0 ~ 320.0˚C.

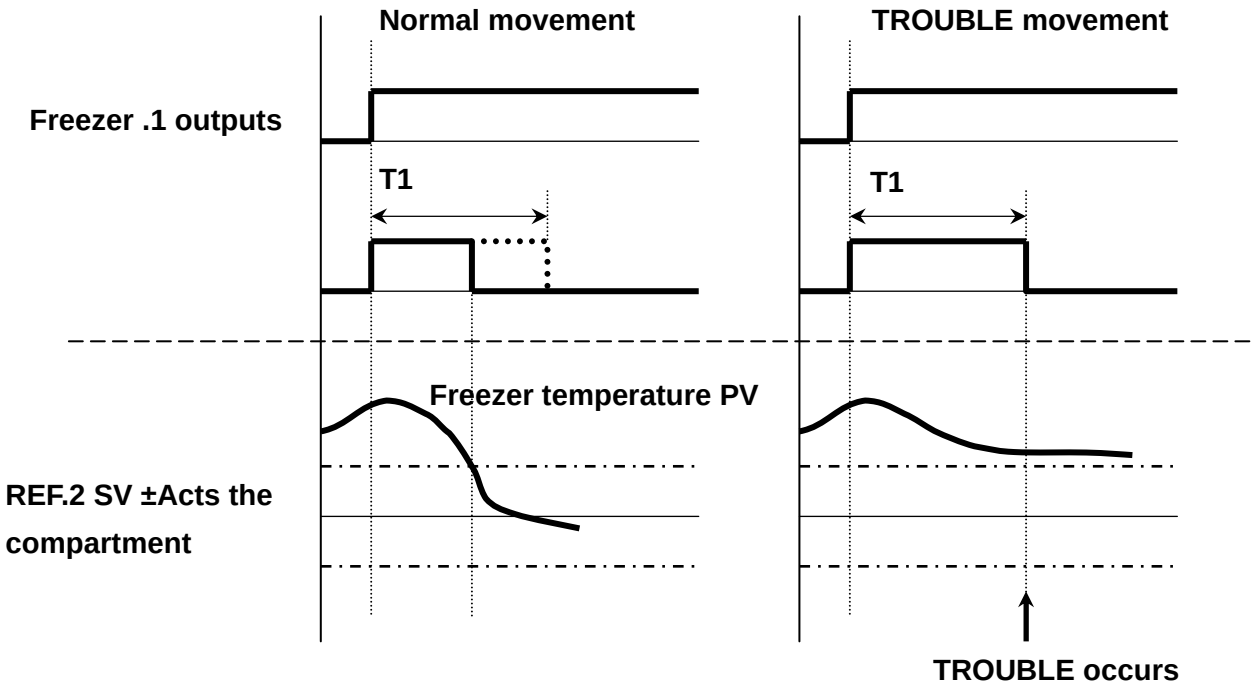
冷凍機保護- Freezer protection

In the project the function makes the unusual condition distinction which fixedly protects for the freezer

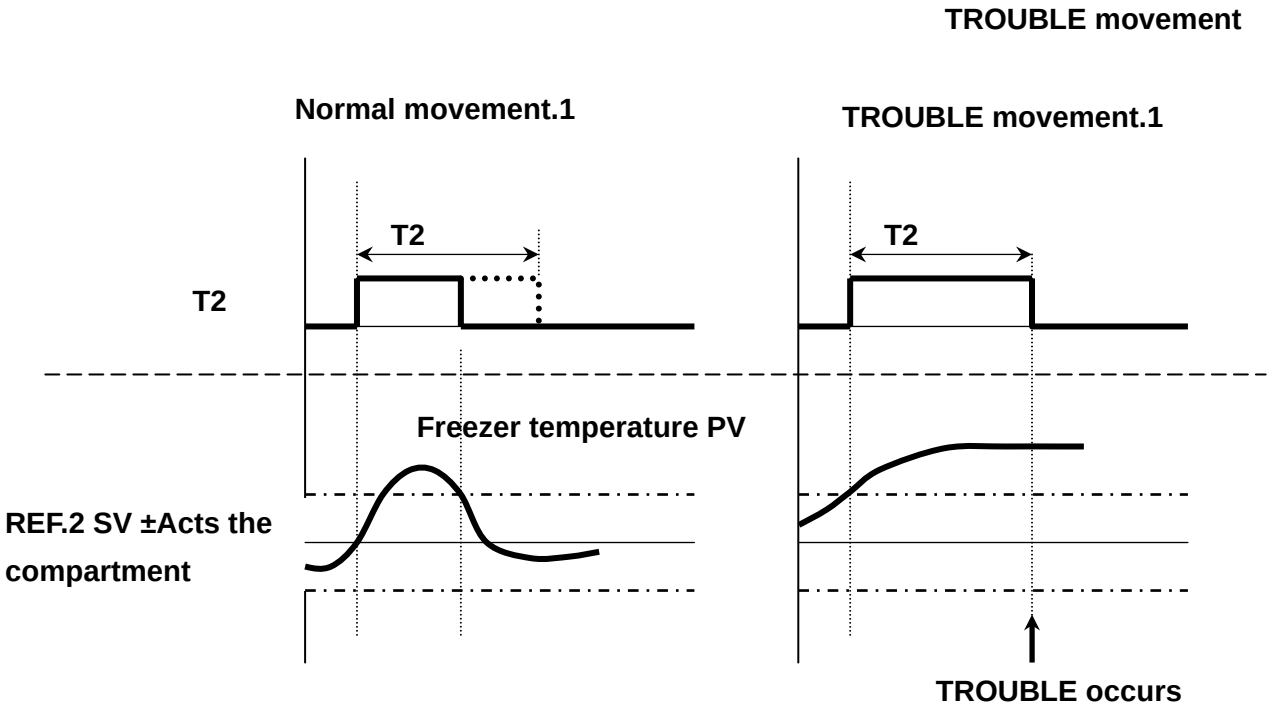
1. Movement principle: When has not satisfied the standard, TROUBLE condition occurrence.
2. Setup project : Divides into “arranges the collection”, “the unusual condition time”, “the movement compartment” and so on three items;
   2-1 動作隙間- Movement compartment: Refers to temperature difference scope which the REF.2 movement temperature may allow.
   2-2 異常檢出時間- The unusual condition time: T1 is a freezer. 1 guard time, T2 is a freezer. 2 guard times.
3. Unusual condition movement principle
   3-1.[T1]: When the revolution starts, from “freezer. after 1 outputs ON”, namely starts to accumulate the time.
      3-1-1. In establishes in the time, if freezer temperature's PV enters “the movement compartment” in scope, namely stop accumulation time.
      3-1-2. In establishes in the time, if the freezer temperature's PV value has not entered “the movement compartment” in scope, namely TROUBLE occurrence.
      3-1-3 When establishes 0 min, the TROUBLE function is invalid.

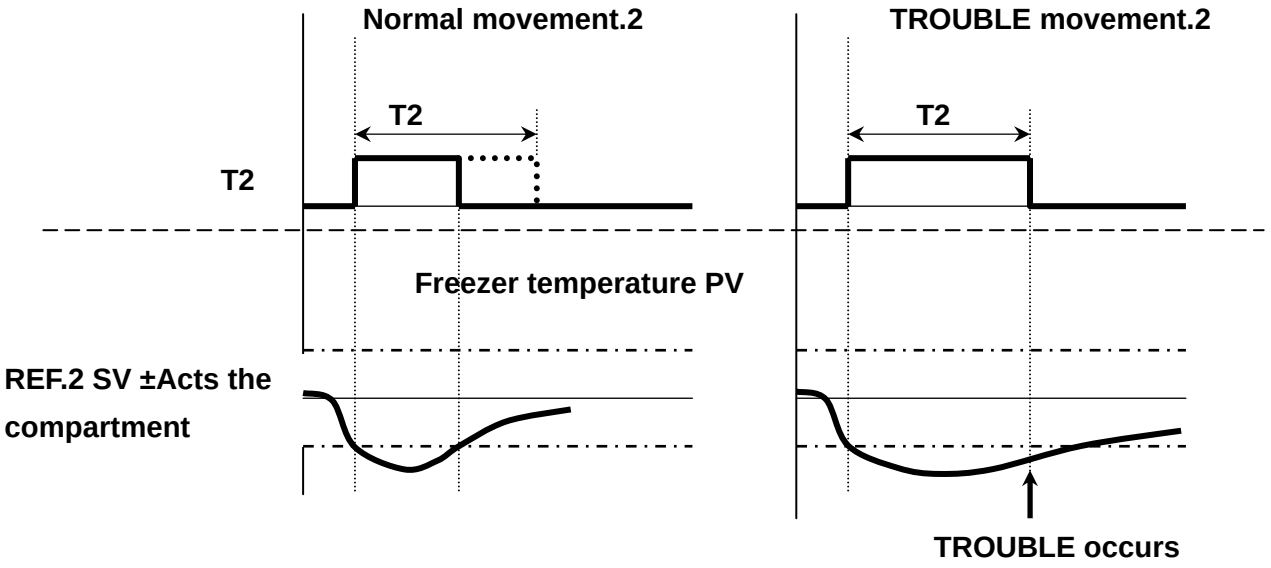
   3-2.[T2]: In the revolution, freezer temperature's PV surpasses “the movement compartment” when scope, namely starts to accumulate the time.
      3-2-1. In establishes in the time, if freezer temperature's PV enters “the movement compartment” again when scope, namely stop accumulation time.
      3-2-2. In establishes in the time, if freezer temperature's PV has not entered “the movement compartment” again in scope, namely TROUBLE occurrence.
      3-2-3. When establishes 0 min, the TROUBLE function is invalid.
   3-3. Defrosts execution period, stops this protection function temporarily, does not carry on the unusual condition movement.

T1 movement chart



T2 movement chart





12.3 異常歷史資料- Unusual historic information

This function the unusual condition personal history which occurs in the past for the storage, may store up 100 material most greatly; When the personal history surpasses above 100, after advanced leaves the first principle which continues the retention has the unusual personal history. Note: If clicks on the RST key, namely eliminates this material, but hands over by the next material.

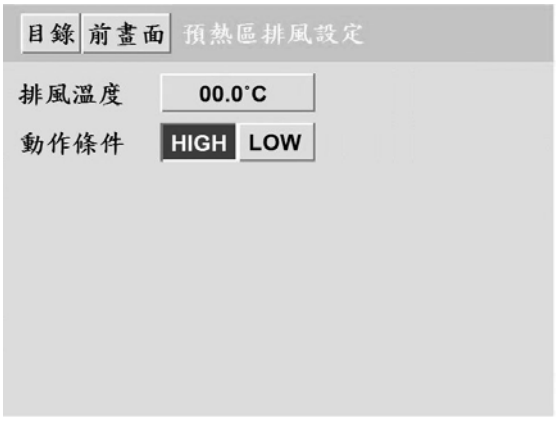
12.4 製造商資料編集- The manufacturer material arranges the collection

This function for the manufacturer material and equipment specification's registering, and may under the picture demonstrate in “the table of contents”.

12.5 預熱區排風設定- Preheating area row of wind setup

1.**排風溫度**-Arranges the wind temperature setup scope: 0.0 ~ 99.9˚C

2.**動作條件**- Acts the condition choice: HIGH or LOW



Control requirement: According to high temperature temperature SV and row of wind temperature SV the corresponding relationships, decided when [EXHAUST] does contact outputs. When high-temperature test execution, take high-temperature test temperature SV as the determination object; When preheating experimental execution, take preheating temperature SV as the determination object.

Acts the condition

HIGH MODE

Controlled member temperature > row of wind hypothesis temperature time, outputs the OFF.

Controlled member temperature ≦ row of wind hypothesis temperature time, outputs ON.

LOW MODE

Controlled member temperature > row of wind hypothesis temperature time, outputs the ON.

Controlled member temperature ≦ row of wind hypothesis temperature time, outputs OFF.

13. Initial period setup 4

13.1 除霜待機-Defrosts the waiting

"Defrosts automatically the setup" the choice "The time" time, this function is only then effective.

1. 有-enable: After now experimented the cold temperature test finally, started to carry out again defrosts the movement.
2. 無-Disable: The setup time arrived, the cold temperature test interrupts temporarily immediately, and starts to carry out defrosts the movement; The waiting defrosted finally, and after the test condition satisfied, then continued to complete has not carried out the cold temperature test.

NOTE:ALALM screen in the screen bottom, Only appear when you have already setup in output relay number.

13.2 除霜溫度控制- Defrosting temperature control

This function is refers to when the execution defrosts the movement, whether the precooling area temperature does control assigning.

1. 有-enable: Defrosted the conclusion temperature according to the hypothesis to carry out the PID control.
2. 無-Disable: Does not carry out the PID control.

13.3 試驗時間條件- Testing time condition :H.M/M.S Choice

This function is refers to the experiment when the hypothesis or the execution, time condition determination choice.

1. H.M: The experiment time setting or the execution/divide into the condition by the hour.
2. H.S: The experiment time setting or the execution take a minute/second as conditions.

13.4 保養項目- Maintenance project

■ Maintenance setup:May register 1 0 places the inspection project name and the inspection time.

1. Maintenance name:

   The single-byte character, may register 32 writing. (British digit or symbol)

   The double-byte character, may register 15 writing. (Chinese character, British digit or symbol)

2. Next time inspection time:

   But scope of the hypothesis is 0 ~ 9999 time (day).

■ Maintenance control：Hand regulation control output output as well as D A M P E R input/output data condition expression.

1. Control output operation: 0 ~ 100%. Heating chamber and low greenhouse simplex operation
2. DAMPER operation: Opens/closes the choice. (preheating area, test area and precooling area simplex operation)
3. DAMPER input output indicated: Represents “ON” red, the black represents “OFF”.

14. Initial period setup 5

14.1 Experiment mode selection

Divides into 2 ZONE, 3 ZONE, STEP, the LINK four kind of patterns;

14.2 積算通電時間-Accumulation time

This function is the indicator makes a nulling operation movement to the controller current cumulative time.

15. Initial period setup 6

15.1 USB UNIT function choice

This item chooses the controller whether can carry out USB function of the UNIT storage device; If chooses “OFF”, in “auxiliary will establish 2/2” in the picture project to cut away.

The appendix (Chinese input uses Japanese 50 sound indices)

亞 啞娃阿哀愛挨姶逢葵茜穐惡握渥旭葦芦鯵梓壓斡扱宛姐虻飴絢綾鮎或粟袷安庵按暗案闇鞍杏

以 伊位依偉囲夷委威尉惟意慰易椅爲畏異移維緯胃萎衣謂違遺医井亥域育郁磯一壱溢逸稲茨芋鰯允印咽員因姻引飲淫胤蔭院陰隠韻吋

右 字烏羽迂雨卯鵜窺丑碓臼渦嘘唄欝蔚鰻姥厩浦瓜閏噂云運雲

荏 餌叡営嬰影映曳栄永泳洩瑛盈穎頴英衛詠鋭液疫益駅悦謁越閲榎厭円園堰奄宴延怨掩援沿演炎焔煙燕猿縁艶苑薗遠鉛鴛塩

於 汚甥凹央奥往應押旺横欧殴往翁襖鶯鷗黄岡沖荻億屋憶臆桶牡乙俺卸恩温穏音

下 化仮何伽価佳加可嘉夏嫁家寡科暇果架歌河火珂禍禾稼箇花苛茄荷華菓蝦課嘩貨迦過霞蚊俄峨我牙畫臥芽蛾賀雅餓駕介会解回塊壊廻快怪悔恢懐戒拐改魁晦械海灰界皆絵芥蟹開階貝凱劾外咳害崖慨概涯碍蓋街該鎧骸浬馨蛙垣柿蠑鈎劃嚇各廓拡攪格核殻獲確穫覚角赫較郭閣隔革学岳楽額顎掛笠樫橿梶鰍潟割喝恰括活渇滑葛褐轄且鰹叶椛樺鞄株兜竈蒲釜鎌噛鴨栢茅萱粥刈苅瓦乾侃冠寒刊勘勧巻喚堪姦完官寛干幹患感慣憾換敢柑桓棺款歓汗漢澗灌環甘監看竿管簡緩缶翰肝艦莞観諌貫還鑑間閑關陥韓館舘丸含岸巌玩癌眼岩翫雁頑顔願

企 伎危喜器基奇嬉寄岐希幾忌揮机旗既期棋棄機帰毅気汽畿祈季稀紀徽規記貴起軌輝飢騎鬼亀偽儀妓宜戯技擬欺犠疑祇義蟻誼議掬菊鞠吉吃喫桔橘詰砧杵黍卻客脚虐逆丘久仇休及吸宮弓急救朽求汲泣灸球究窮笈級糾給舊牛去居巨拒拠挙渠虚許距鋸漁禦魚亨享京供侠僑兇競共凶協匡卿叫喬境峡強彊怯恐恭挟教橋況狂狭矯胸脅興蕎郷鏡響饗驚仰凝尭暁業局曲極玉桐粁僅勤均巾錦斤欣欽琴禁禽筋緊芹菌衿襟謹近金吟銀

九 倶句区狗玖矩苦躯駆駒具愚虞喰空偶寓遇隅串櫛釧屑屈掘窟沓靴轡窪熊隈粂栗繰桑鍬勲君薫訓群軍郡

卦 架祁係傾刑兄啓圭珪型契形径恵慶慧憩掲攜敬景桂渓畦稽系経継繋罫茎荊蛍計詣警軽頸鶏芸迎鯨劇戟撃激隙桁傑欠決潔穴結血訣月件倹倦健兼券剣喧圏堅嫌建憲懸拳捲検権牽犬献研硯絹県肩見謙賢軒遣鍵険顕験鹸元原厳幻弦減源玄現絃舷言諺限

乎 個古呼固姑孤已庫弧戸故枯湖狐糊袴股胡菰虎誇跨鈷雇顧鼓五互伍午吾娯後御悟梧檎瑚碁語誤護醐乞鯉交佼侯候倖光公功効勾厚口向后喉坑垢好孔孝宏工巧巷幸広庚康弘恒慌抗拘控攻昂晃更杭校梗構江洪浩港溝甲皇硬稿糠紅紘絞綱耕考肯肱腔膏航荒行衡講貢購郊酵鉱礦鋼閤降項香高鴻剛劫號合壕拷濠豪蟲麹克刻告国

穀酷鵠黒獄漉腰甑忽惚骨狛込此頃今困坤墾婚恨懇昏昆根梱混痕紺艮魂

些 佐叉唆嵯左差査沙瑳砂詐鎖裟坐座挫債催再最哉塞妻宰彩才採栽歳済災采犀砕砦祭斎細菜裁載際剤在材罪財冴坂阪堺榊肴咲崎埼碕鷺作削咋搾昨朔柵窄策索錯桜鮭笹匙冊刷察拶撮擦札殺薩雑皐鯖捌錆鮫皿晒三傘参山惨撒散桟燦珊産算纂蚕讃賛酸餐斬暫残

仕 仔伺使刺司史嗣四士始柿姿子屍市師志思指支孜斯施旨枝止死氏獅祉私糸紙紫肢脂至視詞詩試誌諮資賜雌飼歯事似侍児字寺慈持時次滋治爾璽痔磁示而耳自蒔辞汐鹿式識鳴竺軸宍雫七叱執失嫉室悉湿漆疾質実蔀篠偲柴芝屡薬稿舎寫射捨赦斜煮社紗者謝車遮蛇邪借勺尺杓灼爵酌錫若寂弱惹主取守手朱殊狩珠種腫趣酒首儒受呪寿授樹綬需囚収周宗就州修愁拾洲秀秋終繍習臭舟蒐衆襲讐蹴輯週酋酬集醜什住充十従戎柔汁獣縦重銃叔夙宿淑祝縮粛塾熟出術述俊峻春瞬竣舜駿准循旬楯殉淳準潤盾純巡遵醇順処初所暑曙渚庶緒署書薯藷諸助叙女序徐恕鋤除傷償勝匠升召哨商唱嘗奨妾娼宵将小少尚庄床廠彰承抄招掌捷昇昌昭晶松梢樟樵沼消渉湘焼焦照症省硝礁祥称章笑粧紹肖菖蒋蕉衝裳訟証詔詳象賞醤鉦鍾鐘障鞘上丈丞乗冗剰城場壌嬢常情擾條杖浄状畳穣蒸譲醸錠嘱埴飾拭植殖燭織職色触食蝕辱尻伸信侵唇娠寝審心慎振新晋森榛浸深申疹真神秦紳臣芯薪親診身辛進針震人仁刃塵壬尋甚尽腎訊迅陣靭

笥 諏須酢図厨逗吹垂帥推水炊睡粋翠衰遂酔錐錘随瑞髄崇嵩数枢趨雛据杉椙菅頗雀裾澄摺寸

世 瀬畝是凄制勢姓征性成政整星晴棲栖正清牲生盛精聖声製西誠誓請逝醒青静斉税脆隻席惜戚斥昔析石積籍績脊責赤跡蹟碩切拙接摂折設窃節說雪絶舌蟬仙先千古宣専尖用戦扇撰栓栴泉浅洗染潜煎煽旋穿箭線繊羨腺舛船薦詮賤践選遷銭銑閃鮮前善漸然全禅繕膳糎

噌 塑岨措曾曽楚狙疏疎礎祖租粗素組蘇訴阻遡鼠僧創双叢倉喪壮奏宋層匝惣想捜掃挿掻操早曹巣槍槽漕燥争痩相窓糟総綜聡草荘葬蒼藻装走送遭鎗霜騒像増憎臓蔵贈造促側則即息捉束測足速俗属賊族續卒袖其揃存孫尊損村遜

他 多太汰詑唾堕妥惰打柁舵楕陀駄騨体堆對耐岱帯待怠態戴替泰滞胎腿苔袋貸退逮隊黛鯛代台大第醍題鷹滝瀧卓啄宅托択拓沢濯琢託鐸濁諾茸凧蛸只叩但達辰奪脱巽竪辿棚谷狸鱈樽誰丹単嘆坦担探旦歎淡湛炭短端箪綻耽胆蛋誕鍛団壇弾断暖檀段男談

値 知地弛恥智池痴稚置致蜘遅馳築畜竹筑蓄逐秩内茶嫡着中仲宙忠抽昼柱注虫衷註酎鋳駐樗瀦猪苧著貯丁兆凋喋寵帖帳庁弔張彫微懲挑暢朝潮牒町眺聴脹腸蝶調諜超跳銚長頂鳥勅捗直朕沈珍賃鎮陳

津 墜椎槌追鎚痛通塚栂掴槻佃漬柘辻蔦綴鍔椿潰坪壺嬬紬爪吊釣鶴

亭 低停偵剃貞呈堤定帝底庭廷弟悌抵挺提梯汀碇禎程締艇訂諦蹄逓邸鄭釘鼎泥摘擢敵滴的笛適鏑溺哲徹撤轍迭鉄典填天展店添纏甜貼転顛点殿澱田電

兔 吐堵塗妬屠徒斗杜渡登菟賭途都鍍砥礪努度土奴怒倒党冬凍刀唐塔塘套宕島嶋悼投搭東桃檮棟盗淘湯濤灯燈當痘禱等答筒糖統到董蕩藤討謄豆踏逃透鐙陶頭騰動同堂導憧撞洞瞳童胴萄道銅峠鴇匿得徳瀆特督禿篤毒独読橡凸突椴届鳶苫寅酉瀞噸屯惇敦沌豚遁頓呑曇鈍

奈 那內乍凪薙謎灘捺鍋楢馴縄畷南楠軟難汝

二 尼弐邇匂賑肉虹廿日乳人如尿韮任妊忍認

濡

禰 祢寧葱猫熱年念捻撚燃粘

乃 廼之埜嚢悩濃納能脳膿農覗蚤

巴 把播覇杷波派琶破婆罵芭馬俳廃拝排敗杯盃牌背肺輩配倍培媒梅楳煤狽買売賠陪這蝿秤矧萩伯剝博拍柏泊白箔粕舶薄迫曝漠爆縛莫駁麦函箱硲箸肇筈櫨幡肌畑畠八鉢溌発醗髪伐罰抜筏閥鳩噺塙蛤隼伴判半反叛帆搬斑板氾汎版犯班畔繁般藩販範采煩頒飯挽晩番盤磐蕃蛮

匪 卑否妃庇彼悲扉批披斐比泌疲皮碑秘緋罷肥被誹費避非飛樋簸備尾微枇毘琵眉美鼻柊稗匹疋髭彦膝菱肘弼必畢筆逼檜姫媛紐百謬俵彪標冰漂瓢票表評豹廟描病秒苗錨鋲蒜蛭鰭品彬斌浜瀕貧賓頻敏瓶

不 付埠夫婦富冨布府怖扶敷斧普浮父符腐膚芙譜負賦赴阜附侮撫武舞葡蕪部封楓風葺蕗伏副復幅服福腹複覆淵弗払沸仏物鮒分吻噴墳憤扮焚奮粉糞紛雰文文

丙 併兵塀幣平弊柄並蔽閉陛米頁僻壁癖碧別瞥蔑箆偏変片篇編辺返遍便勉娩弁鞭

保 舗鋪圃捕歩甫補輔穂募墓慕戊暮母簿菩倣俸包呆報奉宝峰峯崩庖抱捧放方朋法泡烹砲縫胞芳萌蓬蜂褒訪豊邦鋒飽鳳鵬乏亡傍剖坊妨帽忘忙房暴望某棒冒紡肪膨謀貌貿鉾防吠頬北僕卜墨撲朴牧睦穆釦勃没殆堀幌奔本翻凡盆

摩 磨魔麻埋妹昧枚毎哩槙幕膜枕鮪柾鱒桝亦俣又抹末沫迄儘繭麿万慢満漫蔓

味 未魅巳箕岬密蜜湊蓑稔脈妙耗民眠

務 夢無牟矛霧鵡椋婿娘

冥 名命明盟迷銘鳴姪牝滅免棉綿緬面麺

摸 模茂妄孟毛猛盲網耗蒙儲木黙目杢勿餅尤戻籾貰問悶紋門匁

也 治夜爺耶野弥矢厄役約薬訳躍靖柳藪鑓

愉 愈油癒諭輸唯佑優勇友宥幽悠憂揖有柚湧涌猶猷由祐裕誘遊邑郵雄融夕

予 餘與譽輿預傭幼妖容庸揚揺擁曜楊様洋溶熔用窯羊耀葉蓉要謡踊遙陽養慾抑欲沃浴翌翼淀

羅 螺裸來萊頼雷洛絡落酪乱卵嵐欄濫藍蘭覧

利 吏覆李梨理璃痢裏裡里離陸律率立葎掠略劉流溜琉留硫粒隆竜龍侶慮旅虜了亮僚両凌寮料梁涼猟療瞭稜糧良諒遼量陵領力緑倫厘林淋燐琳臨輪隣鱗麟

瑠 塁涙累類

令 伶例冷励嶺怜玲礼苓鈴隷零霊麗齢暦歴列劣烈裂廉恋憐漣煉簾練聯蓮連錬

呂 魯櫓炉賂路露労婁廊弄朗楼榔浪漏牢狼籠老聾蠟郎六麓禄肋録論

倭 和話歪賄脇惑枠鷲互亘鰐詫藁蕨椀湾碗腕

份

記號

英數

特殊