Discontinue

CKD

HYCOOL

HYW3033·HYW5033

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

05-11 9th EDITION SM-12002-A

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.

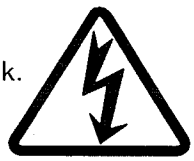
CAUTION This denotes hazards which COULD result in minor personal injury and/or product or property damage, if not avoided.

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.

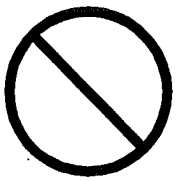


CAUTION : Hot surface

★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.

Keep this booklet in custody to prevent misplacing it.

Discontinue

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

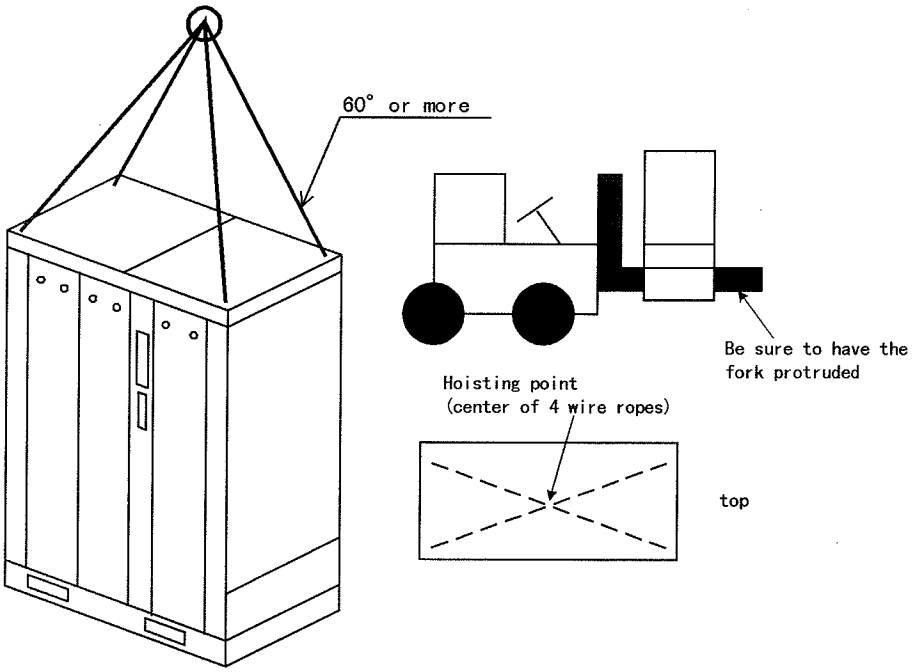
Pass the fork through the fork holes provided in the base of HYCOOL. Be sure to have the fork ends protruded from the HYCOOL base.

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℃.

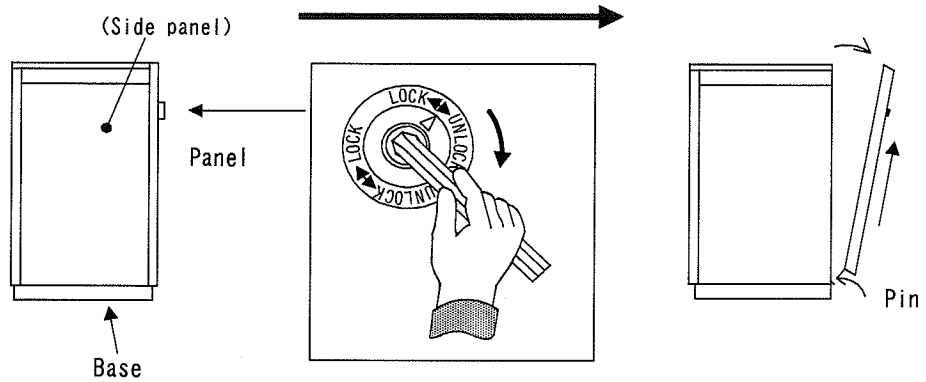
1-4.Using

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



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.

2. Installation

2-1.Installation

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

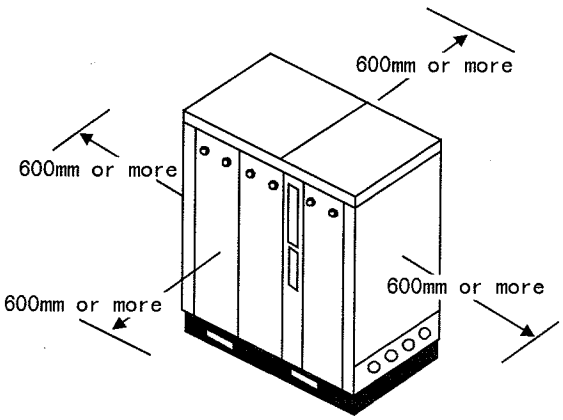
(2) Do not install the machine in a place where it is likely to by exposed to direct sunlight and where heat is likely to be generated.

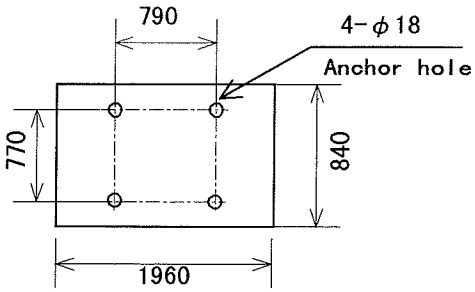
(3) Do not use the machine in a place where corrosion gas exist.

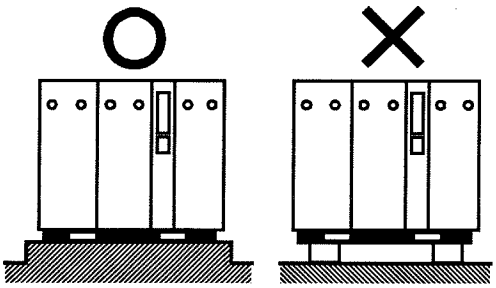
(4) Install the machine in a clean and dust free area.

(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.







*Do not take the way of installation which supports partially.

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

2-2.Wiring

(1)Be sure to wiring the earth.

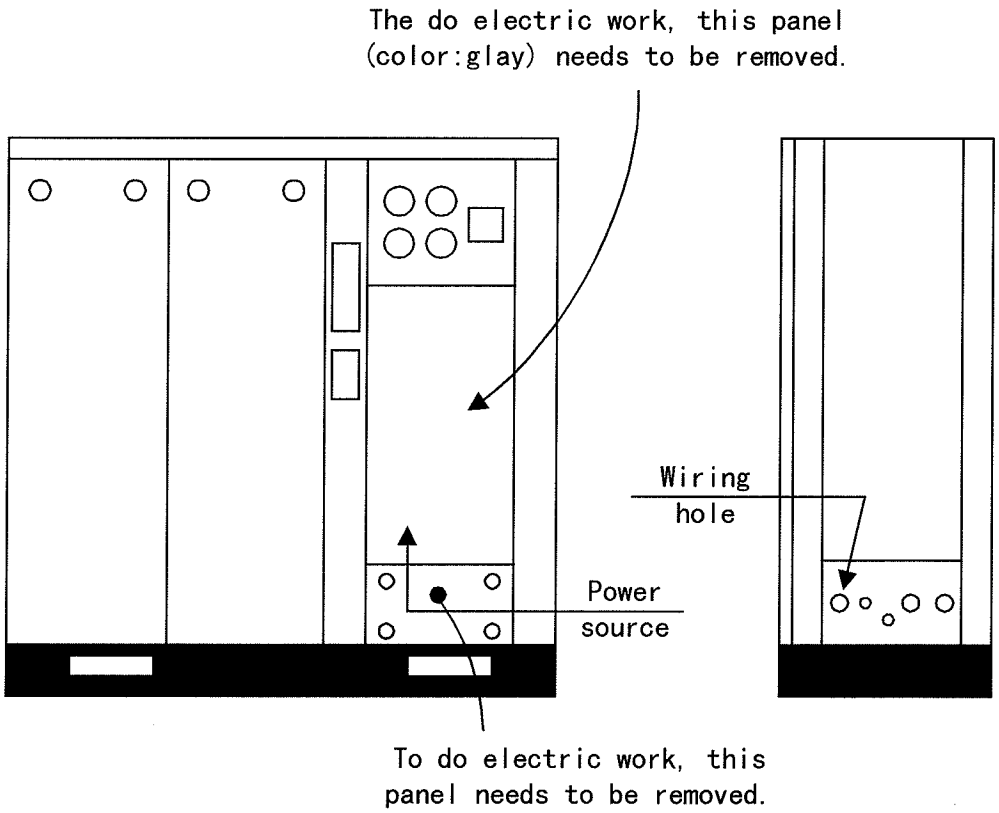
(2)Power source : 3 phase 200V AC±10% 50/60Hz±1%.

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

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

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

VV	Signal core	Over38mm^2
	Three core	Over 60mm^2
CV	Signal core	Over 22mm^2
	Three core	Over 38mm^2
Earth line		Over 22mm^2



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 : 0.6 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.

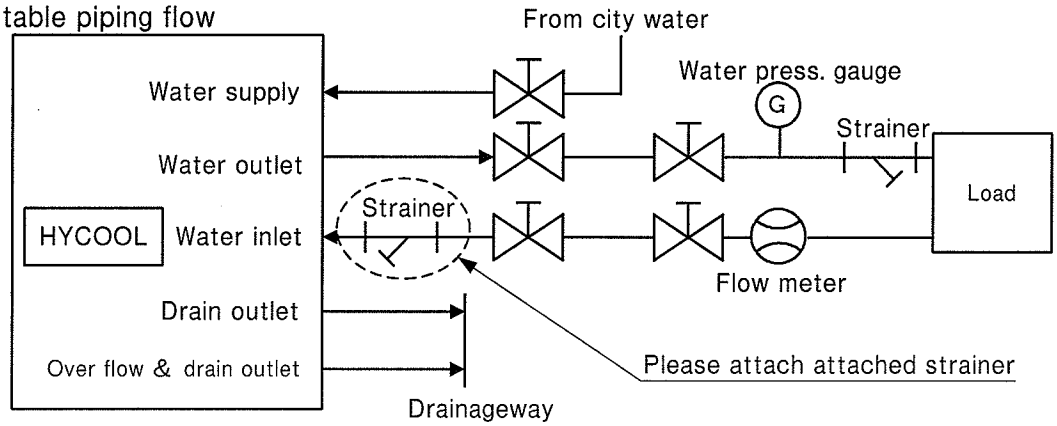
(7) The surface of the water inlet/outlet piping may have condensation depending on the ambient temperature and humidity condition. In order to prevent the falling of water drops due to condensation, keep the piping warm with an insulating material, if necessary.

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

⚠ CAUTION

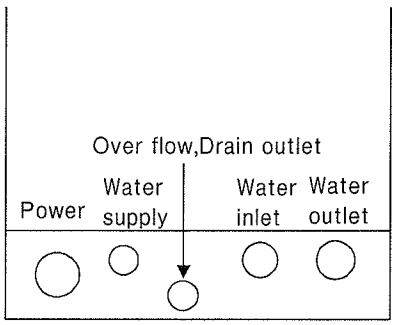
If garbage mixes in HYCOOL, there is a possibility that apparatus, such as a heat exchanger, may be damaged.

Suitable piping flow



(9) Piping size

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



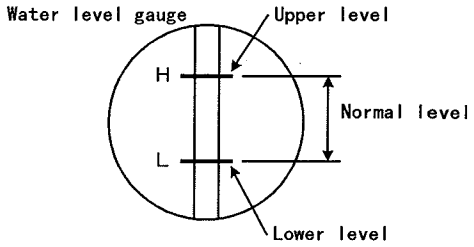
3. Operation

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.



(In case of water supply)

① Remove the front panel (center) from HYCOOL.

② Take the cover from water tank.

③ Supply water to the tank directly, until its level reaches the normal range.

④ Put the cover on it.

⑤ Attach the front panel (center) again.

(2)Water supply to the machine

①Fully open 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).

④Turn 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 「5 Troubleshooting」.

⑤Set 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.(HYW3033)

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 the front panel (right) again.
WATER TANK CAPACITY 120 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 0.6MPa. The feed pump may be defective.
③If there is not flow meter in pipe line, check the flow rate by water flow head chart.

3-3.Thermo-controller

1)Setting of thermo-controller

(Delivery setting)

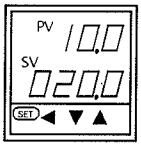
Setting value(SV)	20℃
Upper temperature limit	38℃
Lower temperature limit	2℃

(Setting of thermo-controller)

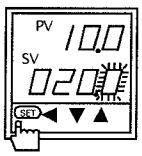
- Never change the parameters except for the setting value(SV), or otherwise trouble may be caused.
- Set the setting value(SV) within a range of 5-30℃.

(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.

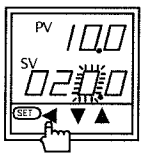


(1)Selection of setting value(SV) mode



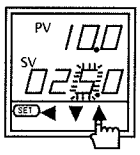
Press the [SET] mark of the set key to select the setting value(SV) mode. Upon the setting value(SV) mode is selected, the lowest digit lamp (right end) lights up. The setting of the digit for which the lamp is ON is ready for changed.

(2)Changing(shifting of lighted digit)



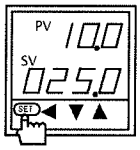
Press the [◀] mark of the setting digit shift key to shift the lighted digit to the first digit.

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



Press the [▲] mark of the setting 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

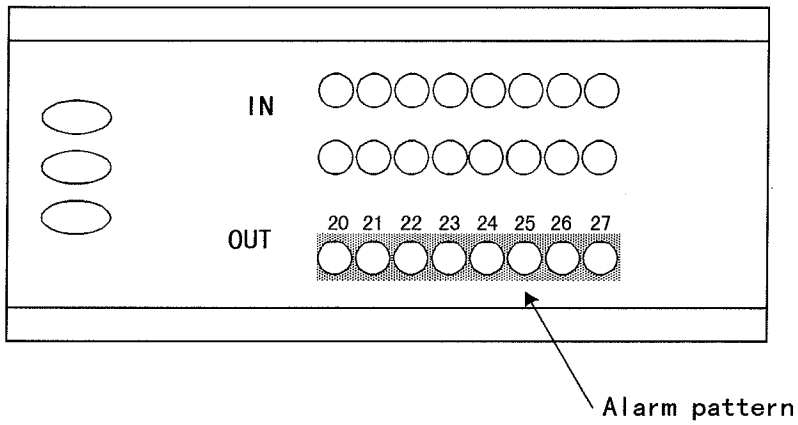
3-5.Stopping

Press the STOP switch.
HYCOOL dose not stop immediately. While the RUN lamp is flickering, the refrigerant circuit makes a pump down operation.
【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) 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 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.

Discontinue

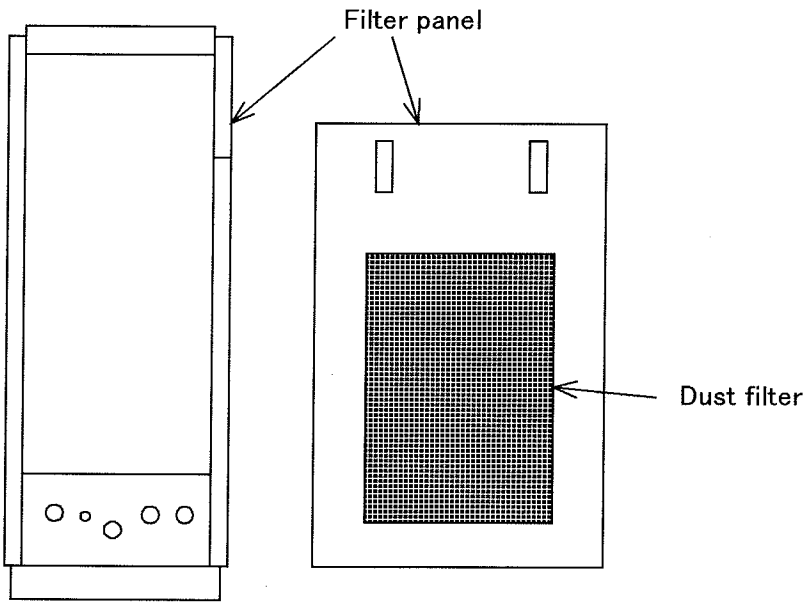
4. Inspection and maintenance items

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 0.6 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.
Press feed pump	Water leakage		○			Exchange sealing parts
	Abnormal noize				○	Exchange bearing
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.



4-3.Exchange of water in water tank

(1) Cut off the source power and circuit breaker.
(2) Remove the front panel(right).
(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.

Discontinue

4-4.Exchange parts of press. feed pump. HYW3033

32UT150
40UT150

IWAYA ELECTRIC MFG. CO.,LTD.

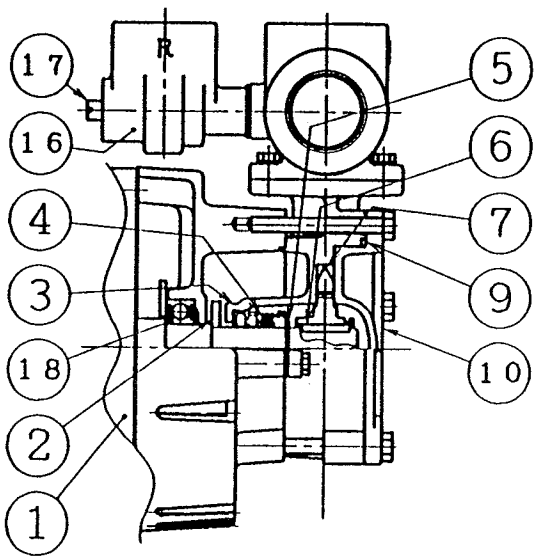
MAINTENANCE

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	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

4-4.Exchange parts of press. feed pump. HYW5033

MT622 IWAYA ELECTRIC MFG.CO.,LTD

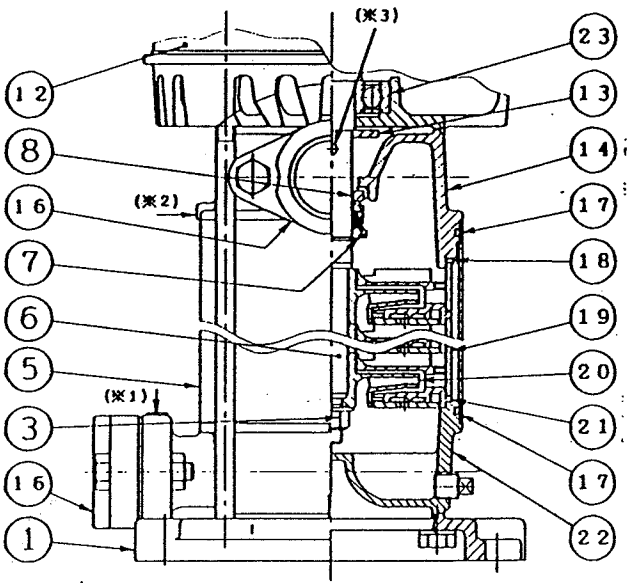
MAINTENANCE

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	Pump bracket	1
3	U nut M12	1
5	Sleeve	1
6	Shaft	1
7	C Stopring22 for shaft	1
8	Mechanical seal	1
12	Electric motor	1
13	Deflector	1
14	Delivery casing	1
16	Flange	2
17	O ring G130	2
18	O ring G120	1
19	Guide Plate	6
20	Impeller Ass'y	6
21	Guide Plate holder Ass'y	6
22	Suction casing	1
23	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. Turn the pump upside down, after draining fully to protect the motor from being flooded.
2. Remove mounting bolts,and remove the pump bracket.
3. Remove the suction casing after hammering the suction gate(structural view ※1).
4. Wrench away the two cut points(structural view ※2)of the delivery casing making use of a minus screwdriver. The sleeve can be removed along with the unit.
5. Insert an iron stick into the 6mm hole (strutural view ※3) at the shaft in order to fix the shaft, and remove U nut, impeller ass'y, guide plate, guide plate holder ass'y.
6. Remove the C stopring from the shaft, and extract the mechanical seal rotary ring.
7. Remove the delivery casing. Don't extract at a breath to be sure not damage the mecanical seal fixing ring.
8. 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 rirg.
   (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 bracket opposite 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.

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	3	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 *1 (For inverter [INV] cooling)	1	Every six months	When there are dirt and an allophone(6 years) 20,000 hours
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	SV1a, SV1b SV2a, SV2b SV3a, SV3b	6	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.)
Circulation pump	PMa, PMb	2	A	15,000 hours (4 years)
Pressure fan	FMa, FMb	2	A	20,000 hours (6 years)
Electromagnetic contactor (For compressors)	MC1+OCR1 *3 MC2+OCR2 *3	2	A	20,000 hours (6 years)
Electromagnetic contactor (For fan)	MC3+OCR3 *3 MC4+OCR4 *3	2	A	20,000 hours (6 years)
Electromagnetic contactor (For Circulation pump)	MC5+OCR5 *3 MC6+OCR6 *3	2	A	20,000 hours (6 years)
Electromagnetic switch (For pumps) *2	MC7+OCR7 *3	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 *1	INV	1	A	25,000 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.

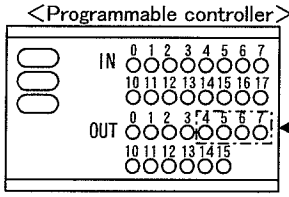
NOTE *1 Inverter and a Box fan (for Inverter) are not using it for HYW3033.

*2 The electromagnetic switch MC7 is not used for HYW5033.

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

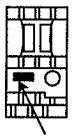
5. Trouble shooting and remedies

<Programmable controller>



These 4 lamp patterns tell the loation of the trouble.

Electromagnetic switch



Reset switch

	点灯パターン (●:点灯, ○:消灯)	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 START/STOP switch, and the error will be removed.
②	20 21 22 23 24 25 26 27 ○ ○ ● ○ ○ ○ ○ ○	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	20 21 22 23 24 25 26 27 ○ ● ○ ○ ○ ○ ○ ○	Too high water temperature	◆ Reduce load, and lower the ambient temperature. ◆ Adjust the water temperature setting value to a range of 15~30℃. ☐ After taking the above remedies, press. the STOP-RESET switch, and the error will be removed.
④	20 21 22 23 24 25 26 27 ● ○ ○ ○ ○ ○ ○ ○	Over current through compressor "a"	☐ 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 : ◆ Reduce load, and lower the ambient temperature.
⑤	20 21 22 23 24 25 26 27 ○ ○ ● ● ○ ○ ○ ○	Too high compressor "a" Temperature	
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, press the STOP-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 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	20 21 22 23 24 25 26 27 ○ ● ● ○ ○ ○ ○ ○	Over current through fan motor "a"	☐ 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 on object which hits the fan impeding the fan rotation.
⑨	20 21 22 23 24 25 26 27 ● ○ ● ○ ○ ○ ○ ○	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	20 21 22 23 24 25 26 27 ● ● ○ ○ ○ ○ ○ ○	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	20 21 22 23 24 25 26 27 ● ● ○ ● ○ ○ ○ ○	Ref. pump down alarm "a"	☐ After taking the above remedies, press the STOP-RESET switch, and the error will be removed.
⑫	20 21 22 23 24 25 26 27 ● ● ● ○ ○ ○ ○ ○	Abnormal PC	☐ After taking the above remedies, press the STOP-RESET switch, and the error will be removed.
⑬	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ● ○ ○ ○	Over current through compressor "b"	☐ Press the RESET button of the thermal relay of the electromagnetic switch MC2, then press the STOP-RESET switch, and the error will be removed. ○ Before restarting, check the following : ◆ Reduce load, and lower the ambient temperature.
⑭	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ○ ○ ● ●	Too high compressor "b" Temperature	

Discontinue

	点灯パターン (●:点灯,○:消灯)	Contents of error	Remedy
⑮	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, press the STOP-RESET switch, and the error will be removed.
⑯	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ● ○ ○ ●	Frozen cooling water in evaporator "b"	☐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.
⑰	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ○ ● ● ○	Over current through fan motor "b"	☐ Press the RESET button of the thermal relay of the electromagnetic switch MC4,then Press. the STOP-RESET switch, and the error will be removed. ○Before restarting, check the following: ◆Check the fan for locking or on object which hits the fan impeding the fan rotation.
⑱	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ● ● ○ ●	Ref. pump down alarm "b"	☐ After taking the above remedies, press the STOP-RESET switch, and the error will be removed.
⑲	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ○ ● ● ●	Over current through circulation pump "a"	☐ After press the reset button of the thermal relay of the electromagnetic switch MC5, press the STOP-RESET switch.
⑳	20 21 22 23 24 25 26 27 ○ ○ ○ ○ ● ○ ● ●	Over current through circulation pump "b"	☐ After press the reset button of the thermal relay of the electromagnetic switch MC6, press the STOP-RESET switch.

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

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 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

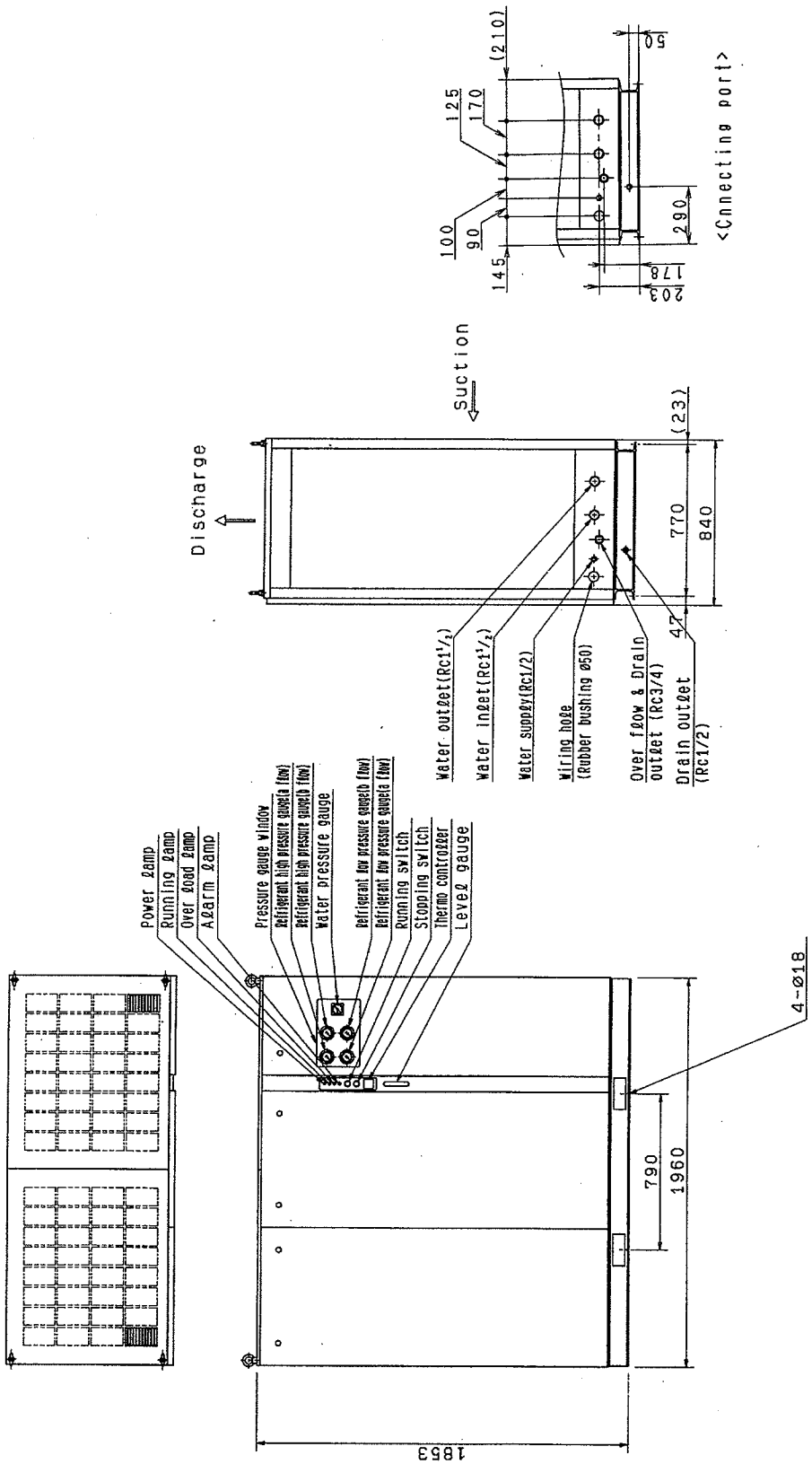
Name of product			HYCOOL	
Items			HYW3033	HYW5033
Service range	Installation placed		Indoor	
	Range of ambient temp.		5～40℃(Freezing not allowed)	
	Range of ambient humidity		40～80% RH	
	Electric power		3 phase 200V AC, 50/60Hz	
	Service media		Water	
	Max. Working Pressure		0.6 MPa	
	Range of outlet temp. control		5～30℃	
Capacity	Cooling capacity (*1)		30.2/32.6 kW	
	Outlet water temp. Control		±2℃	
	Water flow rate (*2)		95/120 ℓ/min	150 ℓ/min
Electric specifications	Electric consumption		18/22kW	
	Running current		64/72A	
	Control circuit		DC 24V/AC200V	
	Remote control signal		Dry contact	
	Alarm signal		Dry contact	
	Protective devise	Power source	Circuit breaker	
		Electric power circuit	Fuse	
		Compressor	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 $1^{1}/_{2}$	
	Water outlet		Rc $1^{1}/_{2}$	
	Water supply		Rc $^{1}/_{4}$	
	Over flow & Drain outlet		Rc $^{3}/_{4}$	
	Drain pan		Rc $^{1}/_{2}$	
Others	External dimensions	Width(mm)	1960mm	
		Depth(mm)	840mm	
		Height(mm)	1853mm	
	Painting color (Munsell No.)		5GY 7.5/0.5, 9G4.5/10,3G 6.0/0.5	
	Mass of product		775kg	780kg
	Water tank		120 ℓ	
	Refrigerant		HCFC22	

(*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, 50/60HZ.……HYW3033
The value shows water flow rate at water outlet pressure 0.4MPa. …… HYW5033

Discontinue

6-2.Outline drawing



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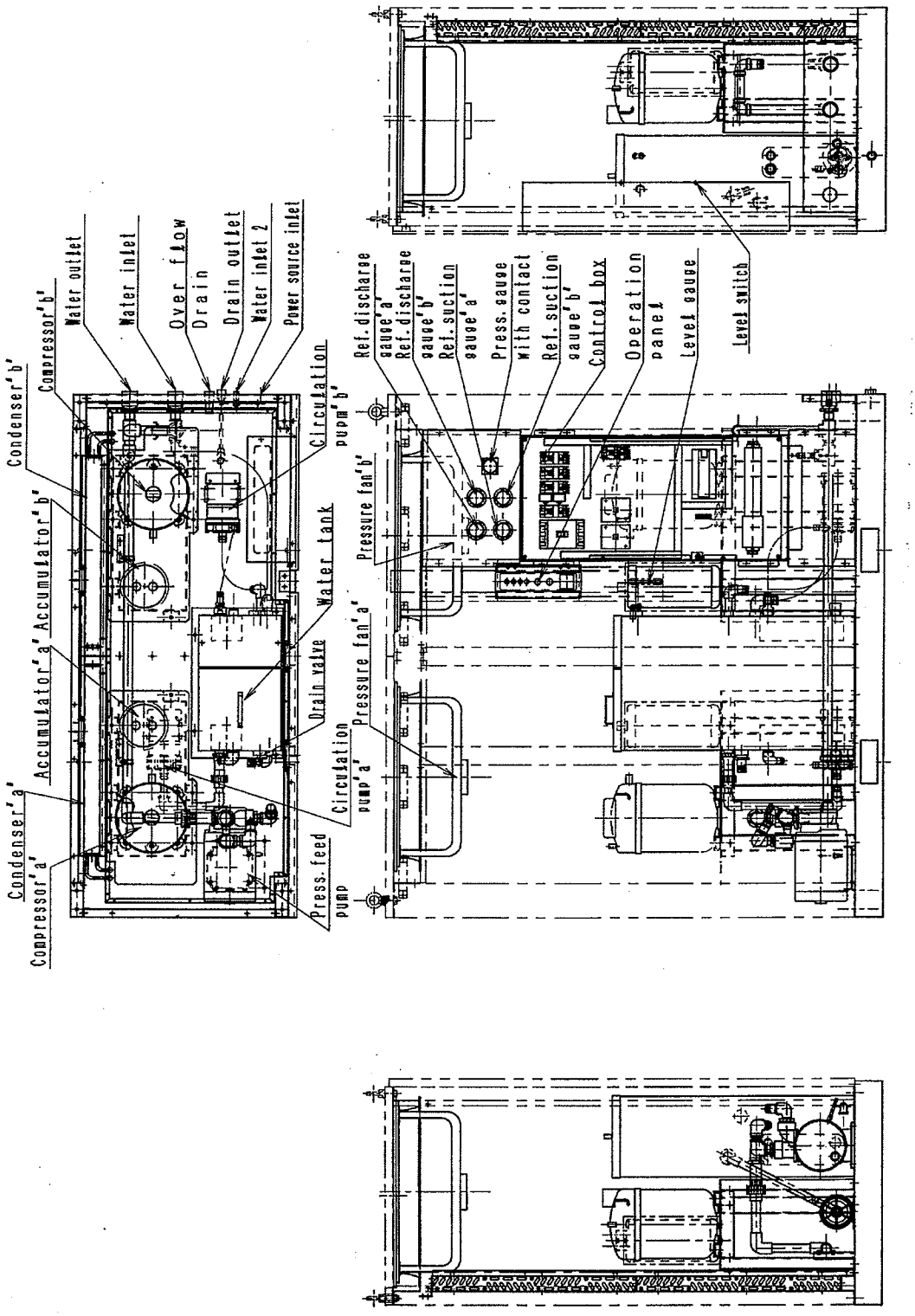
6-3.Inside structure drawing HYW3033



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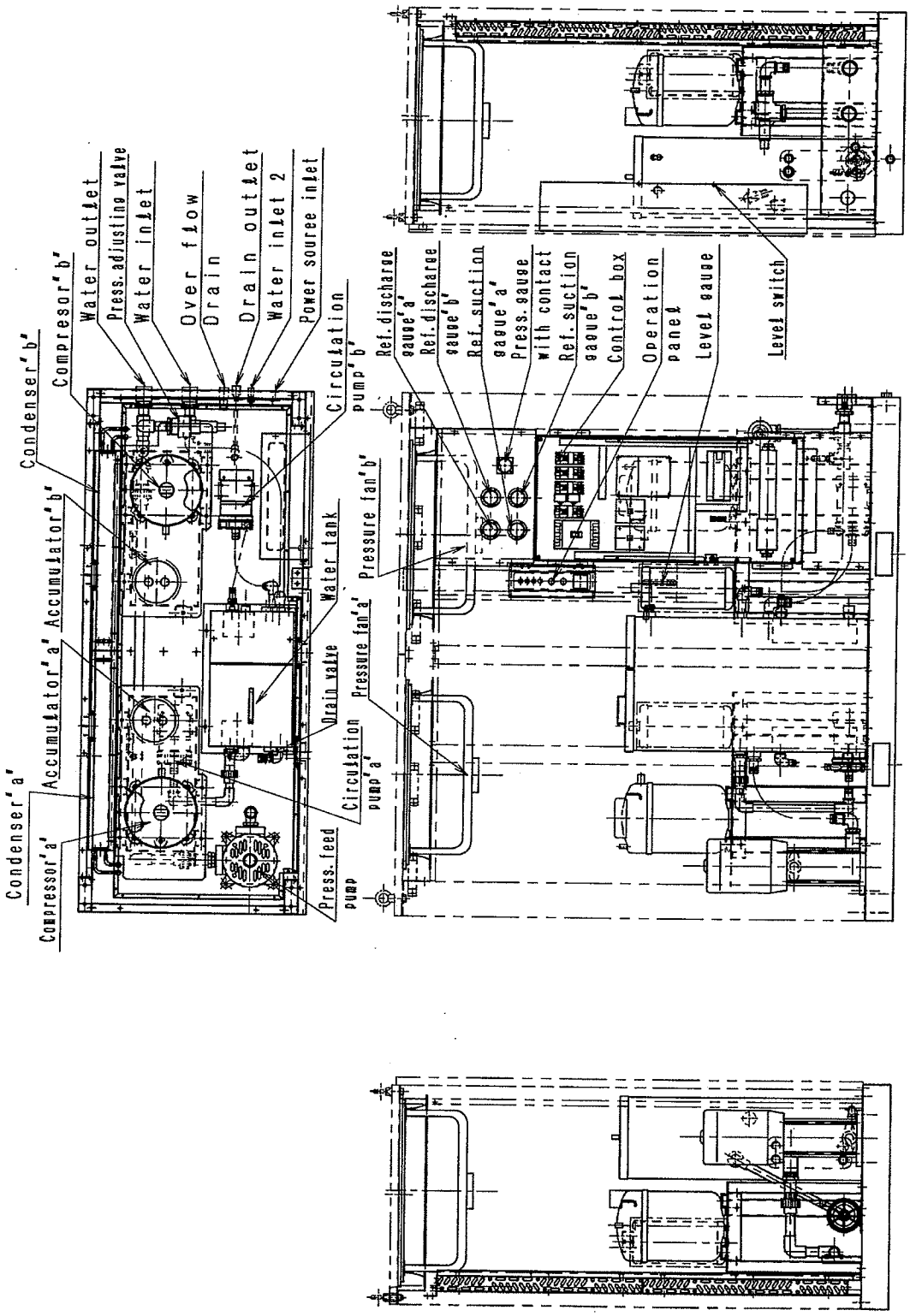
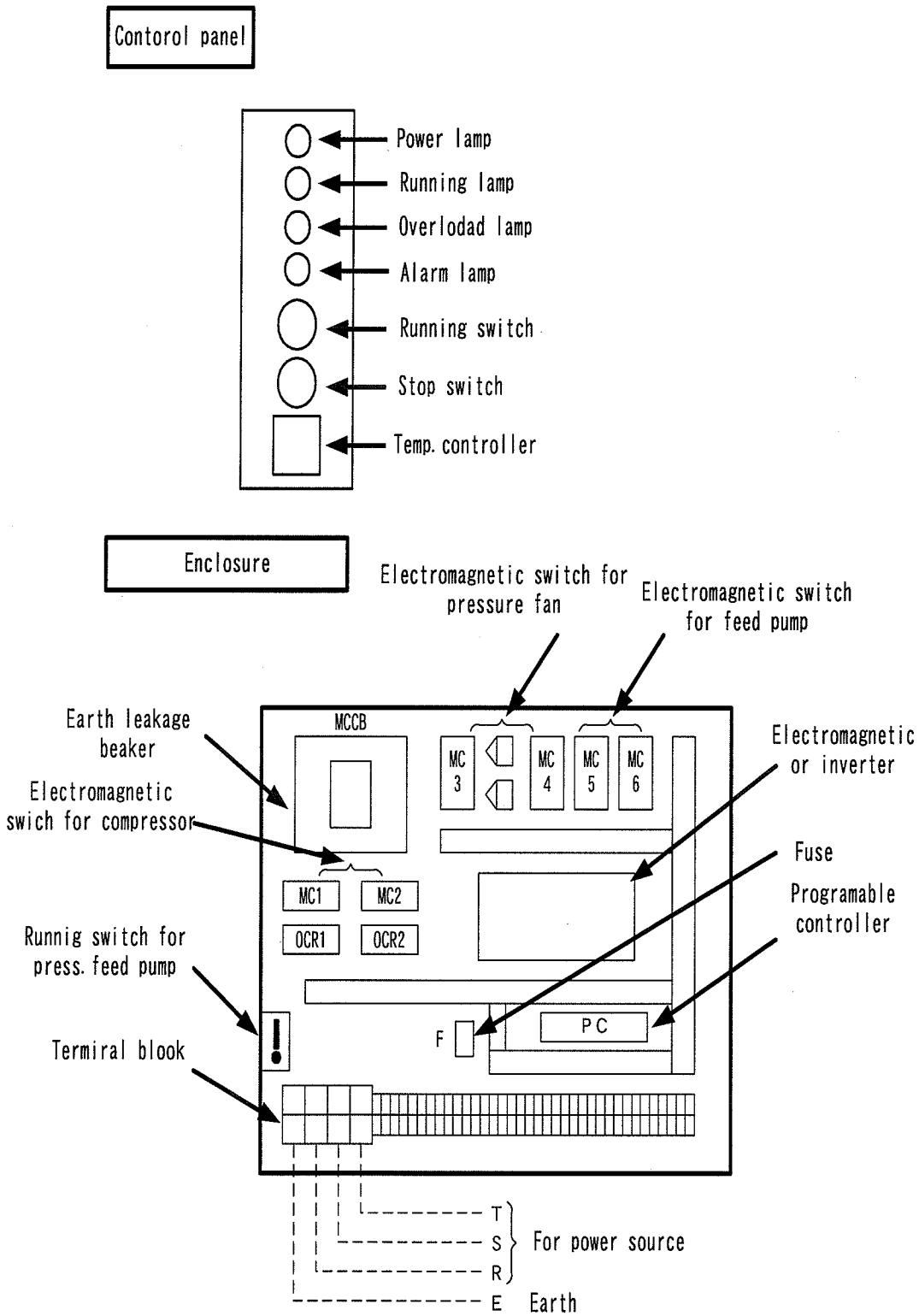
6-3.Inside structure drawing HYW5033



6-4.Control panel



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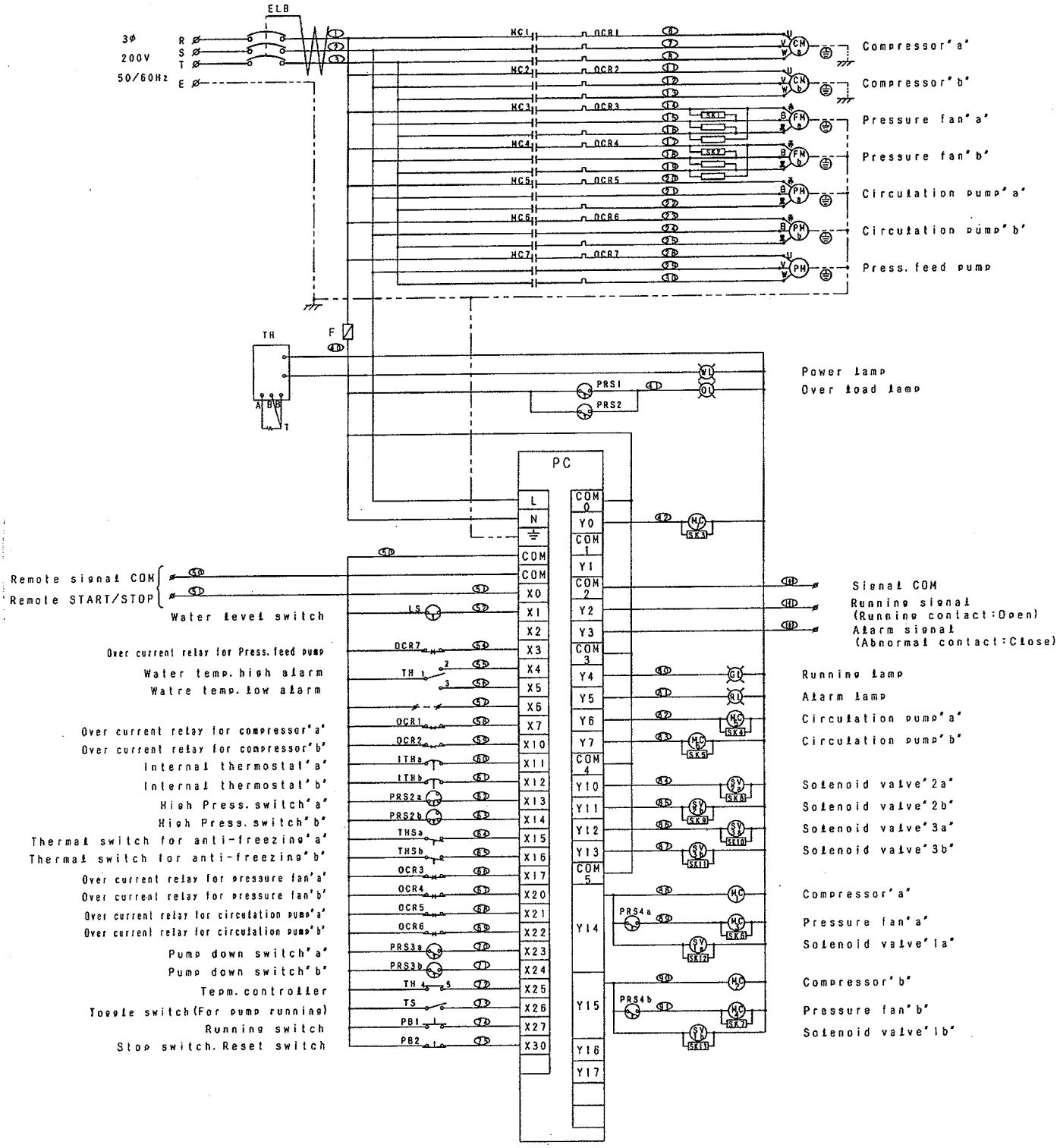
6-5.Electric circuit diagram HYW3033



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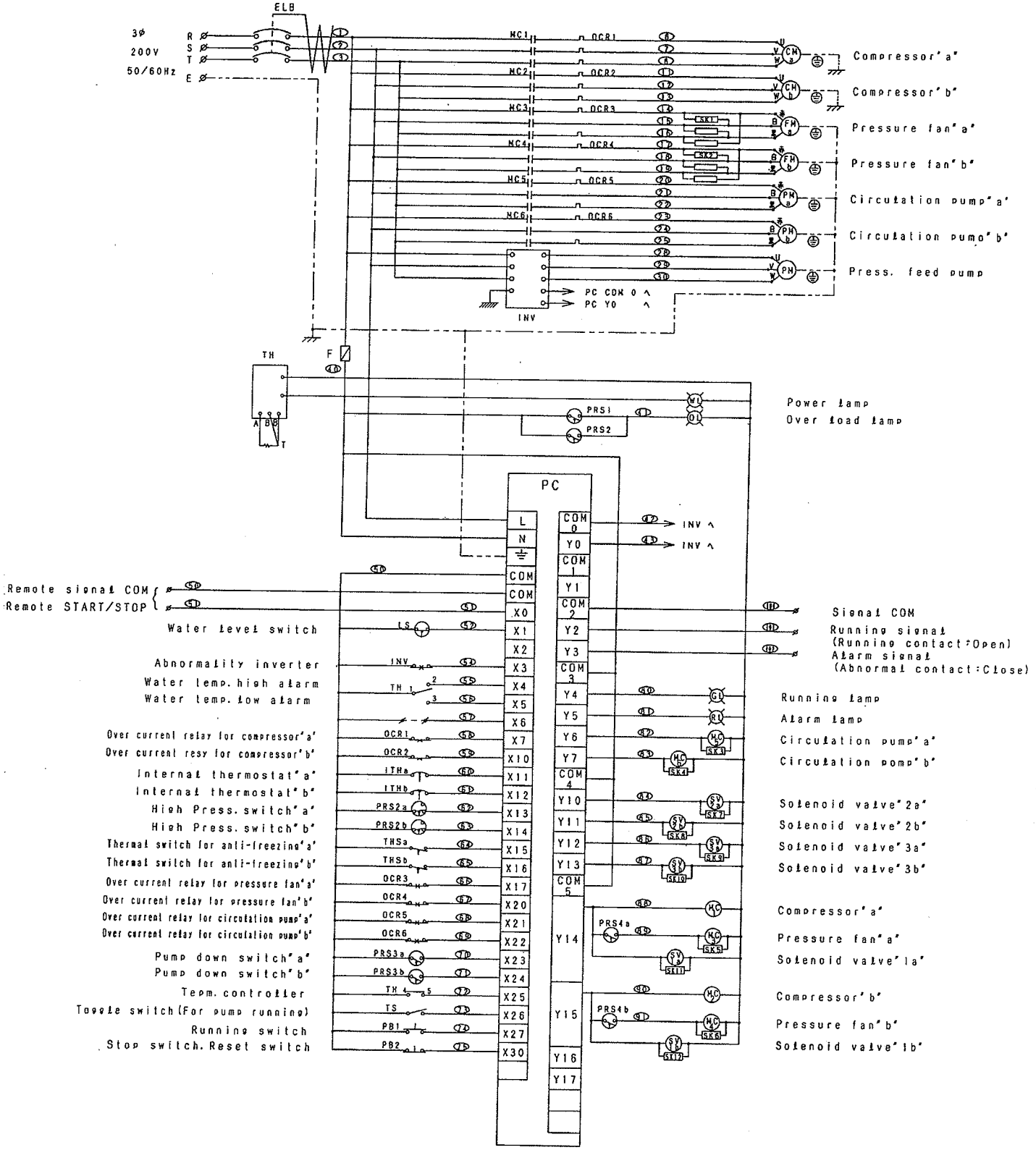
THS a, b	Temp. switch	2	
SV3 a, b	Solenoid valve	2	For refrigerant
SV2 a, b	Solenoid valve	2	For refrigerant
SV1 a, b	Solenoid valve	2	For refrigerant
PC	Programmable controller	1	
TS	Toggle switch	1	
WL	Indicating lamp	1	
OL	Indicating lamp	1	
GL	Indicating lamp	1	
RL	Indicating lamp	1	
T	Temp. sensor	1	
TH	Temp. controller	1	
ITH a, b	Internal thermostat	2	
PRS4 a, b	Fan control switch	2	
PRS3 a, b	Pump down switch	2	
PRS2 a, b	High press. switch	2	
PRS1 a, b	Over load switch	2	
LS	Water laval switch	1	
SK 8~13	Spark killer	6	
SK 3~7	Spark killer	5	
SK 1, 2	Spark killer	2	
PB2	Push button switch	1	
PB1	Push button switch	1	
F	Fuse (3A)	1	Spare part (1Pc.)
INV	Inverter	1	
MC 7	Electromagnetic swicth	1	
MC 5, 6	Electromagnetic switch	2	
MC 3, 4	Electromagnetic switch	2	
MC 1, 2	Electromagnetic switch	2	
OCR 7	Over current relay	1	
OCR 5, 6	Over current relay	2	
OCR 3, 4	Over current relay	2	
OCR 1, 2	Over current relay	2	
PM	Press. feed pump	1	
PM a, b	Circulation pump	2	
FM a, b	Pressure fan	2	
CM a, b	Compressor	2	
ELB	Earth leakage breker	1	125A
品番 NO	部品名 PARTS 材料 MATERIAL	数量 QTY	備考 REMARK

Discontinue

6-5.Electric circuit diagram HYW5033



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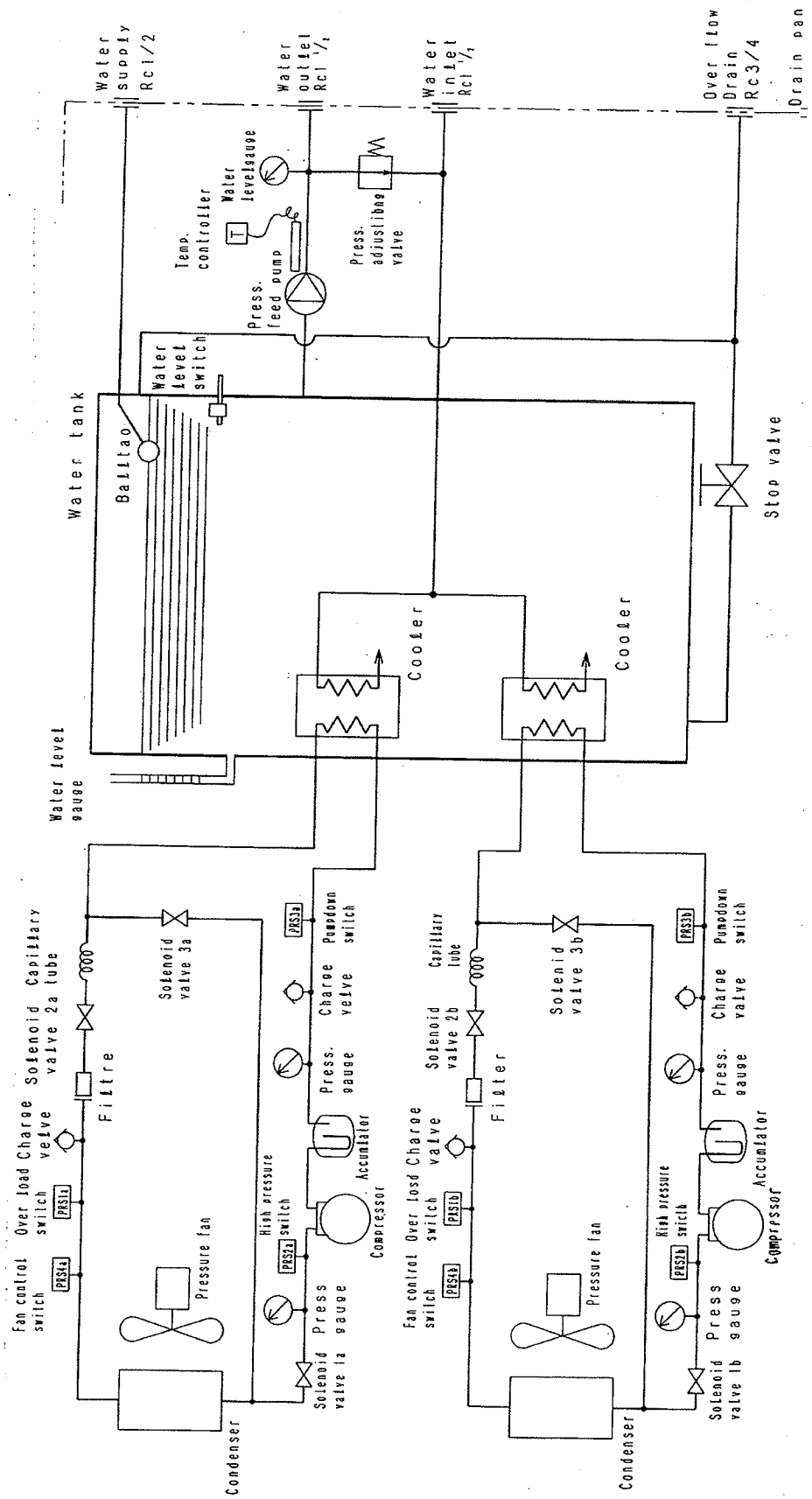
品番 NO	部品名 PARTS	材料 MATERIAL	数量 QTY	備考 REMARK
THS a, b	Temp. switch		2	
SV3 a, b	Solenoid valve		2	For refrigerant
SV2 a, b	Solenoid valve		2	For refrigerant
SV1 a, b	Solenoid valve		2	For refrigerant
PC	Programmable controller		1	
TS	Toggle switch		1	
WL	Indicating lamp		1	
OL	Indicating lamp		1	
GL	Indicating lamp		1	
RL	Indicating lamp		1	
T	Temp. sensor		1	
TH	Temp. controller		1	
ITH a, b	Internal thermostat		2	
PRS4 a, b	Fan control switch		2	
PRS3 a, b	Pump down switch		2	
PRS2 a, b	High press. switch		2	
PRS1 a, b	Over load switch		2	
LS	Water laval switch		1	
SK 7~12	Spark killer		6	
SK 3~6	Spark killer		4	
SK 1, 2	Spark killer		2	
PB2	Push button switch		1	
PB1	Push button switch		1	
F	Fuse (3A)		1	Spare part (1Pc.)
INV	Inverter		1	
MC 5, 6	Electromagnetic switch		2	
MC 3, 4	Electromagnetic switch		2	
MC 1, 2	Electromagnetic contactor		2	
OCR 5, 6	Over current relay		2	
OCR 3, 4	Over current relay		2	
OCR 1, 2	Over current relay		2	
PM	Press. feed pump		1	
PM a, b	Circulation pump		2	
FM a, b	Pressure fan		2	
CM a, b	Compressor		2	
ELB	Earth leakage breker		1	125A

Discontinue

6-6.Flow chart　　HYW3033・ HYW5033



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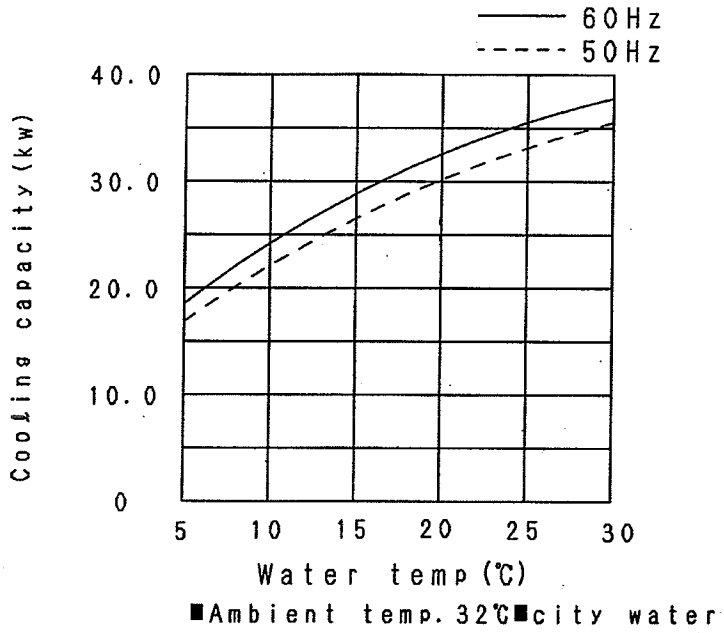
6-7.Performance curve

Cooling capacity



Water rate flow