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# CHILLER MANUAL

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**SAM JUNG ENC CO.,LTD.**

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## 1. Cautions for conveying chiller

- 1) In principle, chiller shall be conveyed, loaded or unloaded by heavy machine (forklift).
  - ※ It is possible to load and unload by crane, hoist, etc, but it is required to be careful of convey, because there is no eye bolt on the outer casing face.
- 2) Grasping the distance to destination, required time and road condition, it is essential to firmly and securely fix the chiller before departure so that bolt may not be loosened or inside of chiller may not be damaged by vibration of vehicle for long time transportation.
  - ※ Waterproof measure is indispensable to protect chiller from rain or wind.
- 3) After arriving at the destination, be sure to visually check the possible problem that may occur while conveying chiller. Then, convey it to the installing place with heavy machine under the instruction of safety control section.
  - ※ However, when moving chiller into the building, be sure to use conveying cart instead of pipe or lever.

## 2. Cautions for installing chiller.

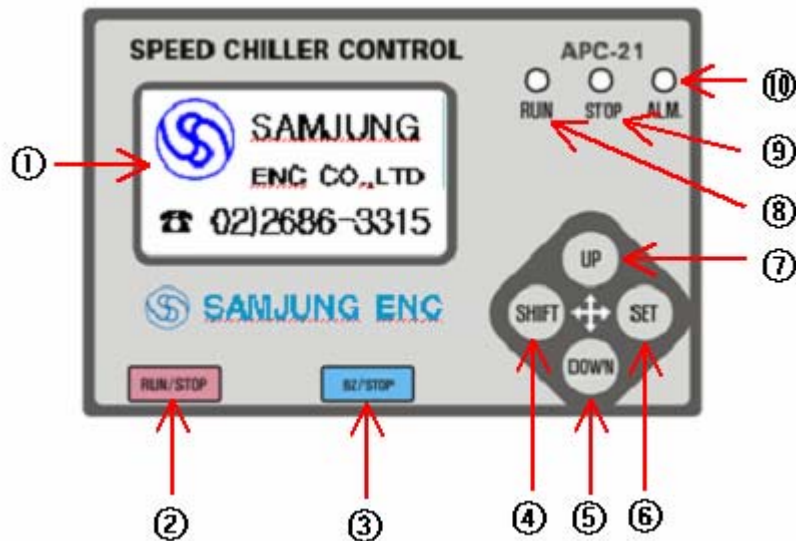
- 1) Install chiller in the building (If installing outdoors, be sure to install shade or rainwater cover.)
- 2) Install chiller at place free of dust, moist and foreign materials.
- 3) Install chiller at well ventilated place without heater.
- 4) Install chiller at place where it can be easily checked and repaired.
- 5) Connect pipe after checking inlet and outlet of cold water.
- 6) Install the power switch separate from other machines.
- 7) Check visually whether supporter or hanger of pipe is installed correctly.
- 8) Check visually or by drawing the pipe joint and inlet/outlet of connection of the other service.
- 9) Check the capacity of the 1<sup>st</sup> electric distributing panel (power).
- 10) While constructing electric cable, be sure to check insulation (earth).

## 3. Cautions for use

- 1) The 1<sup>st</sup> power supply of chiller and power breaker inside chiller shall be on always and they may be off in emergency only.
- 2) As system runs to prevent rupture by freezing all the year round, power supply shall be on always.

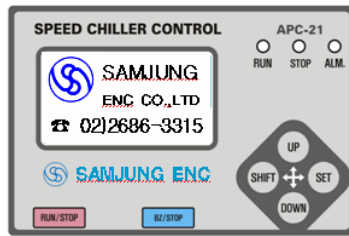
# ★ How to operate CHILLER CONTROLLER

## 1) Name of each part



- ① : LCD screen (128 \* 64 DOT) BLUE COLOR
- ② : Run/Stop switch (Run/Stop is repeated each time switch is pressed.)
- ③ : Buzzer/Stop switch (switch that stops buzzer which operates in the case of error)
- ④ : Moving switch (switch to move set value or set menu)
- ⑤ : Decreasing switch (switch to decrease set value)
- ⑥ : Setting switch (switch to convert main screen into set screen)
- ⑦ : Increasing switch (switch to increase set value)
- ⑧ : Run LED (While running, green LED is lit.)
- ⑨ : Stop LED (While stopping, red LED is lit.)
- ⑩ : Warning LED (In the case of error, red LED flickers.)

## 2) Initial screen

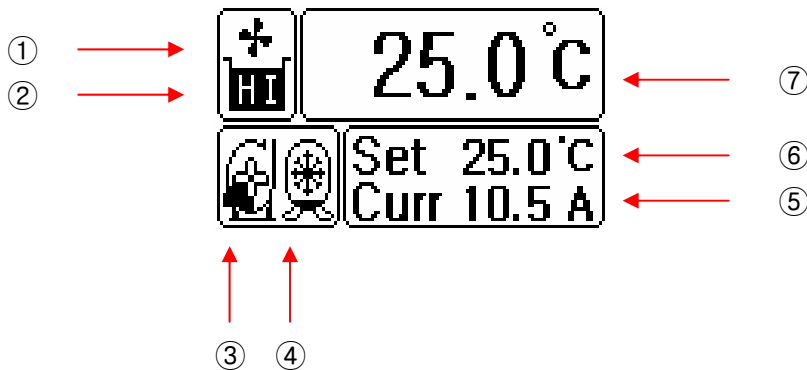


Initial screen when chiller is powered for the first time. (all operations in halt)

## 3) Normal operating screen



Normal operating state after supplying power and manipulating running key.



① : Indicating the state of operating condenser fan



→ Condenser fan in rotation

② : Indicating water level



→ High water level (water supplying SV output halts)



→ Low water level (water supplying SV output in operation)

③ : Indicating pump output state



→ Pump in normal operation



→ Pump in halt

④ : Indicating comp output state

① general control:



→ Comp in normal operation



→ Comp in halt

② precise control: Comp operates always.



→ Heating SV in operation



→ Chilling SV in operation



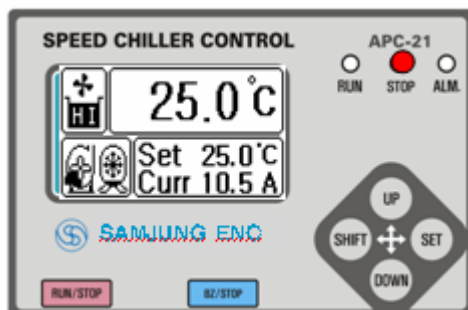
→ Both operating and chilling SV in operation

⑤ : Indicating the electric current value of main power supply at present

⑥ : Indicating the set temperature of cooling water

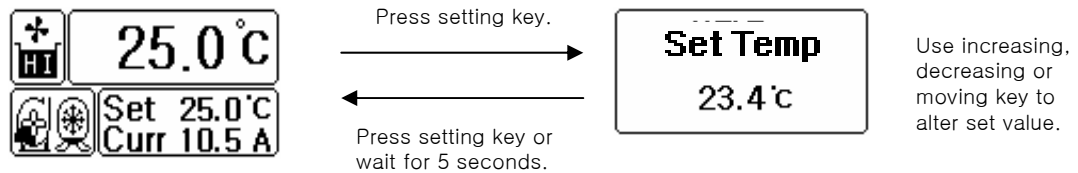
⑦ : Indicating the temperature of cooling water at present

#### 4) OFF Screen

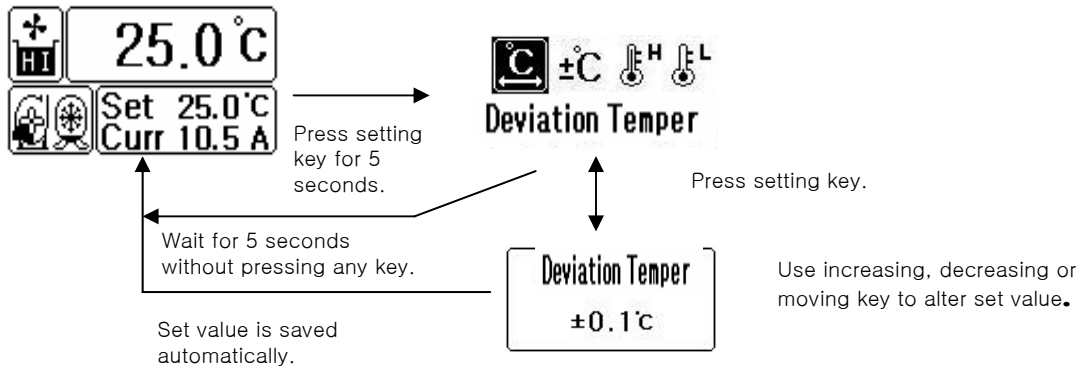


Only pump and comp halt.  
Condenser fan and water  
supplying SV normally  
operate per input signal.

### 5) Setting temperature of cooling water (0°C ~ 70°C)



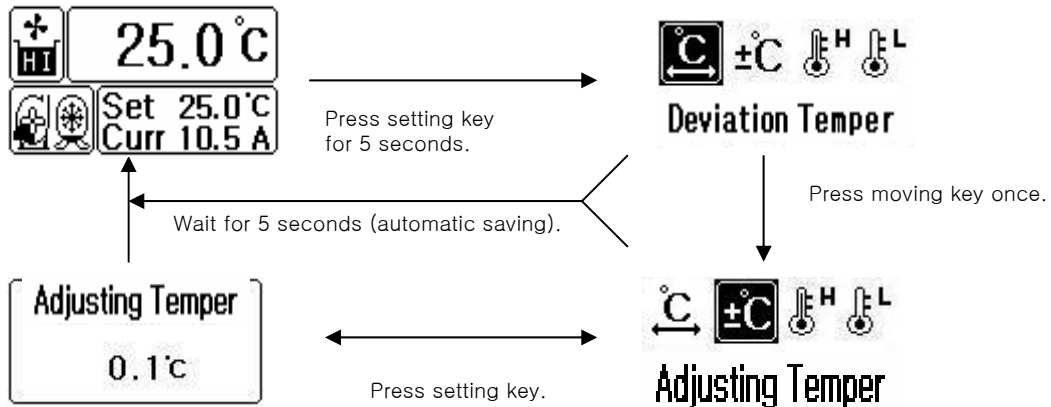
### 6) Deviation of main temperature ( ±0.0°C ~ ±9.9°C)



EX) Example of use

If deviation of main temperature is ±0.5°C and set temperature is 10.0°C, comp runs at 10.5°C and stops at 9.5°C in normal control.

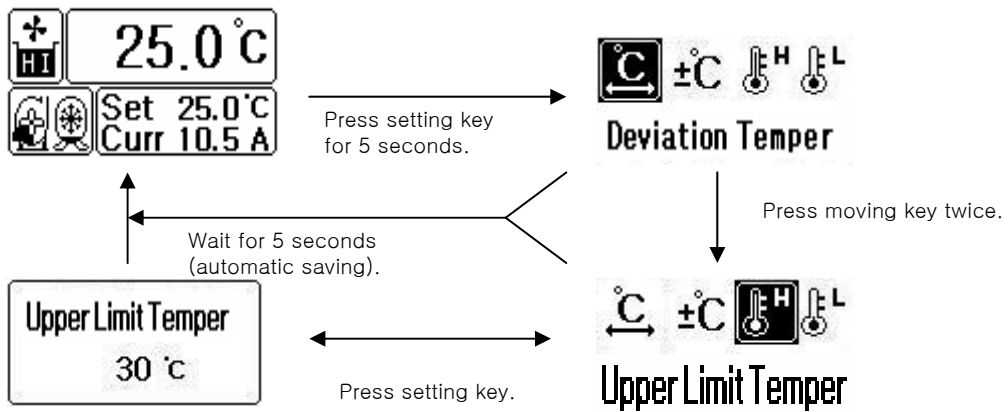
### 7) Adjusting main temperature (-9.9°C ~ +9.9°C)



Use increasing, decreasing or moving key to alter set value.

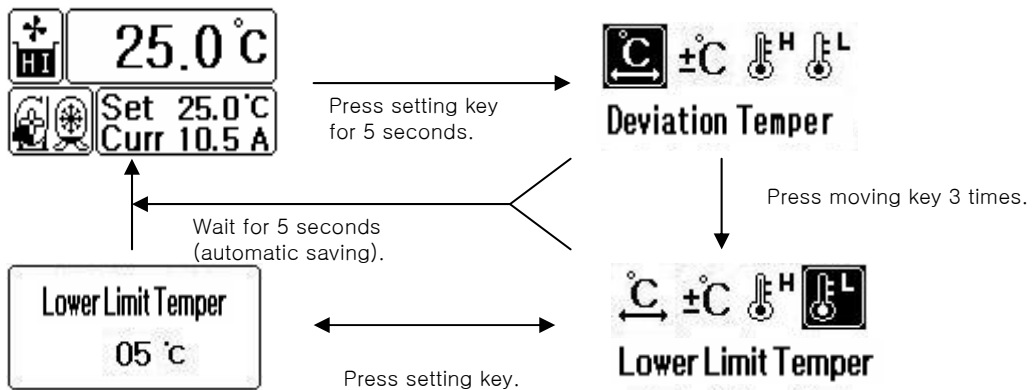
The set value is to adjust deviation between current indicated temperature of cooling water and actual temperature of cooling water.

8) Setting upper limit temperature (0°C ~ 80°C)



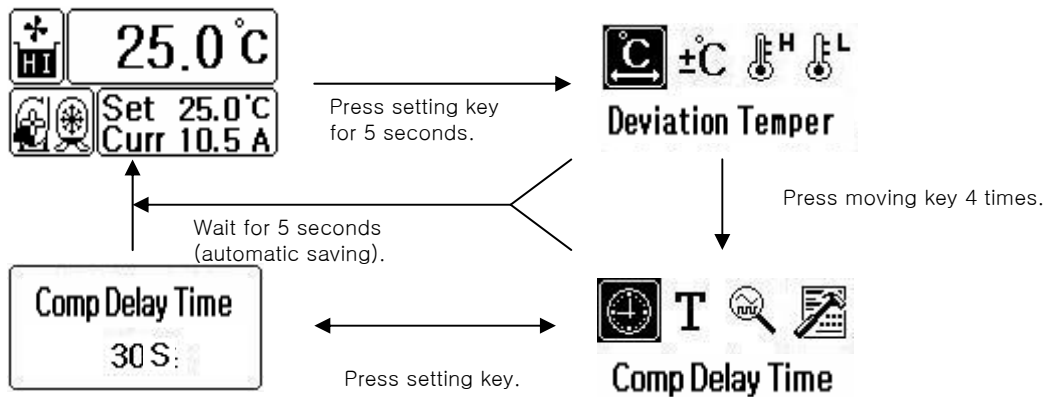
Use increasing, decreasing or moving key to alter set value.

9) Setting lower limit temperature (0°C ~ 80°C)



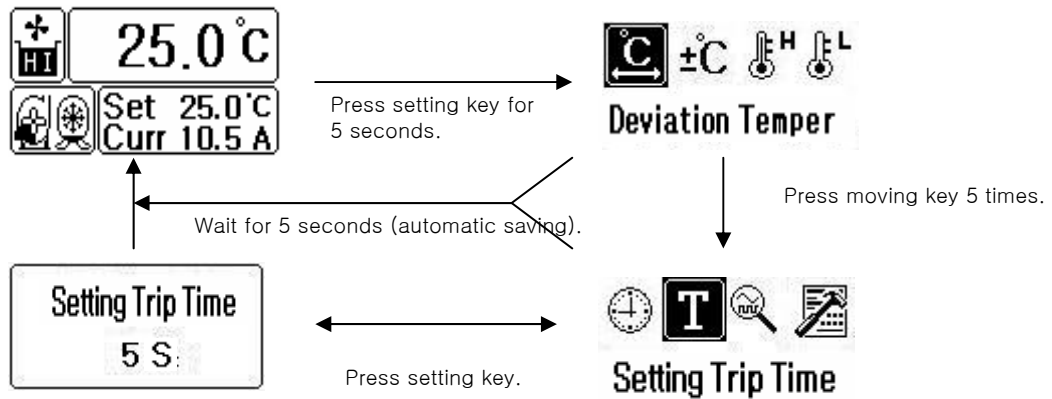
Use increasing, decreasing or moving key to alter set value.

10) Comp delay time (0second ~ 150 seconds)



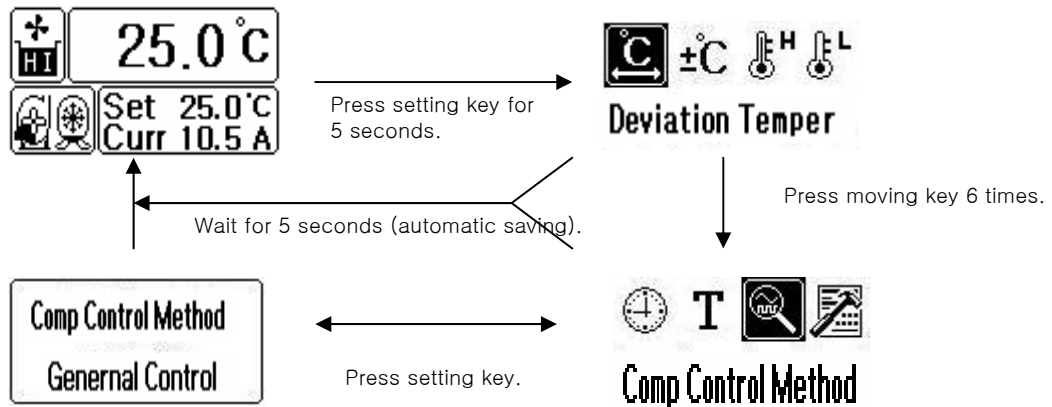
Use increasing, decreasing or moving key to alter set value.

11) Trip time (0 second ~ 10 seconds)



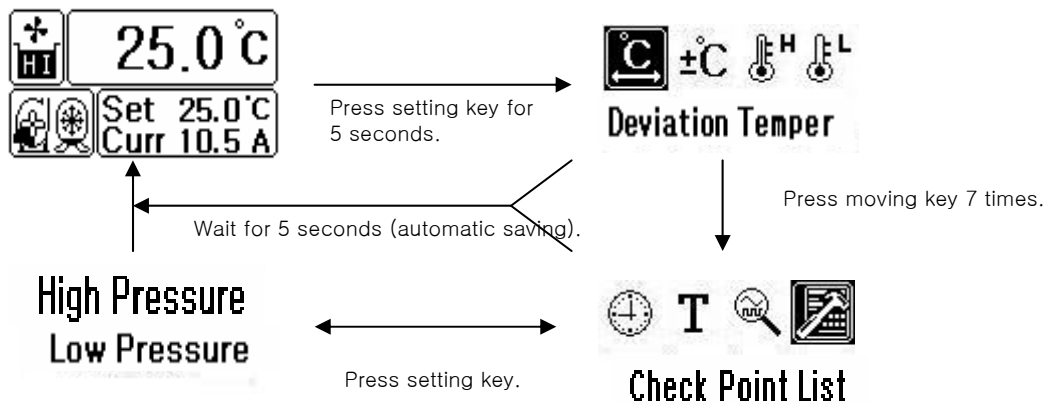
Use increasing, decreasing or moving key to alter set value.

12) Comp controlling method (general control, precise control)



Use increasing, decreasing key to alter control method.

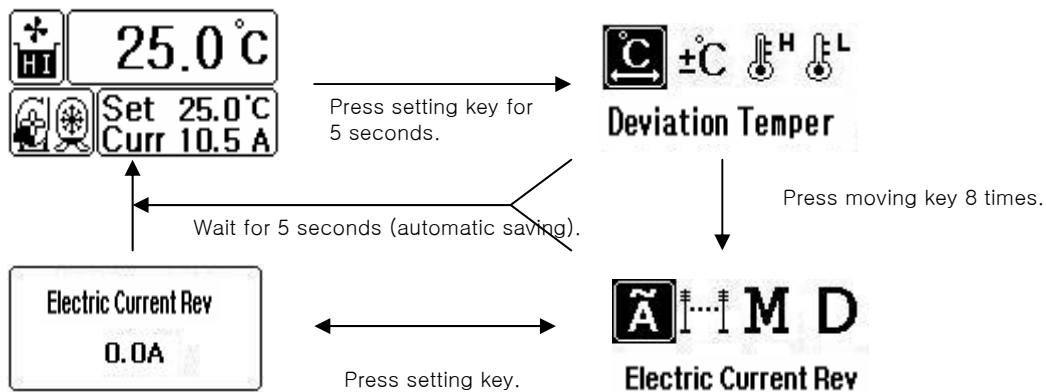
13) Details of problem (recording up to 10 items)



Use moving key to move the screen of details of problem.

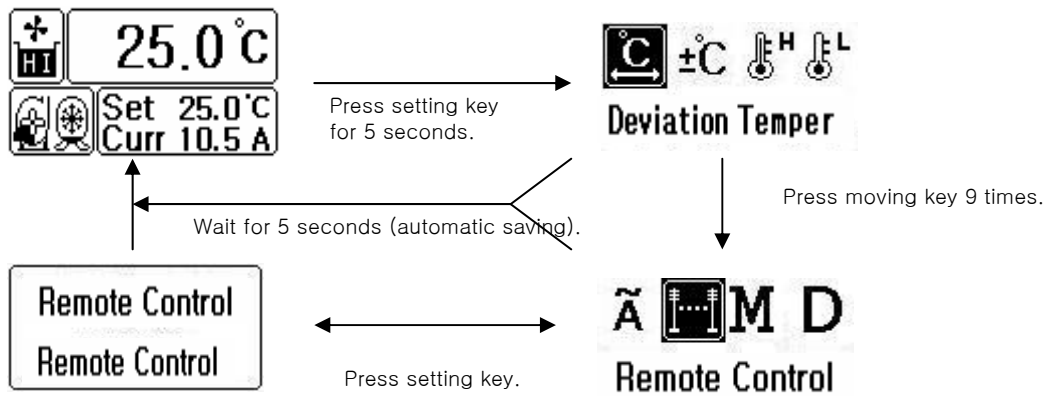


14) Adjusting current ( -9.9A ~ 9.9A)



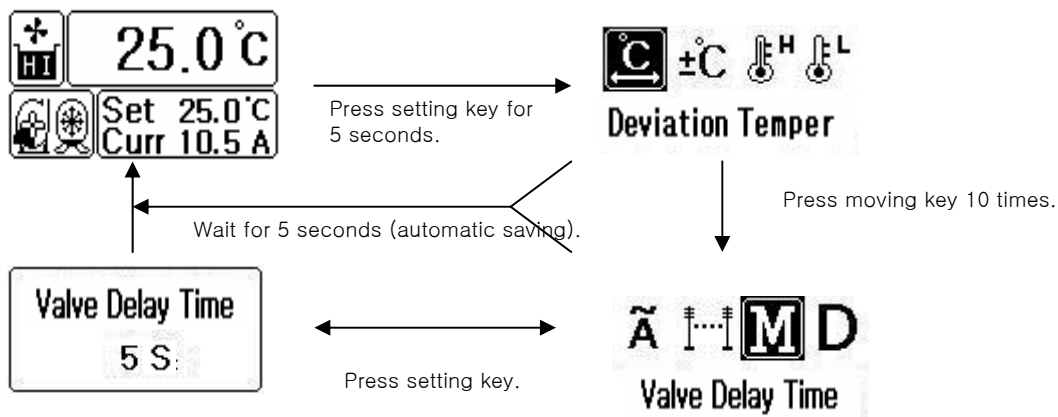
Use increasing, decreasing or moving key to alter set value.

15) Remote control (general control, remote control)



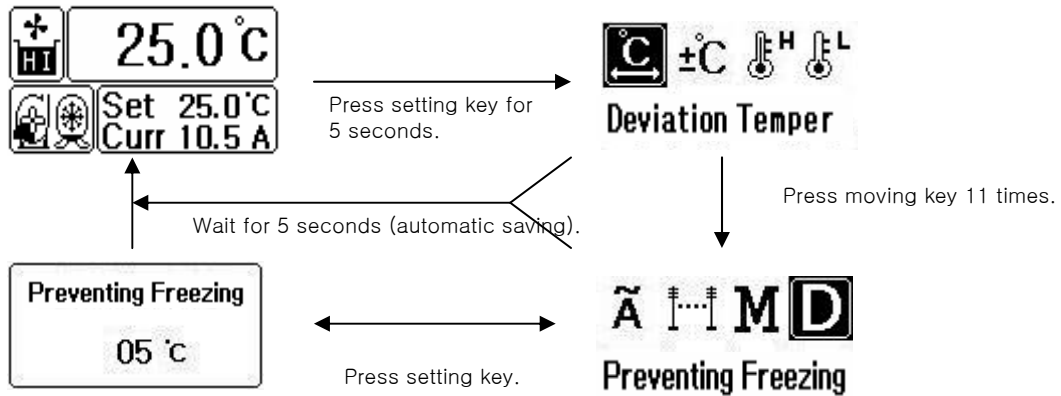
Use increasing, decreasing key to alter control method.

16) Valve delay time (1 second ~ 60 seconds)



Use increasing, decreasing or moving key to alter set value.

17) Preventing rupture caused by freezing (0°C ~ 70°C)



Use increasing, decreasing or moving key to alter set value.

No	Name	Setting range	Basic set value	Remark
1	Set temp	Low temperature ~high temp	10°C	
2	Temperature dev	±0.0°C ~ ±9.9°C	±1.0°C	
3	Temperature adjustment	-9.9°C ~ +9.9°C	0.0°C	
4	Upper temperature	0°C ~ +80°C	70°C	
5	Lower temperature	0°C ~ +80°C	8°C	
6	Comp delay	0 second~150 seconds	10 seconds	
7	Trip time	0 second~10 seconds	5 seconds	
8	Comp control method	General control/precise control	general control	
9	Current adjustment	-9.9A ~ +9.9A	0.0A	
10	Remote control	Remote control/general control	general control	
11	Valve delay	1 second~ 60 seconds	2 seconds	
12	Preventing rupture caused by freezing	0 °C ~ 70 °C	5 °C	

★ Output specification

PCB No	WIRE No	Output name	Output condition
R	R1	AC220V input (R-Phase)	
T	T1	AC220V input (T-Phase)	
CM	T1	AC220V output (T-Phase)	
A	SJ1	Preliminary	
B	SJ2	Solenoid Valve output	When low signal enters Solenoid Valve input
C	SJ3	ALARM output	When alarm sounds
D	SJ4	Water supplying SV	When low water level is detected
E	SJ5	Heating SV	When lower than set temperature in precise control
F	SJ6	Cooling SV	Always ON in general control When higher than set temperature in precise control
G	SJ7	PUMP MG	When power is ON
H	SJ8	COMP MG	When higher than (set temperature + temperature deviation) in general control Always ON in precise control
I	SJ9	FAN MG	When low signal enters FAN control input

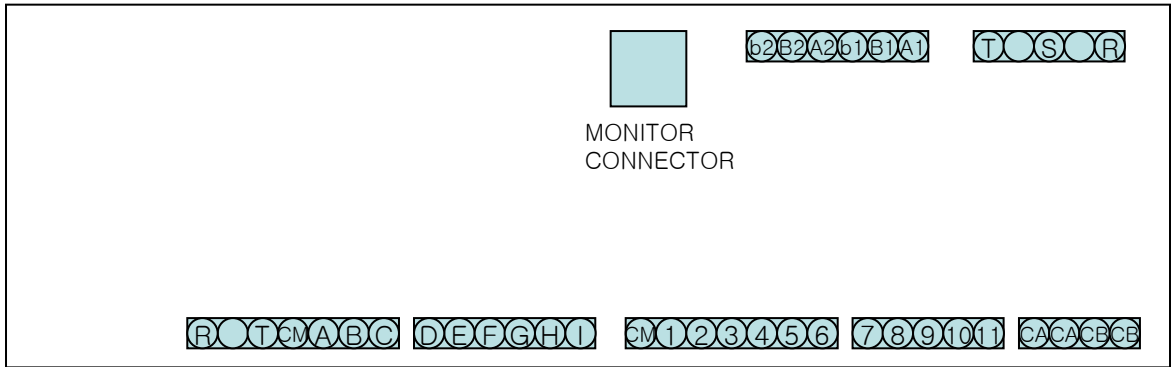
★ Input specification

PCB No	WIRE No	Input name	Input condition
CM	SJ-	AC14.5V common input	
1	SJ10	Low level input	NC
2	SJ11	High level input	NC( Solenoid Valve output when it opened)
3	SJ12	Pump OCR	NC
4	SJ13	Comp OCR	NC
5	SJ14	FAN OCR	NC
6	SJ15	High pressure input	NC
7	SJ16	Low pressure input	NC
8	SJ17	FAN control	NC(FAN OCR output while opening)
9	SJ18	FLOW switch input	NO(to be closed within 15 seconds while water is circulating)
10	SJ19	remote contact point	NC(remote control operates when it is opened while remote control is selected)
11	SJ20	Solenoid Valve input	NC(AC220V being applied 2 seconds after it opened)
	SJ21, SJ21	CT sensor input1	Solenoid Valve
	SJ22, SJ22	CT sensor input2	
	R1	Reversed Phase input R	
	S1	Reversed Phase input S	
	T1	Reversed Phase input T	

★ Troubleshooting (Measures to be taken when alarm sounds)

Alarm	Measure	Remark
Compressor overload	Reset magnet OCR!! If repeated in 3 times, replace it!!	automatic restoration
Pump overload	Reset magnet OCR!! If repeated in 3 times, replace it!!	automatic restoration
Abnormality in low level	Provide a Directly-supplied water valve, and refill cooling water by manual.	automatic restoration
High pressure alarm	Check condenser fan motor and ventilation around condenser.	automatic restoration
Low pressure alarm	Check cold water circulation system, supply refrigerant R-22	automatic restoration
Abnormal main temperature sensor	Check PT100Ω temperature sensor.	automatic restoration
High temperature alarm	Check present temperature and equipment under load, check temperature sensor	automatic restoration
Low temperature alarm	Check quantity of circulating cold water and level in the water tank, check temperature sensor	automatic restoration
Alarm of water circulation	Check valve lock and the part under load, check floor sensor.	manual restoration
Reversed Phase error	Replace RST of main power line by RTS.	manual restoration
Condenser fan overload	Reset magnet OCR!! If repeated in 3 times, replace it!!	automatic restoration

# ★ Wiring diagram



**Output**

R : AC220V input (R1)  
T : AC220V input(T1)  
CM : Common output (T1)  
A : spare (SJ1)  
B : solenoid valve output (SJ2)  
C : ALARM output (SJ3)  
D : Water supplying SV(SJ4)  
E : Heating SV(SJ5)  
F : Cooling SV(SJ6)  
G : PUMP MG(SJ7)  
H : COMP MG(SJ8)  
I : FAN MG(SJ9)

**Input**

CM : Common input (SJ-)  
1 : Low level input (SJ10)  
2 : High level input (SJ11)  
3 : Pump OCR(SJ12)  
4 : Comp OCR(SJ13)  
5 : FAN OCR(SJ14)  
6 : High pressure input (SJ15)  
7 : Low pressure input (SJ16)  
8 : FAN control (SJ17)  
9 : FLOW switch point (SJ18)  
10 : Remote point (SJ19)  
11 : Solenoid Valve input (SJ20)

**CT Sensor input**

CA : CT sensor input A  
(SJ21, SJ21)  
CB : CT sensor input B  
(SJ22, SJ22)

**Reversed Phase inspection**

3Phases consist of  
R : R-Phase(R1)  
S : S-Phase(S1)  
T : T-Phase(T1)

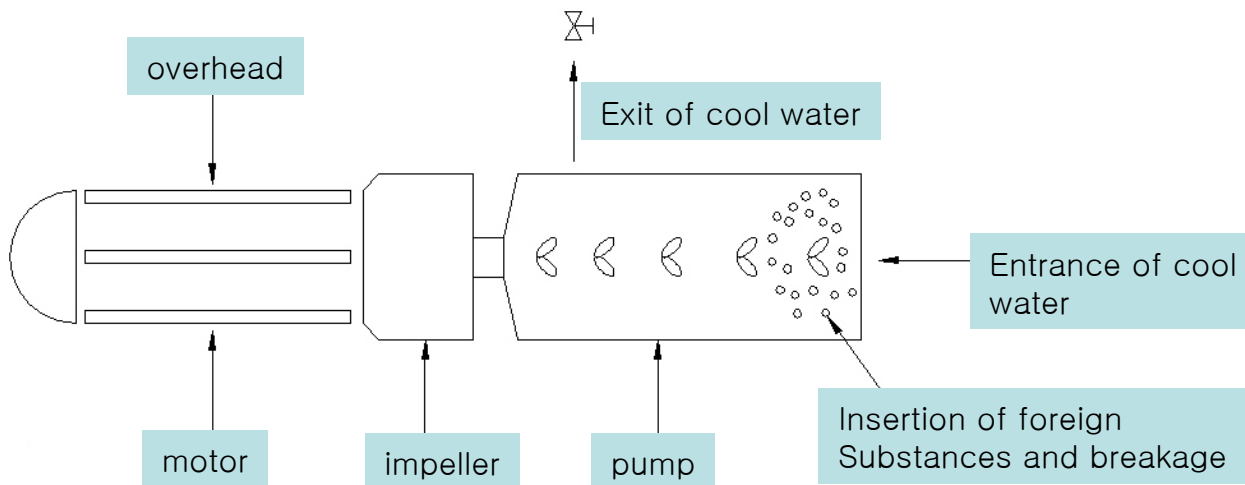
**PT100 temperature sensor input**

A1B1b1: PT100 sensor1  
A2B2b2: PT100 sensor2

# 1.Maintenance of PUMP

(1) PUMP: As device for heat movement of fluid, it aims to transmit regular pressure and fluid quantity through pipe to the part where heat of fluid must be changed. It is composed of excessive current C/T and operation of E.O.C.R.

- 1) Symptom : Alarm on the APC-21 L.C.D monitor.
- 2) Cause for alarm
  - ① Alarm for excessive current C/T
  - ② Alarm for current detection by pump motor magnet E.O.C.R.
- 3) Countermeasure
  - ① Operate it again after altering set value in the menu of setting unit numerical value.
  - ② Replace pump motor if burned and damaged.
- 4) Maintenance



## 2. Maintenance of COMPRESSOR

(2) COMP : As GAS-compressed (piston) MOTOR COMPRESSOR that makes refrigerant GAS by electric machine heat, it is composed of refrigerant, high pressure, low temperature and switch operation.

1) Symptom: Alarm on the APC-21 L.C.D monitor

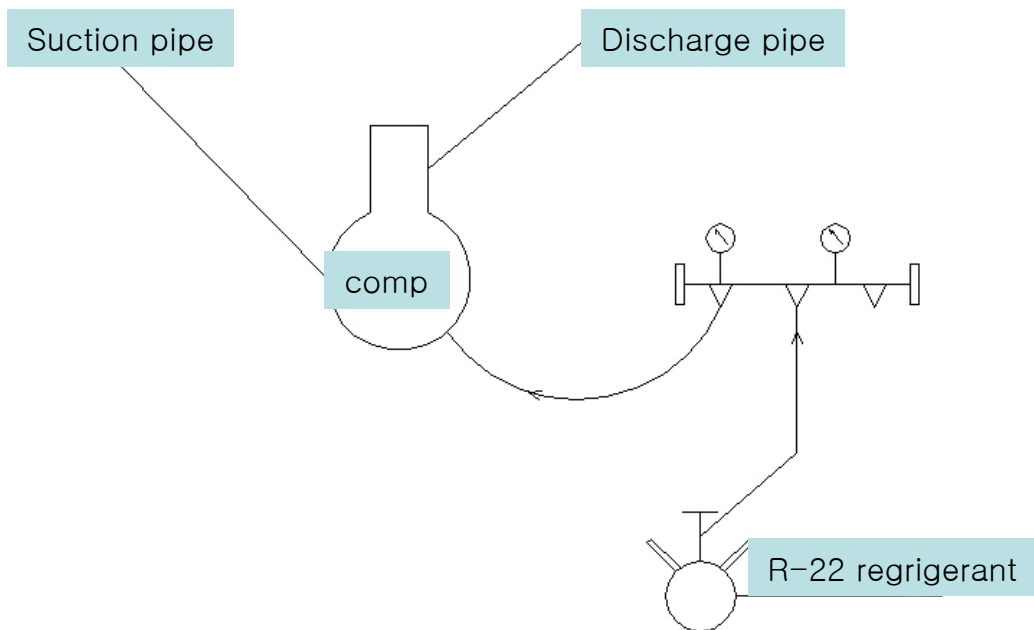
2) Cause for alarm

- ① Alarm for excessive current C/T
- ② Alarm for current detection by compressor motor magnet E.O.C.R.
- ③ Alarm for set value of high pressure and low pressure of refrigerant gas

3) Countermeasures

- ① Operate it again after altering set value in the menu of setting unit alarm numerical value
- ② Replace compressor motor coil if burned and damaged.
- ③ When high pressure and low pressure switch is operating, high pressure : cleaning condenser/ low pressure: supply refrigerant.

4) Maintenance





### 3. Maintenance of FAN

(1) FAN : Discharging the heat of high temperature and high pressure gas that is produced when compressing freezing gas by propeller angle and motor rotation, it is composed of excessive current C/T and E.O.C.R operation

- 1) Symptom : Alarm on the APC-21 L.C.D monitor
- 2) Cause for alarm

- ① Cause for excessive current C/T
- ② Alarm for current detection by fan motor magnet E.O.C.R.

- 3) Countermeasure

- ① Operate it again after altering set value in the menu of setting unit alarm numerical value
- ② Replace fan motor coil if burned and damaged.

- 4) Maintenance

