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CKD

HYCOOL
HYW2012・HYW2023・HYW2045

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
05-06 21th EDITION SM-11413-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.

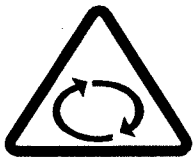
WARNING CAUTION

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.

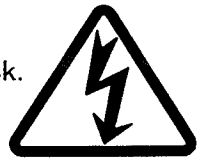
WARNING : Rotating device

★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.

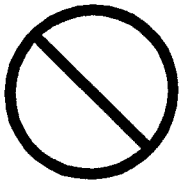


CAUTION : Hot surface

★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

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

1-2.Carriage

(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 HYCCOL base.

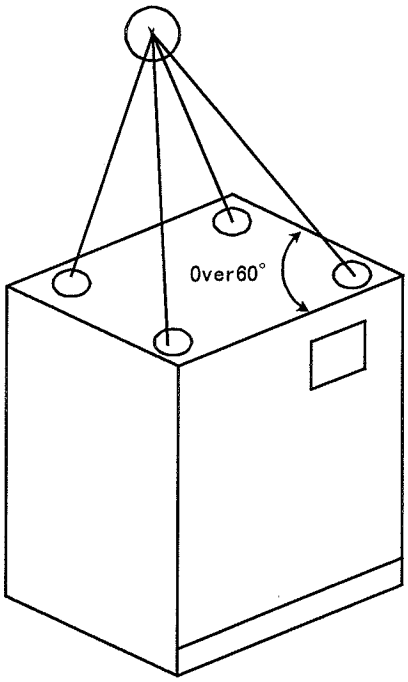
When hoisting

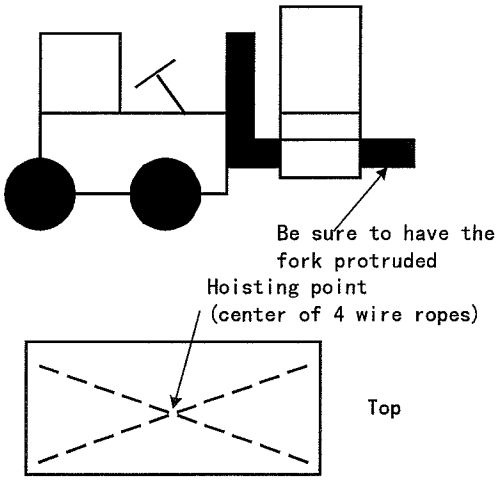
Use wire ropes with a sufficient strength.

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

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

(Hooks are optional parts.)





(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.
- Never try to touch electric components or wiring upon removing a panel while power is still kept ON.
  Never alter internal wiring of HYCOOL.

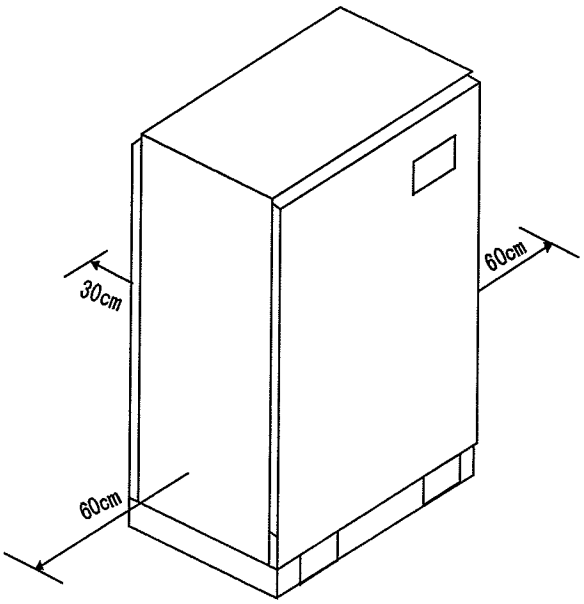
⚠ CAUTION

- While in running, not to open the panel. There are 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 for operation 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

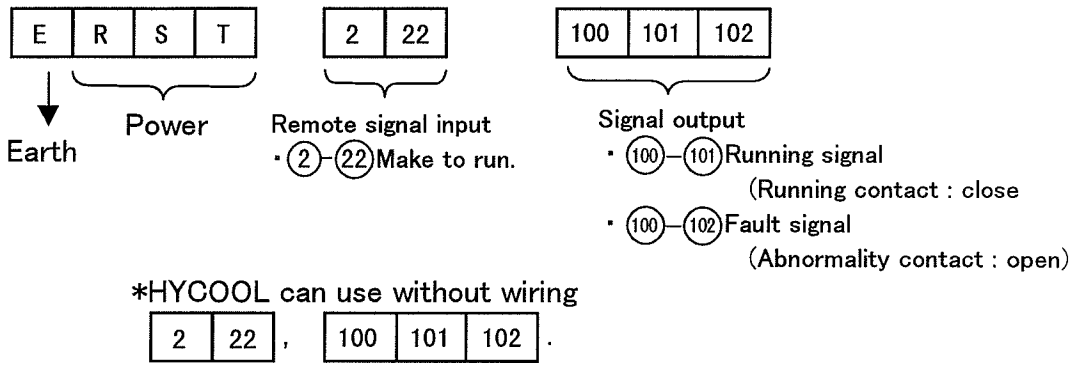
(1) Be sure to provide an earth leakage breaker(sensitivity:100mA or less) and an over current device to the main power source.

(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.

	HYW2012	HYW2023	HYW2045
Power source	3 phase 200V AC,50/60Hz		
Power cord [mm^2]	Over 1.25		Over 2.0
Breaking current [A]	10		15

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 : 0.5 MPa

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

(4) For the overflow, drain and drain pan drain ports, do not use risers. Also arrange for the prevention of 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.

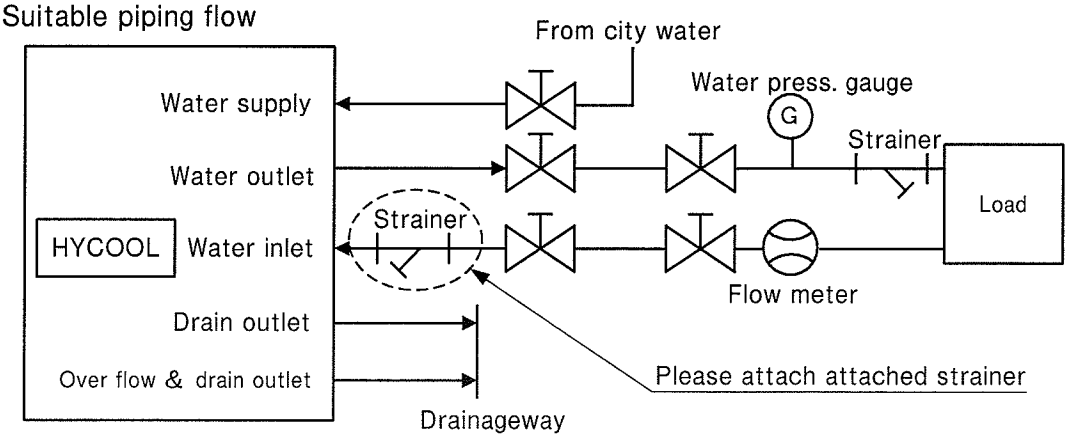
(7) The surface of the water inlet/outlet piping may have condensation depending on the ambient temperature and humidity condition. In order to prevent the falling of water drops due to condensation, keep the piping warm with an insulating material, if necessary.

(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



	HYW2012	HYW2023	HYW2045
Water inlet	Rc 1/2		Rc 3/4
Water outlet	Rc 1/2		Rc 3/4
Water supply	Rc 1/2		
Over flow, Drain	Rc 3/4		
Drain outlet	Rc 1/2		

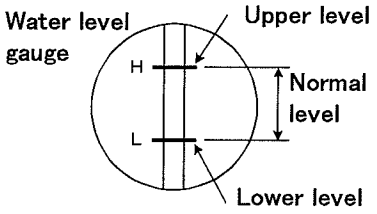
3. OPERATION

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.

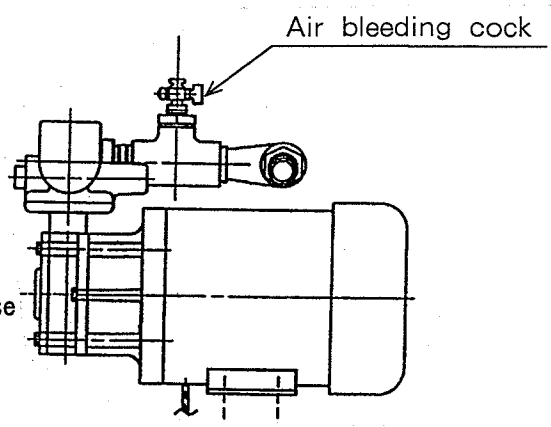
② Check with the water level gauge to make sure that the water level is within the normal water level range.



【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 panel.

③Turn ON the MAIN POWER switch.

【WARNING】

Never touch the changing part within the enclosure.
(Otherwise you may get an electric shock.)

④If water temp. is lower than 4℃, 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 『5.TROUBLESHOOTING FOR OTHER TROUBLES』.

⑤Set the PUMP toggle switch to the ON side.(Refer to 『6-4.Name of equipment』)
If the power source is in the negative phase, the water pump will not work and power lamp of PC will not light up. 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, turn on START/STOP switch [0] side after turn on [1] side 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 again.

WATER TANK CAPACITY	HYW2012	8.5 ℓ
	HYW2023	14 ℓ
	HYW2045	25 ℓ

3-2.Test run

(1)Remove the front panel.

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

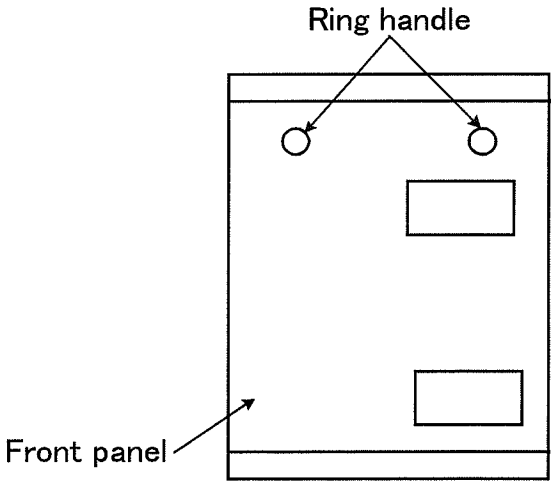
(3)Turn on the power source and circuit breaker.
After turning on the power, make sure that lamps of thermo-controller is lit.

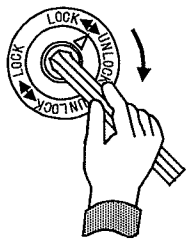
(4)Check of flow rate.

①Turn on feed pump running switch.

②As shown in suitable piping flow, if flow meter is established to 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

Setting of thermo-controller

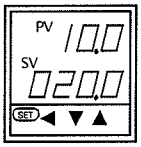
(Delivery setting) Setting value(SV) : 20℃
Upper temperature limit : 38℃
Lower temperature limit : 4℃

(Setting of thermo-controller)

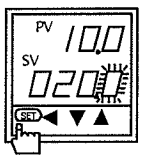
- Never change the parameters except for the setting value(SV), or otherwise trouble may be caused.
- Set the setting value(SV) within a range of 5-30℃.

(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.

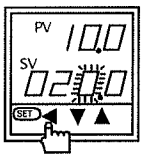


(1)Selection of setting value(SV) mode



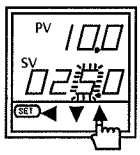
Press the [SET] mark of the set key to select the setting value(SV) mode. Upon the setting value(SV) mode is selected, the lowest digit lamp (right end) lights up. The setting of the digit for which the lamp is ON is ready for changed.

(2)Changing(shifting of lighted digit)



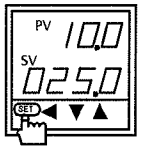
Press the [◀] mark of the setting digit shift key to shift the lighted digit to the first digit.

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



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

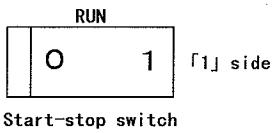
(4)Registration of setting value



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.
(2)Turn on source power.
(3)Turn on START-STOP switch
[1] side to start HYCOOL.



(4)Running lamp lit and HYCOOL run.

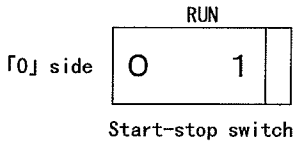
- Feed pump start to run.
- When the setting value (SV) of the thermo-controller is smaller than the actually measured value (PV) (SV<PV), compressor starts immediately. When SV is larger than PV (SV>PV), however, compressor dose not start until SV<PV is achieved. When compressor starts, the fan motors may repeat start/stop.

(5)Check to make sure that the actually measured value (PV) is stable near the setting value (SV) (with a deflection of approx.±1℃.)

【CAUTION】 Never open the front panel during operation

3-5.stopping

Turn on START-STOP switch [1] side to start HYCOOL.

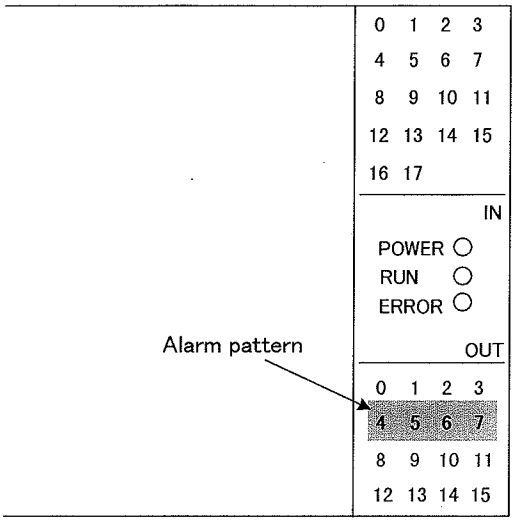


【CAUTION】 Do not turn OFF the MAIN POWER switch until HYCOOL stops completely.

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.
(4)HYCOOL is designed for cooling the city water, not to use another liguid.
(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.
(8)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 lights 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 pushing by START/STOP switch [0] side.

- When HYCOOL is operated by using the pendant switch, turn on Start-stop switch [1] side 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 and the ERROOR 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.)

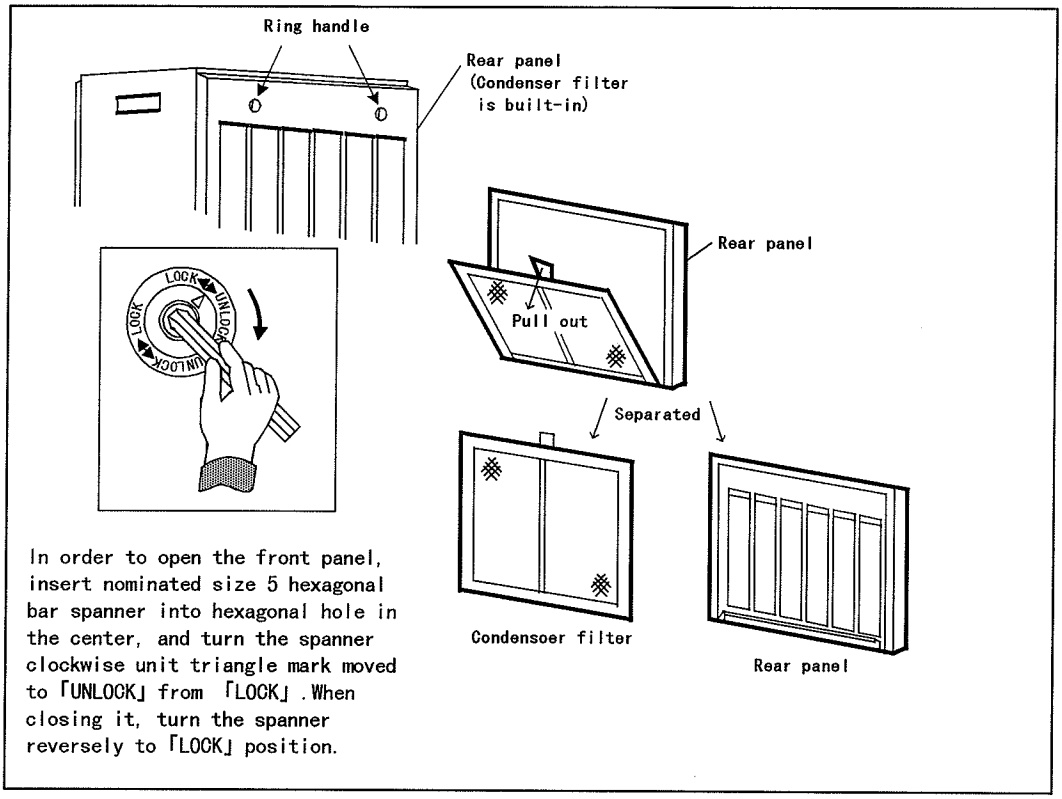
4. INSPECTION AND MAINTENANCE ITEMS

4-1.Inspection items

Inspection point	Inspection item	Inspection frequency				Remarks
		Daily	Weekly	Monthly	Quarterly~ halfly 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 0.5MPa)	○				In case of press. 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

- Clean the filter regularly and keep cleaned condition.
  Use natural detergent for greasy.



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

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.Cleaning the water tank

(1)cleaning the water tank (Cleaning with water)

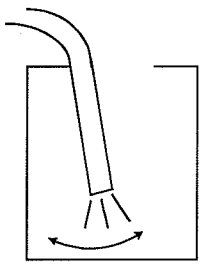
If the water tank becomes dirty, wash the interior and replace the water.
Cleaning should be carried out once three months.

《Cleaning method》

①Turn the operating switch to the OFF position and then disconnect the power source and the short circuit breaker.

②Remove the front panel.

③Shut the pipe that is connected to the water supply operating.
If the water supply pipe has a stop valve attached, close it.



④Open the waste water valve and let the water run out.

⑤Remove the lid from the water tank.

⑥Rinse the inside of the tank with water from a hose.

【note】

- Use only clean water.
- Be careful not to get the outside of the tank wet.
- Leave the drain valve open while you rinse out the tank.
- While cleaning, wear rubber gloves to protect your hands.
- Be careful no to put your hand accidentally into the tank.

⑦When the waste water has become clean, shut off the hose and close the waste water valve.

⑧Water supply to tank

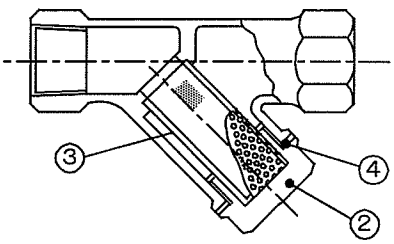
Connect the breaker and the power source.
Begin operating the water supply according to the instruction manual 『4-2.Operation』.

【note】 Be sure to attach the front panel after reconnecting the water supply.

⑨If a Y-strainer is attached, take the Y-strainer apart and clean it.

《Cleaning methods》

Disassembling & A assembling procedures.
Remove the strainer ③ by loosening the cap ②.
Clean the strainer with water and remove foreign matter, dust, etc. attached to the strainer.
Mount the strainer with the packing ④ being fitted in and tighten them.



⑩Then cleaning for water tank is finished

- If after cleaning the water tank the water still becomes dirty, or if the flow of the water seems blocked or insufficient, it probably means the pipes are dirty, so please use a cleanser.
- Cleaning the pipes with a cleanser should be done by someone with sufficient knowledge of cleansers.

(2)Cleaning the water tank pipes (Cleaning with cleansers)

- If after cleaning the water tank the water still becomes dirty, or if the flow of the water seems blocked or insufficient, it probably means the pipe are dirty, so please use a cleanser.
- Pipes should be cleaned once a year.
  (Cleaning the pipes with a cleanser should be done by someone with sufficient knowledge of cleanser)

《Cleaning method》

① Turn off START/STOP switch to stop the operation machine.
② Remove the front panel. Then add the cleaning agent in water tank. When water flowing out from the tank, drain a small quantity of water from drain valve.
The amount of cleaning agent (standard) 1～2 ℓ
③ Put the cover on water tank and attach the front panel. Then operate the machine for approx. 30 minutes.
④ After drained the whole quantity of water, wash the strainer.
⑤ Repeat the operations as mentioned ②,③,④, two to three times. The cleaning is finished, when no foreign substances exist in the strainer.
⑥ Supply only water to the water tank. Then operate the machine for 5 minutes. (Washing with water)
⑦ After drained the whole quantity of water, wash the strainer.
⑧ Repeat the operations as mentioned ⑥,⑦ three to four times.

Cleaning agent

1) MITSUBISHI GAS CHEMICAL COMPANY INC.	Slime eliminate 「DESLIME」
2) KURITA WATER INDUSTRY LTD.	Slime eliminate 「KURICHEMICAL-A」

○ Remark

① Before operating the machine, be sure that all panels is attached to it. Furthermore, do not remove the all panels while in operation.
②Hand the cleaning agent in accordance with instruction manual published by cleaning agent manufacturers.

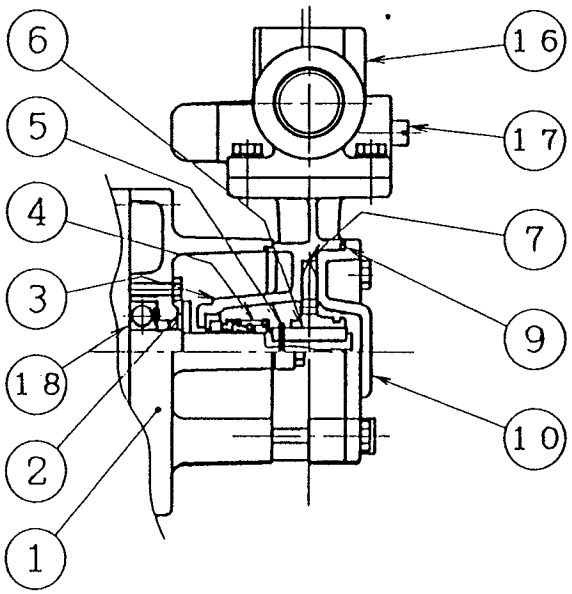
4-5.Exchange parts of press. feed pump

Parts replacement of Pressure feed pump

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	Locking pin	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 the vent hole of the motor fan cover to check that the fan rotates lightly.

   (If the fan rotates abnormally, inspection must be carried out again.)

   Now, the assembly is complete.

4-6. 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	1	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)
Gasket (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	HYW2012	HYW2023	HYW2045	pcs /set	How to exchange	Standard exchange time※
Solenoid valve	SV1	SV1	SV1	1	×	15,000 hours (4 years)
Solenoid valve	SV2	SV2	SV2	1	×	15,000 hours (4 years)
Compressor	CM	CM	CM	1	×	20,000 hours (6 years)
Pressure feed pump	PM	PM	PM	1	○	20,000 hours (6 years) (A mechanical seal is removed.)
Pressure fan	FM	FM	FM	1	○	20,000 hours (6 years)
Electromagnetic switch (For pumps)	MC+OCR	MC1+OCR	MC1+OCR1	1	○	20,000 hours (6 years)
Relay (For compressors)	R1	—	—	1	○	20,000 hours (6 years)
Electromagnetic contactor (For compressors)	—	MC2	MC2	1	○	20,000 hours (6 years)
Over current relay (For compressors)	—	—	OCR2	1	○	20,000 hours (6 years)
Relay (For fan motor)	—	—	R1	1	○	15,000 hours (4 years)
Programmable controller	PC	PC	PC	1	○	20,000 hours (6 years)
Temperature controller	TH	TH	TH	1	○	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

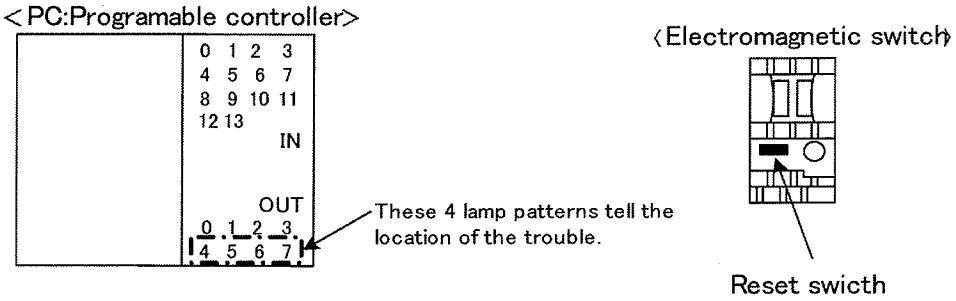
○ : Those who have the knowledge and experience of piping, electricity, etc. Need to perform exchange of parts.

(When there are not these knowledge and experiences, ask our company or a special contractor.)

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

5. TROUBLESHOOTING AND REMEDIES

Remedies are summarized for cases of various malfunctions. There are many cases that you customer is capable to fix it. Read this article good enough and render remedies by yourself for saving down time of your cooler.



No	Lighting pattern (●:ON、○:OFF)				Contents of error	Remedy
	4	5	6	7		
①	○	○	○	●	Abnormal water level (too low water level)	☐ Supply water, and then turn on Start-Stop switch [0] side, and the error will be removed.
②	○	○	●	○	Over current through press feed pump	☐ Press the RESET button of the thermal relay of the electromagnetic switch, then . turn on Start-Stop switch [0] side, 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	○	●	○	○	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, turn on Start-Stop switch [0] side, and the error will be removed.
④	●	○	○	○	Over current through press feed pump	☐ 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	○	○	●	●	Too high compressor Temperature	
⑥	○	●	○	●	Too high refrigerant pressure	◆ Reduce load, and lower the ambient temperature. ☐ After taking the above remedies, turn on Start-Stop switch [0] side, and the error will be removed.
⑦	●	○	○	●	Frozen cooling water in evaporator	☐ turn on Start-Stop switch [0] side, and the error will be released. Then, check the following . ◆ Check to make sure that the cooling water is being fed.
⑧	●	●	○	○	Too low water temperature	◆ Adjust the water temperature range to 5～30℃. ☐ After taking the above remedies, turn on Start-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, turn on Start-Stop switch [0] side to release the error.)

※ 1.In case of abnormal stop, wait at least 3 minutes, and the restart HYCOOL.

Sympton	Cause	Remedies
RUN lamp dose not light up.	·Too short time from stop to restart.	·Wait at least 3 minutes after stop
	·Defect of the 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 lights 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	·Replace the fuse
	·Pressing of the EMERGENCY switch	·Pull OFF the EMERGENCY switch

Discontinue

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 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
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 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 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
	·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 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
	·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 too high	·Adjust to the specified range
	·Clogging of dust filter	·Clean the dust filter
	·Abnormal power voltage	·Adjust to the solenoid valve
Frozen cooling water in evaporator	·Defect of solenoid valve	·Repair the solenoid valve. If water is frozen, wait for defrosting
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			HYW2012	HYW2023	HYW2045
Service range	Installation placed		Indoor		
	Range of ambient temp.		5～40℃		
	Range of ambient humidity		40～80% RH		
	Electric power		3 phase 200V AC, 50/60Hz		
	Service media		Water		
	Set pressure		0.35 MPa (Relief valve pressure)		0.5 MPa (Relief valve pressure)
	Set pressure range		0.3～0.55 MPa (Relief valve pressure)		
	Max. Working Pressure		0.3 MPa		0.45 MPa
	Range of outlet temp. control		5～30℃		
Capacity	Cooling capacity (*1)		1.1/1.2 kW	2.0/2.3 kW	4.2/4.5 kW
	Outlet water temp. Control		±1℃		
	Water flow rate (*2)		32/41 ℓ/min		35/44 ℓ/min
Electric specific-ations	Electric consumption		1.1/1.4 kW	1.6/2.1 kW	2.2/2.7 kW
	Running current		4.8/5.7 A	5.6/6.8 A	7.6/8.7 A
	Control circuit		200V AC		
	Remote control signal		Dry contact		
	Alarm signal		Dry contact		
	Protective devise	Electric power circuit	Fuse		
		Compressor	Over load protector		Over current relay
		Feed pump	Over current relay		
		Refrigerant circuit	Anti-freezing thermal switch, High pressure switch		
	display	Running	Green		
		Alarm	Red		
		Over load	Orange		
Connecting ports	Water inlet		Rc 1/2		Rc 3/4
	Water outlet		Rc 1/2		Rc 3/4
	Water supply		Rc 1/2		
	Over flow & Drain outlet		Rc 3/4		
	Drain pan		Rc 1/2		
Others	External dimensions	Width(mm)	550	600	650
		Depth(mm)	400	400	450
		Height(mm)	900	1050	1200
	Painting color (Munsell No.)		5GY 7.5/0.5, 3G 6.0/0.5		
	Mass of product		105 kg	120 kg	140 kg
	Water tank		8.5 ℓ	14 ℓ	25 ℓ
	Refrigerant		R-22		

(*1) Cooling capacity is based on water outlet temp. at 20℃ and ambient temp. at 32 ℃
(*2) Water flow rate is at water outlet pressure 0.12MPa.

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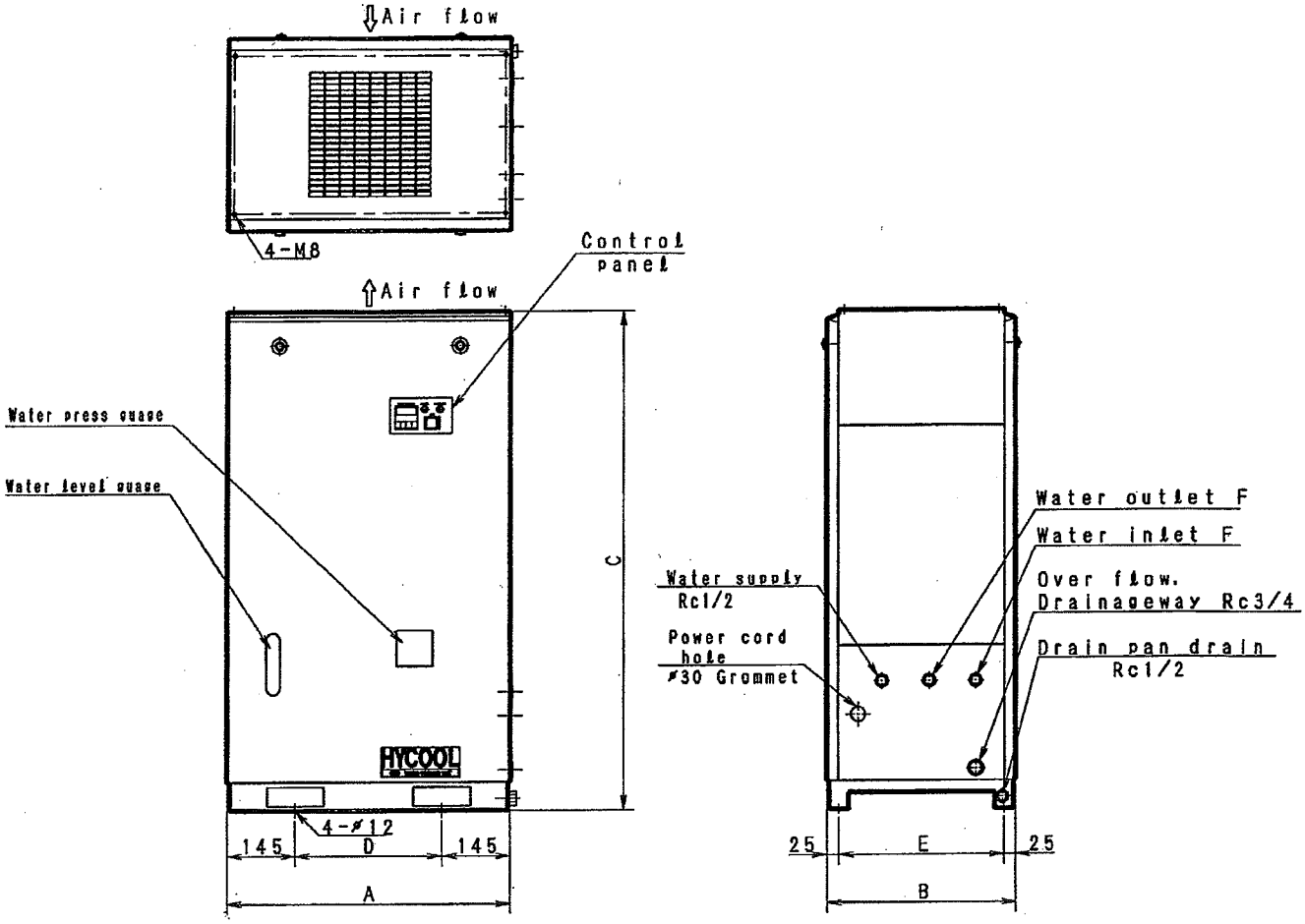
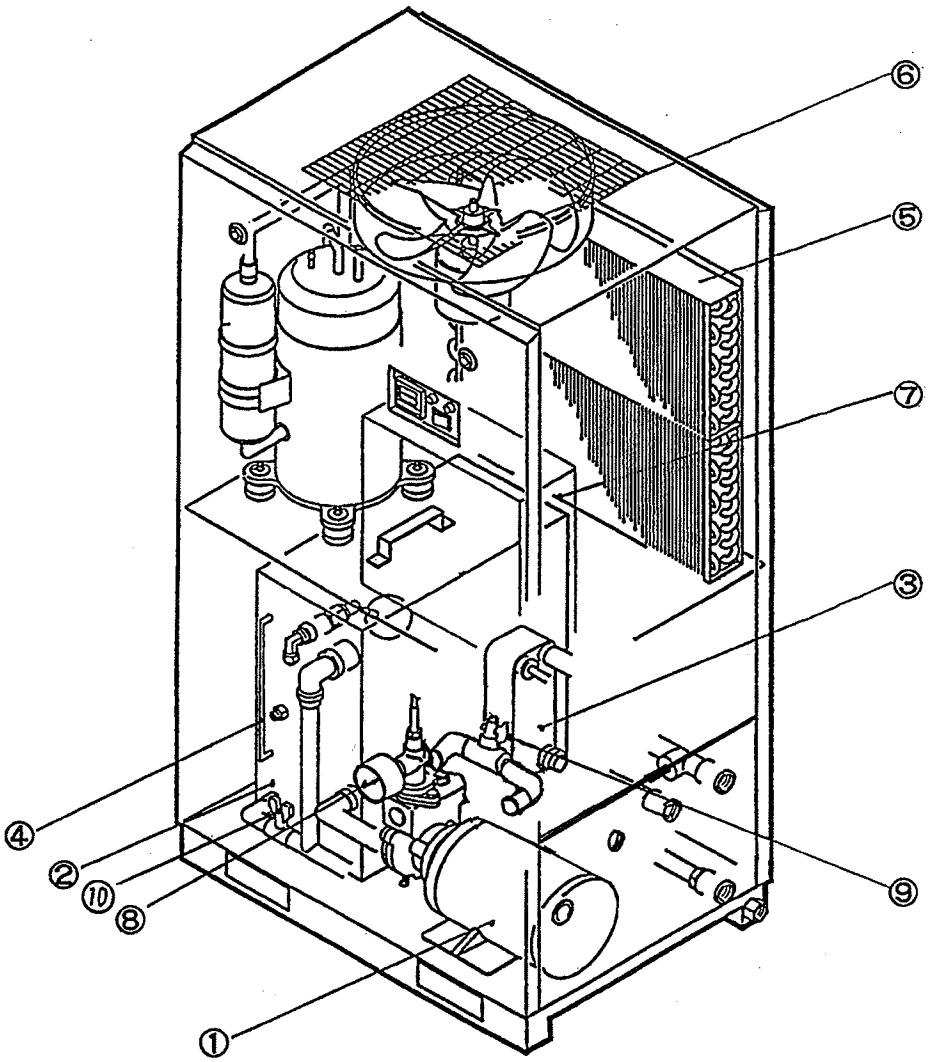
6-2.Outline drawing



Mark / Model No.	A	B	C	D	E	F
HYW2012	550	400	900	260	350	Rc1/2
HYW2023	600	400	1050	310	350	Rc1/2
HYW2045	650	450	1200	360	400	Rc3/4

6-3.Inside structure drawing

No.	Equipment name
①	Press. feed pump
②	Water tank
③	Evaporator
④	Level gauge
⑤	Condenser
⑥	Condenser fan
⑦	Control box
⑧	Water press. gauge
⑨	Air bleeding cock
⑩	Drain valve



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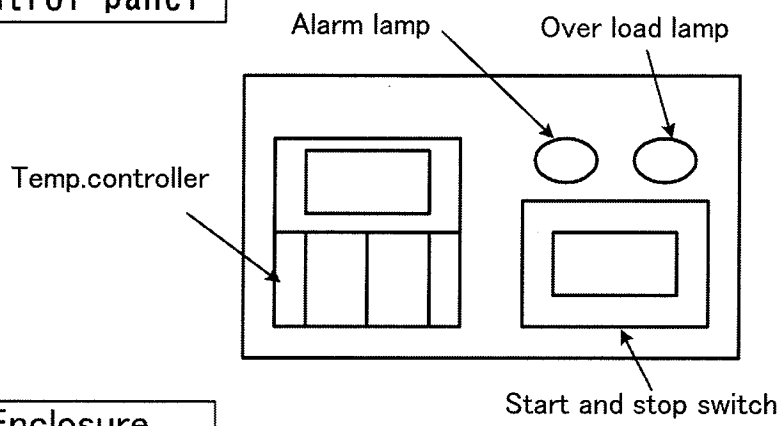
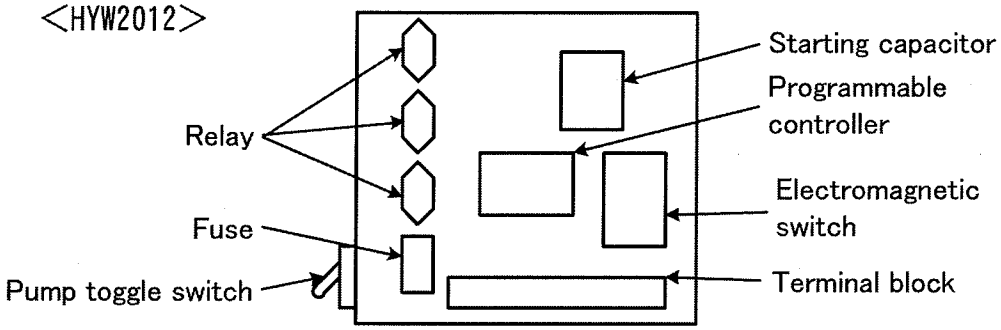
6-4. Control panel

Control panel



Enclosure

<HYW2012>



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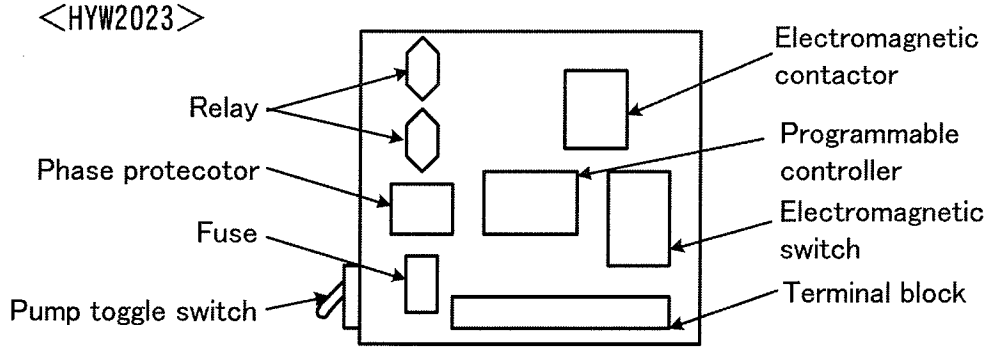

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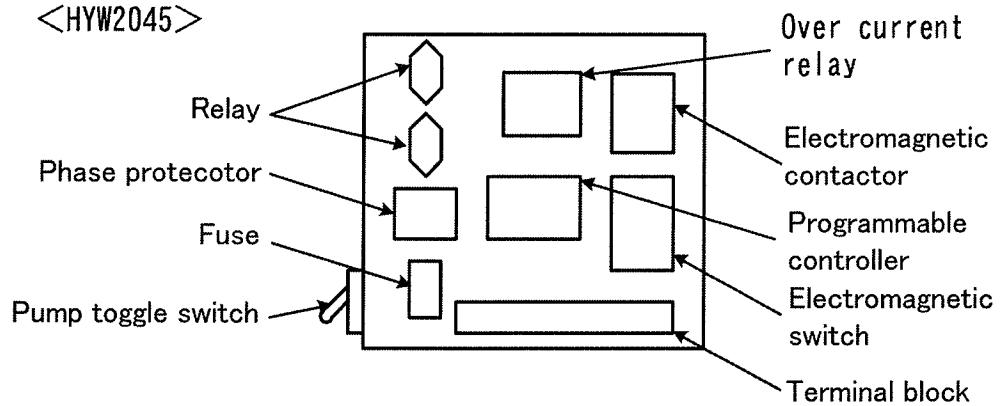

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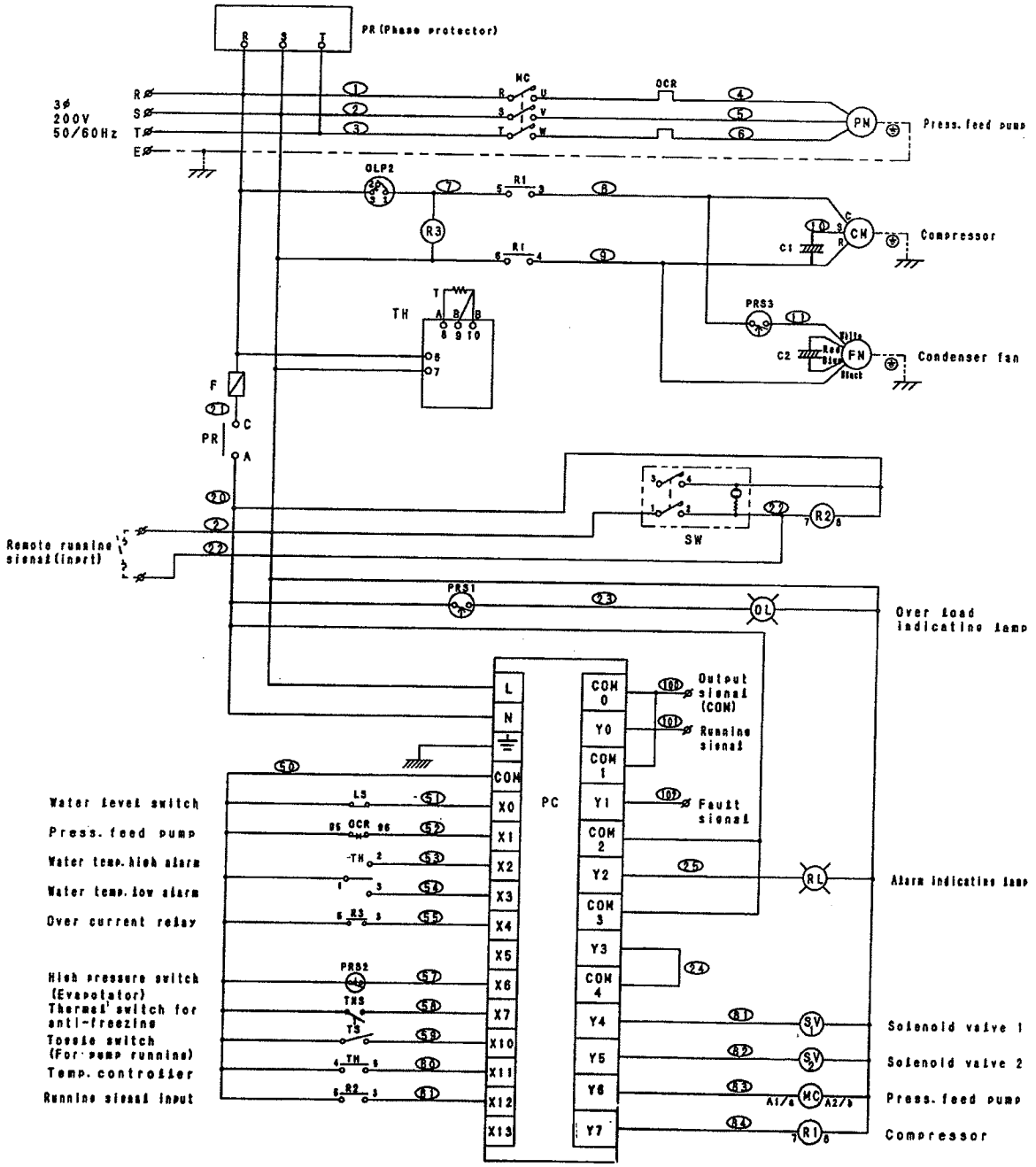
6-4. Electric circuit diagram

HYW2012

Mark	Description	Set point
PRS1	2.45MPa closed 2.06MPa open	
PRS2	2.75MPa open 2.26MPa closed	
PRS3	1.67MPa closed 1.18MPa open	
THS	-10Copen(-6Cclosed)	
OLP	4.5A	
OCR	3.3Aopen	

No.	Parts name	Q'ty	Remark
PR	Phase protector	1	
PC	Programmable controller	1	
R1~3	Relay	1	
SV1,2	Solenoid valve	1	
RL	Indicating lamp (Red)	1	
OL	Indicating lamp (Orange)	1	
TS	Toggle switch	1	
THS	Thermal switch for anti-freezing	1	
PRS3	Fan control switch	1	
PRS2	High range press. switch	1	
PRS1	Over load switch	1	
LS	Water level switch	1	
SW	Start switch	1	With indicating lamp
F	Fuse	1	3A
T	temp. sensor	1	
TH	temp. controller	1	
C2	Power capacitor	1	
C1	Running capacitor	1	
OLP	Over load protector	1	
OCR	Over current relay	1	
MC	Electromagnetic switch	1	
FM	Condenser fan	1	
CM	Compressor	1	
PM	Press. feed pump	1	



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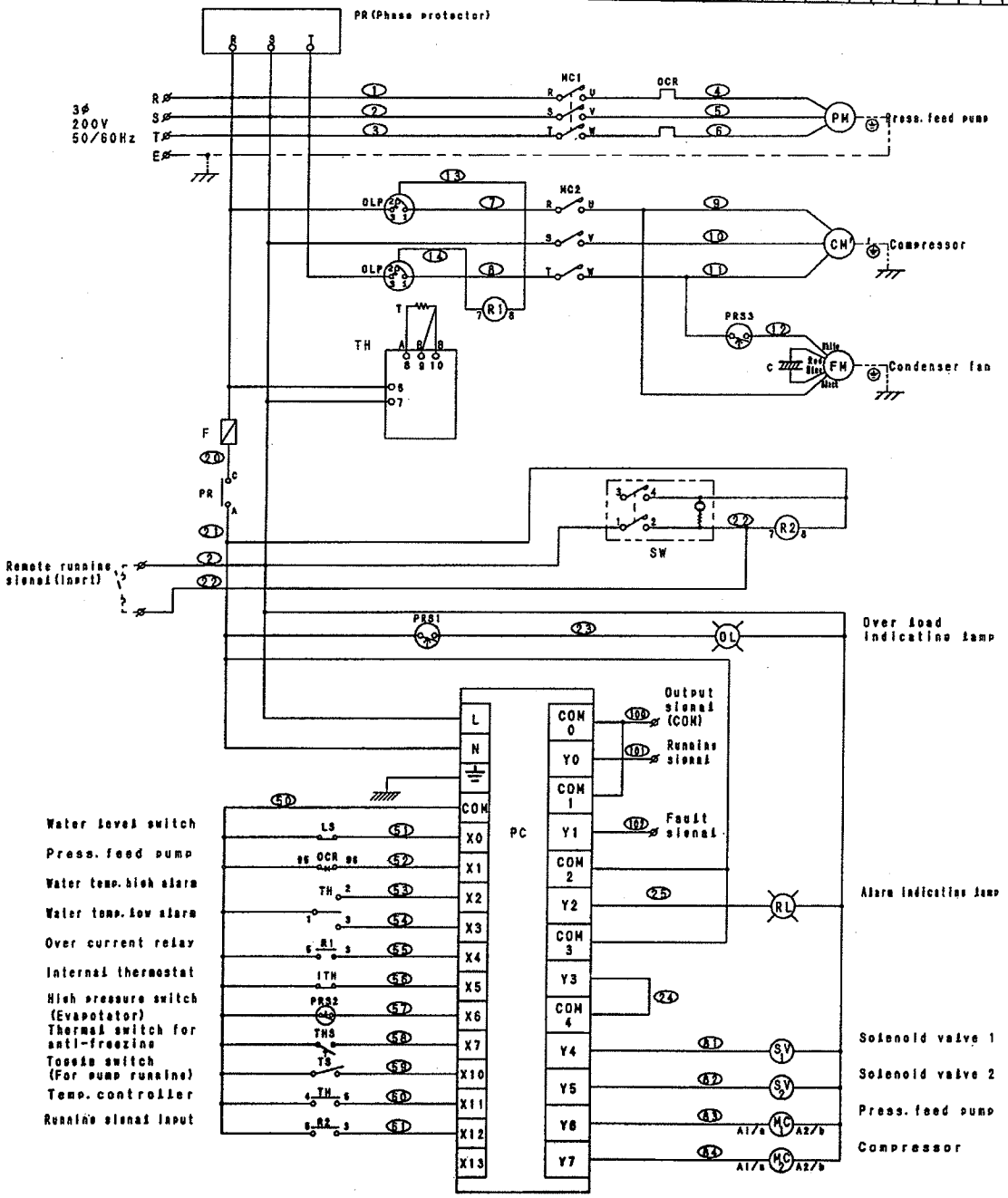
6-4. Electric circuit diagram
HYW2023

Mark	Set point Description
PRS1	2.45MPa closed 2.06MPa open
PRS2	2.75MPa open 2.26MPa closed
PRS3	1.67MPa closed 1.16MPa open
ITH	130℃open 108℃closed
THS	-10℃open(-8℃closed)
OCR	3.3A
OLP	6.5Aopen

No.	Parts name	Q'ty	Remark
PR	Phase protector	1	
PG	Programmable controller	1	
R1~3	Relay	1	
SV1.2	Solenoid valve	1	
RL	Indicating lamp (Red)	1	
OL	Indicating lamp (Orange)	1	
TS	Toggle switch	1	
THS	Thermal switch for anti-freezing	1	
PRS3	Fan control switch	1	
PRS2	High range press. switch	1	
PRS1	Over load switch	1	
ITH	Internal thermo switch	1	
LS	Water level switch	1	
SW	Start switch	1	With indicating lamp
F	Fuse	1	3A
T	Temp. sensor	1	
TH	Temp. controller	1	
C	Power capacitor	1	
OLP	Over load protector	1	
OCR1	Over current relay	1	
MC2	Electromagnetic switch	1	
MC1	Electromagnetic switch	1	
FM	Condenser fan	1	
CM	Compressor	1	
PM	Press. feed pump	1	



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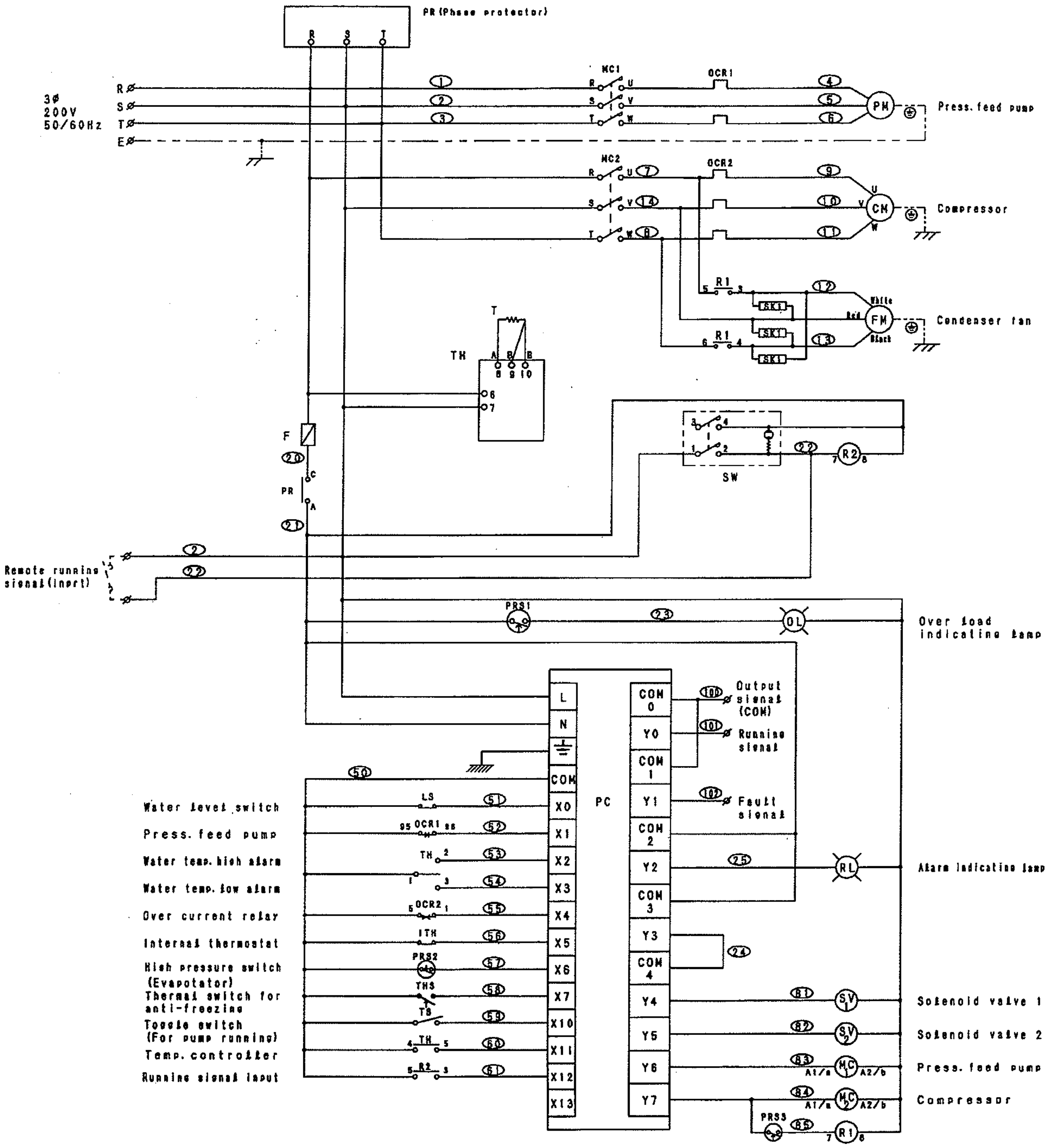
6-4. Electric circuit diagram

HYW2045

Mark	Description	Set point
PRS1	2.45MPa closed 2.06MPa open	
PRS2	2.75MPa open 2.26MPa closed	
PRS3	1.67MPa closed 1.16MPa open	
ITH	125±5℃open 90±5℃closed	
THS	-10℃open(-6℃closed)	
OCR	3.3A	
OLP	9.0Aopen	

品番 No	部品名 PART	材質/規格 MATERIAL/NUMBER	数量 Q'TY	備考 REMARK
SK1	Spark killer		1	
PC	Programable controller		1	
R1,2	Relay		1	
SV1,2	Solenoid valve		1	
RL	Indicating lamp (red)		1	
OL	Indicating lamp (orange)		1	
TS	Toggle switch		1	
THS	Thermal switch for anti-freezing		1	
PRS3	Fan controll switch		1	
PRS2	High pressure switch		1	
PRS1	Over load switch		1	
ITH	Internal thermostat		1	
LS	Water level switch		1	
SW	Start switch		1	With indicating lamp
F	Fuse		1	3A
T	Temperature controller		1	
TH	Temperature controller		1	
OCR2	Over current relay		1	
MC2	Electromagnetic switch		1	
OCR1	Over current relay		1	
MC1	Electromagnetic switch		1	
FM	Condenser fan		1	
CM	Compressor		1	
PM	Press. feed pump		1	



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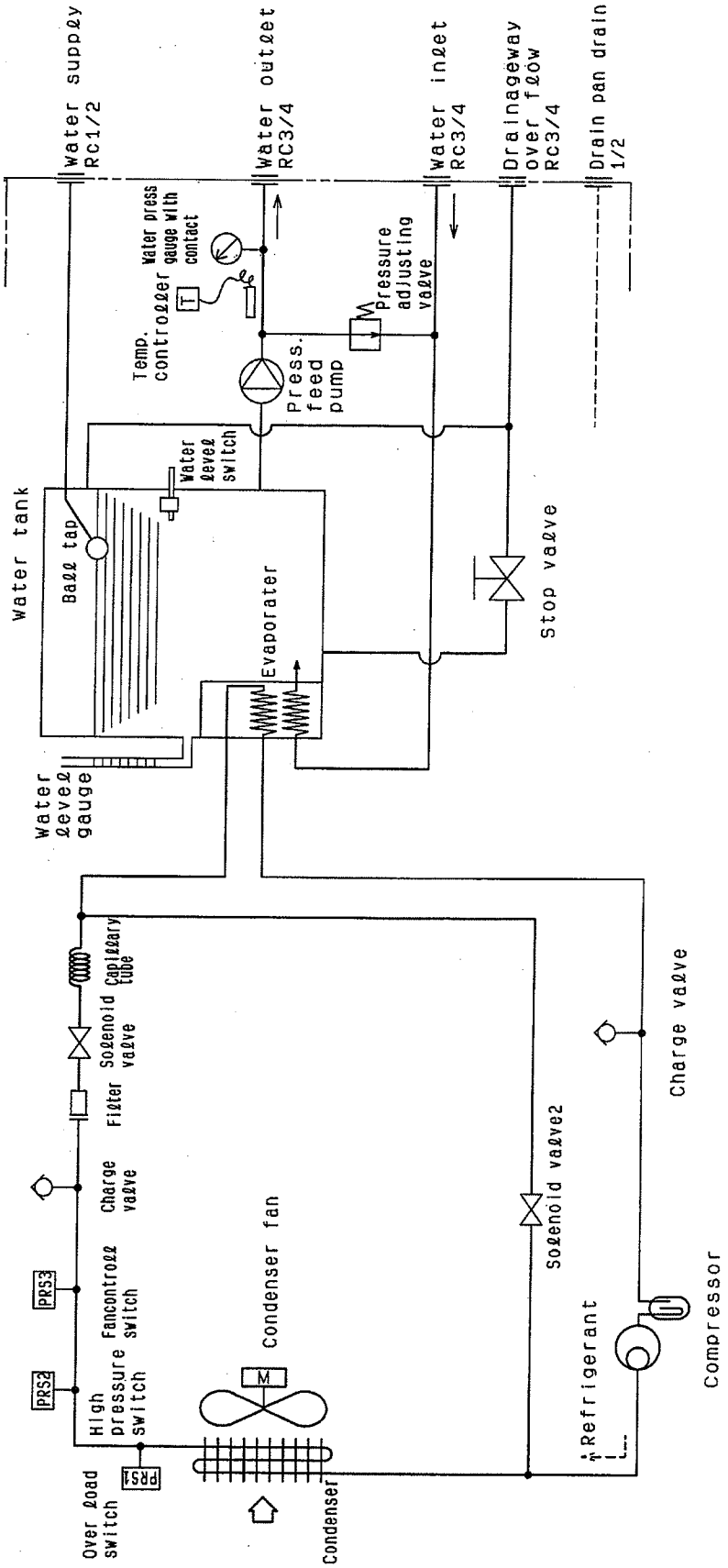
6-5.Flow chart



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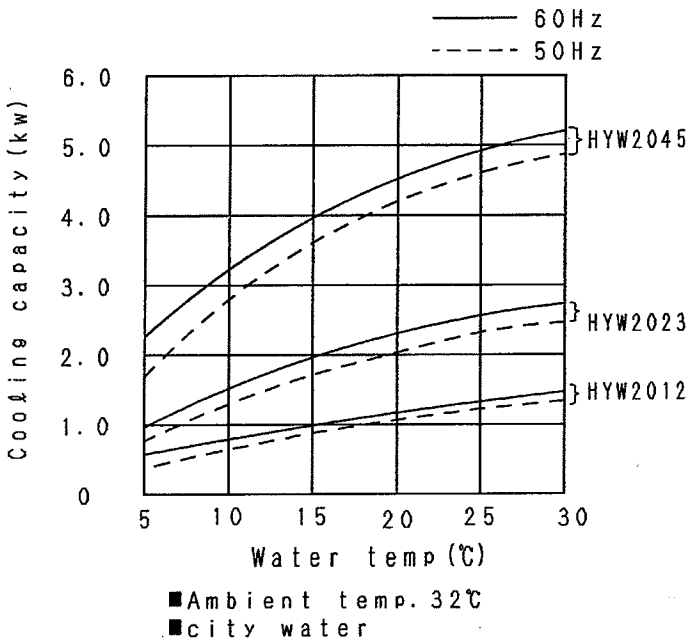
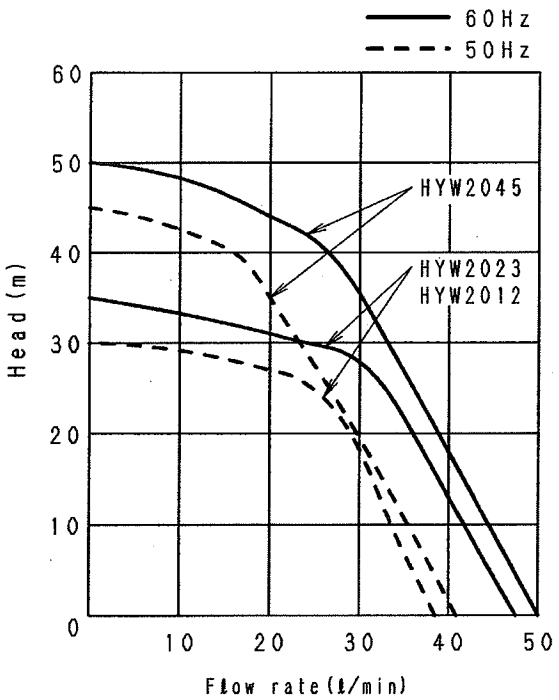
6-6.Performance

Cooling capacity



Water rate flow



HYW2012 Relief pressure 50Hz 0.3MPa
HYW2023 Relief pressure 50Hz 0.45MPa