Discontinue

CKD

HYCOOL

HYW5010·HYW5016
HYW5023·HYW5027

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

'07-01 17th EDITION SM-11946-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.

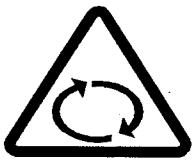
WARNING CAUTION

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.

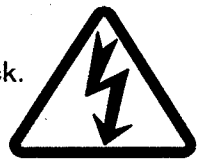
WARNING : Rotating device

★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.

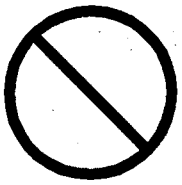


CAUTION : Hot surface

★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.

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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

HYCOOL is designed for Cooling the city water, not to use another liqid.

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

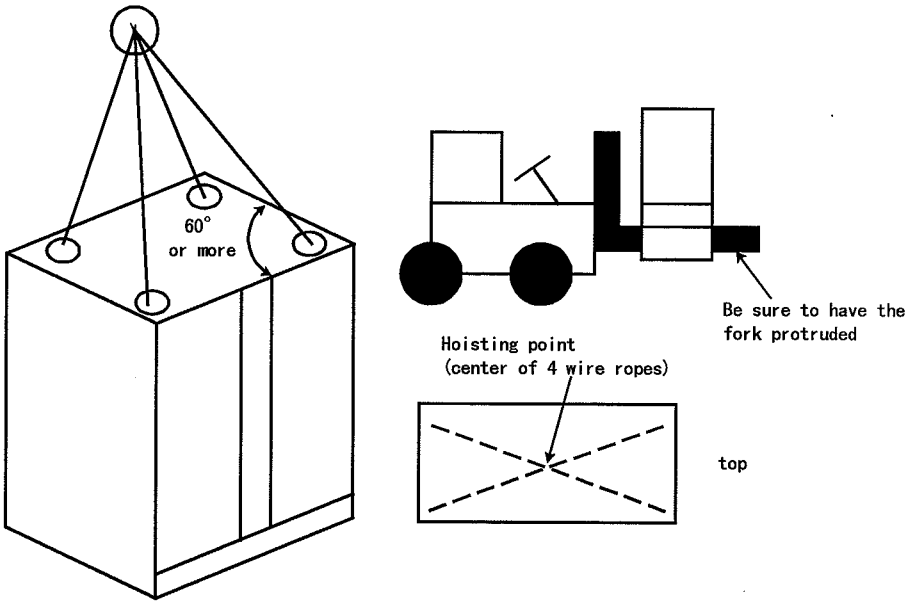
Pass the fork through the fork holes provided in the base of HYCOOL. Be sure to have the fork ends protruded from the HYCOOL base.

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.
(2) Do not install the HYCOOL in a place where corrosion 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 5～40℃.

1-4.Using

⚠ 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 dry running for pump.
- Do not touch the relief valve. Otherwise the HYCOOL may cause trouble.
- Do not exchange program of programmable controller. Warranty shall be invalidated.
- 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.

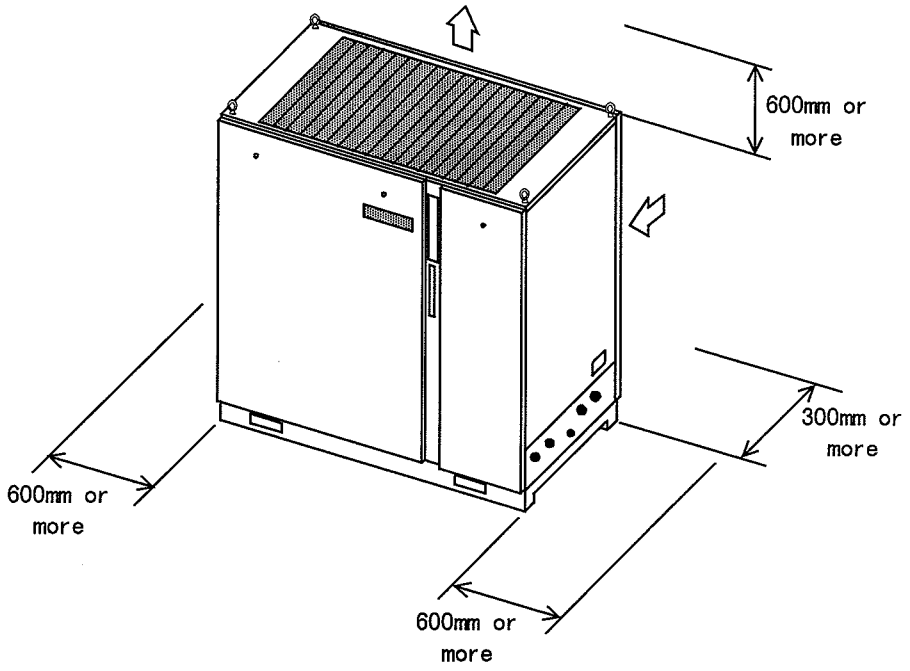
(2) Do not install the machine in a place where it is likely to by exposed to direct sunlight and where heat is likely to be generated.

(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)

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



(7) The operation ambient temperature range is 5 to 40°C. 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.

2-2.Wiring

(1)Be sure to an earth leakage breaker (Sensitivity : 100mA or less)and an over current device to the main power source.

(2)Be sure to wiring the earth.

(3)Power source : 3 phase 200V AC±10% 50/60Hz±1%.

(4)In connection to the power source, check the phase sequence and make sure of correct connection from right side wiring hole.

(5)In remote control, refer to the appended electric circuit diagram and make sure of correct connection.

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

		HYW5010	HYW5016	HYW5023	HYW5027
V V	Signal core	Over3. 5mm^2	Over 8mm^2	Over 14mm^2	Over 22mm^2
	Three core	Over 5. 5mm^2	Over 14mm^2	Over 22mm^2	Over 38mm^2
C V	Signal core	Over 3. 5mm^2	Over 3. 5mm^2	Over 8mm^2	Over 14mm^2
	Three core	Over 3. 5mm^2	Over 5. 5mm^2	Over 14mm^2	Over 22mm^2
Earth line		Over 3. 5mm^2	Over 3. 5mm^2	Over 8mm^2	Over 14mm^2
Protective device breaking current for protective device		30 A	40 A	60 A	75 A

2-3.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) Draw water from a city water service pipe, and set the pressure for water supply to approx. 0.1～0.2 MPa

(4) For the over flow, drain and drain pan drain ports, do not use risers. Also arrange for the prevention on back pressure on the piping.

(5) Provide a stop valve which can withstand the maximum working pressure to each pipe. Also provide a pressure gauge to the water supply and inlet/outlet pipes.

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

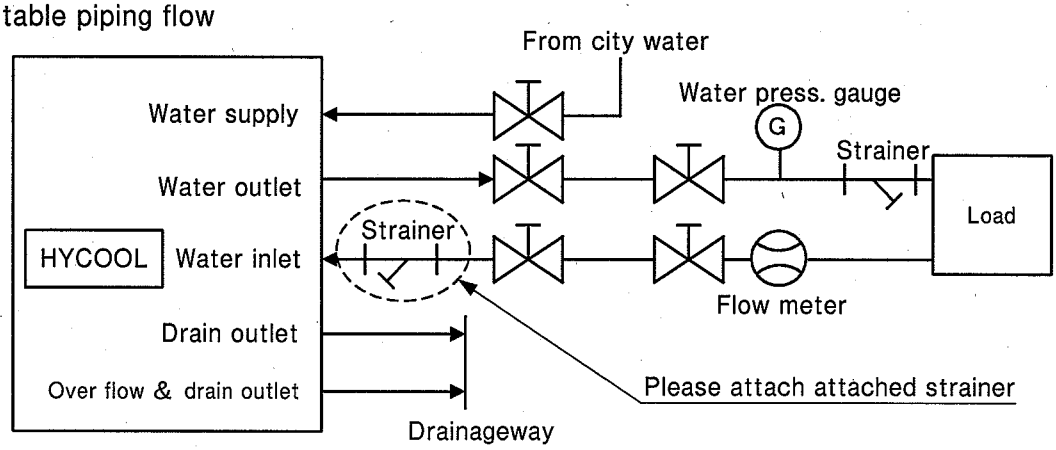
(7) The surface of the water inlet/outlet piping may have condensation depending on the ambient temperature and humidity condition. In order to prevent the falling of water drops due to condensation, keep the piping warm with an insulating material, if necessary.

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

⚠ CAUTION

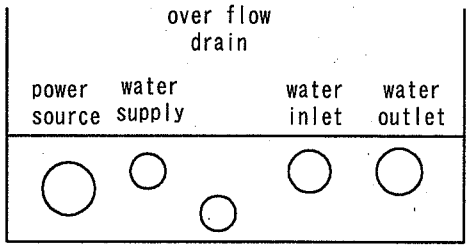
If garbage mixes in HYCOOL, there is a possibility that apparatus, such as a heat exchanger, may be damaged.

Suitable piping flow



(9) Piping size

	HYW5010 HYW5016	HYW5023 HYW5027
Water outlet	Rc 1	Rc $1^{1}/_{4}$
Water inlet	Rc 1	Rc $1^{1}/_{4}$
Over flow, Drain	Rc $^{3}/_{4}$	
Water supply	Rc $^{1}/_{2}$	
Drain outlet	Rc $^{1}/_{2}$	



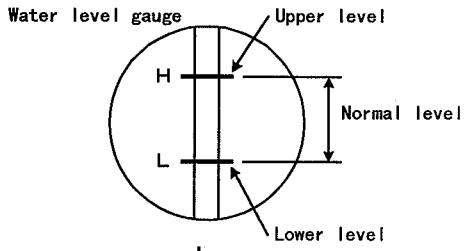
3. Operation

3-1.Water supply

(1)Water supply for water tank

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.

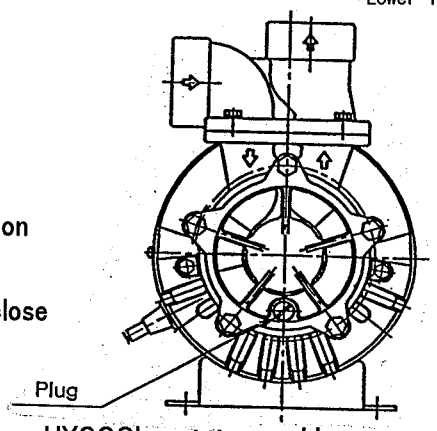
② Check with the water level gauge to make sure that the water level is within the normal water level range.



【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 close all the stop valves disposed between HYCOOL and the machine.

②Remove the front right panel.(Refer to next page : How to remove the panel)

③Turn ON the MAIN POWER switch.

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

④ Turn on the circuit breaker inside the enclosure. If water temperature is lower than 2℃, feed pump should run immediately. If the ALARM lamp is ON while the water level is within the normal water level range, diagnose the trouble by referring to 4-1. Troubleshooting.

⑤ Set the PUMP toggle switch to the ON side. If the power source is in the negative phase, the water pressure will not rise. Check the water pressure gauge. If the power source is in the negative phase, turn off the MAIN POWER SWITCH, and exchange 2 power wires out of the 3 power wires.

⑥Press. 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.

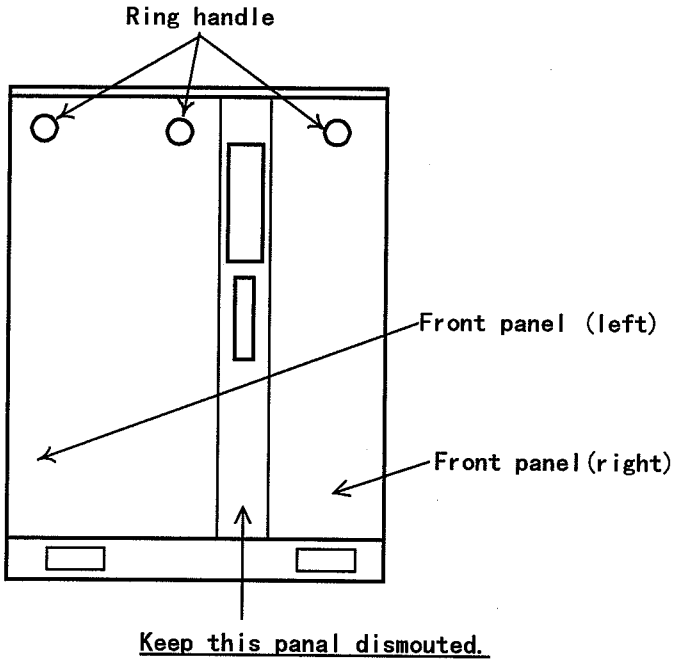
4) Retry this item again (It may happen for many times caused by pipeline capacity.

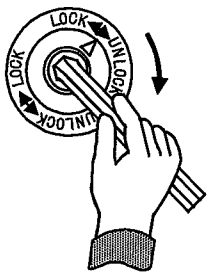
⑦Water supply to the load is complete.
Turn off toggle switch
⑧Attach a upper front panel (right) again.

WATER TANK CAPACITY	HYW5010、5016	70 ℓ
	HYW5023、5027	85 ℓ

3-2.Test run

(1) Remove the front panel(right).
(2) Check the water level gauge to make sure that the water level is with in normal water level range. Supply water to the tank directly, until its level reaches the normal range.
(3) Turn on the power source and circuit breaker.
After turning on the power, make sure that the power lamp is lit.
(4) Check of flow rate.
①Turn on feed pump running switch.
②As shown in suitable piping flow, if flow meter is established pipe line, check flow rate and pressure. Do not over pressure 0.5MPa. The feed pump may be defective.
③If there is not flow meter in pipe line, check the flow rate by water flow head chart.





In order to open the front panel, insert nominated size 5 or 3/16 hexagonal bar spanner into hexagonal hole in the center, and turn the spanner clockwise until triangle mark moved to 「UNLOCK」 from 「LOCK」. When closing it, turn the spanner reversely to 「LOCK」 position.

3-3.Thermo-controller

1)Setting of thermo-controller

(Delivery setting)

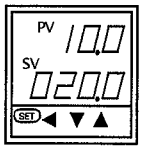
Setting value(SV)	20℃
Upper temperature limit	38℃
Lower temperature limit	2℃

(Setting of thermo-controller)

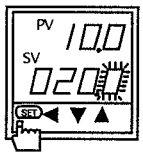
- Never change the parameters except for the setting value(SV), or otherwise trouble may be caused.
- Set the setting value(SV) within a range of 20-30℃.

(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.

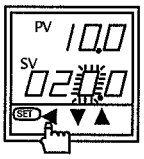


(1)Selection of setting value(SV) mode



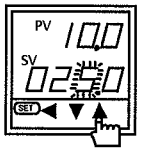
Press the [SET] mark of the set key to select the setting value(SV) mode. Upon the setting value(SV) mode is selected, the lowest digit lamp (right end) lights up. The setting of the digit for which the lamp is ON is ready for changed.

(2)Changing(shifting of lighted digit)



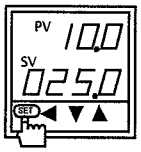
Press the [◀] mark of the setting digit shift key to shift the lighted digit to the first digit.

(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)Close all panels expect front panel(right).
(2)Turn on source power.
(3)Turn on circuit breaker in the enclosure.
◆Power lamp lit.
(4)Close front panel(right).
(5)Push start switch on control panel.
(6)Running lamp lit and HYCOOL run.
◆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.
(7)Check to make sure that the actually measured value (PV) is stable near the setting value (SV)
【CAUTION】 Never open the front panel during operation

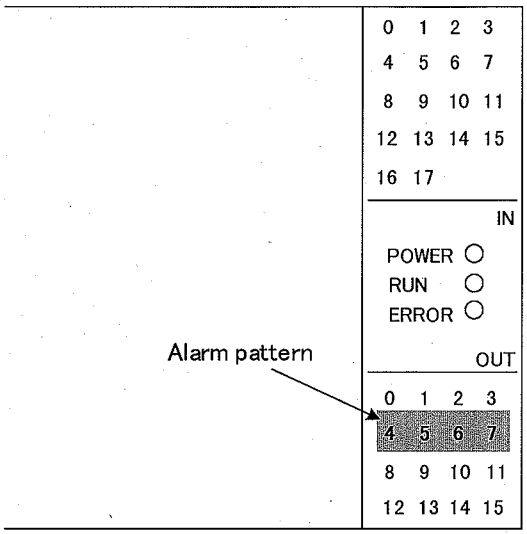
3-5.Stopping

Press the STOP switch.
HYCOOL dose not stop immediately. While the RUN lamp is flickering, the refrigerant circuit makes a pump down operation. Then, after about 30 seconds, HYCOOL comes to completely stop.
【CAUTION】 Do not turn OFF the MAIN POWER switch until HYCOOL stops completely

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.
(3) Never open the front panel.(left)
(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) Install HYCOOL in a place with good ventilation.
Do not place an object on the vent or close the vent.

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 off source power, if pipeline is table to freeze.

If water temp. is lower then 2℃, then feed pump start automatically and protect from freezing.

If water temp. is higher than 10℃, then anti freeze run stops automatically.

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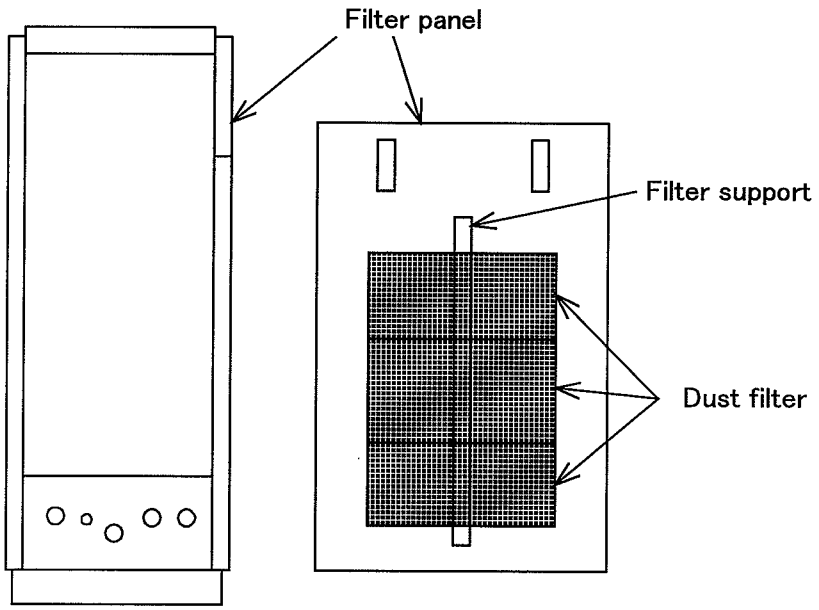
4. Inspection and maintenance items

4-1.Inspection items

Inspection point	Inspection item	Inspection frequency				Remarks
		Daily	Weekly	Monthly	Quarterly ~halfly per year	
Water level gauge	Water level between L and H	○				If water level lowers suddenly, check for water leakage.
Water pressure gauge	Within the specified range (under 0.63 MPa)	○				In case of pressure rise or feed 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.
Dust filter	Adherence of dust and dirt		○	○		If necessary, increase the inspection frequency according to the ambient atmosphere or the degree of adherence.
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 dust filter

- Cleaning the regularly and keep cleaned condition.
  Use neutral detergent for greasy dusts.



①Lower the side latch and pull it this side. Then lift the filter panel to remove.
②After removing the filter sopport, pull the filters this side to remove.

4-3.Exchange of water in water tank

(1) Remove the front panel(right).
(2) Cut off the source power and circuit breaker.
(3) Close the stop valve for water supply.
(4) Open the drain valve.
(5) Replace the front panel (right) and close the drain valve, then supply water.

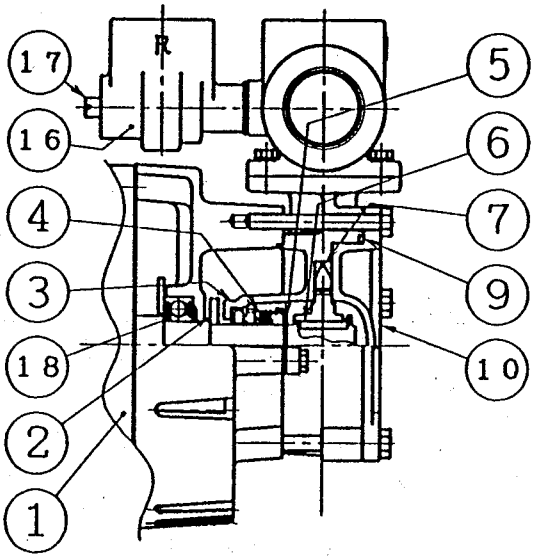
4-4.Exchange parts of press. feed pump.

○HYW5010, HYW5016・・・32UT150　　○HYW5023, HYW5027・・・40UT150

NOTE: Always turn off the earth leakage breaker and the power source before inspection.

Structure

Sectional view



Parts number	Description	Quantity
1	Electric motor	1
2	Deflector	1
3	Casing	1
4	Mechanical seal	1
5	C-type shaft retaining ring	1
6	Key	1
7	Impeller	1
9	O ring	1
10	Casing cover	1
16	Relief valve	1
17	Pressure screw	1
18	Ball Bearing	2

Consumable items: Consumable items are products which are consumed or worn out with use from lubricating oils, packing, mechanical seals, etc.

(1) Replace the consumable items according to the following table.

Consumable goods	Mechanical seal	Ball bearing
Recommended replacement timing	When water leakage is detected	When noise level is high, or abnormal noise is detected. When grease leakage is detected.
Replacement cycle	Every year	Every second or third year

(2) When ordering spare parts, check the pump nameplate to specify the correct pump model and manufacturing number (No.) .

Please refer to the parts list to make sure the parts number and description of the necessary spare parts.

Disassembly/Assembly

1. Remove casing cover mounting bolt(s).
2. Extract the impeller from the main shaft.
3. Remove the key and locking pin from the main shaft.
4. Extract the rotary ring from the mechanical seal.
5. Remove main unit mounting bolt(s), and remove the casing from the motor. The mechanical seal fixing ring can be removed along with the main unit. Be sure not to damage the mechanical seal.
6. Re-assembly is the reverse of disassembly. Please follow the instructions below.
   (1) Clean the sliding surface of the mechanical seal with a dry cloth to prevent damage.
   (2) Turn the main shaft by hand to see if it moves smoothly and lightly.
   (3) Use a new O ring.
   (4) Replace the worn or damaged parts with new parts.
   (5) Tighten bolts gradually and symmetrically. The tighteness should be equal on both sides.
   (6) Insert a screwdriver into a vent hole of the motor bracket on the opposite side of the pump to check that the fan rotates lightly.
   (If the fan rotates abnormally, inspection must be carried out again.)
   Now, the assembly is complete.

Discontinue

4-5. 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	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	1	—	8,000 hours (2 years)
Fuse	1	Each time	When it goes out
The element for Y type strainer	1	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	SV1	1	B	15,000 hours (4 years)
Solenoid valve	SV2	1	B	15,000 hours (4 years)
Solenoid valve	SV3 *1	1 *1	B	15,000 hours (4 years)
Compressor	CM	1	B	20,000 hours (6 years)
Pressure feed pump	PM	1	A	20,000 hours (6 years) (Consumables are excluded.)
Pressure fan	FM	2 *2	A	20,000 hours (6 years)
Electromagnetic switch (For pumps)	MC1+OCR1 *3	1	A	20,000 hours (6 years)
Electromagnetic contactor (For compressors)	MC2+OCR2 *3	1	A	20,000 hours (6 years)
Electromagnetic contactor (For fan)	MC3+OCR3 *3	1	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)

※ 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

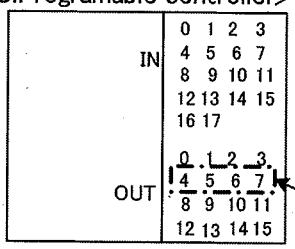
*1 HYW5010 ・・・It is two of valves SV1 and SV2.

*2 HYW5010 ・・・It is one pressure fan.

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

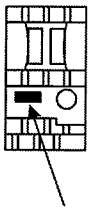
5. Trouble shooting and remedies

<PC:Programable controller>



These 4 lamp patterns tell the location of the trouble.

〈Electromagnetic switch〉



Reset swicth

No	Lighting pattern (●:ON, ○:OFF)	Contents of error	Remedy
①	4 5 6 7 ○ ○ ○ ●	Abnormal water level (too low water level)	☐ Supply water, and then press the START/STOP switch, and the error will be removed.
②	4 5 6 7 ○ ○ ● ○	Over current through press feed pump	☐ Press the RESET button of the thermal relay of the electromagnetic switch MC1, then press. the STOP-RESET switch, and the error will be removed. ○ Before restarting, check the following : ◆ Check the pump for locking or foreign substance. ◆ Check the pump for excessively high water feed pressure
③	4 5 6 7 ○ ● ○ ○	Too high water temperature	◆ Reduce load, and lower the ambient temperature. ◆ Adjust the water temperature setting value to a range of 5~30℃. ☐ After taking the above remedies, press. the STOP-RESET switch, and the error will be removed.
④	4 5 6 7 ● ○ ○ ○	Over current through compressor	☐ Press the RESET button of the thermal relay of the electromagnetic switch, then press the STOP-RESET switch, and the error will be removed. ○ Before restarting, check the following : ◆ Reduce load, and lower the ambient temperature.
⑤	4 5 6 7 ○ ○ ● ●	Too high compressor Temperature	
⑥	4 5 6 7 ○ ● ○ ●	Too high refrigerant pressure	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, press. the START/STOP switch, and the error will be removed.
⑦	4 5 6 7 ● ○ ○ ●	Frozen cooling water in evaporator	☐ Press the STOP-RESET switch, and the error will be removed. Then, check the following . ◆ Check to make sure that the cooling water is being fed.
⑧	4 5 6 7 ○ ● ● ○	Over current through fan motor	☐ Press the RESET button of the thermal relay of the electromagnetic switch MC3, then press. the STOP-RESET switch, and the error will be removed. ○ Before restarting, check the following : ◆ Check the fan for locking or an object which hits the fan impeding the fan rotation.
⑨	4 5 6 7 ● ○ ● ○	Water pressure is abnormal	☐ Press the STOP-RESET switch, and the error will be removed. Then, check the following. ◆ Check the external piping of HYCOOL for clogging. If valve, etc. Are closed, open then.
⑩	4 5 6 7 ● ● ○ ○	Too low water temperature	◆ Adjust the water temperature range 5~30℃. ☐ After taking the above remedies, press the STOP-RESET switch, and the error will be removed. If the error can not be released, drain and then replenish the tank. (When water in tank is drained, the "abnormal water level" error is caused. After supplying the specified volume of water, press the STOP/RESET switch to release the error.)
⑪	4 5 6 7 ● ● ○ ●	Ref. pump down error	☐ After taking the above remedies, press the STOP-RESET switch, and the error will be removed.
⑫	4 5 6 7 ● ● ● ○	Abnormal PC	☐ After taking the above remedies, press the STOP-RESET switch, and the error will be removed.

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

Sympton	Cause	Remedy
POWER lamp dose not light up	·No power supply	·Turn ON MAIN POWER switch
	·Abnormal power voltage	·Adjust to the specified voltage
	·Blowing out of fuse , or operating of circuit breaker	·Replace the fuse, or close the circuit breaker
	·Defect of lamp	·Replace the lamp
RUN lamp dose not light up.	·Too short time from stop to restart	·Wait least 3 minutes after stop
	·Defect of lamp	·Replace the lamp
HYCOOL made an abnormal stop, but the ERROR lamp does not light up.	·Defect of the lamp	·Replace the lamp
OVERLOAD lamp dose not light up	·Dust filter is dirty	·cleaning the dust filter
	·Poor ventilation	·Improve the ventilation
	·Overload ·Too high ambient temperature ·Too high outlet water temperature, and too high water feed rate	·Adjust to the specified range
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 to the specified range
	·Poor ventilation	·Improve the ventilation
	·Leakage of refrigerating gas	·Repair to prevent the leakage. Change 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 , or close the circuit breaker
	·Pressing of the EMERGENCY switch	·Pull OFF the EMERGENCY switch

Sympton	Cause	Remedy
Abnormal water level (Too low)	·Water leakage	·Repair to prevent water leakage
	·Closing of water supply valve	·Open the water supply valve
	·shortage of water supply pressure	·Adjust to the specified pressure
	·Cutoff of water supply	·Wait for the resumption of water supply
	·Defect of level switch	·Repair the level switch
Over. current through press feed pump	·Over load Too high water feed pressure	·Adjust to the specified voltage
	·Abnormal power voltage	
	·Defect of press feed pump	·Repair the press feed pump
	·Mixing of foreign substance in press feed pump	·Remove foreign substance in pump
Too high cooling water temperature	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is to 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 solenoid valve	·Repair the solenoid valve
	·Too low setting of thermo-controller	·Adjust the setting value to within the applicable range
Over curent through refrigerating compressor	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is to 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
	·Defect of solenoid valve	·Repair 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 to 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
	·Defect of solenoid valve	·Repair the solenoid valve
Too high refrigerant pressure	·Overload ·Ambient temperature is too high ·Cooling water inlet temperature is too high and water feed rate is to high	·Adjust to the specified range
	·Clogging of dust filter	·Clean the dust filter
	·Abnormal power voltage	·Adjust to the specified voltage
Too low cooling water temperature	·Defect of solenoid valve	·Replace the solenoid valve. If water is frozen, wait for defrosting
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
Abnormal water level (too low)	·defect of press. control valve	·repair the press. control valve
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

Discontinue

6. Other document

6-1.Specifications

Name of product			HYCOOL			
Items			HYW5010	HYW5016	HYW5023	HYW5027
Service range	Installation placed		Indoor			
	Range of ambient temp.		5～40℃(Freezing not allowed)			
	Range of ambient humidity		40～80% RH			
	Electric power		3 phase 200V AC, 50/60Hz			
	Service media		Water			
	Max. Working Pressure		0.63 MPa			
	Range of outlet temp. control		5～30℃			
Capacity	Cooling capacity (*1)		8.3/9.5 kW	14.1/16.2 kW	21.3/23.3 kW	24.3/27.4 kW
	Outlet water temp. Control		±1℃			
	Water flow rate (*2)		60/82 ℓ/min		82/108 ℓ/min	
Electric specific-ations	Electric consumption		5/6 kW	7/9 kW	10/13 kW	14/17 kW
	Running current		17/20 A	25/30 A	41/45 A	49/50 A
	Control circuit		24VDC /200V AC			
	Remote control signal		Dry contact			
	Alarm signal		Dry contact			
	Protective devise	Power source	Circuit breaker			
		Electric power circuit	Fuse			
		Compressor	Over current relay Phase protector	Over current relay		
		Feed pump (Water circuit)	Over current relay			
		Pressure fan	Over current relay			
		Refrigerant circuit	High pressure switch			
	display	Electric power	Orange			
		Running	Green			
		Alarm	Red			
		Over load	Orange			
Connecting ports	Water inlet		Rc 1		Rc $1^1/_4$	
	Water outlet		Rc 1		Rc $1^1/_4$	
	Water supply		Rc $^1/_2$			
	Over flow & Drain outlet		Rc $^3/_4$			
	Drain pan		Rc $^1/_2$			
Others	External dimensions	Width(mm)	1200		1200	
		Depth(mm)	600		600	
		Height(mm)	1300		1500	
	Painting color (Munsell No.)		5GY 7.5/0.5, 9G4.5/10,3G 6.0/0.5			
	Mass of product		355kg	375 kg	400kg	435 kg
	Water tank		70 ℓ		85 ℓ	
	Refrigerant		R-22			

(*1) Cooling capacity is based on water outlet temperature
at 20℃ and ambient temperature at 32 ℃
(*2) The value shows water flow rate at water outlet pressure 0.25MPa

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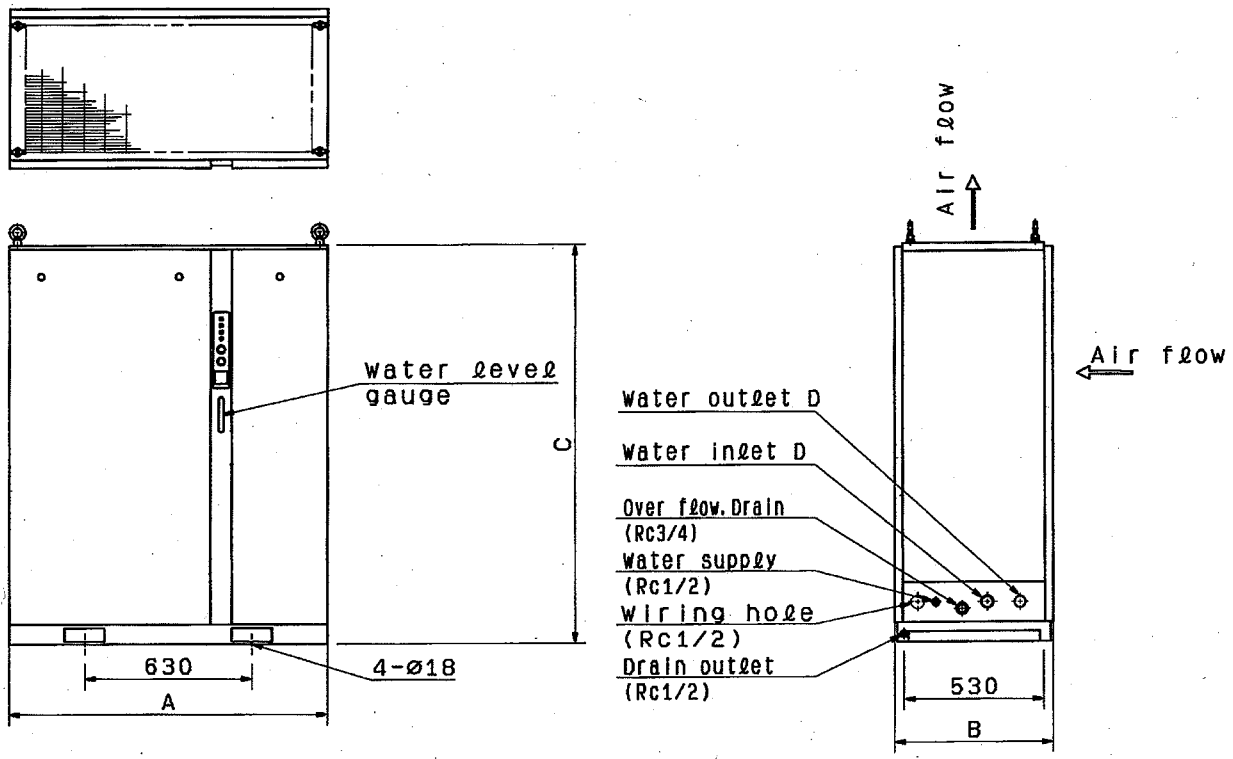
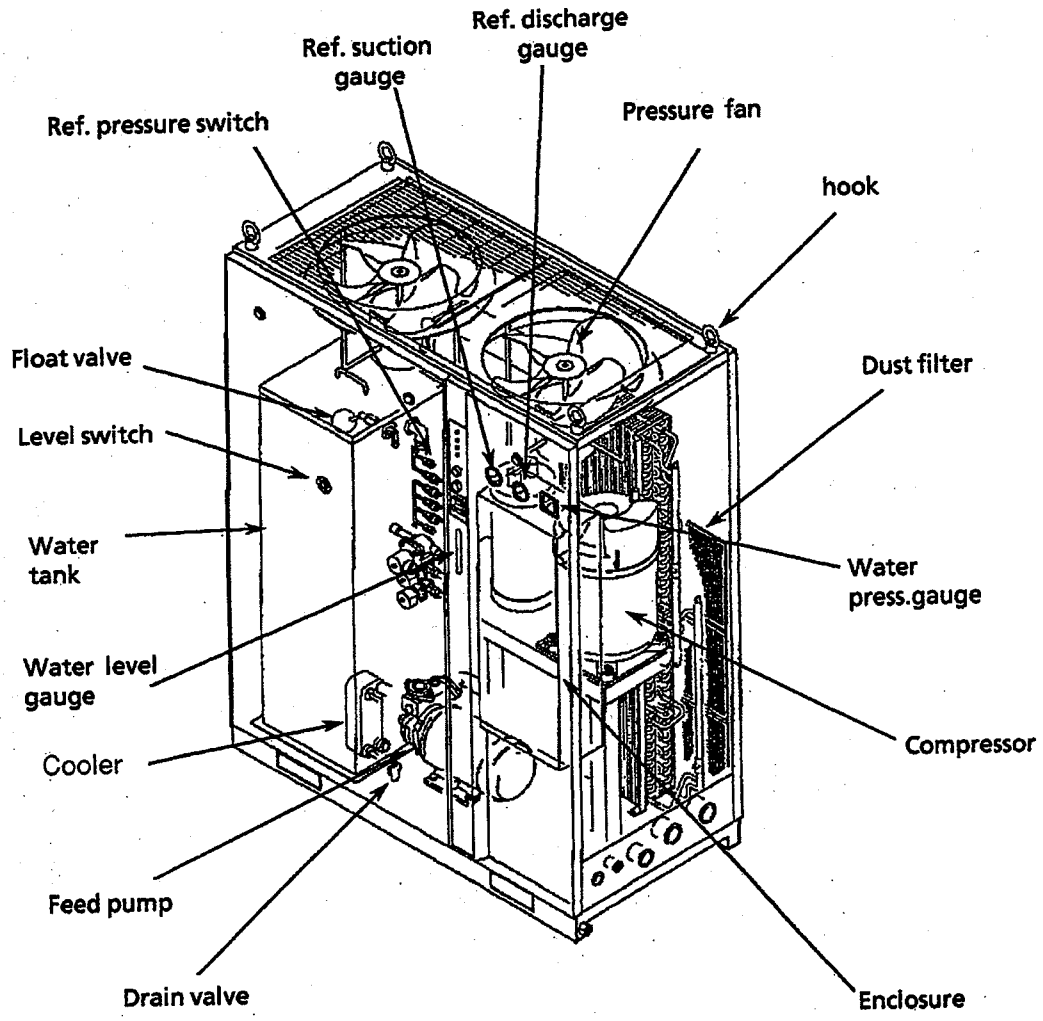
6-2.Outline drawing



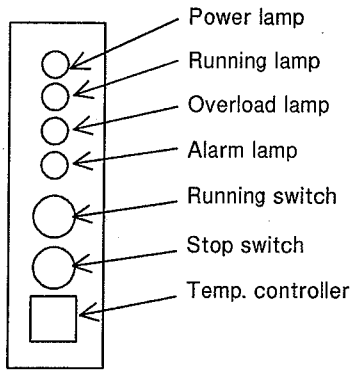
Mark / Model No.	A	B	C	D
HYW5010	1200	600	1300	Rc 1
HYW5016	1200	600	1300	Rc 1
HYW5023	1200	600	1500	Rc $1^1/_4$
HYW5027	1200	600	1500	Rc $1^1/_4$

6-3.Inside structure drawing

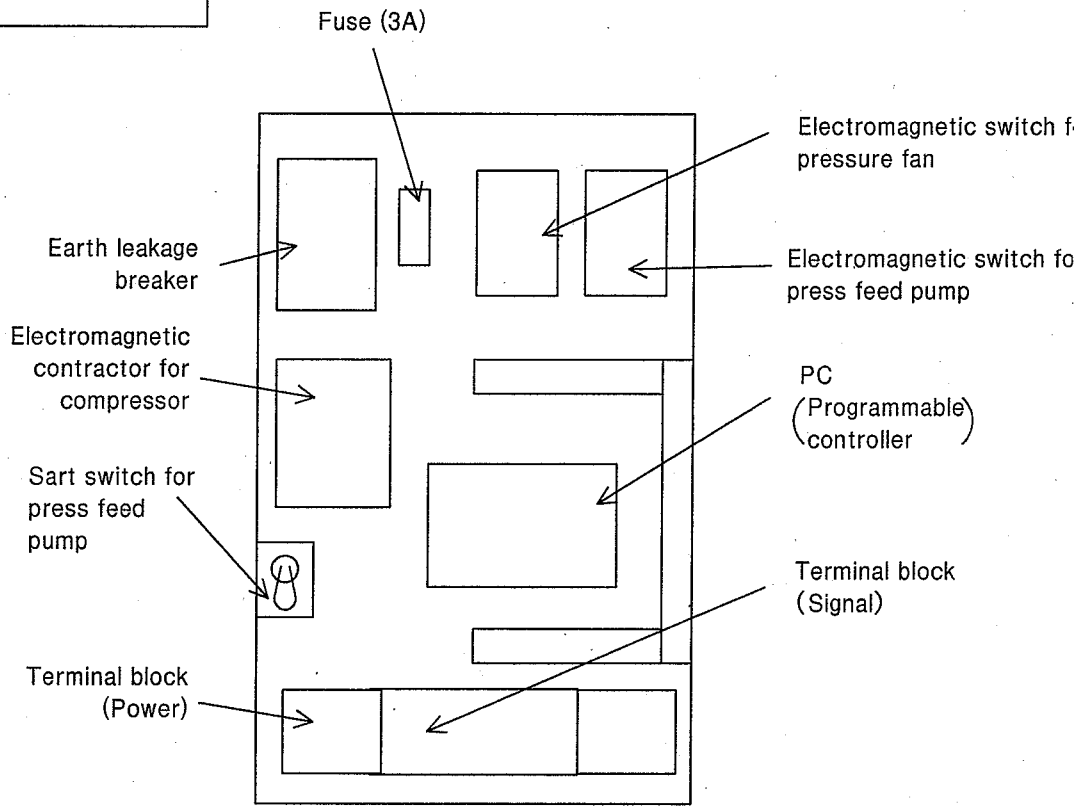


6-4.Control panel

Control panel



Enclosure



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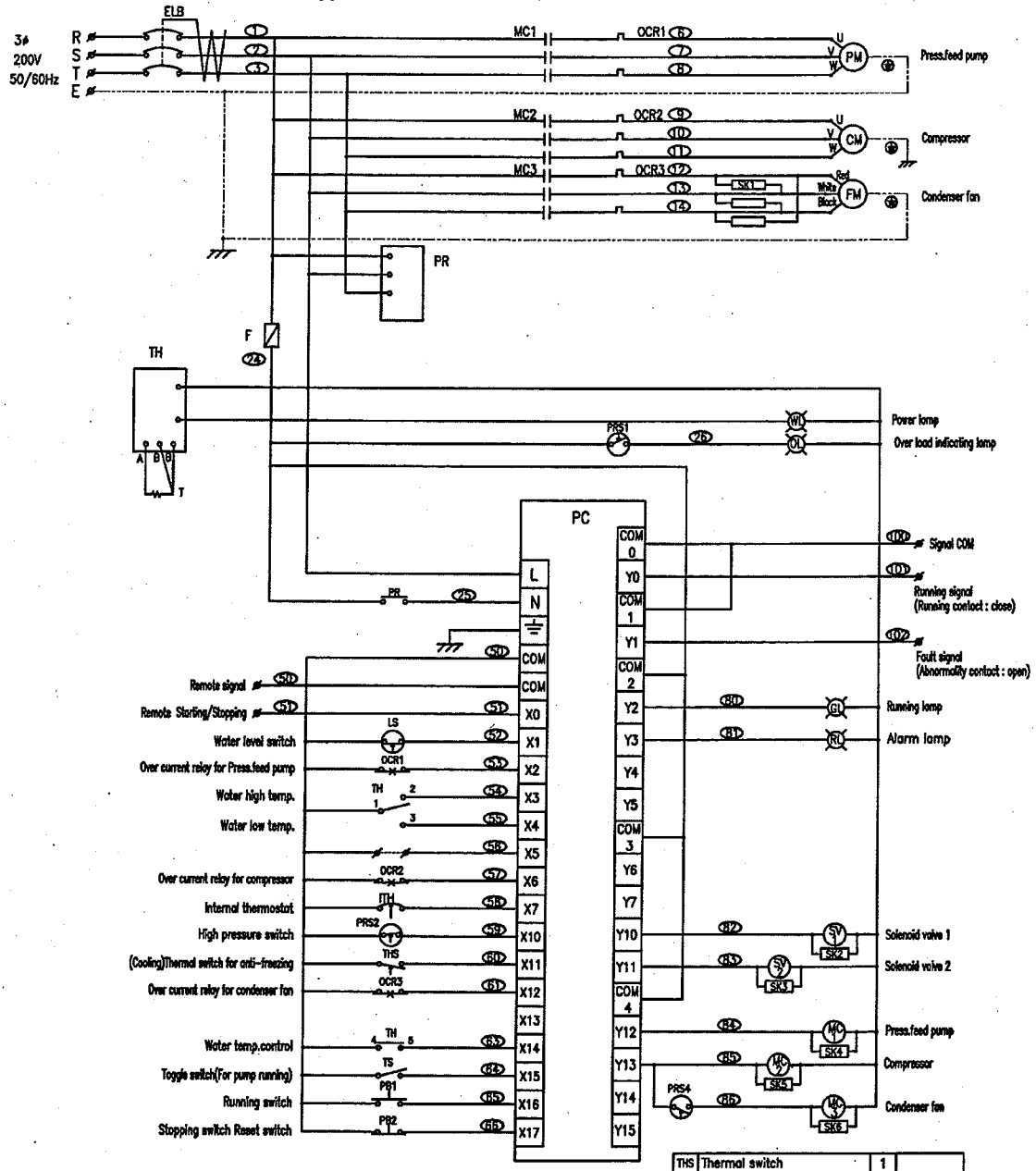
6-5.Electric circuit diagram HYW5010

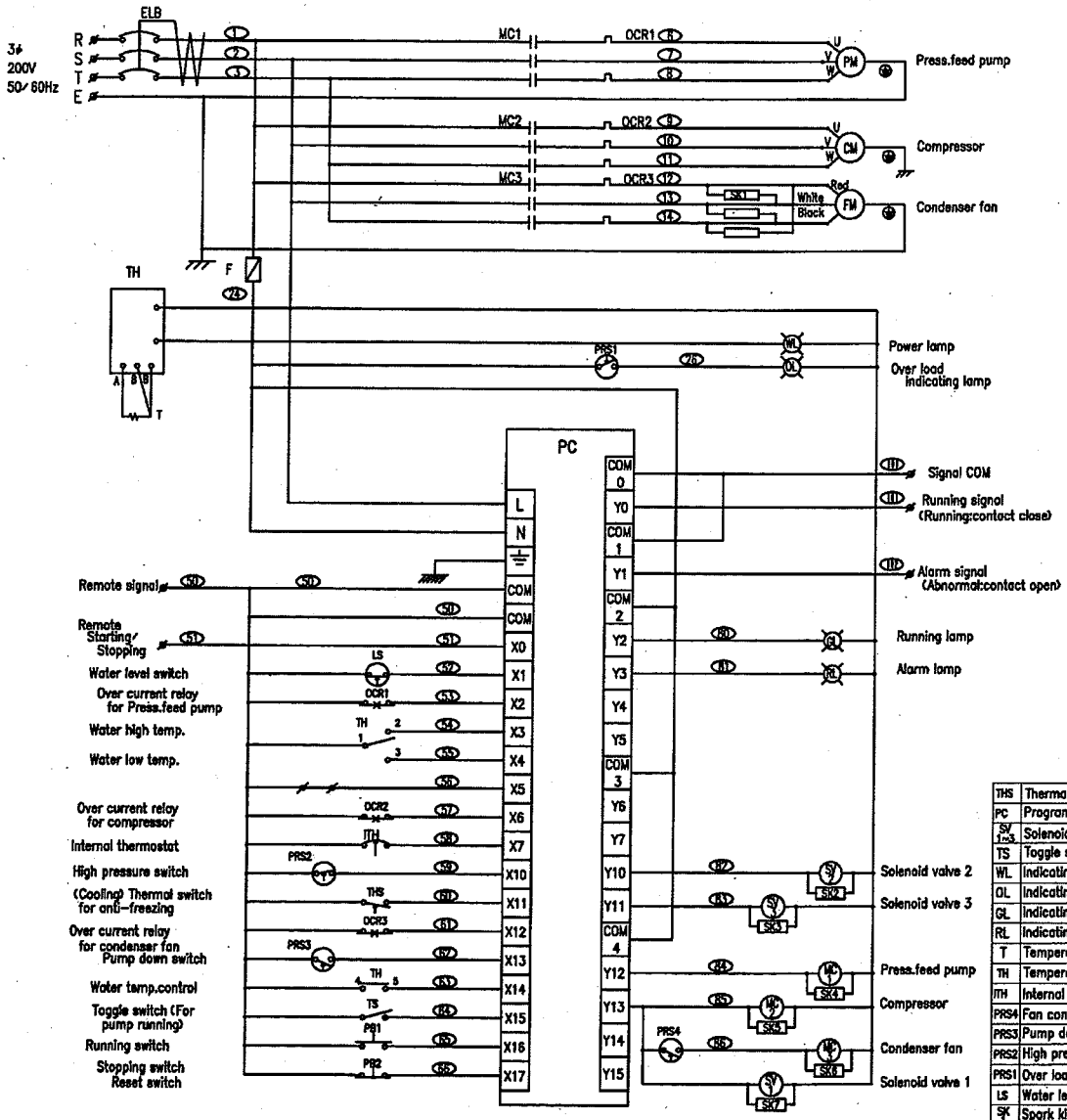


	OCR Set point
OCR1	8.5A
OCR2	19A
OCR3	1.3A

THS	Thermal switch	1	
PR	Phase protector	1	
PC	Programable controller	1	
SV 1~3	Solenoid valve	1/unit	Total:3
TS	Toggle switch	1	
WL	Indicating lamp	1	
OL	Indicating lamp	1	
GL	Indicating lamp	1	
RL	Indicating lamp	1	
T	Temperature controller	1	
TH	Temperature controller	1	
ITH	Internal thermostat	1	
PRS4	Fan controll switch	1	
PRS2	High pressure switch	1	
PRS1	Over load switch	1	
LS	Water level switch	1	
SK	Spark killer	1	
SK 4,5	Spark killer	1/unit	Total:2
SK 1,2,3	Spark killer	1/unit	Total:3
PB2	Push button switch	1	
PB1	Push button switch	1	
F	Fuse	1	3A
MC3	Electromagnetic switch	1	
MC2	Electromagnetic contactor	1	
MC1	Electromagnetic switch	1	
OCR3	Over current relay	1	
PM	Press.feed pump	1	
FM	Condenser fan	2	
CM	Compressor	1	
ELB	Earth leakage breaker	1	
品番 No	部品名 PARTS	数量 Q'TY	備考 REMARK

Discontinue

6-5.Electric circuit diagram HYW5016



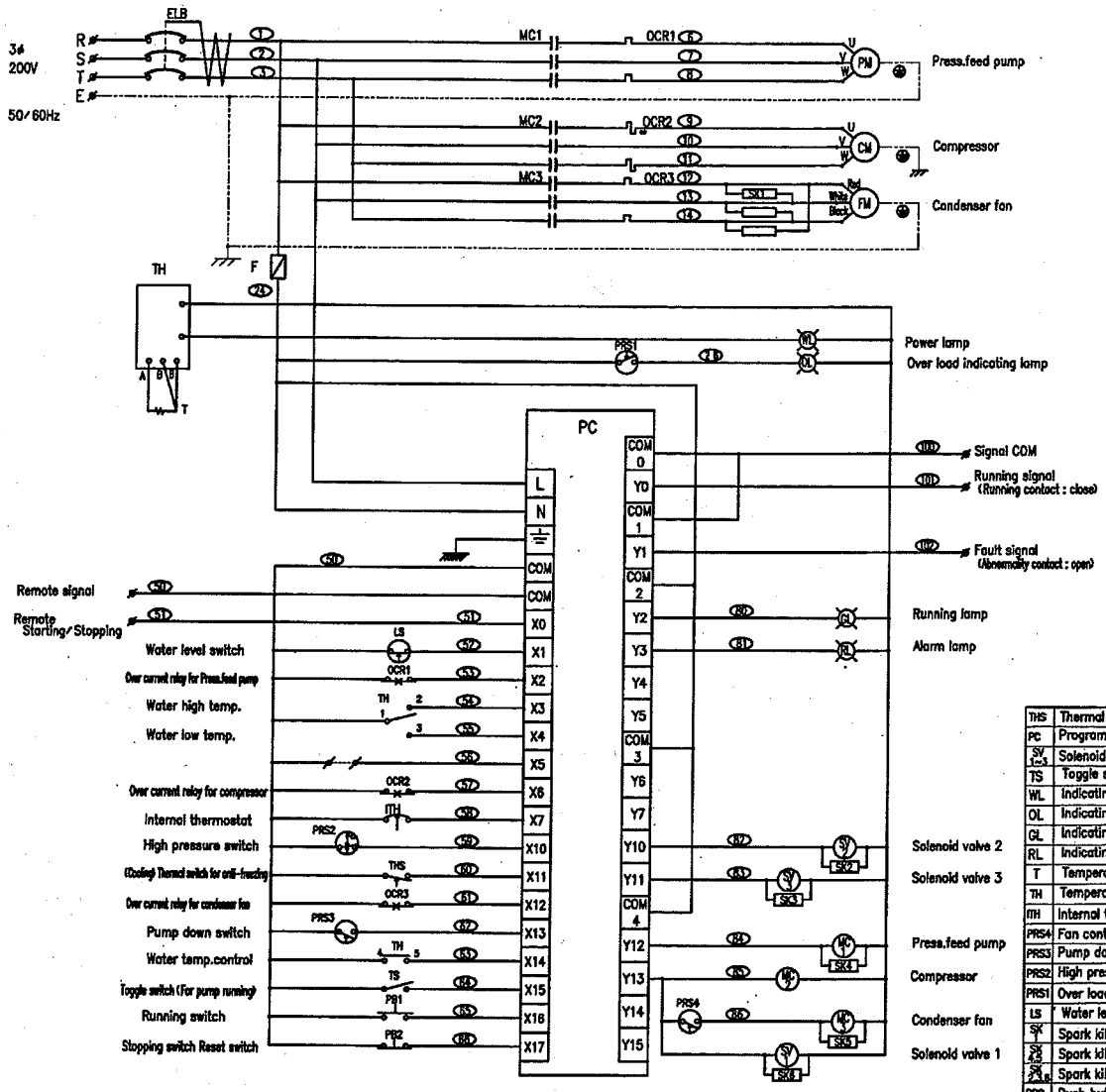
OCR Set point

	HYW3016	HYW5016
OCR1	5.0A	8.5A
OCR2	28A	28A
OCR3	3.2A	3.2A

THS	Thermal switch	1	
PC	Programable controller	1	
SV1~3	Solenoid valve	1 each	Total: 3
TS	Toggle switch	1	
WL	Indicating lamp	1	
OL	Indicating lamp	1	
GL	Indicating lamp	1	
RL	Indicating lamp	1	
T	Temperature controller	1	
TH	Temperature controller	1	
ITH	Internal thermostat	1	
PRS4	Fan controll switch	1	
PRS3	Pump down switch	1	
PRS2	High pressure switch	1	
PRS1	Over load switch	1	
LS	Water level switch	1	
SK	Spark killer	1	
SK1~3	Spark killer	1 each	Total: 3
SK4~7	Spark killer	1 each	Total: 3
PB2	Push button switch	1	
PB1	Push button switch	1	
F	Fuse	1	3A
MC3	Electromagnetic switch	1	
MC2	Electromagnetic contactor	1	
MC1	Electromagnetic switch	1	
OCR2	Over current relay	1	
PM	Press.feed pump	1	
FM	Condenser fan	2	
CM	Compressor	1	
ELB	Earth leakage breaker	1	
品番 No	部品名 PARTS	数量 QTY	備考 REMARK

Discontinue

6-5.Electric circuit diagram HYW5023·HYW5027



OCR Set point

	HYW3023	HYW5023	HYW3027	HYW5027
OCR1	8.5A	10A		
OCR2	46A		62A	
OCR3	4.2A		4.2A	

THS	Thermal switch	1	
PC	Programable controller	1	
SV1~3	Solenoid valve	1/unit	Total: 3
TS	Toggle switch	1	
WL	Indicating lamp	1	
OL	Indicating lamp	1	
GL	Indicating lamp	1	
RL	Indicating lamp	1	
T	Temperature controller	1	
TH	Temperature controller	1	
ITH	Internal thermostat	1	
PRS4	Fan controll switch	1	
PRS3	Pump down switch	1	
PRS2	High pressure switch	1	
PRS1	Over load switch	1	
LS	Water level switch	1	
SK1	Spark killer	1	
SK2,3	Spark killer	1/unit	Total: 2
SK4,5,6	Spark killer	1/unit	Total: 3
PB2	Push button switch	1	
PB1	Push button switch	1	
F	Fuse	1	3A
MC3	Electromagnetic switch	1	
MC2	Electromagnetic contactor	1	
MC1	Electromagnetic switch	1	
OCR2	Over current relay	1	
PM	Press.feed pump	1	
FM	Condenser fan	2	
CM	Compressor	1	
ELB	Earth leakage breaker	1	
No	PARTS	QTY	REMARK

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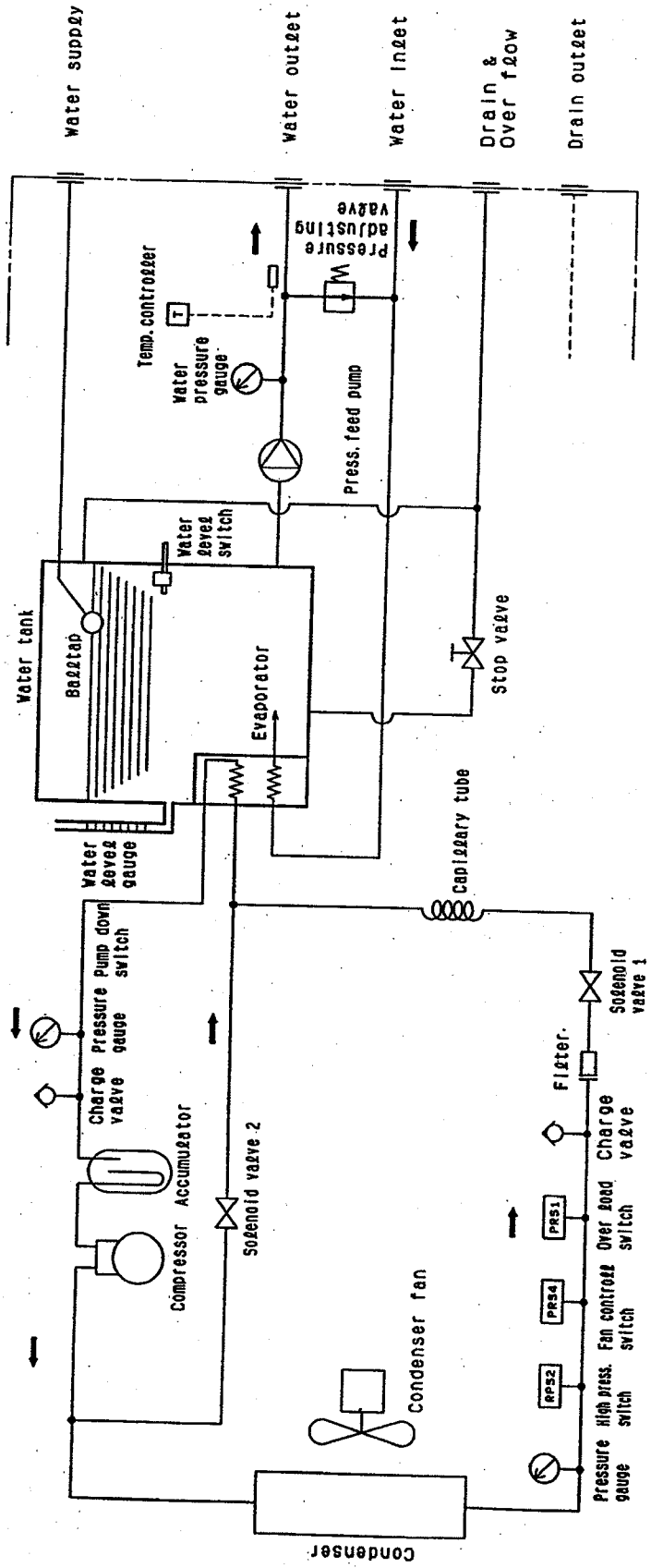
6-6.Flow chart HYW5010



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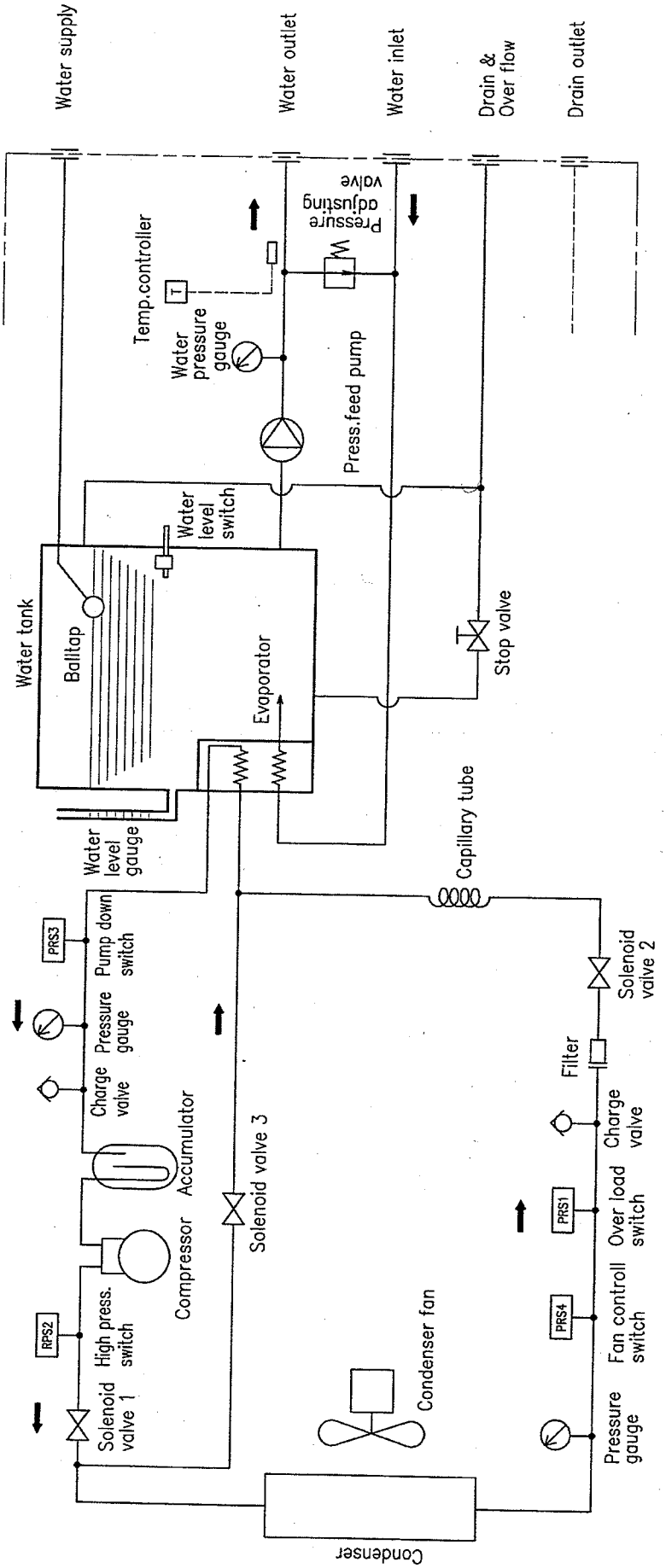
6-6.Flow chart HYW5016·HYW5023·HYW5027



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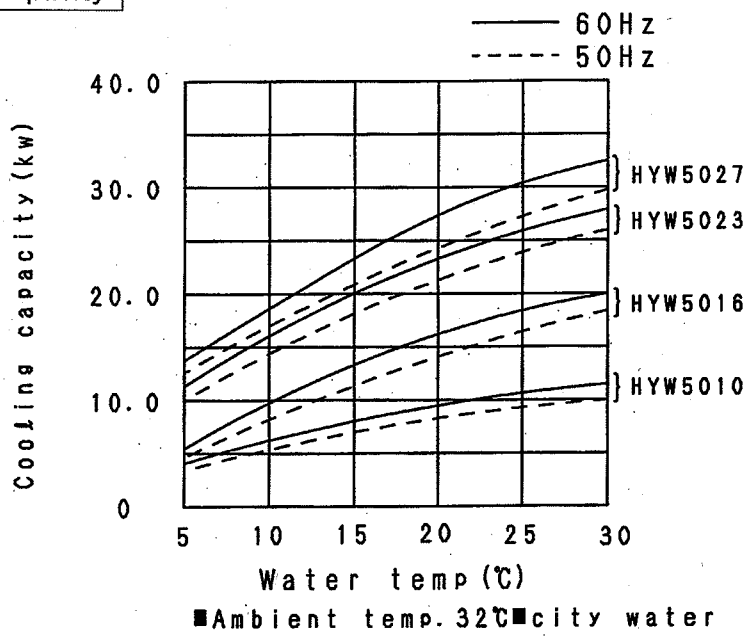
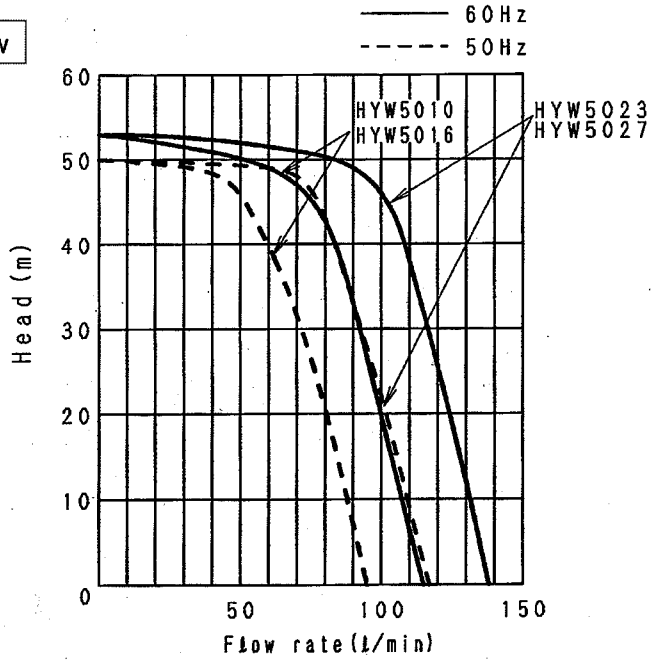
6-7.Performance curve

Cooling capacity



■Ambient temp. 32℃■city water

Water rate flow



Relief pressure 50Hz 0.5MPa