Discontinue

CKD

HYCOOL
HYW6033D

Instruction manual

● Be sure to read this manual before installing and operating your HYCOOL.

● Keep this manual within the reach of an operator all the time.

CKD Corporation
05-12 7th EDITION SM-12134-A

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Safety instructions

This manual is intended for personnel who are familiar with basic knowledge about electricity, compressed air, fluid, piping, and refrigerant. CKD shall not be held responsible for troubles or accidents that result from installation, operation or repairs made by personnel who are not qualified or trained for the above subjects.
Improper handling may cause the machine not to be operated at its maximum performance level or lead to accidents or personal injury.
Always confirm the machine specification and operate the machine in the correct manner designated by CKD.
This machine is equipped with various safety and other protective devices.
However, improper handling of the machine may cause personal injury and/or damage to the machine.
Read this operation manual carefully and fully comprehend its contents before operation.
Read the contents of the following warning labels, as well as cautions stated in the operation manual, and follow the instructions contented therein.
Keep this operation manual near the machine where all concerned personnel have easy access to it.

Safety precautions

Safety precautions are classified into the following groups, WARNING and CAUTION.

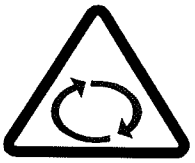
WARNING CAUTION

WARNING This denotes hazards which COULD result in severe personal injury or death, if not avoided.

CAUTION This denotes hazards which COULD result in minor personal injury and/or product or property damage, if not avoided.

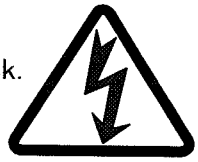
WARNING : Rotating device

★Fan may suddenly start rotating, causing personal injury.
Do not put your hand or foreign object in this part.
●Always shut-down the power before starting inspection.



WARNING : Electric shock hazard

★Power terminal block and switches are electrically live.
Do not touch any part. Doing so may cause an electric shock.
●Always shut-down the power before starting inspection.
Do not inspect the machine with wet hand.

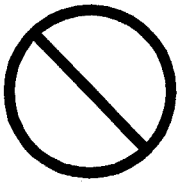


CAUTION : Hot surface

★Surface is hot during operation or immediately after the machine operation is stopped.
●Always shut-down the power and confirm that the surface is cooled before starting inspection.

CAUTION : Falling hazard

★Do not step on the panel. Doing so may fall.
●Never step on the panel.



Ground connection

★To prevent any electric shock hazard, firmly connect the ground cable.

This machine is designed for industrial use. Always carefully handle the machine in the correct manner.

FORWARD

Thank you for purchasing our quality product, "HYCOOL".
For proper application of it, please read this manual well prior to start operating it.

Beware of causing unexpected trouble sometimes, otherwise, not only may fail to attain the capacity to its full extent.

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Table of Contents

1. Caution

1-1.Using fluid

Only water such as city water and distilled water is available for the use of this product. Do not use the fluid such as water included dirt or red rust, chemical fluid, oil and so on.

1-2.Carreige

(1) As HYCOOL is heavy, be very careful not to be wounded during carriage.

(2) For carriage, use a forklift or hoist hooks.

When carrying a forklift

Pass the fork through the fork holes provided in the base of HYCOOL.

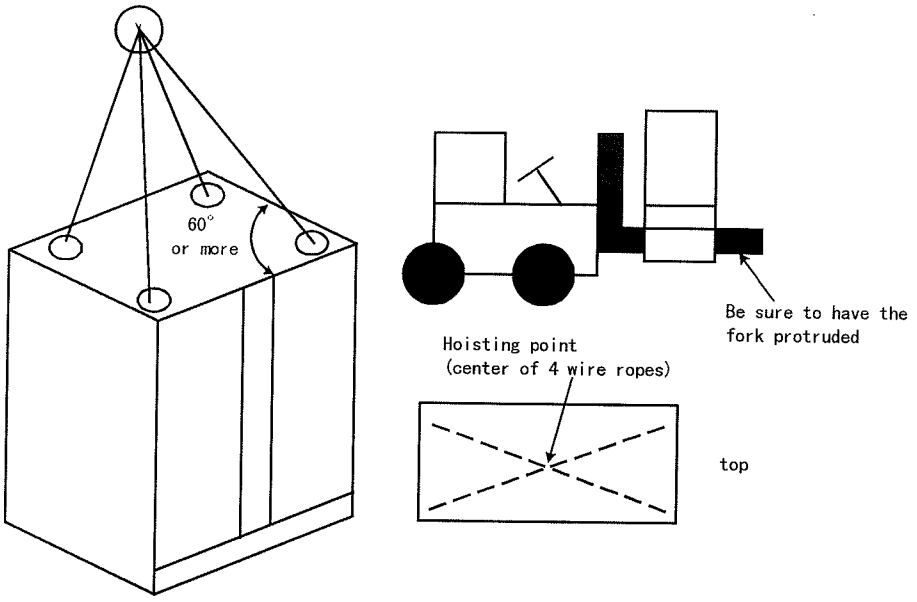
Be sure to have the fork ends protruded from the HYCOOL base.

When hoisting

Use wire ropes with a sufficient strength.

Be sure to hook wire ropes on four points, and set the hoist point to the center of these 4 hooks points.

Secure a hoisting angle of 60° or more as to all the 4 hooks points.



(3) Do not topple down HYCOOL or tilt HYCOOL over 30°. Never use HYCOOL in the toppled or tilted (over 30°) position.

(4) Before carriage, disconnect the wiring and piping from HYCOOL and drain out the water from the water tank.

(5) Do not step on HYCOOL or put anything on HYCOOL.

1-3.Installation

(1) Install the HYCOOL for good ventilation place. Do not install the product in the place where it is likely to be exposed to direct rain water.
(2) Do not install the HYCOOL in a place where corrosive gas exists.
(3) Install a place free from direct sun rays, waste heat from other equipment, and the influence of fire and heat.
(4) Range of ambient temperature is -5~43℃.

1-4.Cautions on operation

⚠ WARNING

- Make sure to wiring for earth.
  Do not touch equipment inside the enclosure, while power source is on.
  It is very dangerous for electrical shock.

⚠ CAUTION

- While in running, not to open the panel. There is rotating equipment and high temperature pipes.
- Do not restart frequently. (Control circuit protect the restart in 3 minutes.)
- Do not operate compressor in a state of the valve closed. In the case that there is stop valve in piping.
- Do not touch the relief valve. Otherwise the HYCOOL may cause trouble.
- Do not cut off main power line and circuit breaker in the control box at night. Because it needs to pass an electrical current through crank case heater in order to make the machine automatically do the upkeep operation for water temp. (refer to P12) and to protect compressor.
- Please check the airtightness of piping so that air bubbles do not mix in a water circuit. Especially, at the time of a test run, using pump independent operation, please do not operate a freezer until a circuit is full of water. Mixing of air bubbles may damage a heat exchanger.

2. Installation

2-1.Installation

(1) Install the machine in a place with good ventilation.

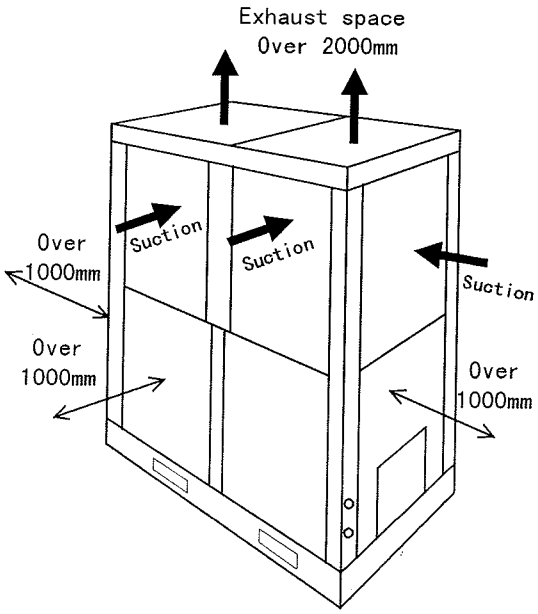
(2) Do not install the machine in a place where it is likely to by exposed to direct sunlight and where heat is likely to be generated.

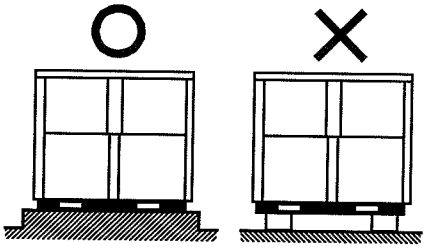
(3) Do not use the machine in a place where corrosion gas exist.

(4) Install the machine in a clean and dust free area.

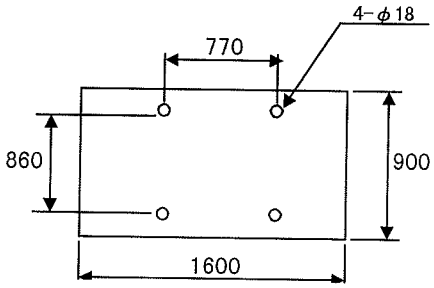
(5) Select a solid and horizontal floor with least amount of vibration.
Solidify the groundwork of the installation place.
(Suitable installation level : FL + more than 100mm)
Fix the machine using anchor bolts to prevent its fall.

(6) Ensure that there is sufficient place around the machine for ease of maintenance and inspection.



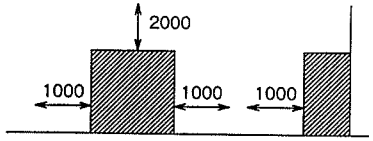
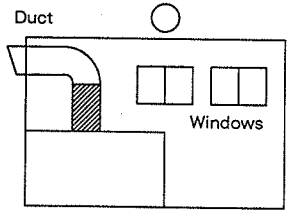
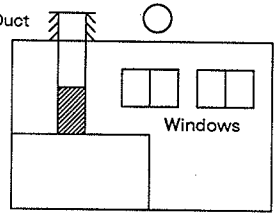
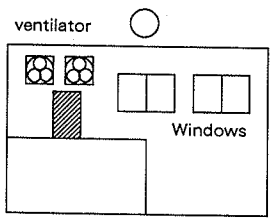
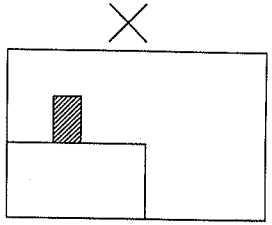
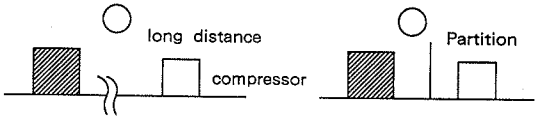
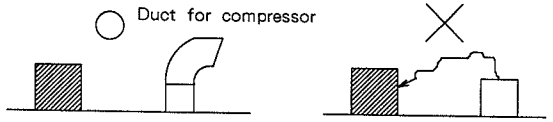
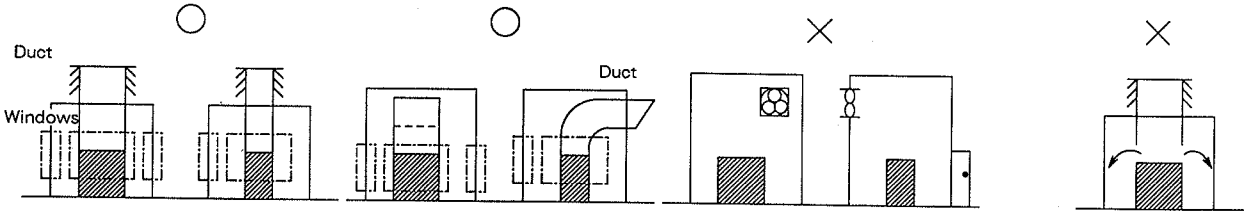


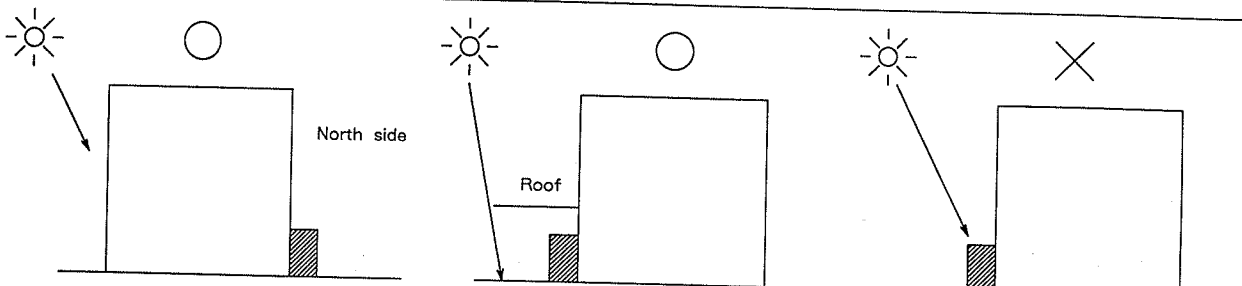
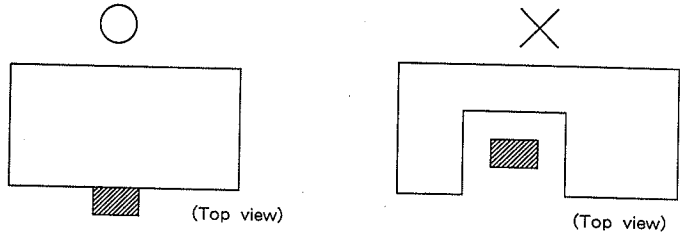
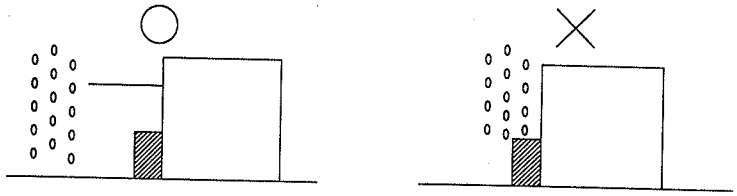
Do not take the way of installation which supports partially.



(7) The operation ambient temperature range is −5 to 43℃. In the case of indoor installation when the machine Install in indoor, waste heat and air discharged from the machine may raise the ambient temperature.
Accordingly, if necessary, provide an intake dust (inlet) an exhaust dust (or ventilating fan) to discharge waste heat to the outdoor.
Make sure that these ventilators will not lower the capacity of the ventilating fan of the machine.

(8) Do not put object which screens air suction and exhaust on and in front of suction surface(the front and the both side surface) and exhaust surface(the upper surface).
This may cause not only emergent stop but also breakdowns.

Place	Condition	Schematic illustration ▨ : HYW6033D
Inside of factory	1. Keep enough space around the HYCOOL for maintenance and exhaust. 2. Keep ambient temperature under 40℃ and intall ventilating facilities, When the HYCOOL is installed on mezzamine floor. 3. Do not suck in the hot air such as air compressor exhaust etc.	 Do not set up fences around the HYCOOL.     Do not restrict the duct section area on the way of it. Top area of duct is 1440 × 740, and its maxium length is under 3m. Mount pressure ventilators which is enough capacity for exhaust. (φ 600 fan blades × 750W 2pcs. or over) Design adequate windows size, to prevent ambient temperature rising. (Exhaust heat quantity : about 70,000kcal/h) Make sure that the exhaust from duct is not sucked from windows again.  
Inside of hobel	1. Keep enough space around the HYCOOL for maintenance. 2. Keep anbient temperature under 40℃ and install ventilating facilities. 3.Install duct to prevent the exhaust circulation to suction side.	 Do not restrict the duct section area on the way of it. Top area of duct is 1440 × 740, and its maxium length is under 3m. Fit the windows on three positions.(right, left side and front) Furthermore, total opening area of windows more then 3m㎡ is necessary.

Place	Conditions	Schematic illustration ▨ : HYW6033D
Outside of factory	1.Do not install the HYCOOL in a place where it is likely to be exposed to direct sunlight.	
	2.Install the HYCOOL with good ventilation and it shall be kept that the temperature at the installation is under 40℃.	
	3.It should be kept that the HYCOOL is installed inside of the factory or a roof is attached to the HYCOOL in big snowfall area.	
	4.Install the HYCOOL with good drain age in order to avoid the inundation.	

2-3.Wiring

(1) Be sure to wiring the earth.

(2) Power source : 3 phase 200V AC 50/60Hz, 220V AC 60Hz.

(3) Connect power line and connector for input and output signals to the connectors in control box through the power source hole at under part of the right side of the machine.

(4) Suitable wires and breaking current are as follows.

VV	Single core	Over 38mm^2
	Three core	Over 60mm^2
CV	Single core	Over 22mm^2
	Three core	Over 38mm^2
Earth line		Over 22mm^2

2-4. Piping

(1) For piping, use pipes of stainless steel, copper, vinyl chloride or the like which are free from rust.

(2) Each piping shall withstand the working pressure. Each connection port shall be so treated as to prevent water leakage. If the length of the piping to the load is long(over 10m)or that part of piping includes many elbows, enlarge the pipe size.

- MAX. pressure at water inlet/outlet piping : 0.63 MPa

(3) For the overflow, drain and drain ports, do not use rises. Also arrange for the prevention of back pressure on the piping.

(4) Provide a stop valve which can withstand the maximum working pressure to each pipe.

(5) Also arrange the same piping at the load side, directing care not to make an error in water inlet/outlet directions.

(6) The surface of the water inlet/outlet piping may have condensation depending on the ambient temperature and humidity condition. In order to prevent the falling of water drops due to condensation, keep the piping warm with an insulating material, if necessary.

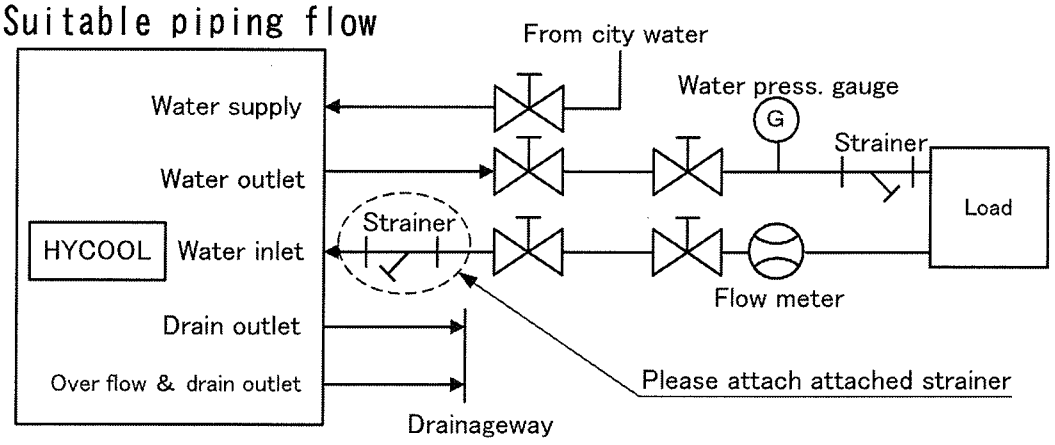
(7) In order to avoid mixing of the garbage into piping etc., please install attached strainer in a water inlet.

(8) When using a water supply mouth, in order to avoid mixing of the garbage into piping, please install strainer.

⚠ CAUTION

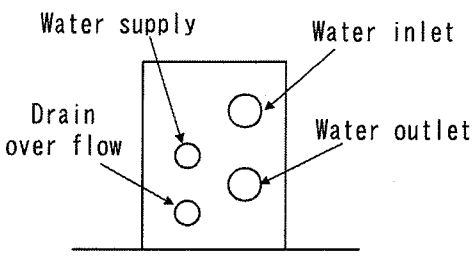
If garbage mixes in HYCOOL, there is a possibility that apparatus, such as a heat exchanger, may be damaged.

Suitable piping flow



(9) Piping size

Water inlet and outlet	Rc $1^1/_2$
Water supply	Rc $^1/_2$
Over flow, Drain	Rc $^3/_4$
Drain inlet and outlet	Rc $^1/_2$



3. Operation

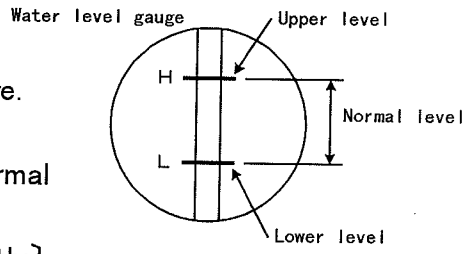
3-1.Water supply

(1)Water supply for water tank

〔In case of water supply from water supply port.〕

① Fully open the city water stop valve of the water supply port. Supply water to the water tank begins. The water is automatically supplied until the water level reaches the normal water level range.

② Check with the water level gauge to make sure that the water level is within the normal water level range.



〔In case of Supply water tank with water directly〕

① Remove the water supply cover at the lower part.

② Remove the cover of the water supply.

③ Supply water to the tank directly.

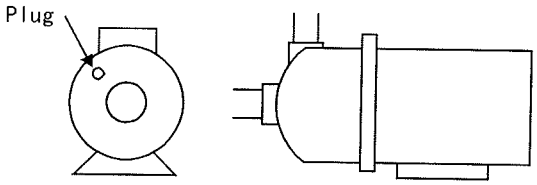
④ Feed water to the normal water level.

⑤ Put back the cover of the water supply.

【Caution】

Always bleed the sir using the following procedures after water has been supplied.

- Open the air bleeding cock on the suction side of the pump to bleed the air
- It water oozes from air bleeding cock, close it to complete the air bleeding work.



(2)Water supply to the machine

①Fully open all the stop valves disposed between HYCOOL and the machine.

②Remove the right front panel at the lower part and cover of the control box.

③Turn ON the MAIN POWER switch.

【warning】 Never touch the charging part within the enclosure(otherwise you may get an electric shock).

④ Set the PUMP toggle switch to the ON side. (Refer to 『6-4.Control panel』)

⑤ Press. feed pump run and it begins to supply water.

1) If pipeline capacity for the load is too big, press. feed pump run and water level down often. Then, alarm lamp may be ON and machine stop.

2) At this case, turn off the toggle switch. Supply water again until its level reaches the normal level.
(Refer to (1) water supply for water tank.)

3) After confirming the normal water level, push stop button for 2 second (it service as a reset switch) to remove alarm. Set the PUMP toggle switch to the ON side again.

4) Retry this item again (It may happen for many times caused by pipeline capacity.

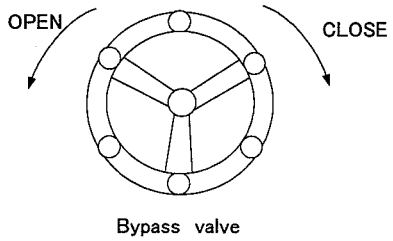
⑥ Water supply to the load is complete.
Turn off toggle switch

WATER TANK CAPACITY 95 ℓ

(3)Check of flow rate

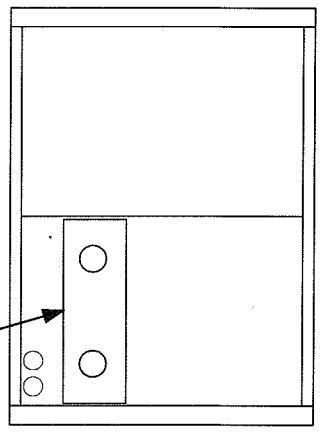
① Turn on feed pump running switch.

② When water supply pressure needs to be adjusted, adjust the bypass valve of this machine.



CLOSE : Water pressure rises and water supply flux also increases.

OPEN : Water pressure falls and water supply flux also becomes less.



⚠ CAUTIONS

(1) The bypass valve has been shut and is not used.
Be sure to open $2^{1}/_{8}$ or more revolutions after closing.

(2) The exit pressure use range is 0.4～0.63MPa.
Be sure to use it by this pressure within the limits.
If it is used out of the operating pressure range, it will become the cause of failure of apparatus.

3-2.Test run

(1) Check with the water level gauge to make sure that the water level is with in the normal water level range. Supply water to the tank directly, until its level reaches the normal range.

(2) Turn on the power source. After turning on the power, make sure that the power lamp is lit.

3-3.Thermo-controller

1)Setting of thermo-controller

(Delivery setting)

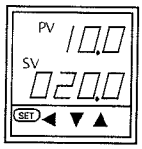
Setting value(SV)	20℃
Upper temperature limit	38℃
Lower temperature limit	2℃

(Setting of thermo-controller)

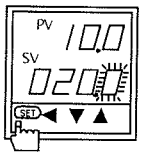
- Never change the parameters except for the setting value(SV), or otherwise trouble may be caused.
- Set the setting value(SV) within a range of 15-30℃.

(Setting procedure)

When changing the setting value(SV) from 20℃ to 25℃, provided that the actually measured value(PV) before setting is 10℃ initial state.

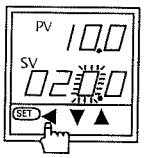


(1)Selection of setting value(SV) mode



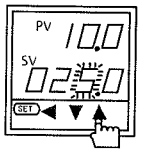
Press the [SET] mark of the set key to select the setting value(SV) mode. Upon the setting value(SV) mode is selected, the lowest digit lamp (right end) lights up. The setting of the digit for which the lamp is ON is ready for changed.

(2)Changing(shifting of lighted digit)



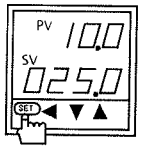
Press the [◀] mark of the setting digit shift key to shift the lighted digit to the first digit.

(3)Changing(increment/decrement of the setting value)



Press the [▲] mark of the setting value increment key to change the first digit to 5.

(4)Registration of setting value



When setting has been completed, press the [SET] mark of the set key. Then, all the digits of the setting value (SV) light up, and the mode returns to the setting value(SV) mode or the actually measured value(PV) display mode.

3-4.Starting

(1)Turn on circuit breaker in the enclosure.
(2)Close all panels expect front panel (right).
(3)Turn on source power.
(4)Push start switch on control panel. Turn on remote operation signal.
(5)Running lamp lit and HYCOOL run.
◆Press feed pump start to run.
◆When the setting value (SV) of the thermo-controller is smaller than the actually measured value (PV)(SV<PV), compressor starts immediately. When SV is larger than PV (SV>PV), however, compressor dose not start until SV<PV is achieved. When compressor starts, the fan motors may repeat start/stop.
◆Exhaust fun is turned on or off by means of the refrigerant pressure of the discharge side.
(6)Check to make sure that the actually measured value (PV) is stable near the setting value (SV)

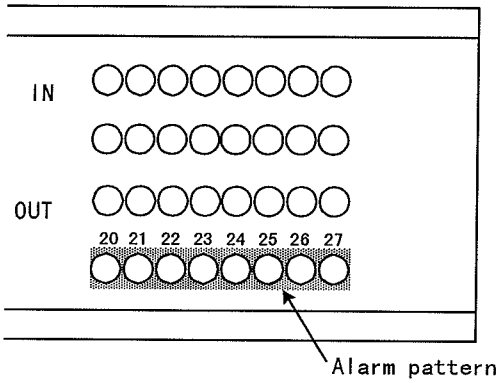
3-5.Stopping

Press the STOP switch.

3-6.Cautions on operation

(1) Use HYCOOL within working range.
(2) Hold frequency of starting/shutting off within 6 times/hour, keep it running for at least 5 minutes before shutting it off and hold restarting it 3 minutes or large.
As HYCOOL is build in the forced shutting off circuit, it dose not restart for 3 minutes after stopping. However, press feed pump can be operated at this time.
(3) Never open the front panel.
(4) HYCOOL is designed for cooling the city water, not to use another liquid.
(5) Use the pump under Max. working pressure.
(6) Pressure fan sometimes repeats “Run and Stop” but this is normal.
(7) Do not touch the relief valve disposed for water pipe. But can be adjusted, when changing water pressure to load.
(8) Install HYCOOL in a place with good ventilation.
Do not place an object on the vent or close the vent.
(9) Turn on source power 6 hours before operation. Then turn on circuit breaker in the enclosure.

3-7.If the ALARM lamp lights up and HYCOOL makes an abnormal stop



◆If the safety devise of HYCOOL is activated and HYCOOL makes an abnormal stop, the ALARM lamp (red) will light up to alarm the trouble. As the PC(programmable controller)lamp within the enclosure tells the location of the trouble, remove the front panel and check the PC lamp (by referring to enclosure layout plan).

◆Troubleshooting table for cases where the ALARM lamp light up and HYCOOL makes an abnormal stop is given in the following pages. (The same table is pasted to the inside of the right front panel.)

How to reset the alarm : when the trouble is located, the cause of the trouble is removed and the trouble is reset, the ALARM lamp goes off.

The alarm can be reset by continuously pressing the STOP-RESET switch for at least 2 seconds.

Restarting after resetting the alarm :

◆When HYCOOL is operated by using the pendant switch, press the START switch again after the ALARM lamp goes off.

◆When HYCOOL is operated by remote control, input the START signal again after the ALARM lamp goes off the ERROR signal disappears.(Even if the REMOTE CONTROL signal is continuously inputted, if an error is caused, the START signal is reset once on the PC program.)

3-8.Anti freezing run

Do not cut of main power line. Keep the machine electrified. In the case of a drop of the water temp. the machine do the operation for preventing the drop of water.
When water temp. is 2℃, press. feed pump runs and heater is turned on.
When water temp. is 10℃, then pump stops and heater is turned off.

4. Inspection and maintenance items

4-1.Inspection items

Inspection point	Inspection item	Inspection frequency				Remarks
		Daily	Weekly	Monthly	Quarterly	
Water level gauge	Water level between L and H	○				If water level lowers suddenly, check for water leakage.
Water pressure gauge	Water pressure is 0.4～0.63MPa	○				In case of pressure rise or flow rate fall, check piping, strainer, etc. for clogging. If the strainer is clogged, clean the strainer. If the piping system is clogged, clean the water circuit.
Press. feed pump	Water leakage		○			Exchange sealing parts
	Abnormal noise				○	Exchange bearing
Refrigerant gauge discharge pressure	Pressure is 2.3MPa	○				Dusts filter stain
Dust filter	Adherence of dust and dirt	○				If necessary, increase the inspection frequency according to the ambient atmosphere or the degree of adherence.
Fan	Adherence of dust			○		Clean the fan
	Abnormal noise				○	Exchange fan
Water in Water tank	Contamination and scale			○		If contamination is excessive, change water. If necessary, increase the inspection frequency according to the water quality.

4-2. Cleaning of the dust filter

(1)Cleaning time

1.Every 2 weeks

2.When refrigerant high pressure is higher than 2.3MPa

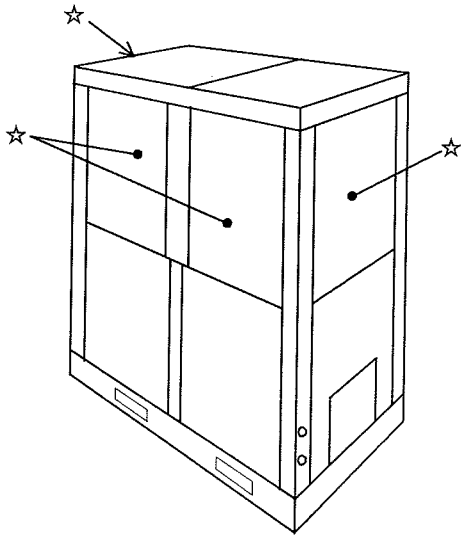
(2)Cleaning methods

◆To keep clean the dust filter, check soiled condition of dust filters and blow the soil out with air gun or with long hair brush.(Metallic is not available.)

◆ Wash dust filters with neutral detergent, when oil soil is attached to them.

Cooling capacity of the HYCOOL may decrease due to poor ventilation, when dust is attached. In the worst case, an emergency stop may be occurred by actuated safety devices.

◆Dust filter are built in upper front panel and both upper side panels.



Remove the panels marked with ☆, then remove the dust filter that is inside and clean it.

4-3.Exchange of water in water tank

(1)Exchanging method

1.Cut off the source power and circuit breaker.

2.Remove the front panel.

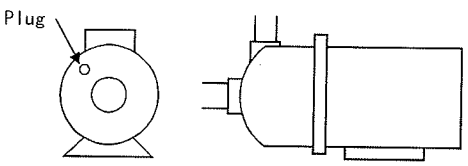
3.Open the drain valve.

4.Drain the whole water of the tank, then clean the inside of the water tank.

5.Replace the front panel (right) and close the drain valve, then supply water.

(2)Air purge when exchanging water

Purge the air prior to pump operation. When exchanging water.



1. Loosen the plug until water appears.
2. Tighen the plug completely when exchanging water.

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4-4. Consumables and maintenance parts (Note: pcs/set is use quantity per 1 set of these devices.)

●Consumables

(The parts which will be exchanged if the state exhausting was checked periodically and it has exhausted.)

Inspect the following parts periodically, and exchange it based on Exchange judgment standard.

Parts name	pcs/set	Inspection frequency	Exchange judgment standard※
Dust filter(front)	2	Every week	When it damages and – dirt does not come off
Dust filter(side)	2	Every week	When it damages and – dirt does not come off
Mechanical seal (For pumps)	1	Every week	When there is a leak or 8,000 hours (2 years)
O ring (For pumps)	1	—	At the time of mechanical seal exchange
Fan control switch	2	—	8,000 hours (2 years)
Box fan (For inverter cooling)	1	6ヶ月	When there are dirt and an allophone (2 years) 20,000 hours
Fuse	1	Every week	When it goes out
The element for Y type strainer		Every week	Water pressure is checked, and when high, it cleans at the time of a flux fall.. It exchanges, when it damages and – dirt does not come off.

※Be careful that it is not a guarantee value since the operation time (years) indicated changes with operating conditions (ambient temperature, installation environment, etc.). Years are a standard at the time of considering as 12 hours/day (Japan Electrical Manufacturer's Association (JEMA)) x 300 days of operating ratios.

※Those who have the knowledge and experience of piping, electricity, etc. need to perform exchange of parts. (When there are not these knowledge and experiences, please ask our company or a special contractor.)

●Periodic maintenance parts (The main parts for which exchange is needed with a use situation)

Check the following parts periodically and exchange them based on standard exchange time.

Parts name		pcs/set	How to exchange	Standard exchange time※
Solenoid valve	SV1a	1	B	15,000 hours (4 years)
Solenoid valve	SV1b	1	B	15,000 hours (4 years)
Compressor	CMa, CMb	2	B	20,000 hours (6 years)
Pressure feed pump	PM	1	A	20,000 hours (6 years) (Consumables are excluded.)
Pressure fan	FMa, FMb	2	A	20,000 hours (6 years)
Electromagnetic switch (For pumps)	MC5+OCR5 *1	1	A	20,000 hours (6 years)
Electromagnetic contactor (For compressors)	MC1+OCR1 *1 MC2+OCR2 *1	2	A	20,000 hours (6 years)
Electromagnetic contactor (For fan)	MC3+OCR3 *1 MC4+OCR4 *1	2	A	20,000 hours (6 years)
Programmable controller	PC	1	A	20,000 hours (6 years)
Temperature controller	TH	1	A	20,000 hours (6 years)
Inverter	INV	1	A	20,000 hours (6 years)

※ Keep in mind that it is not a guarantee value since the operation time (years) indicated above changes with operating conditions (ambient temperature, installation environment, etc.). Years are a standard at the time of considering as 12 hours/day (Japan Electrical Manufacturers' Association (JEMA)) x 300 days of operating ratios. Moreover, since time for the rate of failure in the case where you use it above this time to increase is shown, although it is not necessary to necessarily exchange, this exchange time is exchanged when the case where there are abnormalities at the time of check, and preventive maintenance are performed

・How to exchange

A : Those who have the knowledge and experience of piping, electricity, etc. Need to perform exchange of parts. (When there are not these knowledge and experiences, ask our company or a special contractor.)

B : Before part exchange, refrigerant recovery is required. Moreover, since technical knowledge is needed for exchange work, ask our company or a special contractor.

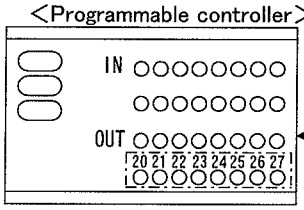
NOTE

*1 An electromagnetic switch is exchanged by the set, respectively.

Discontinue

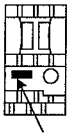
5. Trouble shooting and remedies

<Programmable controller>



These 8 lamp patterns tell the loation of the trouble.

<Electromagnetic switch>



Thermal relay reset button

	Lighting pattern (● : ON, ○ : OFF)	Contents of error	Remedy
①	20 21 22 23 24 25 26 27 ○ ○ ○ ● ○ ○ ○ ○	Abnormal water level (Too low water level)	☐ Supply water, and then press the RESET switch, and the error will be removed.
②	20 21 22 23 24 25 26 27 ○ ○ ● ○ ○ ○ ○ ○	Over current through press feed pump	☐ Turn off the main power switch, and after more than 1minute turn on the main power switch again. ○ Before restarting, check the following : ◆ Check the pump for locking or foreign substance. ◆ Check the pump for excessively high water feed pressure
③	20 21 22 23 24 25 26 27 ○ ● ○ ○ ○ ○ ○ ○	Too high water temperature	◆ Reduce load, and lower the ambient temperature. ◆ Adjust the water temp. setting value to a range of 25～30℃. ☐ After taking the above remedies, turn on RESET switch, and the error will be removed.
④	20 21 22 23 24 25 26 27 ● ○ ○ ○ ○ ○ ○ ○	Over current through compressor "a"	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, press the RESET button of the thermal relay of the electromagnetic switch KM1, then press the RESET switch, and the error will be removed.
⑤	20 21 22 23 24 25 26 27 ○ ○ ● ● ○ ○ ○ ○	Too high compressor "a" Temperature	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, turn on RESET switch, and the error will be removed.
⑥	20 21 22 23 24 25 26 27 ○ ● ○ ● ○ ○ ○ ○	Too high refrigerant "a" pressure	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, turn on RESET switch, and the error will be removed.
⑦	20 21 22 23 24 25 26 27 ● ○ ○ ● ○ ○ ○ ○	Frozen cooling water in evaporator "a"	☐ Press the RESET switch, and the error will be removed. Then check the following. ◆ Check to make sure that the cooling water is being fed.
⑧	20 21 22 23 24 25 26 27 ○ ● ● ○ ○ ○ ○ ○	Over current through fan motor "a"	☐ Press the RESET of the thermal relay of the electromagnetic switch MC3,then press the RESET switch, and the error will be removed. ◆ Check the condenser fan for locking or an object which hits the fan impeding the fan rotation.
⑨	20 21 22 23 24 25 26 27 ● ● ● ○ ○ ○ ○ ○	Over current through heater	☐ Press the RESET of the thermal relay of the electromagnetic switch MC5,then press the RESET switch, and the error will be removed.
⑩	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ● ○ ○ ○	Over current through compressor "b"	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, press the RESET button of the thermal relay of the electromagnetic switch MC2, then press the RESET switch, and the error will be removed.
⑪	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ○ ○ ● ●	Too high compressor "b" temperature	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, turn on RESET switch, and the error will be removed.
⑫	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ○ ● ○ ○	Too high refrigerant "b" pressure	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, turn on RESET switch, and the error will be removed.
⑬	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ● ○ ○ ●	Frozen cooling water in evaporator "b"	☐ Press the RESET switch, and the error will be removed. Then, check the following. ◆ Check to make sure that the cooling water is being fed.
⑭	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ○ ● ● ○	Over current through motor "b"	☐ Press the RESET button of the thermal relay of the electromagnetic switch KM4, then press the RESET switch, and the error will be removed. ◆ Check the condenser fan for locking make sure that the cooling water is being fed.

※1. In case of abnormal stop, wait at least 3 minutes, and the restart HYCOOL.
※2. Press the RESET switch continuously for at least 2 seconds.

Sympton	Cause	Remedies
POWER lamp dose not light up.	·No power supply	·Turn ON MAIN POWER switch
	·Abnormal power voltage	·Adjust to the specifed voltage
	·Blowing out of fuse, or operating of circuit breaker	·Replace the fuse, or close the circuit breaker
	·Defect of lamp	·Replace
RUN lamp dose not light up.	·Too short time from stop to restart.	·Wait at least 3 minutes after stop
	·Defect of starting switch	·Replace the starting switch
	·Defect of the lamp	·Replace the lamp
HYCOOL made an abnormal stop, but the ALARM lamp does not light up.	·Defect of the lamp	·Replace the lamp
Outlet water temperature is too high	·Too high setting value of thermo-controller	·Adjust the setting value
	·Overload ·Too high ambient temperature ·Too high outlet Water temperature, and too high water feed rate	·Adjust the specified range
	·Poor ventilation	·Improve the ventilation
	·Leakage of refrigerating gas	·Repair to prevent the leakage Charge gas
Too low outlet water temperature	·Too low setting value of thermo-controller	·Adjust the setting value
HYCOOL stopped during operation, and all the lamps went off	·Failure of main power supply	·Turn ON the MAIN POWER switch. Wait for the resumption of power supply after power failure
	·Abnormal power voltage	·Adjust to the specified voltage
	·Blowing out of fuse, or operating of circuit breaker	·Replace the fuse
PV valve in temp. controller is unstable or indicates abnormal valve	·Defect of temp. sensor ·defect of temp. controller	·Replace temp. sensor. In the case of no improvement replace temp. controller.

Sympton	Cause	Remedy
Over current through refrigerating compressor	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is too high	·Adjust to the specified range
	·Clogging of dust filter	·Clean the dust filter
	·Poor ventilation	·Improve the ventilation
	·Abnormal power voltage	·Adjust to the specified voltage
	·Defect of refrigerating compressor	·Repair the refrigerating compressor
Too high cooling water temperature	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is too high	·Adjust to the specified range
	·Clogging of dust filter	·Clean the condensor
	·Poor ventilation	·Improve the ventilation
	·Abnormal power voltage	·Adjust to the specified voltage
	·Too low setting of thermo-controller	·Adjust the setting value to within the applicable range
Over current through press feed pump	·Over load Too high water feed pressure	·Adjust to the specified range
	·Abnormal power voltage	·Adjust to the specified voltage
	·Defect of press feed pump	·Repair the press feed pump
	·Mixing of foreign substance in press feed pump	·Repair the press feed pump
Abnormal water level (Too low)	·Water leakage	·Repair to prevent water leakage
	·Defect of level switch	·Repair the level switch
Too low cooling water temperature	·Too low setting of thermo-controller	· Adjust the setting value to within the applicable range
	·Defect of solenoid valve	·Repair the solenoid valve
Abnormal Water pressure	·Defect of pressure control valve	·In crease the amount of sending water
Too low refrigerant temperature	·Lack of the circulating water	·In cases the amount of sending water
Over current through fan motor	·Abnormal power voltage	·Adjust to the specified voltage
	·Defect of motor fan	·Repair the motor fan
	·Foreign substance caught by fan motor rotation part.	·Remove the foreign substance
Too high refrigerant pressure	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is too high	·Adjust to the specified range
	·Clogging of condenser	·Clean the condenser
	·Abnormal power voltage	·Adjust to the solenoid valve
Too high refrigerating compressor temperature	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is too high	·Adjust to the specified range
	·Clogging of dust filter	·Clean the dust filter
	·Abnormal power voltage	·Adjust to the specified voltage
	·Defect of refrigerating compressor	·Repair the refrigerating compressor

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6. Other document

6-1.Specifications

Name of product				HYCOOL
Items				HYW6033D
Service range	Installation placed			Splash-proof type
	Range of ambient temp.			-5～43℃
	Range of ambient humidity			40～80% RH
	Electric power			3 phase 200V AC, 50/60Hz　220VAC 60Hz
	Service media			Water
	Range of outlet water pressure			0.4～0.63MPa
	Range of outlet temp. control			15～30℃
Capacity	Cooling capacity (Water outlet temp. at 20℃、Ambient temp. at 40℃)		kW	30.9/33.7
			kcaℓ/h	26600/29000
	Outlet water temp. Control			±1℃
	Water flow rate (*1)			240ℓ/min
Electric specific-ations	Electric consumption			21/22 kW
	Running current			25.6/26.3 A
	Control circuit			24VDC /200V AC
	Remote control signal			Dry contact,　Status 1a
	Alarm signal			Dry contact,　Operation 1a/Abnormality 1b
	Protective devise	Power source		Circuit breaker
		Control circuit		Fuse
		Compressor		Over current relay
		Feed pump		Over current relay
		Feed pump		Over current relay
		Refrigerant circuit		High pressure switch
	display	Electric power		Orange
		Running		Green
		Alarm		Red
Connecting ports	Water inlet			Rc $1^{1}/_{2}$
	Water outlet			Rc $1^{1}/_{2}$
	Water supply			Rc $^{1}/_{2}$
	Over flow & Drain outlet			Rc $^{3}/_{4}$
	Drain pan			Rc $^{1}/_{2}$
Others	External dimensions	Width(mm)		1600
		Depth(mm)		900
		Height(mm)		1800
	Painting color (Munsell No.)			5GY 7.5/0.5
	Mass of product			600 kg
	Water tank			95 ℓ
	Refrigerant			R-22

(*1) Water flow rate at water outlet pressure 0.4MPa

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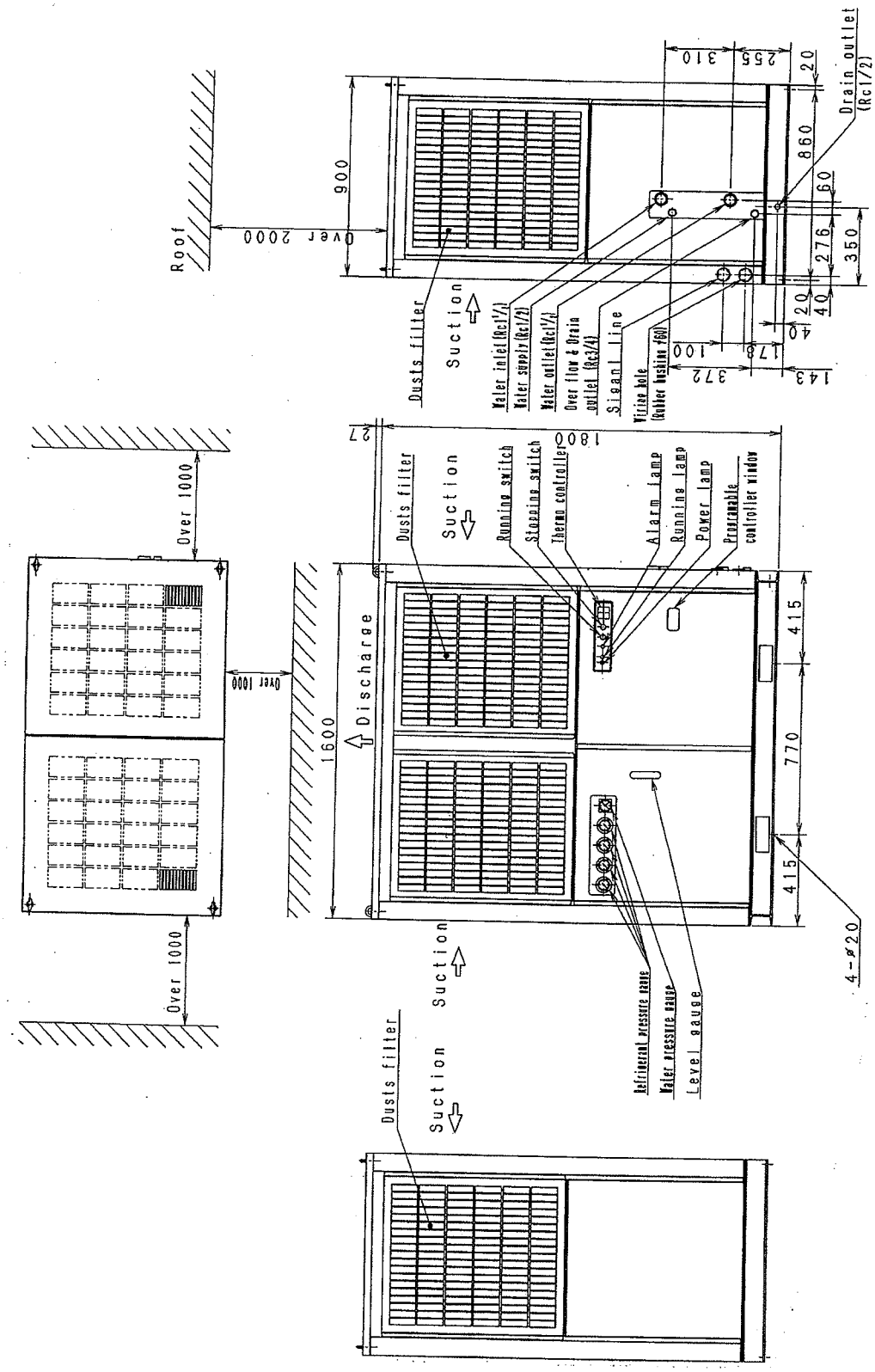
6-2.Outline drawing



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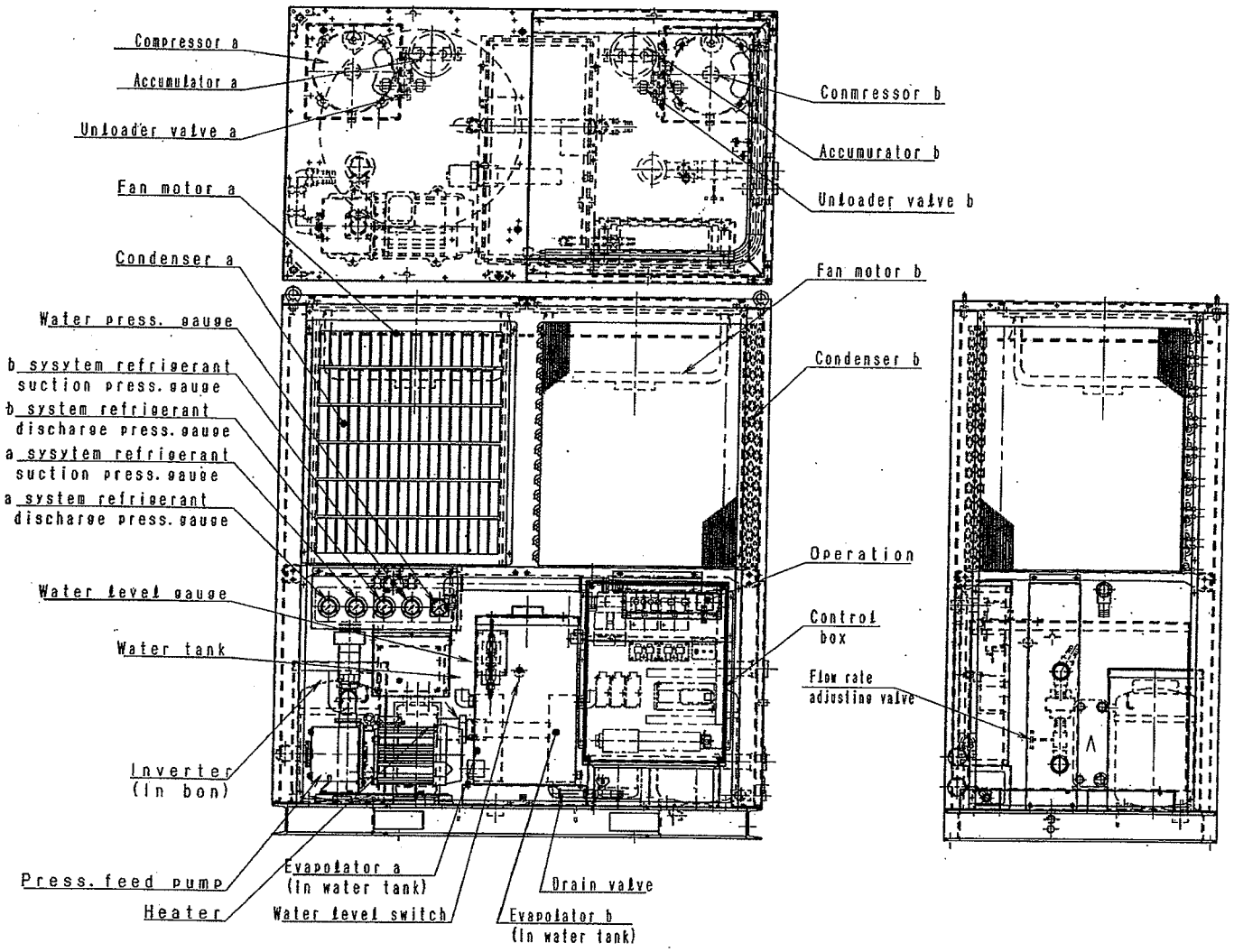
6-3.Inside structure drawing



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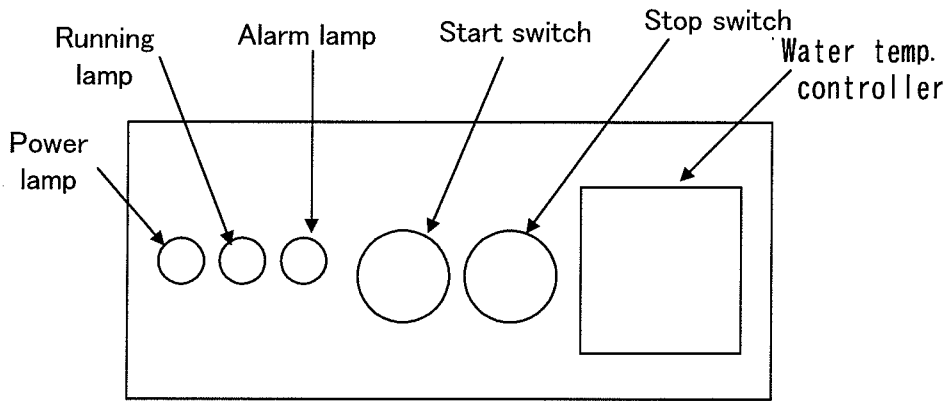
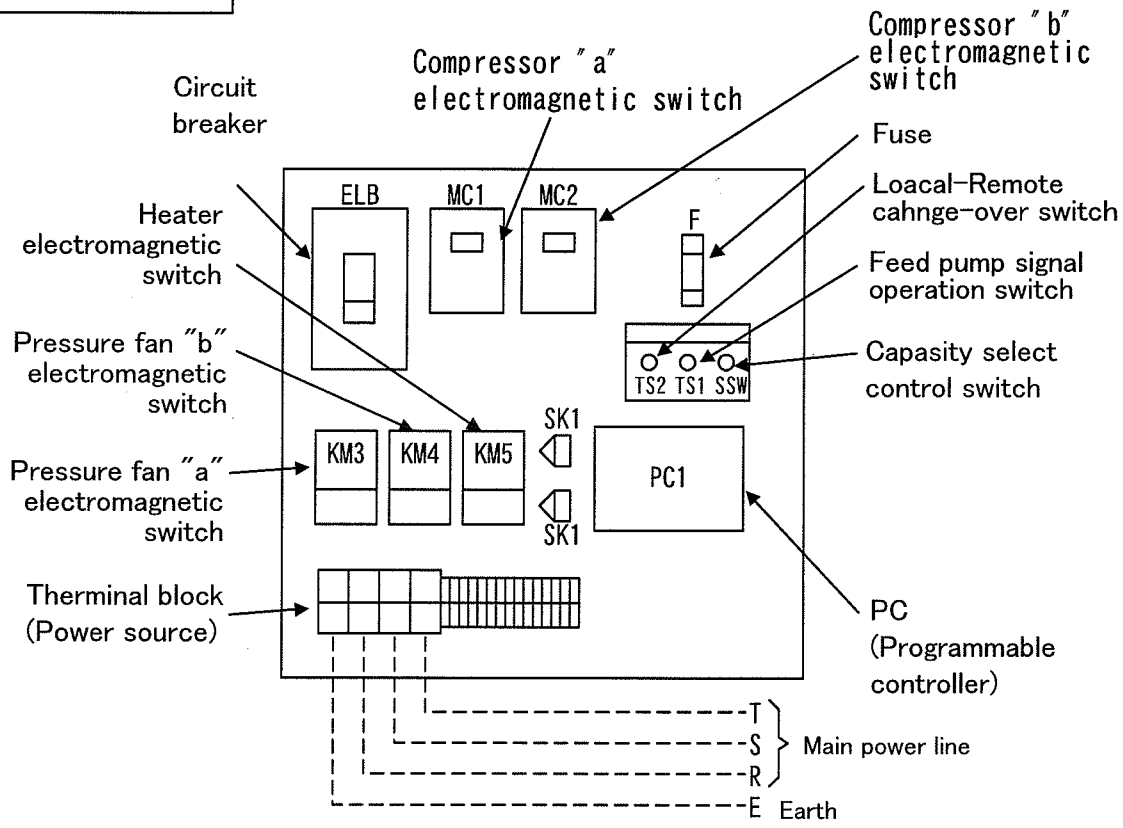
6-4.Control panel

Control panel



Enclosure



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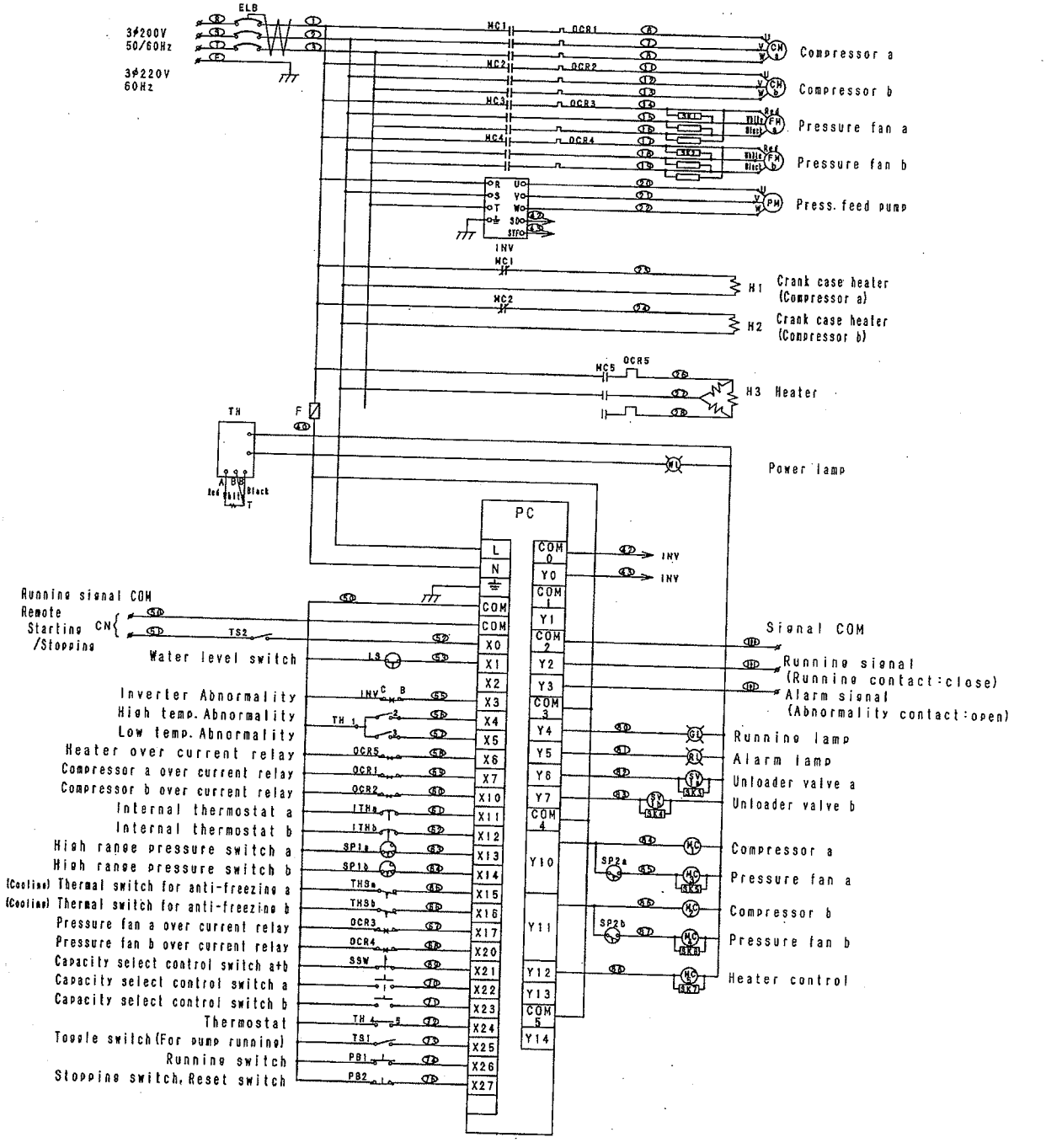
6-5.Electric circuit diagram

No.	Parts name	Q'ty
H3	Heater	1 3kW
BL.1	Crank case heater	2
SSW	Select switch	1
TS2	Toggle switch	1
THS 3,4	Temperature switch	2
SV1 1,2	Solenoid valve	2
PC	Programable controller	1
TS1	Toggle switch	1
WL	Indicating lamp	1
GL	Indicating lamp	1
RL	Indicating lamp	1
T	Temperature controller	1
TH	Thermostat	1
ITH 3,4	Internal thermostat	2
SP2 3,4	Fan control switch	2
SP1 3,4	High range pressure switch	2
LS	Water level switch	1
SK 5,6	Spark killer	3
SK 3,4	Spark killer	2
SK 1,2	Spark killer	2
PB2	Push button switch	1
PB1	Push button switch	1
F	Fuse	1 3A
INV	Inverter	1
MCS	Electromagnetic contactor	1
M C 3,4	Electromagnetic switch	2
M C 1,2	Electromagnetic contactor	2
OCR 1,2	Over current relay	3
OCR 1,2	Over current relay	2
PM	Press. feed pump	1
F M 1,2	Pressure fan	2
C M 1,2	Compressor	2
ELB	Earth leakage breaker	1 125A



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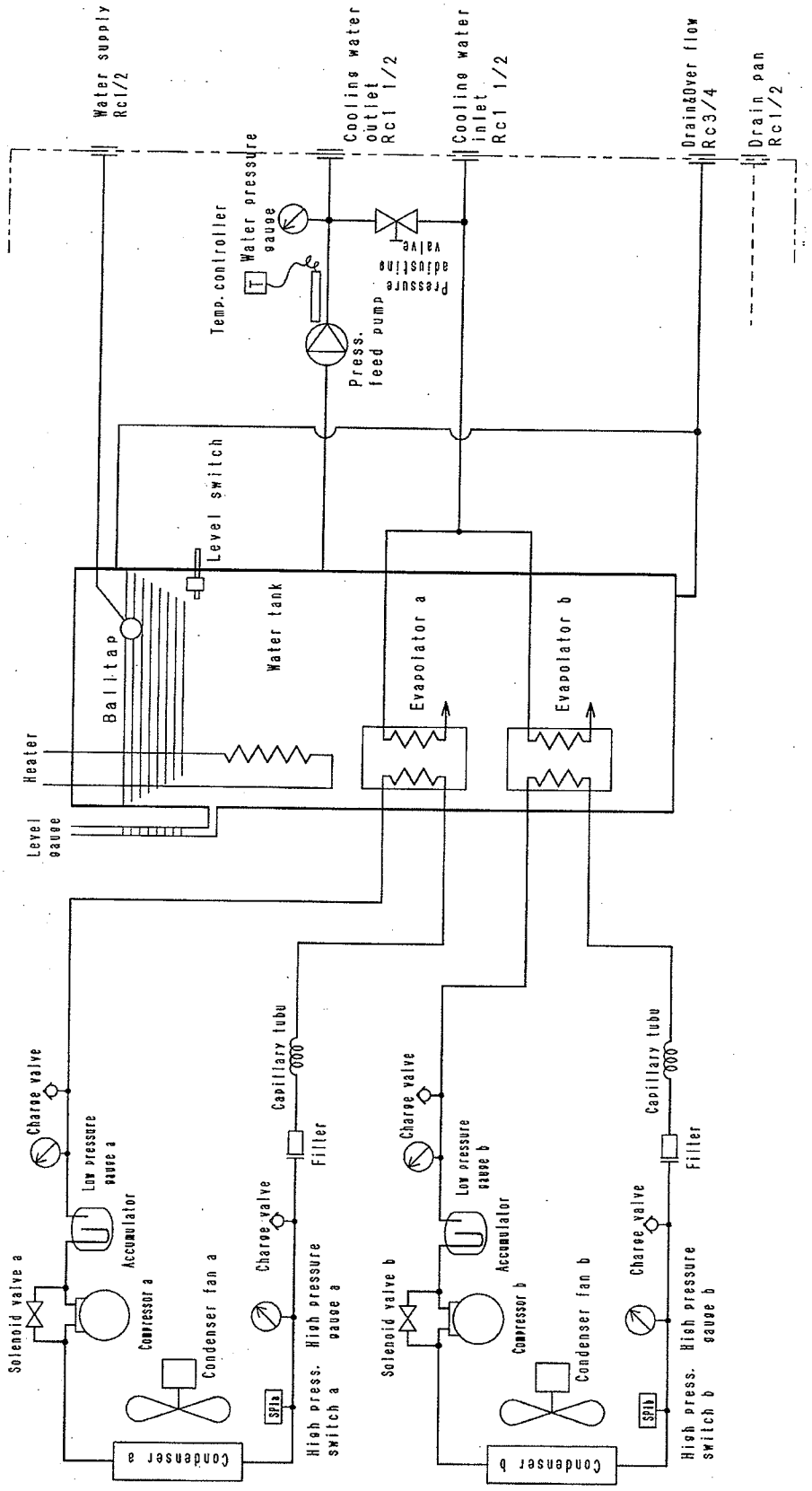
6-6.Flow chart



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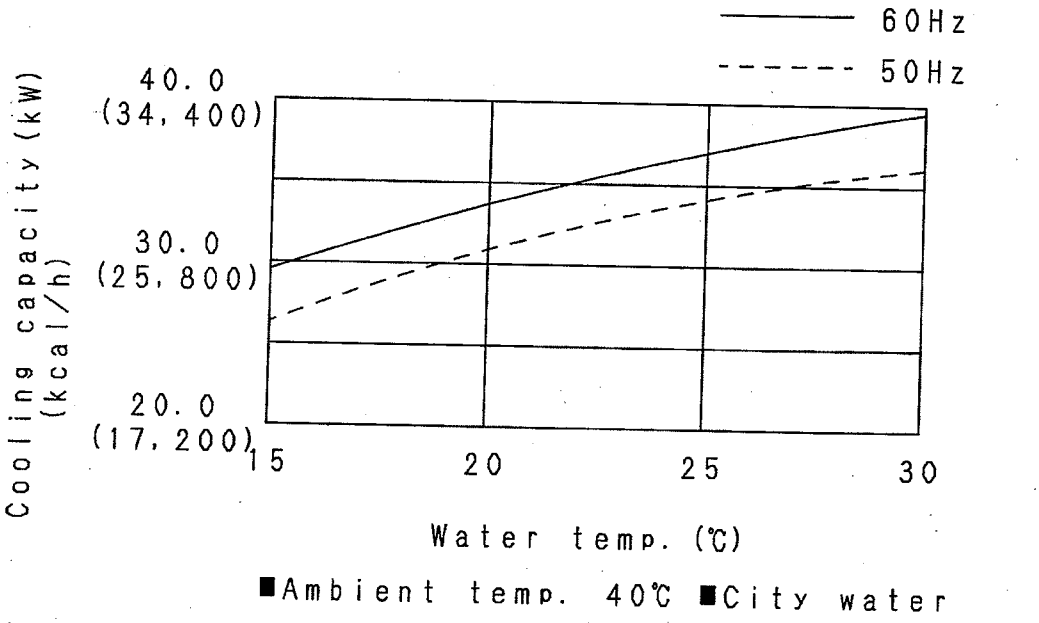
6-5.Performance curve

PERFORMANCE CURVE OF COOLING CAPACITY



PERFORMANCE CURVE FOR PRESS. FEED PUMP