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CKD

HYCOOL
HYW1014, 1024, 1047
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

03-12 11th EDITION SM-11505-A

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Safety instructions

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

Safety precautions

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

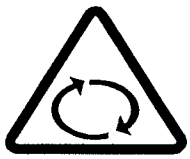
⚠ WARNING ⚠ CAUTION

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

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

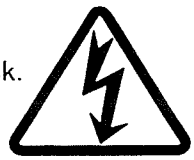
⚠ WARNING : Rotating device

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



⚠ WARNING : Electric shock hazard

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



⚠ CAUTION : Hot surface

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

⚠ CAUTION : Falling hazard

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

Ground connection

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

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

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FORWARD

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

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

Keep this booklet in custody to prevent misplacing it.

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Table of Contents

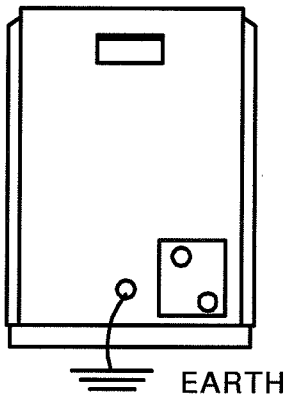
1. Particular care required

1-1. During transportation and installation

⚠ WARNING • Make sure to a grounding so as to avoid electrocution.

⚠ CAUTION • Prevent keeping the cooler on its side or upside down to avoid later mechanical troubles.

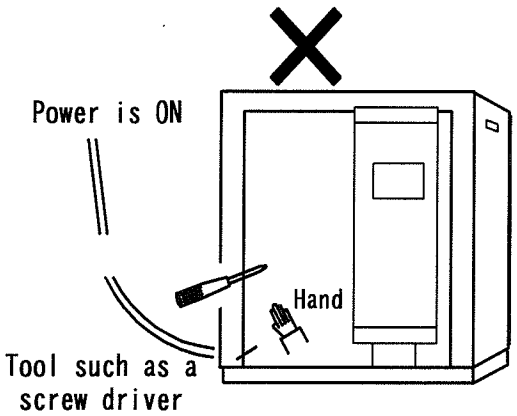
• No stepping on it or place any objects on it.



1-2. Operational cautions

⚠ WARNING • Never try to touch electric components or wirings upon removing a panel while power is still kept ON. Never alter internal wiring of the cooler.

• Make sure to carry out inspection only upon shutting power OFF. Never try to insert hand or finger through opening of panel or try to run the cooler while panel is out of place. It is not only unable to expect a proper operation but creates tremendous danger.



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⚠ CAUTION

- There are high speed fan and high temperature pipes and compressor built-in. Never try to touch neither one of them so as to prevent laceration or burn.
- Eliminate an excessively repetition of ON and OFF of power switch or operational signal because it may sometimes cause a mechanical troubles. Keep such repetition less than 6 times/hour. Give at least 5 minutes running until succeeding stop. Once it is started and provide at least 3 minutes interval before restarting once it is stopped.
- Use the product with min. flow rate and over to prevent freezing.

Model No.	HYW1014	HYW1024	HYW1047
Min. flow (ℓ/min)	12	15	25

- Please check the air tightness of piping so that air bubbles do not mix in a water circuit.
  Especially, please ensure the airtight check of pump suction piping, and the cap of a pump-priming mouth needs to shut strongly and must not inhale air. Mixing of air bubbles may damage a heat exchanger. (This equipment cannot be used in systems which air bubbles mix clearly, such as air bubbles generating equipment.)
- Comply with the following operational order. Otherwise, it may cause malfunction of the cooler.

Item \ Model No.	HYW1014	HYW1024	HYW1047
Power source	Single phase AC200V 50/60Hz	Three Phase AC200V 50/60Hz	
Service media	City water		
Media temperature	5～25℃		
Ambient temperature	5～40℃		
Ambient humidity	40～80% RH		

2. Suggestions during installation

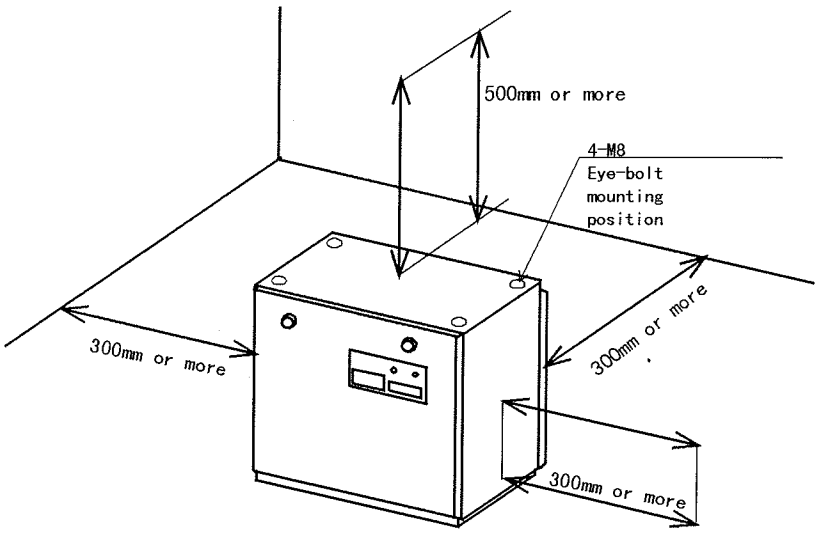
2-1.Installation

◆Select a horizontal and rigid plane to install it.

◆Fix the body, Otherwise it may be moved by earthquake, etc.

◆Keep ample room around the cooler as shown to the right for sufficient ventilation and tool space for later maintenance service.

◆Prevent waste heat (hot air) coming into air inlet.



◆ Prevent air bubbles getting mixed into the press. feed pump.

◆ When hoisting, if necessary, use wire rope with a sufficient strength. Be sure to Hook wire ropes on four eye-bolts which are required to mount on the upper panel.

2-2.Environment of installation

◆Select the location of better ventilation but no trashes or dusts.

◆Install it indoor. Also avoid the place where water splashes over or oil mist generates.

◆Avoid the place where corrosive gas exists.

◆Avoid the place with high humidity or potential dew.

◆Install an additional ventilation fan or air inlet where temperature or operating stop is forecasted to rise up to close 40℃.

◆Avoid exposing it to direct sun beam or heat source as it may deteriorate cooling efficiency.

3. Preparation for operation

3-1.Plumbing

◆ Port sizes of water inlet and outlet.

Diameters of both inlet and outlet are same size. Pipe it to correct port.

Model no.	Water inlet and outlet size(materials)
HYW1014	Rc1/2(SUS304)
HYW1024	Rc3/4(SUS304)
HYW1047	Rc3/4(SUS304)

◆ Pipe's materials

Avoid rusting materials such as iron or aluminum. Plumb the system with such rustles pipes as stainless steel, vinyl chloride or bronze. Since inlet side becomes negative pressure, use suction hose(hose with spring).

◆ Make sure to connect joints tightly to eliminate water leakage. Support the intermediate pipe to floor or wall to avoid total weight of pipes from loading onto the cooler.

◆ Connect a check valve at the water inlet side, when this cooler shall be installed at high positions over the surface of the water.

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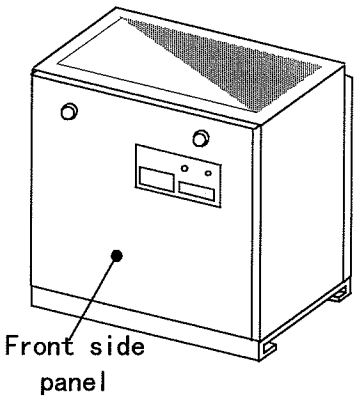
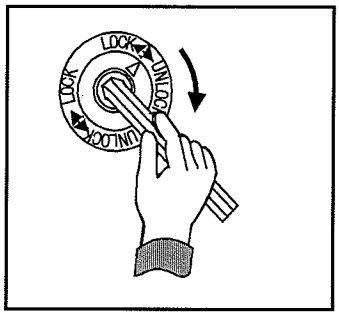
3-2. Wiring

3-2-1.Turn both ring – handles in clockwise direction. Then, remove the front panel.

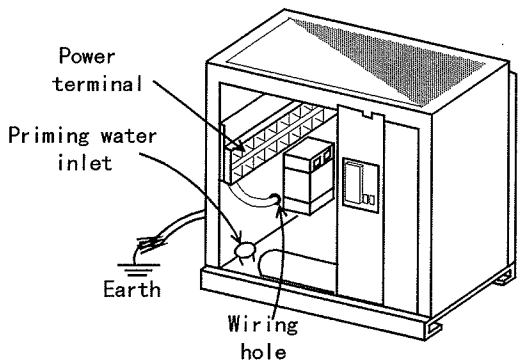




In order to open the front panel, insert nominated size 5 or 3/16 hexagonal bar spanner into hexagonal hole in the center, and turn the spanner clockwise until triangle mark moved to 「UNLOCK」 from 「LOCK」 . when closing it, turn the spanner reversely to 「LOCK」 position.

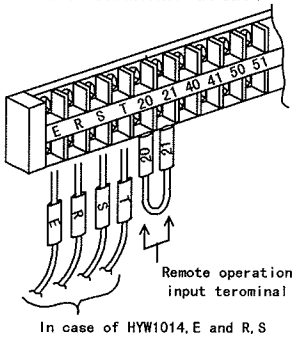
3-2-2.Pass the power cables through wiring hole. Then, connect the power cables with grounding wire.

3-2-3.Make sure to have grounding wire connected.



◆ Rimove a jamping wire which is connected terminal NO. 20 with NO. 21, in case of remote controlled operation. After that, connect a switch between those two terminals. The switch will be used on remote controlled operation.

Power terminal ditail



model no.	Sourse Power
HYW1014	Single Phase AC200V
HYW1024	Three Phase AC200V
HYW1047	Three phase AC200V

3-3.Priming water supply

a) When the cooler is installed under surface of the water.

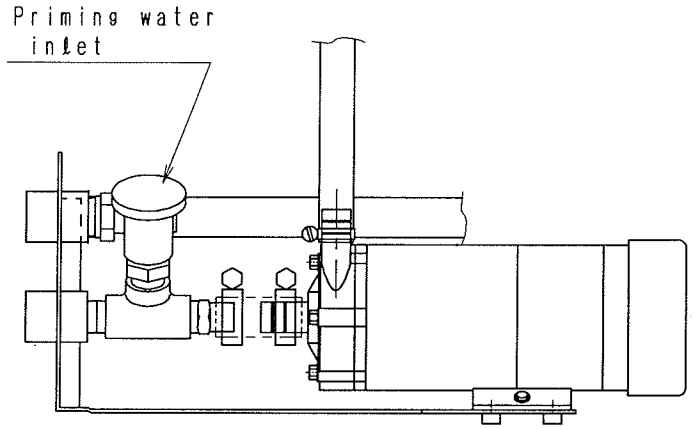
Loose the priming water inlet, then tighten it when the water is oozing.

*Turn the priming water inlet in counter-clockwise direction to loose.

b) When the cooler is installed over surface of the water.

Open the priming water inlet, and fill the water circuits with water.

* Turn the priming water inlet in counter-clockwise direction to loose.



◆Put the front panel back in its place.

4 Operation

4-1. How to start it

4-1-1.Confirm the front panel attached.

4-1-2.Turn the breaker "ON".

4-1-3.Turn the start and stop switch "ON".

Refrigerant compressor dose not start until actual water temperature reaches the setting temperature. Reaching the setting temperature refrigerant compressor starts. And stops when actual water temperature is lower than setting temperature.

4-1-4.Fan repeats "RUN" and "STOP".

4-1-5.Cheack the actual water temperature to be setting temperature.

【CAUTION】 Do not remove the front panel during operation absolutely. It is very dangerous for fan's rotation.

4-2.How to set temperature

Setting value (SV)

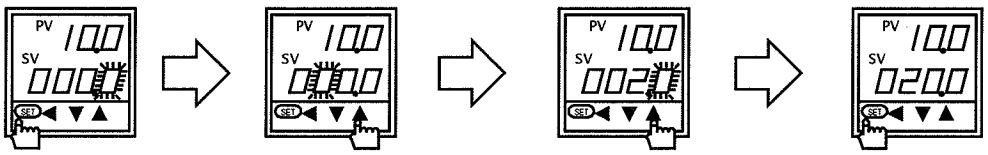
When setting the setting value (SV) 20℃

(1) Selection of setting value (SV) mode

(2) Changing (Shifting of lighted digit)

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

(4) Registration of setting value



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.

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

Press the [▲] mark of the setting value incement key to change second digit to 2.

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.

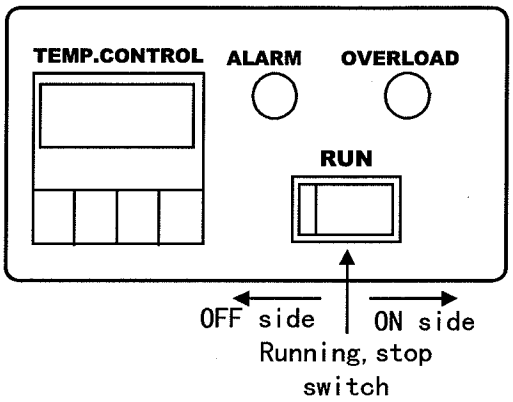
When changing the setting value (SV) from 20 ℃ to 25℃

(1) Press the [◀] mark of the setting digit shift key to shift the lighted digit to the first digit.
(2) Press the [▲]mark of the setting value increment key to change the first digit to 0, the setting value is changed 20℃.

4-3.How to stop it

4-2-1.Turn the Start and stop switch “OFF”.

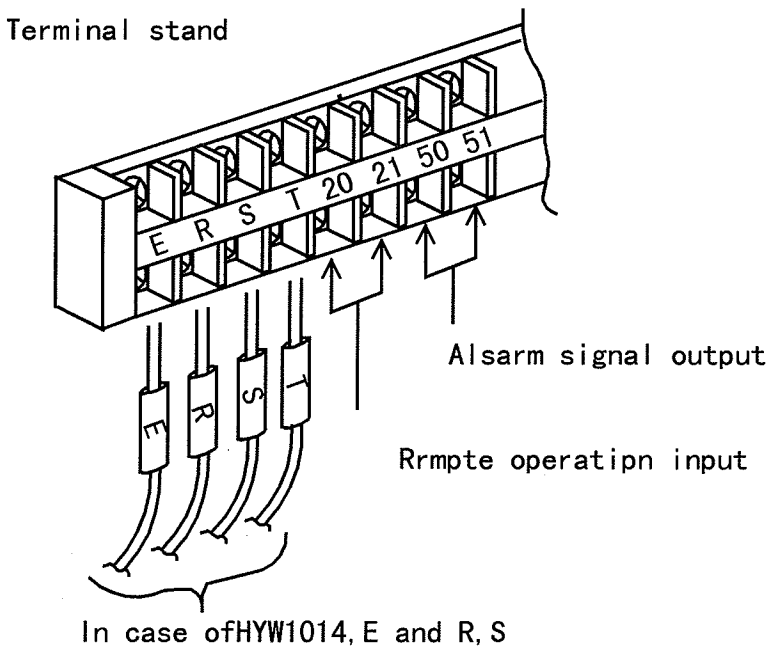
4-2-2.Turn the power circuit breaker “ON”.



4-4.Remote control

Turn start and stop switch to “ON” side, when terminal stand below is setted at remote controlled operation.

The cooler runs on the condition that remote control switch is turning to “ON” side.



5. Safety device

For your of mind during operation, safety devices are built-in. Once a safety device is actuated, the cooler stops automatically.
Refer to the table of "Trouble shooting and remedies" as for resetting the emergency stop and remedies of troubles.

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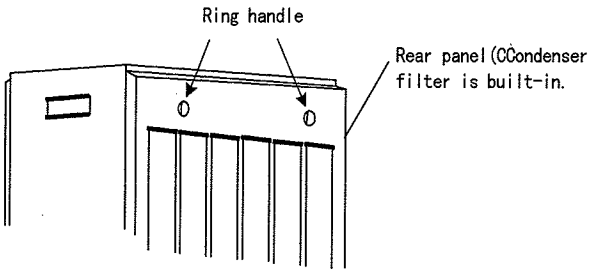
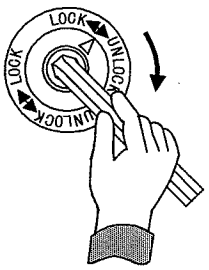
6. Daily inspection and maintenance

6-1. Daily inspection

〈Inspection items〉

- ◆ Any water leakage at pipe joints?
- ◆ It is cooling normally?

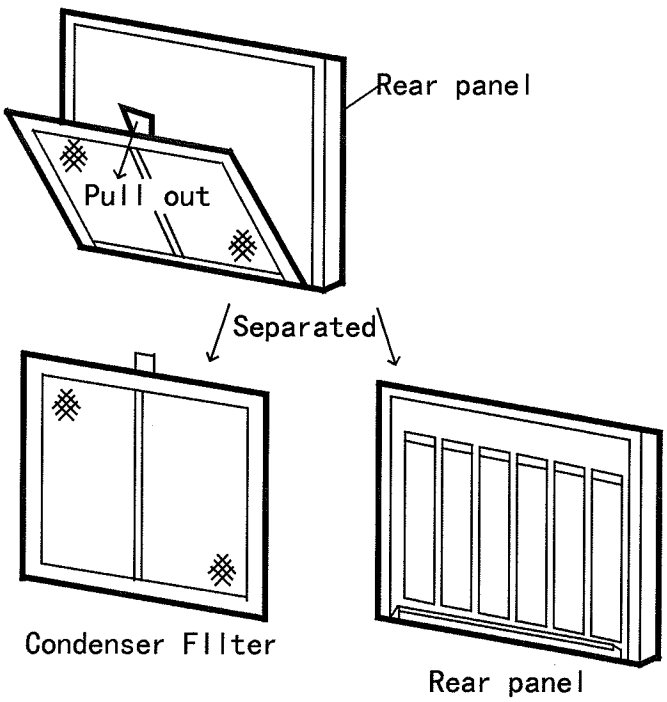




In order to open the front panel, insert nominated size 5 or 3/16 hexagonal bar spanner into hexagonal hole in the center, and turn the spanner clockwise until triangle mark moved to 「UNLOCK」 from 「LOCK」.
when closing it, turn the spanner reversely to 「LOCK」 position.

6-2.Maintenance

Remove the rear panel, check soiled condition of dust filter and blow the soil out with air gun once a month or more. Wash it with water or replace it when soiled condition is excessively heavy.
Never try to run it leaving the filter removed. Not only trash particles or dusts piling to internal part of the cooler deteriorating its heat exchange rate, but in the worst case, an emergency stop may be caused by actuated safety devices.



7. Trouble shooting 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.

Releasing alarm and coping measures

"Alarm" lamp (Red) is lit at the emergent stop of the cooler, and the cooler stop. Comply with the following order to release it.

①Turn the 'start and stop switch' to OFF side when "alarm" lamp is lit.
②Give remedies of trouble referring to the table, "Trouble shooting".
③Turn 'start and stop switch' to ON side. It restars operation.
(Hold turning it ON until it elapses 3 minutes or longer before doing so from its OFF position, once again.)

Notes

Make sure to remove possible cause of trouble otherwise it may cause mechanical trouble.

TROUBLE OF TROUBLE SHOOTING

Troubles	Possible causes	Measures and remedies
"Power" lamp is not lit	1.No power is turned ON.	1.Turn the power ON.
	2.Burnt out fuse.	2.Replace a fuse.
"Alarm" lamp is lit immediately after start and stop switch is turned ON.	3.Phase of order is connected reversal.	3.Shift the connection of two wires of power cable. *1
"Alarm" lamp is lit immediately after compressor starts.	4.Lack of one of 3-phase.	4.Repair the lack of one phase.
	5.Compressor is out of order.	5.Replace a compressor.
"Alarm" lamp is lit in a little while after "Run" lamp is lit. (Compressor starts)	6.Exessive load. (Excessive heat generation)	6.Reduce the load.
	7.Excessive setting of temperature volume.	7.Set water temperature again to 25℃ or lower
	8.Clogged condenser.	8.Clean up the condenser filter.
	9.The cooler is sucking in the hot air exhausted by itself.	9.Relocate the cooler to eliminate of taking hot air.
	10.Insufficient room between rear side of the cooler and wall.	10.Relocate the cooler at least 30cm or more away from a wall.
	11.Fan is not rotating. 11-1.Fan control switch is out of order. 11-2.Fan motor is out of order	 11-1.Replace fan control switch 11-2.Replace the fan motor
	12.Circulating water has been shut off. Measures and remedies.	12.Inspect the circulating pump, if necessary, replace it.
Circulating water is not cooled. (Water temp. reaches at 40℃, then alarm lamp is light up)	13.Erroneous setting of temperature.	13.Inspect and conform the setting temperature
	14.Leakage of refrigerant.	14.Repair.
	15.Similar causes in 6～10	15. Provide similar remedies in 6～10
Water is cooled off excessively.	16. Erroneous setting of temperature volume.	16.Inspectand reconfirm the setting temperature.
"Over-load lamp is lit.	8.Clogged filter of condenser.	8.Clean up the condenser filter.
	17.Excessive cooling capacity. (Check 6～10 mentioned above)	17.Remove the causes.

*1: Expect for HYW1014

8. Custody

(1)Shut OFF power.
Shut OFF power circuit bleaker.
(2)Disconnect pipings and drain water.
(3)Store it. Take care of keeping it from trashes, dust, rain, water, oil, snow and so forth.
(4)When put it back to service.
Upon connecting pipes start operation referring to articles 4 and 5 of this manual.

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9. Other documents

9-1. Specifications

	Model		HYW1014	HYW1024	HYW1047
Service range	Installation placed		Indoor		
	Range of ambient temperature		5～40℃		
	Range of ambient humidity		40～80%RH		
	Electric power		1-phase AC200V±10% 50/60Hz	3-phase AC200V±10% 50/60Hz	
	Service media		Water		
	Setting range of water temp.		5～25℃		
	Range of circulating flow (Head 0m 50/60Hz)		23/28ℓmin or more	27/32ℓmin or more	42/48ℓmin or more
performance	Cooling capacity (Water, Air : 20℃, 32℃)		1. 2／1. 4kW	2. 2／2. 4kW	4. 3／4. 7kW
Electric specifications	Power consumption		0.6/0.7 kW	1.2/1.5 kW	2.0/2.4 kW
	Running current		3.1/3.5 A	4.4/4.7 A	6.8/7.6 A
	Remote operation input		Dry contact (less than AC200V, 0.5A)		
	Alarm signal output		Dry contact (AC200V, 0.5A, DC24V, 1A at rated load)		
	Protective device	Control circuit	Fuse		
		Compressor	Over load protector	I Over current protector Internal thermostat	I Over current relay Internal thermostat
		Refrigerant circuit	High pressure switch protector Anti-freezing thermal switch		
Connecting ports	Water inlet		Rc $^{1}/_{2}$	Rc $^{3}/_{4}$	
	Water outlet		Rc $^{1}/_{2}$	Rc $^{3}/_{4}$	
Details of components	Compressor		Hermetic type		
	Condenser		Cross fin type, forced sir cooling		
	Fan		Motor output 25W		Motor output 50W
	Evaporator		Stainless steel plat type		
	Refrigerant control		Capillary tube		
	Refrigerant		HCFC22		
	Temperature controller		Electronic type(Difference temp. & Constant temp. shifting type)		
	Control board		"Alarm" lamp Temp. controller "Over load" lamp Start and stop switch		
	External dimensions (W×D×H)		460×340×420	560×340×470	600×400×640
Others	Mass		35 kg	50 kg	70 kg

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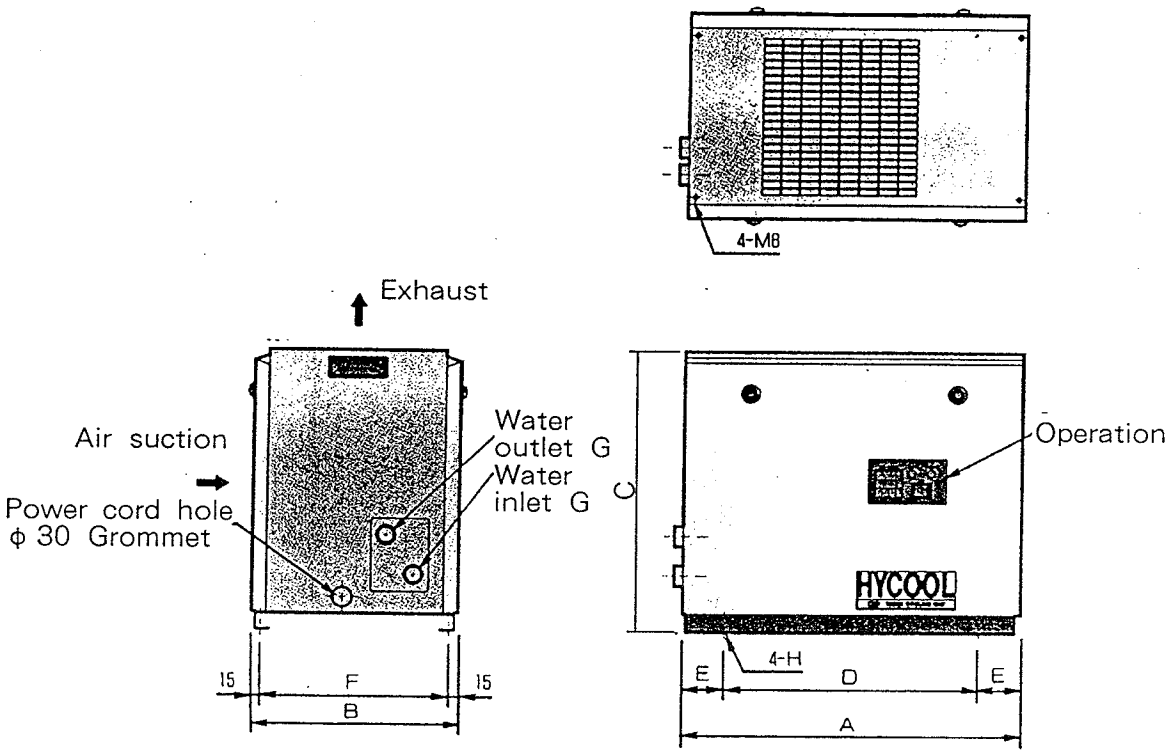
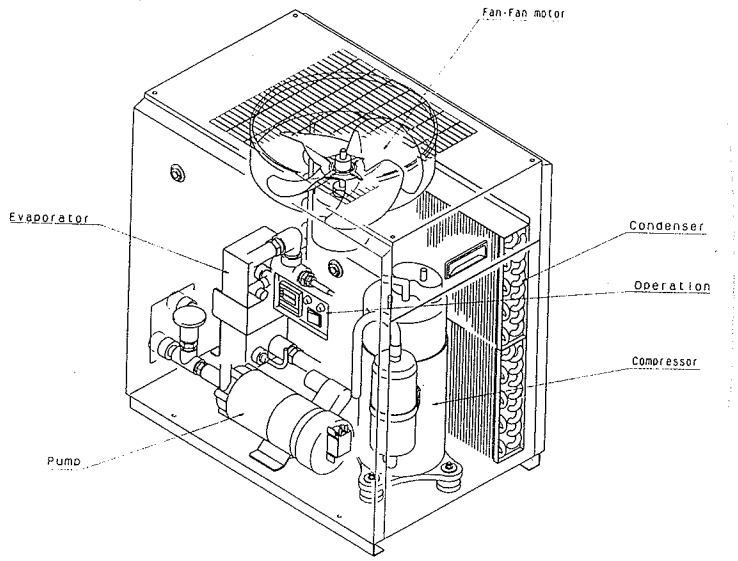
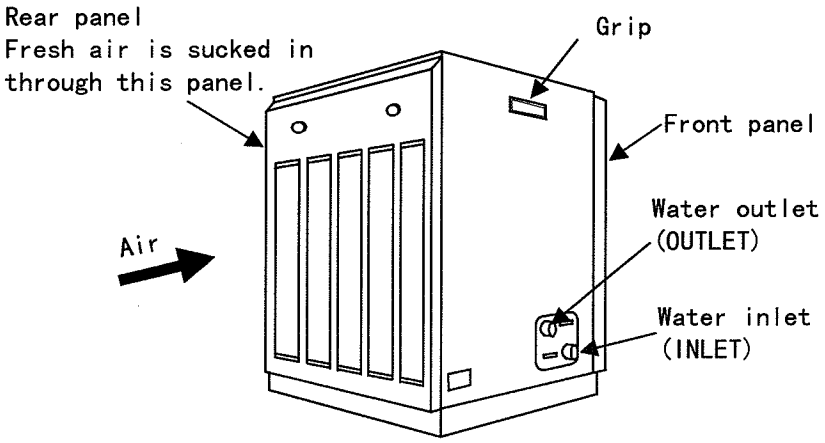
9-2.Outline drawing

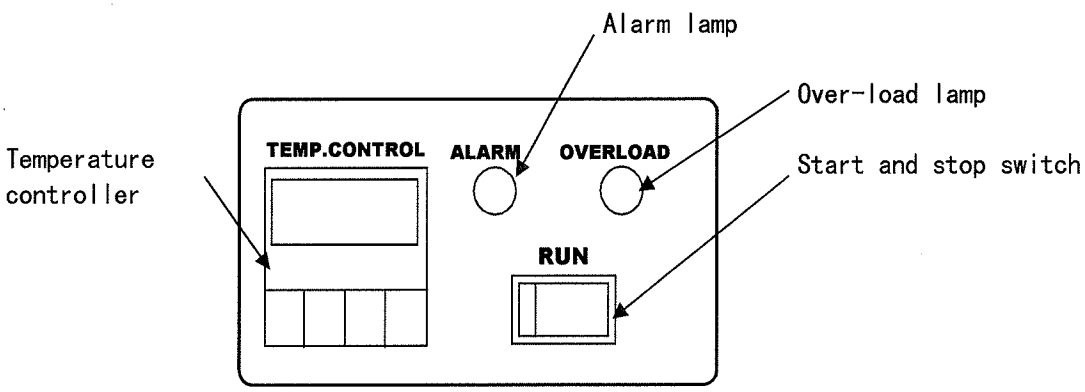


Symbol / Model No.	A	B	C	D	E	F	G	H
HYW1014	460	340	420	320	70	310	Rc1/2	Hole for M6
HYW1024	560	340	470	420	70	310	Rc3/4	Hole for M6
HYW1047	600	400	640	400	100	370	Rc3/4	Hole for M8

9-3.Name of componenpars







Control board details

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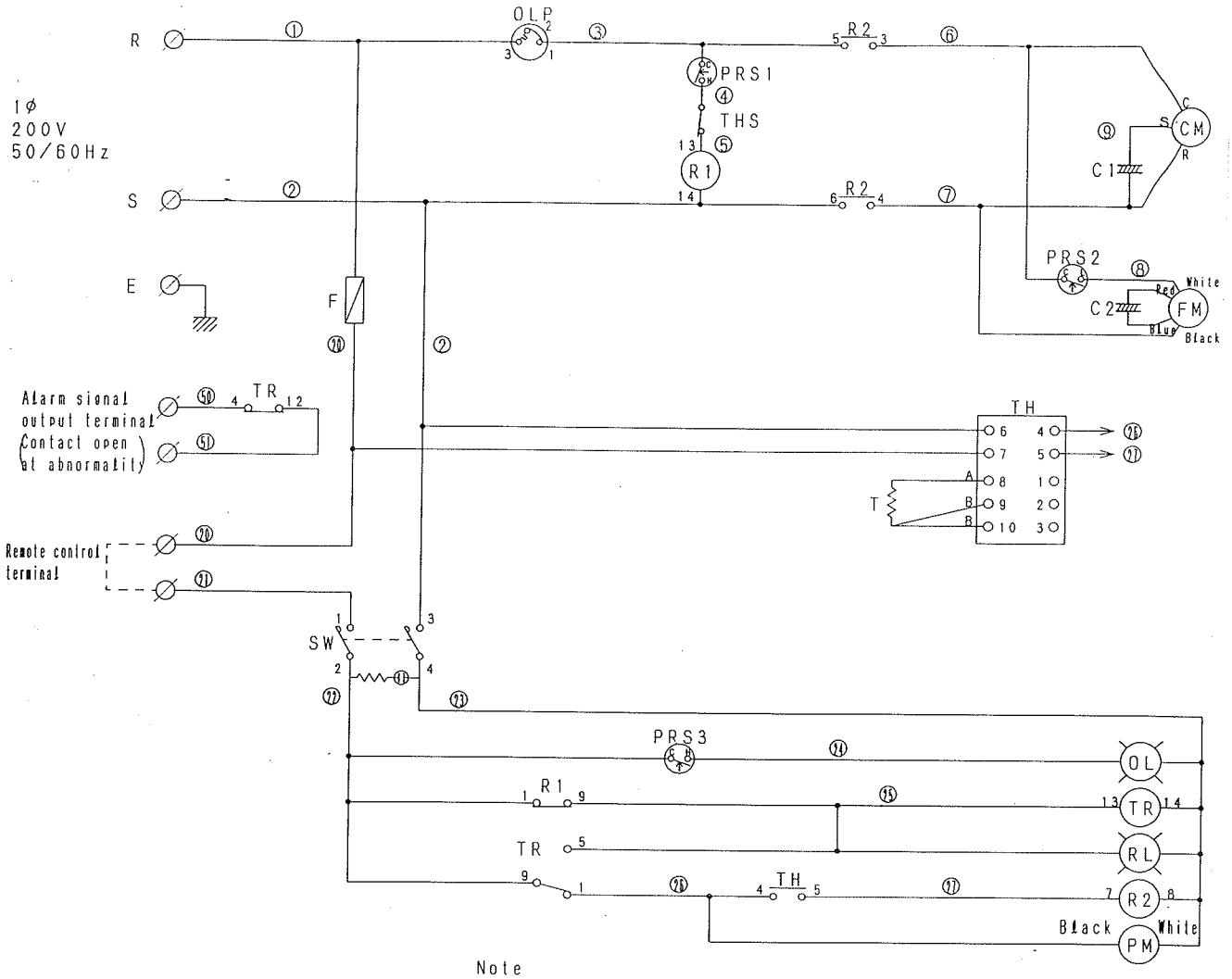
9-4. Electric circuit diagram HYW1014



Note

1. Frequency of start and stop is 6 times or less per hour, time required from re-start to next stop is 3 minutes or over, time of stop is 3 minutes or over.

品番 NO.	部品名 PARTS	材質 MATERIAL	数量 Q'TY	備考 REMARK
CM	Compressor		1	
OLP	Over load protector		1	
FM	Condenser fan		1	
PM	Press. feed pump		1	
PRS1	High range pressure switch		1	
PRS2	Fan control switch		1	
PRS3	Over load switch		1	
C1	Running capacitor		1	
C2	Power capacitor		1	
R1	Relay		1	
R2	Relay		1	
TR	Timer		1	
TH	Temperature controller		1	
T	Temperature sensor		1	
SW	Start Stop switch		1	
OL	Over load lamp		1	
RL	Alarm lamp		1	
F	Fuse		1	3A
THS	Thermal switch for anti-freezing		1	

Set point	
Item	Description
PRS1	2.75MPa open 2.26MPa closed
PRS2	1.67MPa closed 1.16MPa open
OLP	4.5A open
THS	-10℃ open (-6℃ closed)

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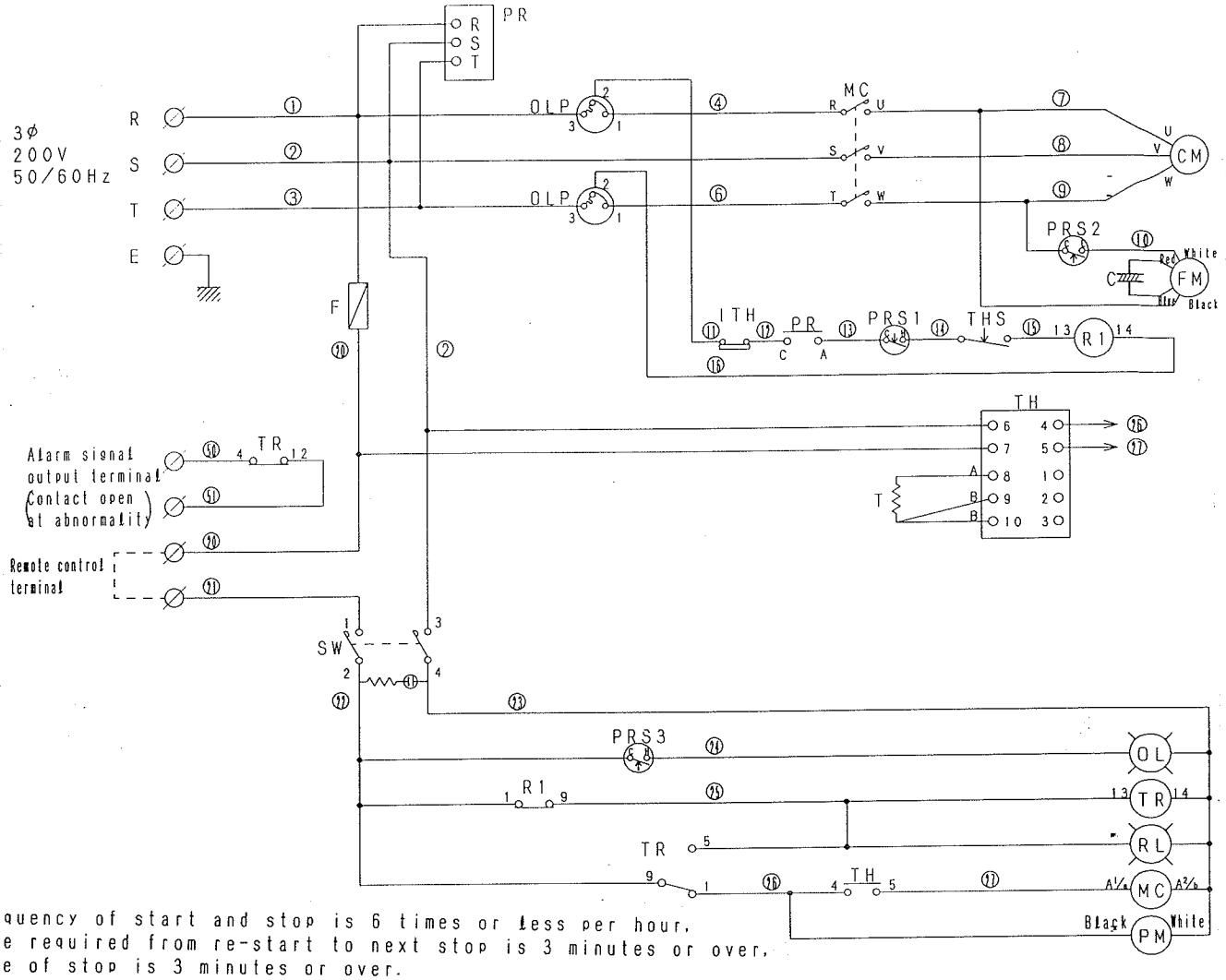
9-4. Electric circuit diagram HYW1024



Note

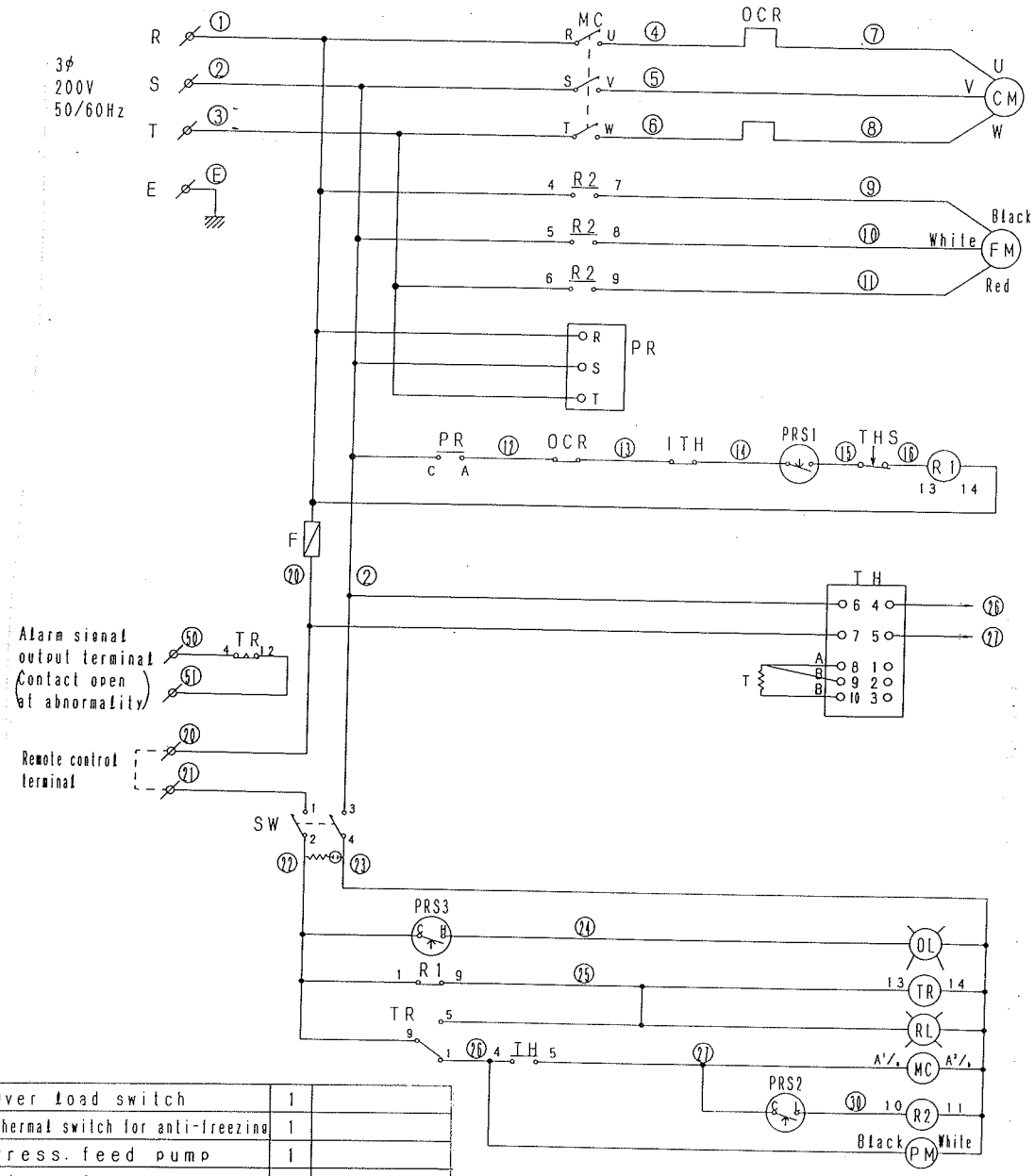
1. Frequency of start and stop is 6 times or less per hour, time required from re-start to next stop is 3 minutes or over, time of stop is 3 minutes or over.

PR	Phase protector	1	
ITH	Internal thermostat	1	
THS	Thermal switch for anti-freezing	1	
F	Fuse	1	3A
RL	Alarm lamp	1	
OL	Over load lamp	1	
SW	Start Stop switch	1	
T	Temperature sensor	1	
TH	Temperature controller	1	
TR	Timer	1	
MC	Electromagnetic contactor	1	
R1	Relay	1	
C	Power capacitor	1	
PRS3	Over load switch	1	
PRS2	Fan control switch	1	
PRS1	High range pressure switch	1	
PM	Press. feed pump	1	
FM	Condenser fan	1	
OLP	Over load protector	2	
CM	Compressor	1	
品番 NO.	部品名 PARTS	材質 MATERIAL	数量 Q'TY / 備考 REMARK

Set point	
Item	Description
PRS1	2.75MPa open 2.26MPa closed
PRS2	1.67MPa closed 1.16MPa open
OLP	6.5A open
ITH	130°C open 108°C closed
THS	-10℃ open (-6°C closed)

Discontinue

9-4. Electric circuit diagram HYW1047

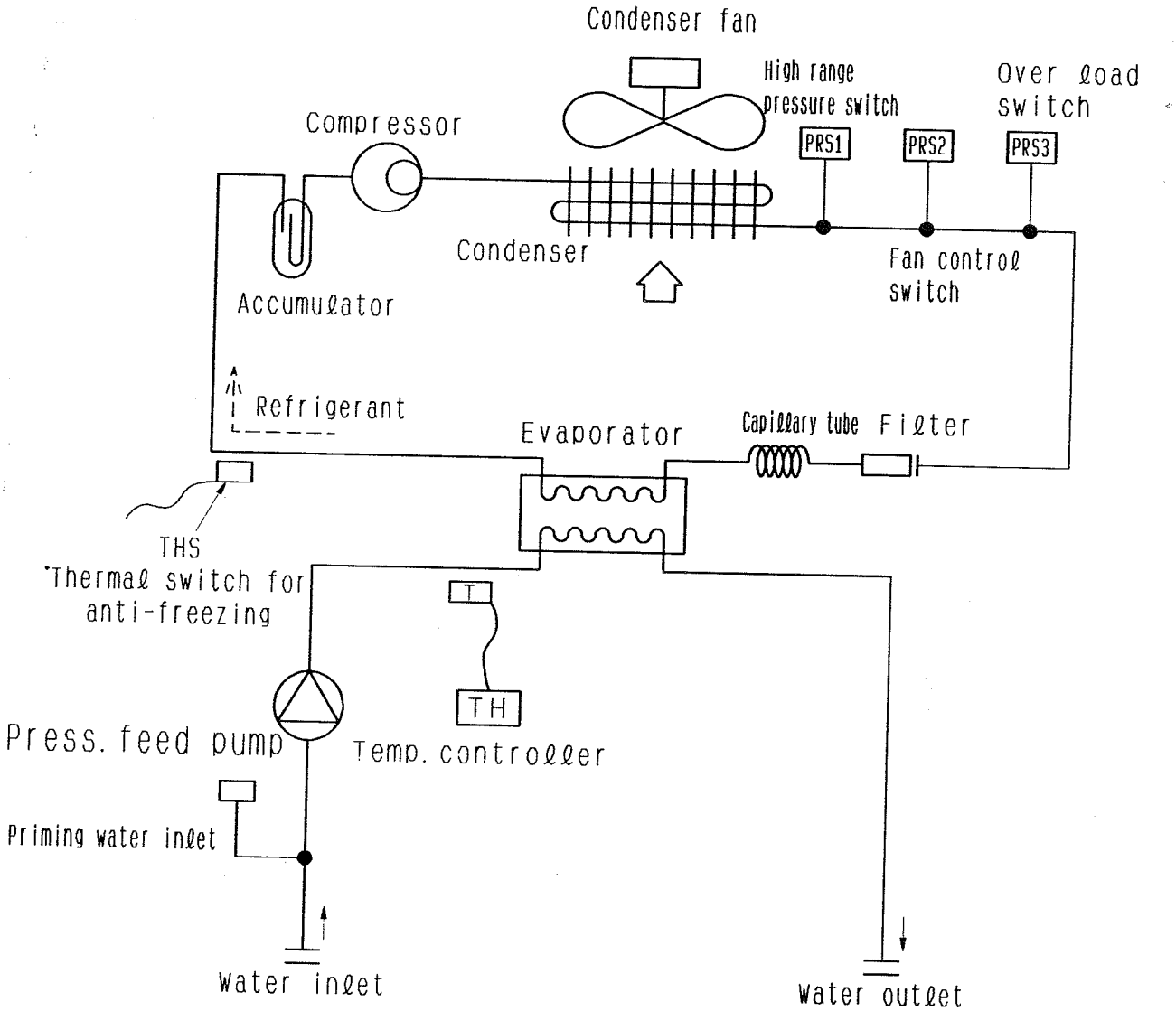


PRS3	Over load switch	1	
THS	Thermal switch for anti-freezing	1	
PM	Press. feed pump	1	
RL	Alarm lamp	1	
OL	Over load lamp	1	
TR	Timer	1	
R2	Relay	1	
R1	Relay	1	
PRS2	Fan control switch	1	
SW	Start Stop switch	1	
F	Fuse	1	3A
T	Temperature sensor	1	
TH	Temperature controller	1	
PRS1	High range pressure switch	1	
ITH	Internal thermostat	1	
PR	Phase protector	1	
FM	Condenser fan	1	
MC	Electromagnetic contactor	1	
OCR	Over current relay	1	
CM	Compressor	1	
品番 NO	部品名 PARTS	材料 MATERIAL	数量 QTY	備考 REMARK

Note
1. Frequency of start and stop is 6 times or less per hour, time required from re-start to next stop is 3 minutes or over, time of stop is 3 minutes or over.

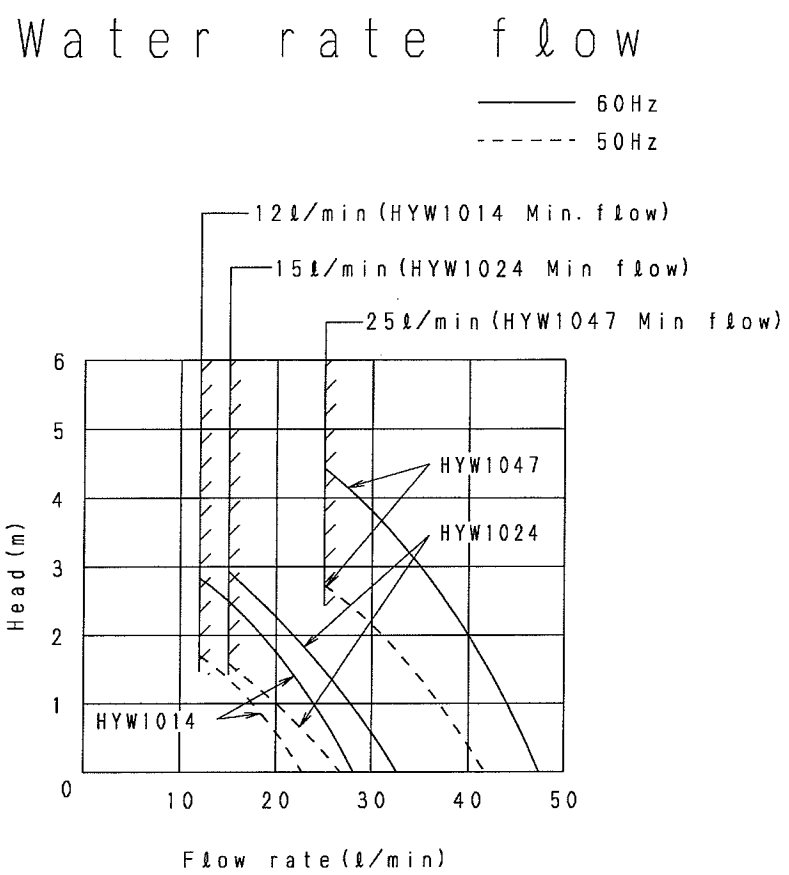
Item	Set point Description
PRS1	2.75MPa open 2.26MPa closed
PRS2	1.67MPa closed 1.1MPa open
OCR	9.0A open
ITH	125±5℃ open 90±5℃ closed
THS	-10℃ open, (-6°C closed)

9-5. Flow chart



Discontinue

9-6. Water flow rate



This is the characteristic of a pump simple substance.