

Operation Manual Installation · Operation

Original Instructions Thermo Chiller HRL Series

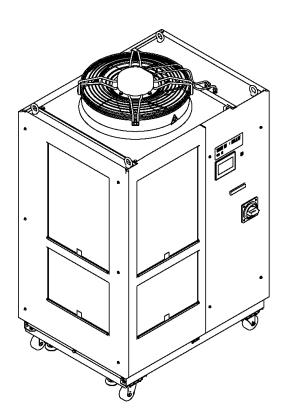
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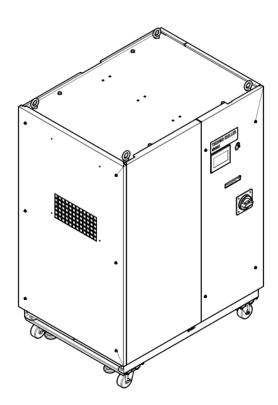
HRL100-W*-40-*

HRL200-A*-40-*

HRL200-W*-40-*

HRL300-A *-40-*





Keep this manual available whenever necessary

To the users

Thank you for purchasing SMC's Thermo chiller (hereinafter referred to as the "product").

For safety and long life of the product, be sure to read this operation manual (hereinafter referred to as the "manual") and clearly understand the contents.

- Be sure to read and follow all instructions noted with "Warning" or "Caution" in this manual.
- This manual is intended to explain the installation and operation of the product. Only people who understand the basic operation of the product through this manual or who perform installation and operation of or have basic knowledge about industrial machines are allowed to work on the product.
- This manual and other documents attached to the product do not constitute a contract, and will not affect any existing agreements or commitments.
- It is strictly prohibited to copy this manual entirely or partially for the use by a third party without prior permission from SMC.

Note: This manual is subject to possible change without prior notice.

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Chapter 1 Safety Instructions



Before using the product, be sure to read and understand all the important actions highlighted in this manual.

1.1 Before Using the Product

- This chapter is intended to specifically describe the safety related issues for handling the product. Read this before handling the product.
- The product is a cooling device using circulating fluid. SMC does not take any responsibility for any problems that may arise from using the product for other purposes.
- This product is not designed for a clean room. It generates dust from the internal components such as pump and fan motor.
- The product is operated at high voltage and contains components which become hot and rotate. If a component needs to be replaced or repaired, contact a specialized vendor for parts and service.
- All personnel who work with or around the product should read and understand the safety related information in this manual carefully before starting work.
- The safety manager is responsible for strictly observing safety standards, but responsibility in respect to safety standards during daily work resides with each individual operator and maintenance personnel.
- Do not use the materials that rust or corrode for the circulating fluid and facility water circuits. Using the materials that tend to rust or corrode may cause clogs or/and leakages of the circulating fluid and facility water circuits. In case of using these kind of materials, consider and carry out some prevention against the rusting or corrosion on the customer side.
- This manual must be kept available to operators whenever necessary.

1.2 Reading the Manual

This manual contains symbols to help identify important actions when installing, operating or maintaining the product.



This sign indicates actions that must be followed.



This sign indicates prohibited actions.

1.3 Hazards

1.3.1 Level of hazards

The instructions given in this manual aim to assure the safe and correct operation of the product, and to prevent injury of operators or damage to the product. These instructions are grouped into three categories, Danger, Warning and Caution, which indicate the level of hazard, damage and also the degree of emergency. All safety critical information should be carefully observed at all times.

"DANGER", "WARNING" and "CAUTION" signs are in order according to severity (DANGER> WARNING> CAUTION).

▲ DANGER

"DANGER": Hazard that WILL cause serious personal injury or death during operation.

WARNING

"WARNING": Hazard that MAY cause serious personal injury or death during operation.

A CAUTION

"CAUTION": Hazard that MAY cause minor personal injury.

CAUTION

"CAUTION without exclamation symbol": Hazard that MAY cause damage or failure of the product, facility, devices, etc.

1.3.2 Definition of "Serious injury" and "Minor injury"

■ "Serious injury"

This term describes injuries that result in after effects including loss of eyesight, burns, electric shock, fracture, poisoning, etc. and requires long-term treatment or hospitalization.

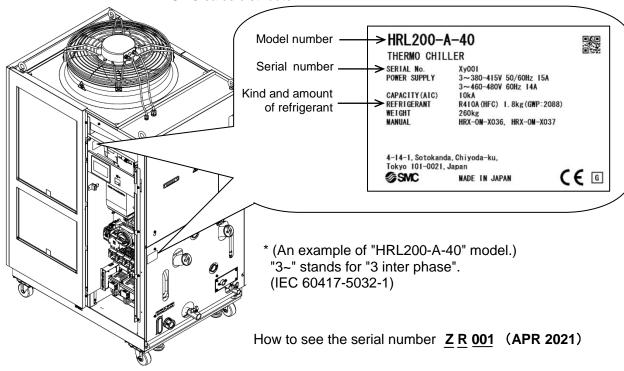
"Minor injury"

This term describes injuries that do not need long-term treatment or hospitalization. (Others excluded from "Serious injury".)

1.3 Hazards HRL Series

1.4 Product Label

Information about the product, such as Serial No. and Model No. can be found on the product label. This information is needed when contacting an SMC sales distributor.



Z				R	001	
Year	Symbol	Remarks	Month	Symbol	Remarks	Serial no.
2021	Z	Repeated from	1	0	Repeated from	
2022	Α	A to Z in	2	Р	O to Z in alphabetical	
2023	В	alphabetical	3	Q	order, with O for	_
↓	\downarrow	order	↓	↓	January and Z for December	

Fig. 1-1 Position of the product label

HRL Series 1.4 Product Label

1.5 Safety Measures

1.5.1 Safety instructions for use

WARNING



Follow the instructions below when using the product. Failure to follow the instructions may cause an accident and injury.

- Read and understand this manual carefully before using the product.
- Before starting maintenance of the product, be sure to lock out and tag out the breaker of the user's power supply.
- If operating the product during maintenance, be sure to inform all workers nearby.
- Use only the correct tools and procedure when installing or maintaining the product.
- Use personal protective equipment where specified ("1.5.2 Personal protective equipment").
- Check all parts and screws are fitted correctly and securely after maintenance.
- Avoid working in a drunken or sick condition, which might cause an accident.
- Do not remove the panels except for the cases permitted in this manual.
- Do not remove the panels during operation.
 Do not handle this product by any means other than specified in this Operation Manual; this can result in damage to the product or fire.

1.5.2 Personal protective equipment

This manual specifies personal protective equipment for each work.

Transport, Installing and Uninstalling

A CAUTION



Always use safety shoes, gloves and head protection when transporting, installing or uninstalling the product.

Handling of circulating fluid

A CAUTION



Always use safety shoes, gloves, mask, apron and eye protection when handling the circulating fluid.

Operation

A CAUTION



Always use safety shoes and gloves when operating the product.

1.5 Safety Measures HRL Series

1.6 Emergency Measures

Emergency Measures When emergency conditions such as natural disaster, fire, earthquake and injury occur, shut off the breaker of the user's power supply that supplies power to the product.

A WARNING



Even when the power supply swtich is turned off, some of the internal circuits are still energized, unless the user's power supply is shut off. Be sure to shut off the breaker of the user's power supply.

1.7 Waste Disposal

1.7.1 Disposal of refrigerant and compressor oil

The product uses hydro fluorocarbon type refrigerant (HFC) and compressor oil. Comply with the laws and regulations in each country for the disposal of refrigerant and compressor oil. The type and quantity of refrigerant is described on the "1.4 Product Label".

If these fluids need to be recovered, read and understand the instructions below carefully. If there is any unclear point, contact an SMC's sales distributor.

WARNING



- Only maintenance personnel or qualified people are allowed to open the cover panels of the product.
- Do not mix the compressor oil with domestic waste for disposal. Also, the disposal of the waste must only be conducted by specific facilities that are permitted for that purpose.

A WARNING



- Comply with the laws and regulations in each country for the disposal of refrigerant and compressor oil.
- The release of refrigerant in to the atmosphere is banned by law. Recover it with specific equipment and dispose of it correctly.
- Only people who have sufficient knowledge and experience about the product and its accessories are allowed to recover the refrigerant and compressor oil.

1.7.2 Disposal of product

The disposal of the product must be handled by a specialized industrial waste disposal agency in accordance with local laws and regulations.

1.7.3 Battery

A battery is used in the touch panel of this product. Please inform this to the disposal agency when you dispose this product.

Battery type: GT11-50BAT

System: Manganese Dioxide-Li/Organic Electrolyte

Nominal Voltage: 3V

Nominal Capacity: 550 mAh

Nominal Discharge Current: 0.2 mA

Weight: 6.8 g

Dimension: 24.5 mm × 5.0mm

The lifetime of it is approximately about 5 years, and the touch panel makes "MT07/ Low Battery" Maintenance notice when the battery needs to be replaced.

1.8 Safety Data Sheet (SDS)

If the safety data sheets of chemicals used in this product are needed, contact an SMC's sales distributor.

Any chemicals used by the user must be accompanied by an SDS.

1.8 Safety Data Sheet (SDS) HRL Series

Chapter 2 Name and Function of Parts

2.1 Model Number of Product

The product can be ordered with the model number configured as shown below.

The product needs to be handled in different ways, depending on the part number. Refer to "1.4 Product Label" and check the part number of the product.

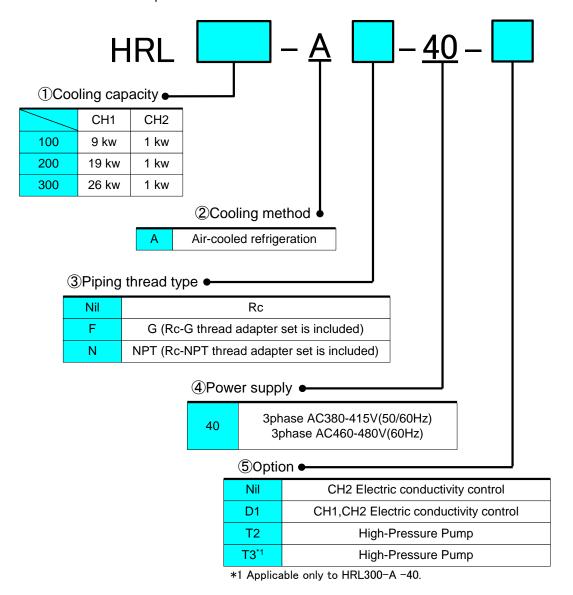


Fig. 2-1 Product model number (Air-cooled type)

HRL Series 2.1 Model Number of Product

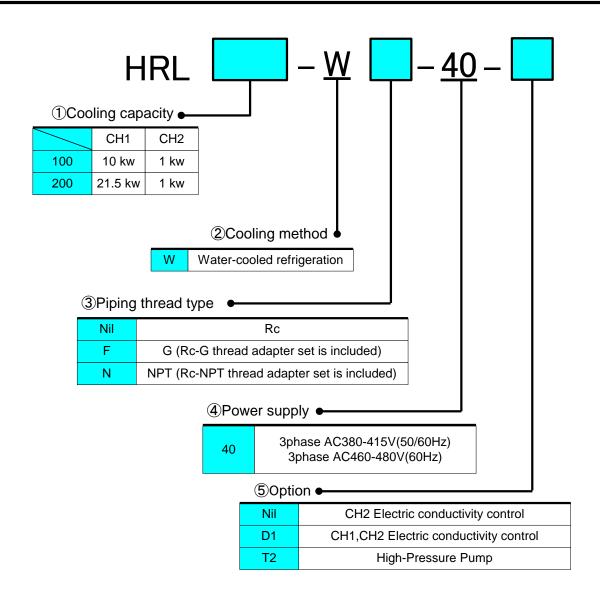


Fig. 2-2 Product model number (Water-cooled type)

2.1 Model Number of Product HRL Series

2.2 Name and Function of Parts

2.2.1 HRL***-A*-40 (Air-cooled type)

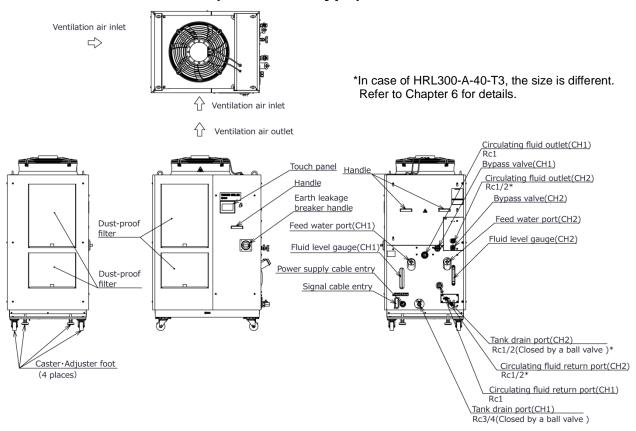


Fig. 2-2 Names of the parts (This drawing shows "HRL200-A-40".)

HRL***-W*-40 (Water-cooled type) 2.2.1 Facility water outlet Air outlet <u>Handle</u> Facility water inlet Touch panel Bypass valve(CH1) Circulating fluid outlet(CH2) Handle Circulating fluid Rc1/2 Earth leakage breakcer handle outlet(CH1) Bypass balve(CH2) Feed water port(CH2) Feed water port(CH1) Fluid level gauge(CH2) Fluid level gauge(CH1) Circulating fluid return port(CH1) Rc1 Tank drain port(CH1) (Closed by a ball valve) Circulating fluid return port(CH2) Power supply entry cable Rc1/2 Signal cable entry cab Tank drain port(CH2) Rc1/2(Closed by a ball valve) Caster · Ajuster foot

HRL Series 2.2 Name and Function of Parts

Fig. 2-2 Names of the parts (This drawing shows "HRL100/200-W-40".)

Table 2.2-1 Accessory list

	Table 2.2-1 Accessory list			
(1)	Operation Manual	2 pcs. (English 1 pc. /Japanese 1 pc.)		
(2)	Particle filter set (for CH1) *1	1 set		
(3)	Particle filter set (for CH2) *1	1 set	[For option –T3.]	
(4)	For HRL***-A/WF-** G thread adapter set	1 set		
(4)	For HRL***-A/WN-** NPT thread adapter set	1 set		
(5)	Anchor brackets *2	2 pcs.		
(6)	DI Filter	1 pc.		
(7)	For option –D1. DI Filter (for CH1)	1 pc.		

^{*1} When "F" or "N" piping thread type is selected, the particle filter connection is "G thread" or "NPT thread".

^{*2} The anchor brackets are used for fixation with the skid when this product is packed. The anchor bolts are not attached. The bolts (M8) used for fixing to the skid are not anchor bolts. Refer to "3.3.1 Installation" when using anchor bolt fixing bracket.

2.3 Function of Parts

The function of parts is as follows.

Table 2.3-1 Function of parts

Name	Function		
Touch panel	Operational settings for the product. Example: Run and stop product. Performance setting		
Fluid level gauge	Indicates the circulating fluid level of the tank. Confirm the level is between HIGH and LOW. For details, refer to "3.5 Circulating Fluid Supply".		
Product label	Shows the product information, such as model number and serial number. For details, refer to "1.4 Product Label".		
Circulating fluid	The circulating fluid flows out from the outlet port.		
outlet port (CH1)	For laser source.		
Circulating fluid	The circulating fluid flows out from the outlet port.		
outlet port (CH2)	For optical systems.		
Circulating fluid return port (CH1) Circulating fluid return port (CH2)	The circulating fluid returns to the return port.		
Tank drain port (CH1) Tank drain port (CH2)	This drain port to drain the circulating fluid out of the tank.		
Dust-proof filter	Inserted to prevent dust and contamination clinging to the air cooled condensers directly. Clean the filter periodically. For details, refer to "8.2.2 Monthly check".		
Power cable entry	Insert the power cable to the power cable entry and connect it to the power terminal. For details, refer to "3.3.2 Electrical wiring"		
Power terminal	and "3.3.3 Preparation and wiring of power supply cable".		
Signal cable entry	Insert the signal cable to the signal cable entry and connect it to the signal connectors. For details, refer to "3.3.5 Wiring of the Run/Stop signal input", "3.3.6 Wiring of the contact output signal", "3.3.7 Wiring of		
Signal connecors	analog output signal", "3.3.8 RS-485 communication wiring", "3.3.9 RS-232C communication wiring" or the Operation Manual Communication Function.		
Earth leakage breaker / Breaker handle	Shuts off the power supply to the internal equipment of the product. (Parts energized remained in the product.) Refer to "3.3.2 Electrical wiring" for the earth leakage breaker.		
Feed water port (CH1) Feed water port (CH2)	Supply circulating fluid to the tank.		
Facility water inlet (For Water-cooled type)	A facility water inlet to which the facility water is fed through piping. The pressure of facility water should be in a range of 0.3 to 0.5MPa.		
Facility water outlet (For Water-cooled type)	A facility water outlet from which the facility water returns to the user's machine through piping.		

HRL Series 2.3 Function of Parts

2.3 Function of Parts HRL Series

Chapter 3 Transport and Setting Up

WARNING



- Only persons who have sufficient knowledge and experience about the product and system are allowed to transport and set up the product.
- Especially pay attention to personal safety.

3.1 Transport

The product is heavy and is potentially dangerous during transportation. Also, to prevent product damage and breakage, be sure to follow the transportation instructions shown below.

A WARNING



When moving the product by a forklift, insert the fork into the right positions referring to 3.1.1 Transportation using forklift and hanging. Moving by forklift and slinging should be done by persons who have the correct license.

WARNING



- Be sure to use all four eye bolts when slinging the product.
- The slant angle of each rope should be 60 degrees or less.

CAUTION



Never lay the product on its side.

The compressor oil will leak in to the refrigerant piping, which may cause early failure of the compressor.

CAUTION



 Drain the residual fluid from the piping as much as possible to prevent any spillage.

CAUTION



 When the product is carried using a forklift, make sure that the fork does not damage the cover panel or piping port.

HRL Series 3.1 Transport

3.1.1 Transportation using forklift and hanging

MARNING



This is a heavy product. (Refer to Table 3.1-1 Weight of the product) Moving by forklift and slinging should be done by persons who have the licenses.

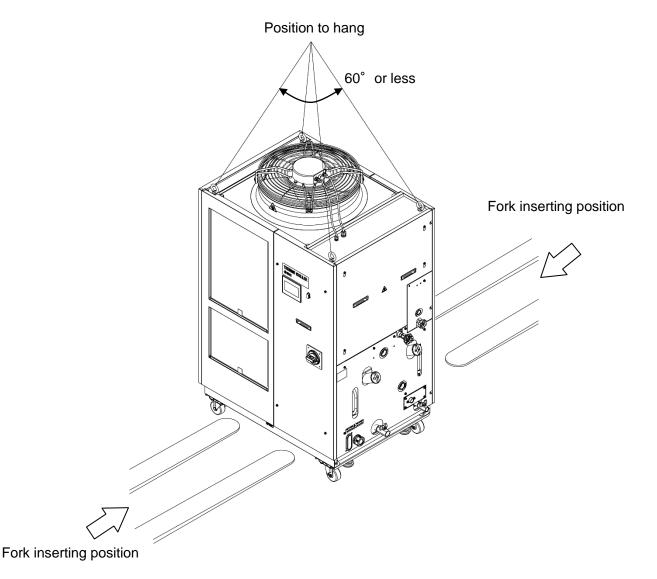


Fig. 3-1 Fork inserting and hanging position (This drawing shows "HRL200-A-40".)

Table 3.1-1 Weight of the product

Model	Weight kg	Option increase
HRL100-A-40	Approx.240	•
HRL200-A-40	Approx.260	Option-D1:+1kg
HRL300-A-40	Approx.330	Option-T2:+1kg
HRL100-W-40	Approx.250	Option-T3:+18kg*
HRL200-W-40	Approx.250	

^{*}Applicable only to HRL300-A*-40.

3.1 Transport HRL Series

3.1.2 Transportation using casters

▲ WARNING



This is a heavy product. (Refer to Table 3.1-1 Weight of the product). Moving the product by casters should be done by 2 persons or more.

CAUTION



Raise the adjuster feet and push the corners of the product when moving the product using the casters.

Do not hold the piping connections or handles of the panels when moving by casters, or it may cause damage to the product..

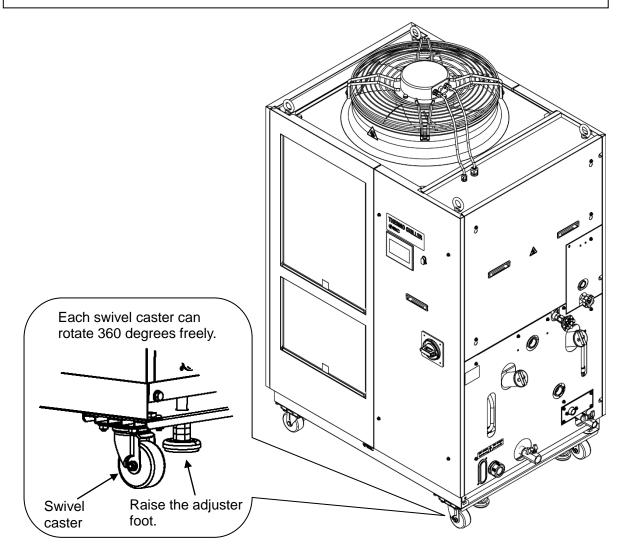


Fig. 3-2 Transportation using casters

HRL Series 3.1 Transport

3.2 Installation

WARNING



 Do not set up the product in exposed locations where there is a risk offlammable gas. Should any flammable gas remain around the product, the product may cause a fire.

A CAUTION



- Keep the product upright on a rigid and flat floor which can resist the weight of the product. Take measures to prevent the product from tipping over. Improper installation may cause water leakage, tipping, damage of the product or injure the operator.
- Keep the ambient temperature of the product between 2 to 45°C. Operation out of this ambient temperature range may cause a product malfunction. Operating the product in an environment temperature of 45 °C may reduce the heat discharging efficiency of the heat exchanger and the safety device may function, resulting in the stoppage of the product operation.
- Following the installation, The installer/end user is responsible for performing an acoustic noise risk assessment on the equipment and taking appropriate measures as required.

3.2.1 Environment

The product must not be operated, installed, stored or transported in the following conditions. Potential malfunction or damage to the product may occur if these instructions are disregarded.

This product is not designed for clean room usage. The pump and ventilating fan inside the product generate particles.

- Location that is outside.
- Location that is exposed to steam, salt water or oil.
- Location that is exposed to dust or powder material.
- Location that is exposed to corrosive gas, organic solvent, chemical solution, or flammable gas. (The product is not explosion-proof.)
- Location where the ambient temperature is out of the following range:
 During transportation or storage: -15 to 50°C (No water or circulating fluid in the piping.)

 During operation: 2 to 45°C
- Location where condensation forms on the inside electrical parts.
- Location that is exposed to direct sunlight or heat radiation
- Location that is near heat sources and poor in ventilation.
- Location that is subjected to abrupt changes in temperature.
- Location that is subjected to strong electromagnetic noise (intense electric field, intense magnetic field, or surges).
- Location that is subjected to static electricity, or conditions where static electricity can discharge to the product.
- Location that is subjected to strong high frequencies raditation.
- Location that is subjected to potential lightening strike.
- Location at an altitude of 3000m or higher (except during product storage and transportation). Refer to the next page for details.
- Location where the product is affected by strong vibrations or impacts.
- Condition that applies external force or weight causing the product to be damaged.
- Location without adequate space for maintenance as required.
- For the product installation or operation in accordance with UL standards, see below.

3.2 Installation HRL Series

■ Thermo-chiller installation at high altitude of 1000 meters or more

Due to the lower air density, the heat radiation efficiencies of the devices in the product will be lower at an altitude of 1000m or higher. For this reason, the maximum ambient temperature for the thermo-chiller operation and the cooling capacity will be reduced.

For product installation at a place of high altitude of 1000 meters or more, select a thermo-chiller of the applicable capacity referring to the table below.

- Max. ambient temp.: Use the product in lower ambient temperature than the described value at each altitude.
- 2. Cooling capacity correction coefficient: Coefficient to calculate the cooling capacity at each altitude.

For the product operation at an altitude of 1800 meters, the cooling capacity = 9.4 Cooling Capacity x 0.8.

Altitude [m]	1. Max. ambient temp. [°C]	2. Cooling capacity correction coefficient
Less than 1000m	45	1.00
1000 m or more - Less than 1500 m	42	0.85
1500m or more - Less than 2000m	38	0.80
2000m or more - Less than 2500m	35	0.75
2500m or more - Less than 3000m	32	0.70

Installation/Operation in accordance with the UL standard

The product cannot be used in the environment shown below:

- Environment at an altitude of 2000 meters or more
- Environment at a pollution degree of 3 or more

HRL Series 3.2 Installation

3.2.2 Location

CAUTION



 Do not install in a location which can be subjected to any of the conditions in "3.2.1 Environment".

CAUTION



Radiates heat from the air vent of the cooling fan. If the product is operated with insufficient air ventilation, the internal temperature can exceed 45°C, which can cause and affect the performance and life of the product. To prevent this, ensure that suitable ventilation is available (see below).

Installation of multiple products

Keep sufficient space between products so that the air vented from one product will not be taken in by other products.

Installation at indoor site

1. For a facility with a large installation area that can vent the air naturally:

Make an air outlet on a wall at a high level and air inlet on a wall at a low level, to allow for adequate airflow.

2. For a facility with a small installation area that cannot vent the air naturally:

Make a forced air exhaust vent on a wall at a high level and an air inlet on a wall at a low level.

3. Using duct to exhaust the air:

In case the indoor site cannot accept the exhausted air from the product or/and is air conditioned, ventilate by installing a duct on the outlet ventilation of the product. Do not fasten the duct on the outlet ventilation of the product directly. Ensure the space is at least the duct's diameter apart. Use a fan for the duct that considers the ventilation resistance of the duct.

Table 3.2-1 Amount of radiation and required ventilation

		Required ventilation amount (m³/min)		
Model	Heat radiation (kW)	Differential temp. of 3 °C between inside and outside of installation	Differential temp. of 6 °C between inside and outside of installation	
		area	area	
HRL100-A*-40	Approx.18	305	155	
HRL200-A*-40	Approx.35	590	295	
HRL300-A*-40	Approx.45	760	380	

3.2 Installation HRL Series

CAUTION



The water cooled product radiates heat to the facility water. It is necessary to supply the facility water. Please prepare the facility water system that satisfies the heat radiation and the facility water specifications below.

■ Required facility water system (for water cooled type)

Table 3-1 Heat Radiated

Model	Heat Radiated kW	Facility water specifications
HRL100-W*-40	Approx.18	Pofor to "0.1 Specifications"
HRL200-W*-40	Approx.35	Refer to "9.1 Specifications".

Installation environment specifications

Sound noise: HRL100-A*-40: 75 dB(A)

HRL200-A*-40 : 75 dB(A) HRL300-A*-40 : 71 dB(A) HRL100-W*-40 : 72 dB(A) HRL300-W*-40 : 72 dB(A)

HRL Series 3.2 Installation

^{*} Front 1m, height 1m, rated condition

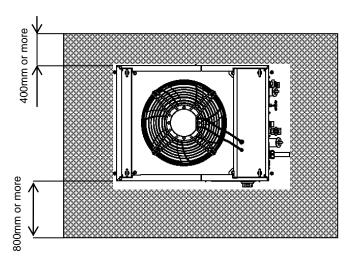
3.2.3 Installation and maintenance space

It is recommended to keep the space around the product shown in Fig. 3-3

A CAUTION



Have enough space for product ventilation. Otherwise, it may cause a lack of cooling capacity or/and stoppage of the product. Ensure there is enough space for maintenance.



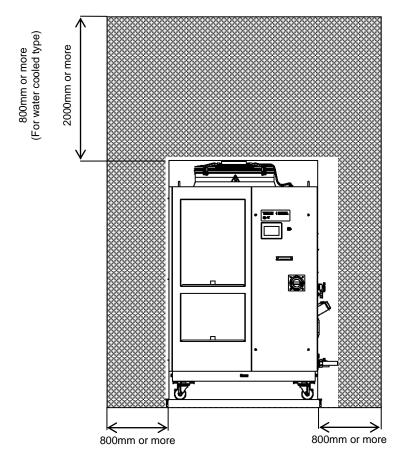


Fig. 3-3 Installation space (This drawing shows "HRL200-A-20".)

3.2 Installation HRL Series

3.3 Installation

3.3.1 Installation

A CAUTION



Install the product on a vibration free level floor.

Prepare the M10 anchor bolts suitable for the material of the floor that the product will be installed on. Drive the anchor bolts in at least two places on the product's left and right sides (four places in total). Refer to "9.2 Dimensions" for the position dimensions of the anchor bolts.

■ Use a bracket

- **1.** Install this product according to the anchor bolts installed on the level floor.
- **2.** Fasten the nuts to the anchor bolts.
- **3.** Make sure that there is no looseness on any of the anchor bolts and nuts.

[Tips]

SMC Foundations bolt set "IDF-AB500" (SUS M10x50) is applicable. Please order separately.

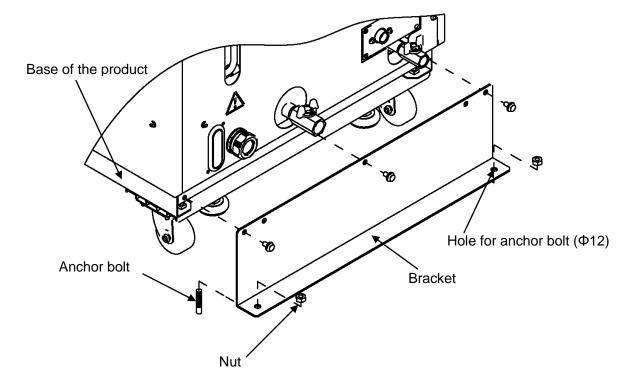


Fig. 3-4 Installation procedures

HRL Series 3.3 Installation

Use the adjuster foot

A CAUTION



Install the product on a vibration free level floor. Be sure to use the adjuster foot to install on the floor. The adjuster foot is not earthquake-proof. If necessary make an earthquake-resistant measure on the customer side.

- 1. Install the product on a level floor.
- **2.** Lower the adjuster to the level floor to fix the product in place.

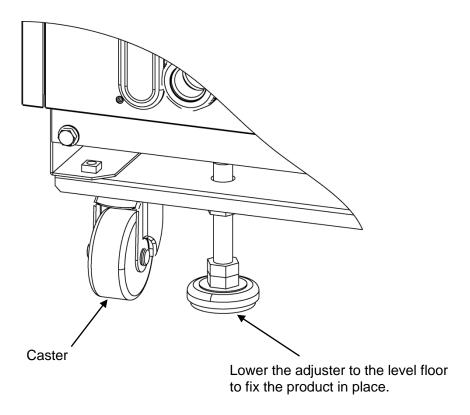


Fig. 3-5 Installation by adjuster foot

3.3 Installation HRL Series

3.3.2 Electrical wiring

MARNING

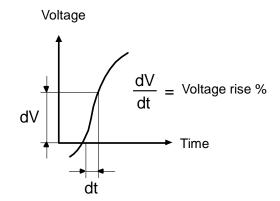


- Do not modify the internal electrical wiring of the product. Incorrect wiring may cause an electric shock or fire. Also, modifying the internal wiring will void the product's warranty.
- NEVER connect the ground to water line, gas pipe or lightning conductor.

A WARNING



- The installation of electrical equipment and wiring work should be performed only by personnel with sufficient knowledge and experience.
- Be sure to shut off the user's power supply. Wiring with the product energized is strictly prohibited.
- The wiring must be conducted using cables complying with "Table 3.3-1" and firmly secured to the product to prevent the external force of cables being applied to the terminals. Incomplete wiring, or improper securing of wiring, may cause electrical shock or excessive heat and fire.
- Ensure a stable power supply with no voltage surges.
- Ensure that an earth leakage breaker is used in the power supply of the product. See "Table 3.3-1".
- Use a power supply suitable for the specifications of the product.
 Use a power supply of over voltage category 3 (IEC60664-1).
- Be sure to connect the ground connection.
- Ensure that a lock out facility is available on the power supply.
- Each product must have its own separate earth leakage breaker.
 Otherwise, there can be a risk of electric shock or fire.
- Ensure that no harmonics are superimposed at the power supply.
- (Do not use inverters, etc.)
- Supply a steady power supply which is not affected by surges or distortion. In particular, if the voltage rate of increase (dv/dt) at zero crossing exceeds 40V/200µsec, it may cause malfunction.



^{*:} For the product operation in the UL compliant conditions, please refer to "Installation/Operation in accordance with the UL standard" in the next page.

HRL Series 3.3 Installation

Power supply specifications, power supply cable and earth leakage breaker

Prepare the power supply shown in the following table. For the connection between the product and power supply, use the power supply cable and earth leakage breaker shown below. An earth leakage breaker must be mounted to a position where the breaker is easily accessible and close to the thermo-chiller.

Table 3.3-1 Power	supply cable and ea	arth leakage breaker ((Recommended)

Model	Power supply voltage	Terminal block screw diameter	Recommended crimp terminal	Cable Specifications *1	Earth leakage breaker	
					Breaker size (A)	Sensitivity of leakage current (mA)
HRL100-A*-40	3-phase 380 to 415V AC (50Hz/60Hz) 3-phase 460 to 480V AC(60Hz)	M5	R5.5-5	4 cores x AWG10 (4 cores x 5.5 mm²) *including ground	20	30
HRL200-A*-40					30	
HRL100/200-A*-40						
HRL300-A*-40			R8-5	4 cores x AWG8 (4 cores x 8 mm ²) *including ground	40	

^{*1} Cable specifications are the examples when using the product at a continuous allowable operating temperature of 70 °C, with an operating voltage of 600 V and two kinds of plastic insulated wires at an ambient temperature of 30 °C. Please select the proper size cables according to the actual condition.

■ Installation/operation in accordance with the UL standard

For the product operation in the UL compliant conditions, the conditions shown below must be satisfied:

- Use power supply of overvoltage category 2 (transient overvoltage 2500 V or less)
- Bending radius of the power supply cable must be 38.1 mm or more.

*1 When using a power supply in the overvoltage category 3, take measures such as mounting an isolation transformer between the product and the power supply or keep the transient overvoltage of the power supply to 2500 V or less by using a varistor, etc.

3.3 Installation HRL Series

3.3.3 Preparation and wiring of power supply cable

A WARNING



- The electrical facilities should be installed and wired in accordance with local laws and regulations of each country and by a person who has knowledge and experience.
- Check the power supply. Operation with voltages, capacities and frequencies other than the specified values can cause fire and electric shock.
- Wire with an applicable cable size and terminal. Forcibly mounting with an unsuitably size cable may result in heat generation or fire.

▲ WARNING



Prior to wiring lock out and tag out the breaker of the facility power supply (customer power supply facility).

WARNING



Connect the power supply cable from the product side first, and then connect the breaker of the facility power supply (the user's machine power supply).

A CAUTION

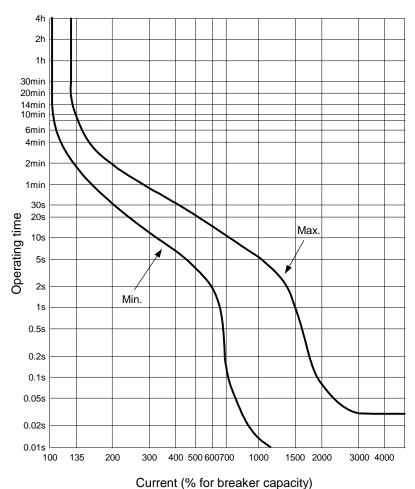


When the panel is removed or mounted, be sure to wear protective shoes and gloves to prevent injury with the edge of the panel.

HRL Series 3.3 Installation

CAUTION

A breaker that has the operating characteristic below is installed. Please use a breaker that has the same or longer operating time as/than this for the customer side (upstream side). If it has a shorter operating time, there is a possibility of accidental breaker trip due to the internal motors' inrush currents of this product.



Operating characteristics of the breaker

3.3 Installation HRL Series

Preparation for operation

1. Remove four screws to remove the front panel for the electrical unit.

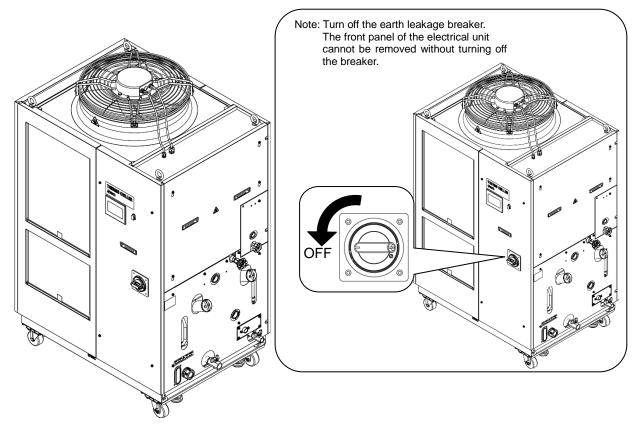


Fig. 3-6 Remove the front panel for the electrical unit (For air-cooled type)

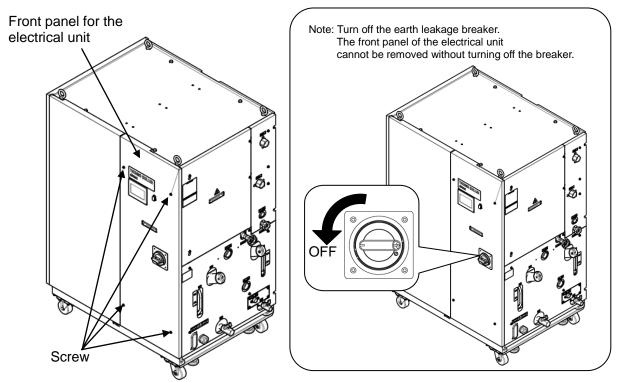


Fig. 3-7 Remove the front panel for the electrical unit (For water-cooled type)

HRL Series 3.3 Installation

2. Hold the handle and pull up the front panel of the electrical unit, and remove it.

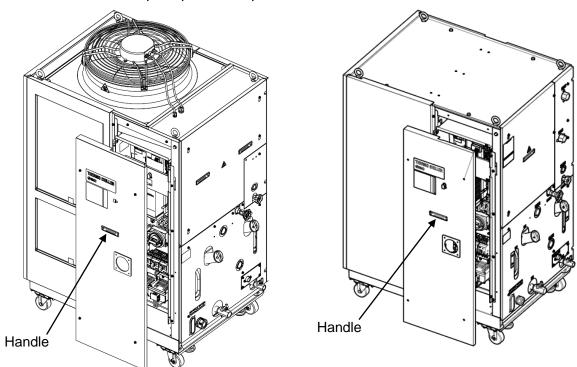


Fig. 3-8 Remove the front panel for the electrical unit

3. Loosen the power cable outlet cap and insert the power cable.

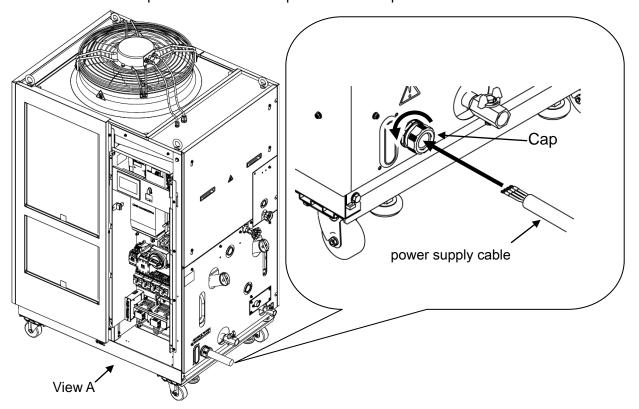


Fig. 3-9 Wiring of power supply cable

3.3 Installation HRL Series

4. Connect the power supply cable and the ground cable as shown in the figure below.

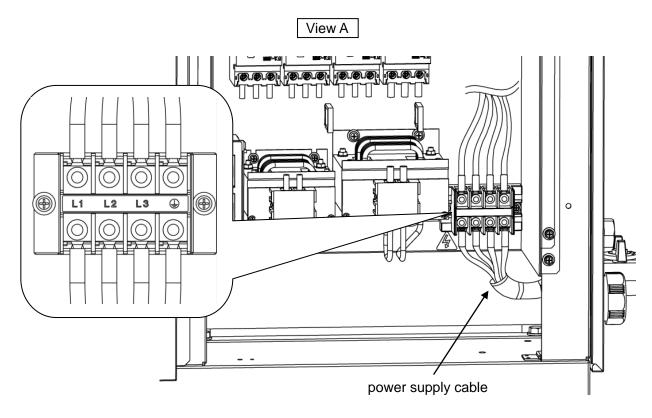


Fig. 3-10 Wiring of power supply cable

* Connect an over current protection to the power cable connected to the equipment to avoid hazard.

3.3.4 Contact input/output communication wiring

A WARNING



Be sure to lock out and tag out the breaker of the facility power supply (the user's machine power supply) before wiring.

CAUTION

- Use the connectors specified.
- The capacity of the output contact of the product is limited. If the capacity is not large enough, install a relay etc. (to allow for larger capacity). Also, ensure that the input current of the relay is small enough in relation to the contact capacity of the product.

The product has a contact input/output communication function as shown below. Connect cables referring to the applicable chapter for each function.

- Run/Stop input (Refer to "3.3.5 Wiring of the Run/Stop signal input")
- Contact output signal(Refer to "3.3.6 Wiring of the contact output signal")
- Analog output signal (Refer to "3.3.7 Wiring of analog output signal")

Use the signal cable described below for wiring of each function.

■ Contact Input/Output communication connector

The following connectors are used for this product as a contact input / output signal connector. Please prepare suitable matching connector cable.

Table 3.3-2 Contact input/output communication connector

Connector specification (this product side)

Dsub 25 pin female (socket) type

Table 3.3-3 Contact input/output/ analog output communication specification

Item		Specification		
	Electrical isolation	Photocoupler		
Contact input	Rated input voltage	DC24V	· Run/Stop signal	
	Operating voltage range	DC21.6V to 26.4V	External switch signalOperation mode request signal	
signal1,2,3	Rated input current	5mA TYP	(Contact input 3 fixed)	
	Input impedance	4.7kΩ		
Contact output	Rated load voltage	AC48V or less / DC30V or less	 Signal of operating status Alarm signal TEMP READY signal etc *2 	
Contact output signal 1,2,3,4,5,6	Maximum load current	AC/DC 800mA or less *1		
	Minimum load current	DC5V 10mA		
Analog output signal 1,2	Output voltage range	0V to +10V		
	Maximum output current	10mA	_	
	Maximum accuracy	±0.4%F.S. or less		
DC24V output voltage		DC24V±10% 200mA MAX *1 (It can not be used for induction		

^{*1:}The total load current must be 800 mA or less. To use the power from the device, the total load current must be 200 mA or less.

^{*2:}Refer to "3.3.6 Wiring of the contact output signal"

Table 3.3-4 Contact input/output communicatin /Analog output pin number

PIN	Application	Division	Default setting	
No.	пррисалогі	Dividion	Dordan coming	
1	DC24V output	Output	_	
2	DC24V input	Input	_	
3	Contact input signal 1	Input	Run/Stop *1	
4	Contact input signal 3	Input	Operation mode request signal (fix)*2	
5	Contact output signal 6	Output	OFF*1	
6	Contact output signal 1	Output	Run status signal [N.O type](fix)*2	
7	Contact output signal 3	Output	Operation continuation[WRN]alarm signal [N.C. type](fix)*2	
8	Contact output signal 5	Output	OFF *1	
9	None	_	Do not connect. *3	
10	Analog output signal 2	Output	CH2 Electric conductivity *1	
11	Analog output signal 1	Output	CH2 Circulating fluid temperature *1	
12	None	_	Do not connect. *3	
13	None	_	Do not connect. *3	
14	24 COM output (Common of contact input signal)	Output	_	
15	Common of contact output signal 1, 2, 3, 4, 5	Output	_	
16	Contact input signal 2	Input	External switch signal *1	
17	None	_	Do not connect. *3	
18	Common of contact output signal 6	Output	_	
19	Contact output signal 2	Output	Operation stop [FLT] alarm signal [N.C. type](fix)*2	
20	Contact output signal 4	Output	OFF *1	
21	None		Do not connect. *3	
22	Common of contact output signal 2	Output	_	
23	Common of contact output signal 1	Output	_	
24	None	_	Do not connect. *3	
25	None	_	Do not connect. *3	

^{*1 :} It is possible to change the setting.
*2 : You can not change the setting("N.O type / N.C. type" can be changed).

^{*3 :} Do not connect any wire

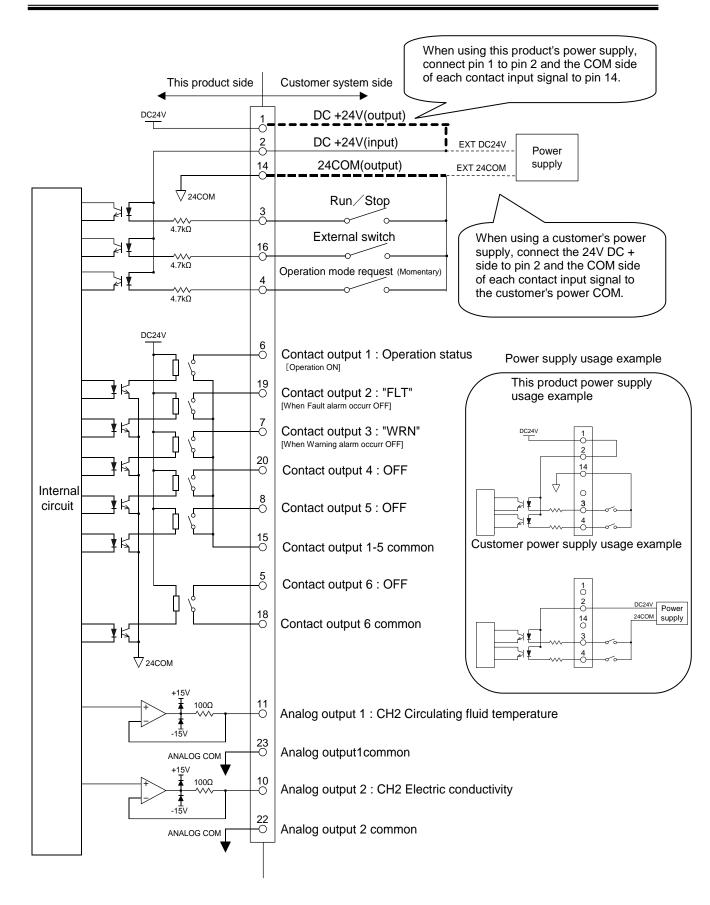


Fig. 3-11 Circuit diagram

3.3.5 Wiring of the Run/Stop signal input

This product can be remotely controlled by the contact signal. This chapter illustrates examples of wiring.

To enable Run / Stop signal input, set the operation mode to "DIO mode" after wiring. (Refer to "5.4.1 Home screen Operation mode").

[Tips]

This product has three input signals. Two of them can be customized depending on the customer's application.

1. Prepare the switch (power supply voltage: 24 VDC, contact capacity: 35 mA or more, minimum load current: 5mA) and suitable connector cable.

2. Wire the contact input / output signal connector as follows and connect it to this product. (This is a wiring example.)

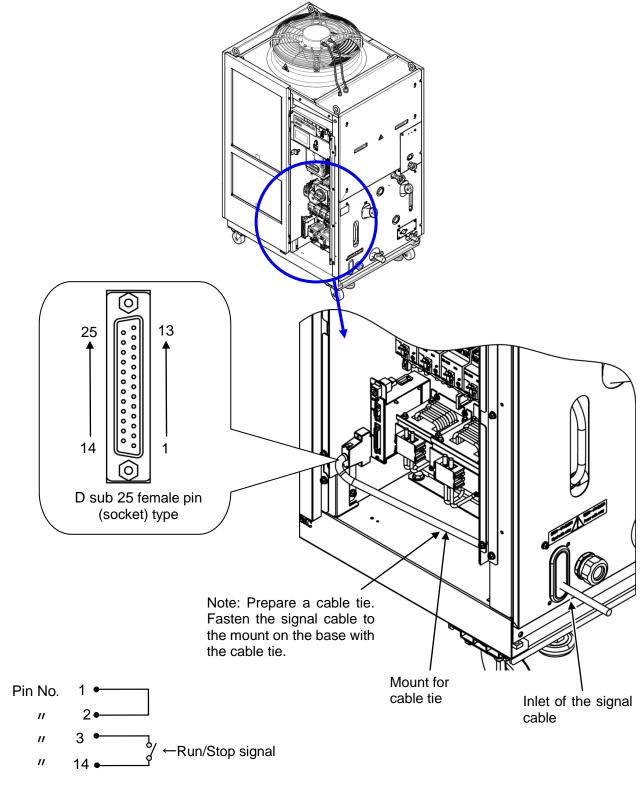


Fig. 3-12 Wiring of Run/Stop signal input and remote signal input (Example)

3.3.6 Wiring of the contact output signal

Contact output signals are the signals that output the status of this product. Contact specification of each signal output is shown below.

WARNING



Be sure to turn OFF the breaker of the facility power supply (the user's machine power supply) before wiring.

Contact specification of each signal output is shown below.

Table 3.3-5 Contact signal output at the factory setting

Contact output	Content of the signal (Default setting)	Operation	
Contact output signal 1	Operation status signal	N.O.	During operation: Contact closed During operation stop: Contact open Power supply cutoff: Contact open
Contact output signal 2	Operation stop [FLT] alarm signal	N.C	While alarm being generated: Contact open While alarm being generated: Contact closed Power supply shut off: Contact open
Contact output signal 3	Operation continuation[WRN] alarm signal	N.C	When alarm is being generated: Contact open When alarm is being generated: Contact closed Power supply shut off: Contact open
Contact output signal 4,5,6	OFF	_	_

[Tips]

This product has six output signals. Three of them can be customized to user's application

Signals shown below can be output. Refer to "5.4.10Communication setting screen".

- DIO MODE signal output
- · Alarm signal output
- ·Maintenance remainder signal output
- ·CH1 TEMP READY signal output
- CH2 TEMP READY signal output
- TEMP OUT signal output
- START-UP setting signal output
- · ANTI-FREEZING setting signal output
- •WARMING- UP setting signal output
- Operation mode request signal status
- ·Selected alarm signal output
- ·Selected maintenance signal output

3.3.7 Wiring of analog output signal

This product can send output analog signals.

WARNING



Be sure to turn OFF the breaker of the facility power supply (the user's machine power supply) before wiring.

The analog output signal and the factory settings are as follows:

The signal content can be selected from four types. Refer to "5.4.10Communication setting screen"

Table 3.3-6 Analog output signal

No.	Signal item	Output voltage	Default setting
1	CH2 circulating fluid temperature	0.0 to 100.0 °C:0.00 to 10.00V	Analog output 1
2	CH2 electric conductivity	0.1 to 50.0μS/cm: 0.02 to 10.00V	Analog output 2
3	CH1 circulating fluid temperature	0.0 to 100.0 °C:0.00 to 10.00V	_
4	CH1 electric conductivity	0.1 to 50.0µS/cm: 0.02 to 10.00V	_

3.3.8 RS-485 communication wiring

This product can operate the following by serial communication RS-485.

- -Control of Run/Stop
- -Circulating fluid temperature setting
- -Circulating fluid temperature reading
- -Operation status reading
- -Alarm condition reading

Refer to Operation Manual Communication Function for more details.

■ RS-485 communication connector

The following connector is used for this product as a connector for RS - 485 communication. Please prepare suitable mating connector.

Table 3.3-7 RS-485 communication connector

Connector specification

Dsub 9 pin female (socket) type

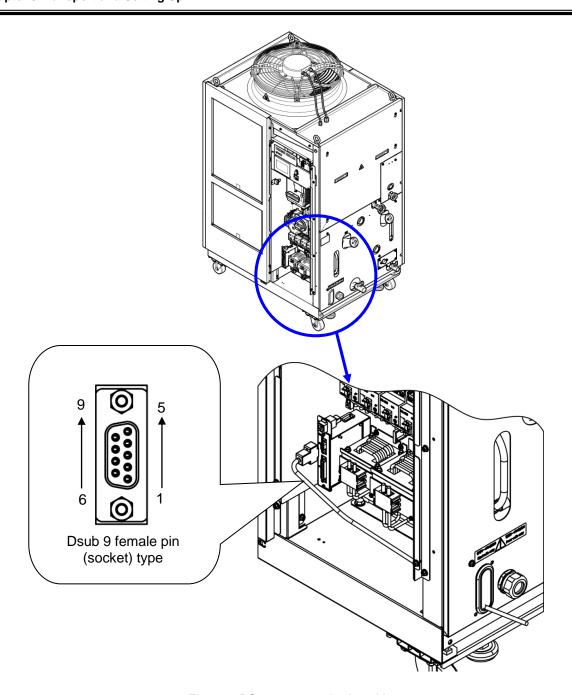


Fig. 3-13 RS-485 communication wiring

■ Wiring of the interface communication cable

WARNING



Be sure to turn OFF the breaker of the facility power supply (the user's machine power supply) before wiring.

Connecting to PC

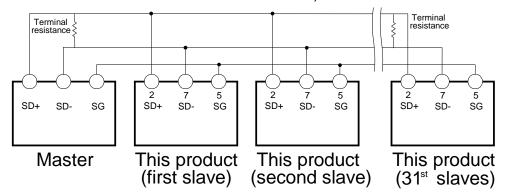
RS-485 cannot be directly connected to a normal PC. Use a RS-232C/RS485 converter which is available on the market.

Be sure to follow the wiring procedure shown below for connecting multiple thermo-chillers.

Configuration of connection

One thermo-chiller for one host computer, or multiple thermo-chillers for one host computer.

(31 thermo-chillers can be connected at maximum.)



Do not connect any wire to other PIN numbers.

[Tips]

Both ends of the communication connection (the end nodes) need to be connected to the host computer.

If the terminating resistor is required, please be connected by the customer.

3.3.9 **RS-232C communication wiring**

This product can operate the following by serial communication RS-232C.

- -Control of Run/Stop
- -Circulating fluid temperature setting
- -Circulating fluid temperature reading
- -Operation status reading
- -Alarm condition reading

Refer to Operation Manual Communication Function for more details.

RS-232C communication connector

The following connector is used for this product as RS-232C communication connector. Please prepare suitable maching connector.

Table 3.3-8 communication connector

Connector specification Dsub 9 pin female (socket) type

Wiring of communication cable

WARNING

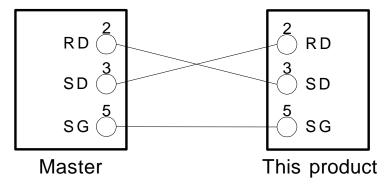


Be sure to turn OFF the breaker of the facility power supply (the user's machine power supply) before wiring.

Be sure to wire as shown in the figure below.

Configuration

One thermo-chiller for one master.



Do not connect any wire to other PIN numbers.

Fig. 3-14 Connection of RS-232C

3.3.10 Ethernet Modbus/TCP Communication wiring

This product can operate the following by Ethernet Modbus/TCP communication.

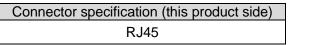
- -Control of Run/Stop
- -Circulating fluid temperature setting
- -Circulating fluid temperature reading
- -Operation status reading
- -Alarm condition reading

Refer to Operation Manual Communication Function for more details.

■ Ethernet Modbus/TCP communication connector

The following connector is used for this product as Ethernet Modbus / TCP communication connector. Please prepare suitable mating connector.

Table 3.3-9 Ethernet Modbus / TCP communication connector



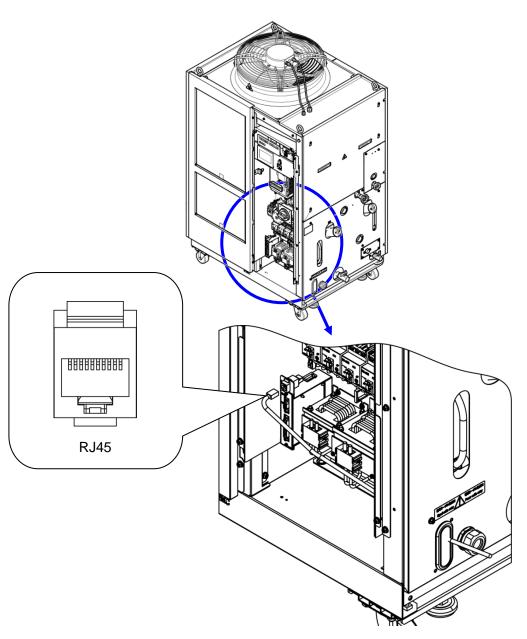
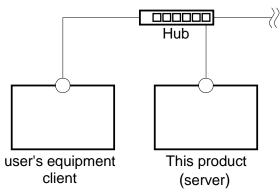


Fig. 3-15 Ethernet Modbus/TCP communication wiring

Wiring of communication cable

Configuration

The figure below shows the connection with the user's equipment(client).



- Connect the user's equipment (client) and this product (server) via a hub.
 Cable, connector, hub, please use the one that satisfies the standards of IEEE802.3 10BASE-T / 100BASE-TX.
- User's equipment can be connected up to four at the same time.





Be sure to turn OFF the breaker of the facility power supply (the user's machine power supply) before wiring.

3.4 Piping

A CAUTION



- Connect piping firmly. Incorrect piping might cause leakage of supplied or drained fluid to surrounding area and facility.
- Use caution not to allow dust and foreign matter to enter the water circuit, etc. during connection of piping.
- Securely connect the piping at the piping port with specific wrench when tightening.
- Incorrect piping can burst when in service.
- Use non-corrosive material for fluid contact parts for the circulating fluid and/or facility water. The use of corrosive materials such as aluminum or iron for fluid contact parts, such as piping, may not only lead to clogging or leakage in the circulating fluid and facility water circuits but also refrigerant leakage and other unexpected problems.
- Do not generate a rapid change of pressure by water hammer.
 Internal parts of the product and/or the piping may be damaged.
- It is recommended to use heat insulation to reduce the heat radiation and absorption to/from customer's piping.

A CAUTION



 Be sure to wear protective shoes and gloves to prevent injury from the panel edges.

■ Piping port size

Table 3.4-1 Piping port size

CH No.	Description		Port size	Recommended tightening torque	Recommended piping specifications	
	Circulating fluid	Chi	ller side	1" union	178 to 185N·m	_
	outlet port	Filter side		Rc1 *1	36 to 38N•m	1.0MPa or more
CH1	Circulating fluid return port			Rc1 *2	36 to 38N•m	1.0MPa or more
	Tank drain port			Rc3/4 *2	28 to 30N·m	_
	Circulating fluid	Chi	ller side	e 1/2" union 64 to 70N·m		_
			Option T3	3/4" union *3	106 to 115N⋅m	_
		Filt	er side	Rc1/2 *1	20 to 25N·m	0.8MPa
CH2			Option T3	Rc3/4 *1*3	28 to 30N·m	or more
CHZ	Circulating fluid			Rc1/2 *2	20 to 25N·m	0.8MPa
	return port Option T3		Rc3/4 *2*3	28 to 30N·m	or more	
	Tank drain port Option T3		Rc1/2 *2	20 to 25N·m		
			Option T3	Rc1/4 *2*3	8 to 12N•m	_
-	Facility water inlet *4			Rc1	36~38N·m	1.0MPa or more
-	Facility water outlet *4			Rc1	36~38N·m	1.0MPa or more

- *1 : When the piping thread type "F (G thread)" or "N (NPT thread)" is selected, it becomes "G thread " or "NPT thread ".
- *2 : When the piping screw type "F (G thread)" or "N (NPT thread)" is selected, a conversion joint is included.
- *3 : In the case of option T3 "CH2 High-Pressure Pump Mounted", refer to chapter 6.
- *4 : For water-cooled type.



<For HRL***-A/WN-**>

A set of thread adapters that converts the connections from Rc to NPT is enclosed as an accessory. For NPT thread, be sure to use this adapter.

<For HRL***-A/WF-**>

A set of thread adapters that converts the connections from Rc to G is enclosed as an accessory. For G thread, be sure to use this adapter.

■ Installation of the particle filter

- . The attach accessory particle filter must be installed.
- **1.** Wrap seal tape around the nipple (1") of the CH1 particle filter set, and connect the union (1") to the CH1 circulating fluid outlet. (Recommended tightening torque:36 to 38N·m)

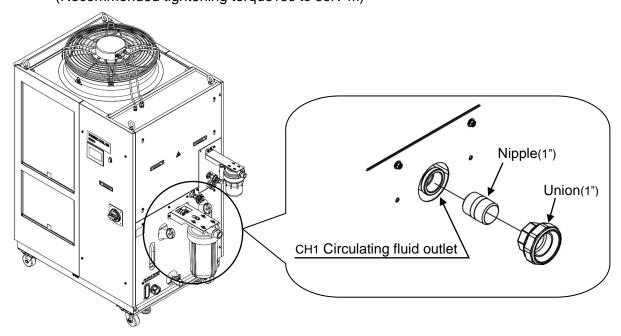


Fig. 3-16 CH1 side Tightening of piping

2. Attach the CH1 particle filter. Insert the gasket (1") and install it. (Recommended tightening torque:178 to 185N·m)

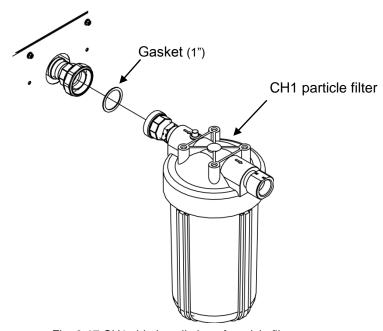


Fig. 3-17 CH1 side Installation of particle filter

3. Attach the CH1 filter bracket.

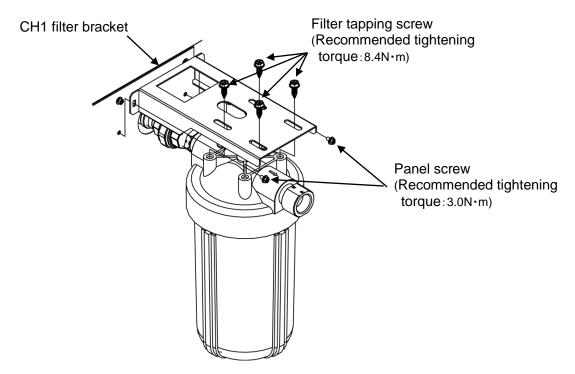


Fig. 3-18 CH1 side Installation of filter bracket.

In case of HRL300-A-40-T3, go to step 7

Wrap seal tape around the nipple (1/2") of the CH2 particle filter set, and connect the union (1/2") to the CH2 circulating fluid outlet.

(Recommended tightening torque: 20 to 25N·m)

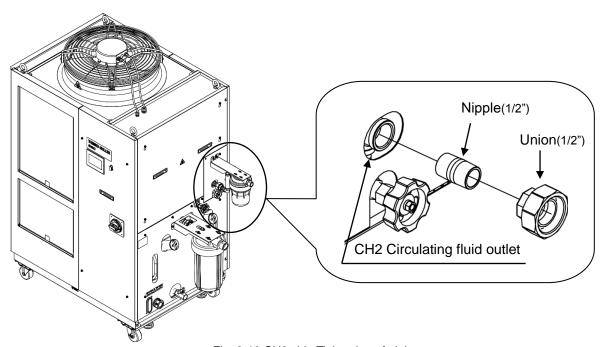


Fig. 3-19 CH2 side Tightening of piping

5. Attach the CH2 particle filter. Insert the gasket (1/2") and install it. (Recommended tightening torque: 64 to 70N·m)

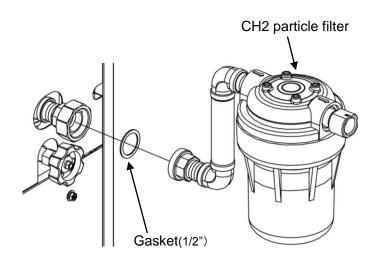


Fig. 3-20 CH2 side Installation of particle filter

6. Attach the CH2 filter bracket.

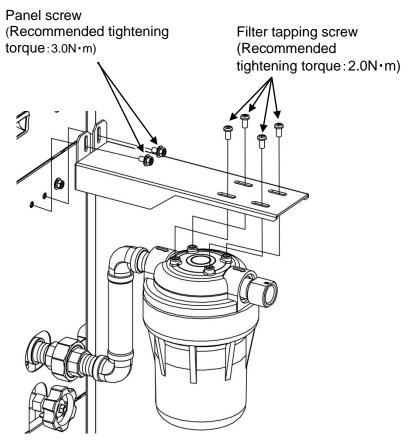
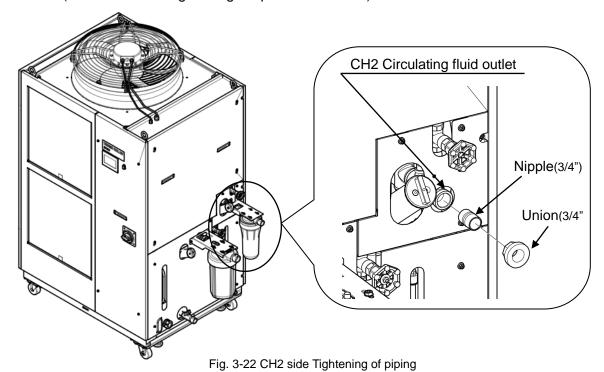


Fig. 3-21 CH2 side Installation of filter bracket.

In case of HRL300-A-40-T3.

Wrap seal tape around the nipple (3/4") of the CH2 particle filter set, and connect the union (3/4") to the CH2 circulating fluid outlet.

(Recommended tightening torque: 28 to 30N·m)



8. Attach the CH2 particle filter. Insert the gasket (3/4") and install it. (Recommended tightening torque: 106 to 115N·m)

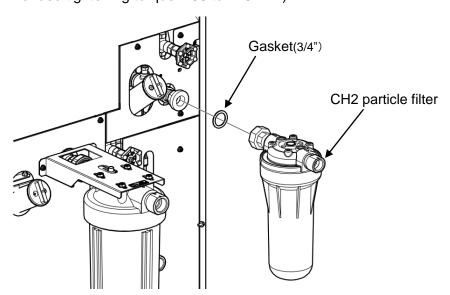


Fig. 3-23 CH2 side Installation of particle filter

9. Attach the CH2 filter bracket.

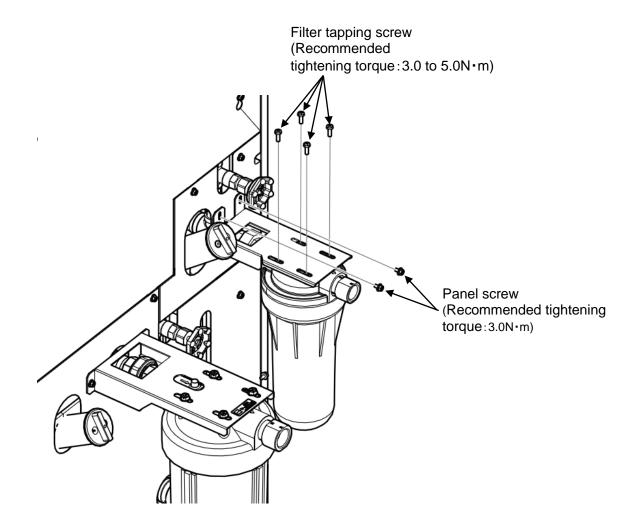


Fig. 3-24 CH2 side Installation of filter bracket.

■ Installation of the particle filter element

1. Remove the filter case using the maintenance handle.

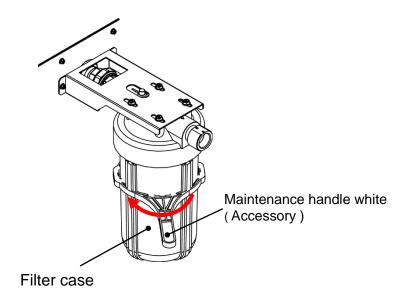


Fig. 3-25 CH1 particle filter case removal

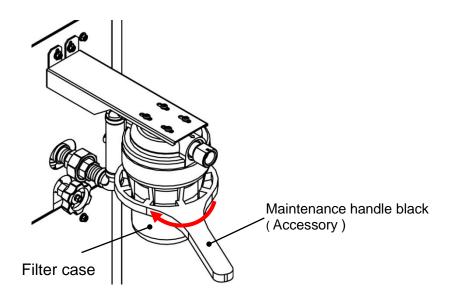


Fig. 3-26 CH2 particle filter case removal

2. Insert the element and mount the filter case. Attach the filter case by hand tighten.





A CAUTION



- Mounting of the case should be performed by hand-tighten. When the case is tightened excessively by tools or handle, the case might crack or be damaged.
- Make sure that the case is held manually by hand when removing and mounting the case. If the case is dropped, it may result in cracking or breakage.

■ How to connect to the circulating fluid outlet

When piping the circulating fluid outlet, hold the filter outlet side fitting of the circulating fluid outlet with a wrench not to rotate it.

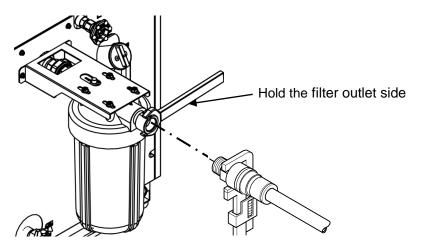


Fig. 3-27 Hold the filter outlet side

A CAUTION



Without using a wrench to hold the circulating fluid outlet's filter side fitting, the fitting may rotate. This could cause fluid leakage and/or product malfunction. Ensure the filter side fitting is held securely.

How to connect to the drain port

When piping the drain port, hold the ball valve of the drain port with a wrench not to rotate it.

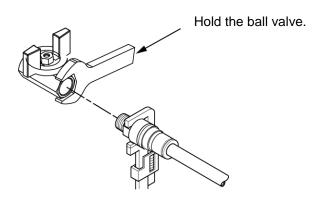


Fig. 3-28 Connection to the drain port

A CAUTION



Without using a wrench to hold the drain port's ball valve, the ball valve may rotate. This could cause fluid leakage and/or product malfunction. Ensure that the ball valve of the drain port is held securely.

■ How to connect to the facility water inlet/outlet

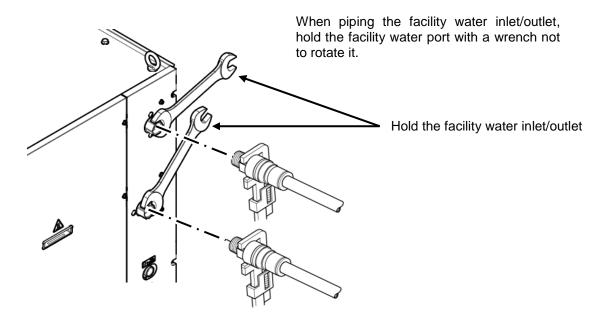


Fig. 3-29 Connection to the facility water inlet/outlet

A CAUTION



If piping is performed without fixing the facility water inlet/outlet, it may cause deformation of the panel. Ensure that the facility water inlet/outlet is held securely.

Recommended piping circuit

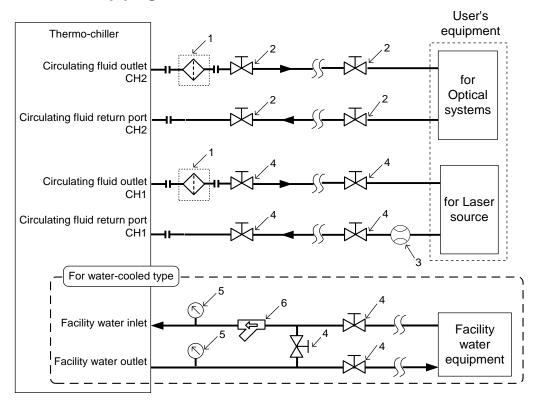


Fig. 3-30 Recommended piping circuit

No.	Description	Recommended part no.	Size
1	Particle filter (Accessory)	_	Filtration accuracy :5µm
2	Valve	_	1"
3	Flow meter	_	Prepere a flow meter with an appropriate flow range.
4	Valve	_	1/2" 3/4" (In case of HRL300-A-40-T3)
5	Pressure gauge	_	0~1.0MPa (For water-cooled type)
	Y-strainer	HRS-S0212	1" (For water-cooled type)
6	Filter	Refer to the table below	1" Filtration accuracy :5µm (For water-cooled type)

* Recommended filters for facility water inletApplicable modelRecommended

Applicable model	Recommended filter
HRL100-W	FQ1012N-10-T020-B-X61 Note)
HRL200-W	FGESA-10-T020A-G2 Note)

Note) The filter shown above cannot be directly connected to thethermo-chiller. Install it in the user's piping system.

■ Mounting of the DI filter

At delivery, "Temporary piping for DI filter" is connected. Install the DI filter (accessory) according to "8.4.2 Replacing the DI filter".

3.5 Circulating Fluid Supply

- **1.** Ensure that the power source and the power supply of the product is turned off.
- **2.** Check the drain port is valve to prevent the supplied circulating fluid from draining out.
- **3.** Open the circulating fluid supply port by turning it counterclockwise, and fill the circulating fluid within the range from LOW to HIGH shown on the level gauge. Use tap water which satisfies the water quality standard shown in Table 8.1-1, or a DI water (pure water). When deionized water is used, the conductivity should be 1.0 μS/cm or higher (Electrical resistivity: 1 $M\Omega$ ·cm or lower).

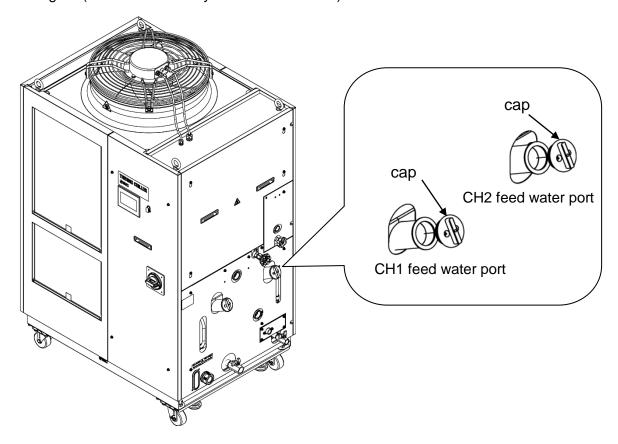


Fig. 3-31 Supplying the fluid to the supply fill port

CAUTION



- When tap water is used, refer to "8.1 Quality Control of Circulating Fluid and Facility Water".
- When deionized water is used, the conductivity should be 1.0 μS/cm or higher (Electrical resistivity: 1 MΩ·cm or lower).

CAUTION



 Confirm that the fluid level is between "HIGH" and "LOW" level of the fluid level gauge.

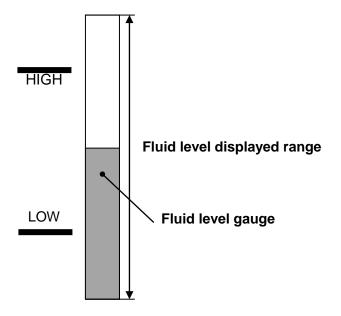


Fig. 3-32 Fluid level gauge

Open the supply port cap and put the circulating fluid within the display range of "HIGH" and "LOW".

3.5 Circulating Fluid Supply

HRL Series

Chapter 4 Starting the Product

CAUTION



Only people who have sufficient knowledge and experience about the product and its accessories are allowed to start and stop the product.

4.1 Before Starting

Check the following points before starting the product.

- Installation state
 - Check that the product is installed horizontally.
 - Check that there are no heavy objects on the product, and the external piping is not applying excessive force to the product.
- Connection of the cables
 - Check that the power, ground and I/O signal cables (to be supplied by user) are correctly connected.
- Circulating fluid piping
 - Check that the circulating fluid piping is correctly connected to the inlet and outlet.
- Fluid level gauge
 - Confirm that the fluid level is between "HIGH" and "LOW" levels of the fluid level gauge.

HRL Series 4.1 Before Starting

4.2 Preparation for Start

4.2.1 Power supply

Turn ON the facility power supply breaker.

Turn ON the breaker handle.

If the product is powered on properly, the touch panel of the product operates as follows.

• The startup screen first appears on the touch panel and then switches to the operation screen (home screen).

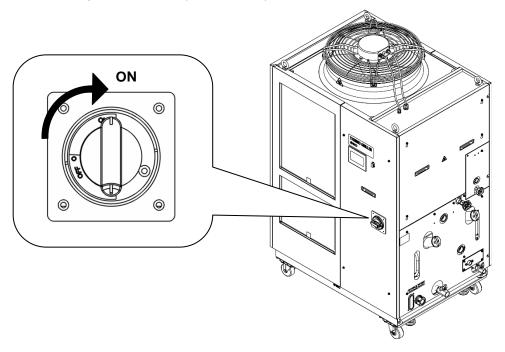


Fig. 4-1 Position of the breaker handle(the figure shows HRL200-A-40)



Fig.4-2 Startup screen

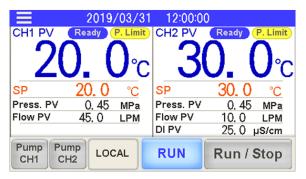


Fig.4-3 Operation screen (home screen)

4.2 Preparation for Start HRL Series

4.2.2 Operation screen (home screen)

Items displayed on the home screen are listed in Table 4.2-1 Items displayed on the home screen.

Refer to Chapter 5 Display and Setting of Various Functions for details.

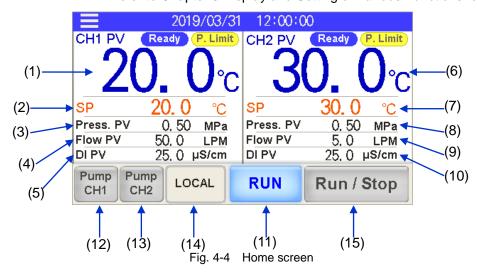


Table 4.2-1 Items displayed on the home screen

No.	Classification	CH number	ltem	Explanation	
(1)			Circulating fluid temperature	It indicates the current temperature.	
(2)			Circulating fluid set temperature	It indicates the set temperature.	
(3)		CH1	Circulating fluid Discharge pressure	It indicates the discharge pressure.	
(4)		OH	Circulating fluid flow rate	It indicates the fluid flow rate. This value is not measured by a flow meter. It should be used as a reference value (rough indication). It includes the flow rate in the bypass circuit.	
(5)			Circulating fluid electric conductivity	It indicates the electric conductivity. *1	
(6)	Displayed value	splayed value CH2	Circulating fluid temperature	It indicates the current temperature.	
(7)			Circulating fluid set temperature	It indicates the set temperature.	
(8))		Circulating fluid discharge pressure	It indicates the discharge pressure.	
(9)		Common		Circulating fluid flow rate	t indicates the flow rate measured by a flow meter. It does not include the flow rate in the bypass circuit.
(10)			Circulating fluid electric conductivity	It indicates the electric conductivity.	
(11)			Common	Operating condition display	It indicates the run and stop status of the product.
(12)		CH1	Independent pump operation	CH1 pump operates independently while the button is pressed.	
(13))	CH2	Independent pump operation	CH2 pump operates independently while the button is pressed.	
(14)	Button	Common	Operatrion mode	To select a operatrion mode from the touch panel (LOCAL mode), contact input (DIO mode) or serial communication (SERIAL mode).	
(15)		Common	Run/Stop	To run/stop the product.	

^{*1} When option D1 "CH1 Electric conductivity control" is purchased, a numerical value is displayed.

4.3 Preparation of the Circulating Fluid Supply to the User's Equipment

Circulating fluid is only supplied to the product at the time of installation of the thermo-chiller. If the operation starts under this condition, the circulating fluid inside of the product is supplied to user's device and the piping. This lowers the fluid level of the product which then requires additional fluid to be supplied. Follow the instructions below to supply additional fluid.

1. Touch [Pump |] button or [Pump |] button on the touch panel.

Pump operates independently while pressing the [Pump CH1 Pump CH2] button.

[Pump | Pump |] button (blue) lights up during independent pump operation. The circulating fluid is then supplied to user's device and the piping to bleed the air inside the piping.

[Tips]

Independent pump operation is carried out at the following pump rotations: 50% for CH1 and 45% for CH2 (minimum rotation). The product does not operate at maximum rotation.

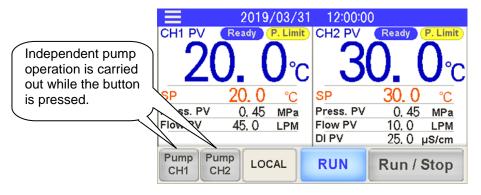


Fig.4-5 Pump independent operation

If the fluid level in the tank drops, an alarm is activated and "AL02 CH1 Low Level WRN" or "AL04 CH2 Low Level WRN" is displayed on the screen.

2. Supply circulating fluid in the range between HIGH and LOW to turn off the alarm.

After supplying the circulating fluid, press [Alarm Reset] button to turn off the alarm.

The displayed alarm will be turned off.

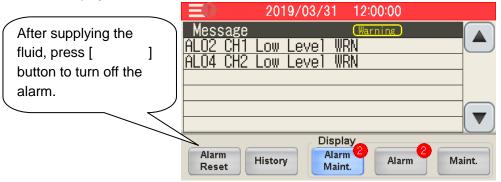


Fig. 4-6 Turning off the low tank fluid level alarm

4.2 Preparation for Start HRL Series

Touch [(menu key)]to display the menu.

When [Home] button is pressed, the home screen will be displayed.

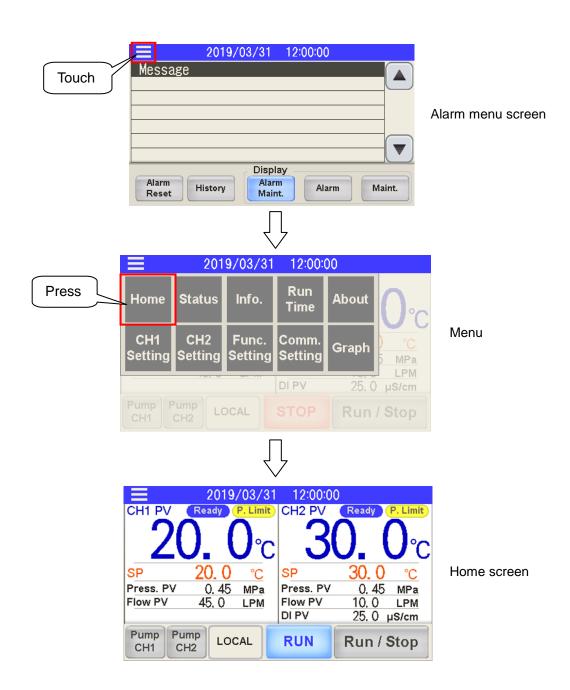


Fig. 4-7 Screen change from alarm menu to home screen

HRL Series 4.2 Preparation for Start

4. Repeat the procedures 1–3 until the fluid level of the product stops dropping.

[Tips]

While the low tank fluid level alarm (AL02/AL04) is still on (without turning off the alarm), the home screen can be displayed to carry out independent pump operation. If the fluid level continues to drop, the alarm "AL01 CH1 LOW level FLT" or "AL03 CH2 LOW level FLT" is activated.

4.4 Operation Start and Stop

4.4.1 Setting of circulating fluid temperature

Press the [SP] value on the touch panel (home screen) to display numeric keys to set the circulating fluid set temperature. Enter the set temperature for CH1 and CH2.

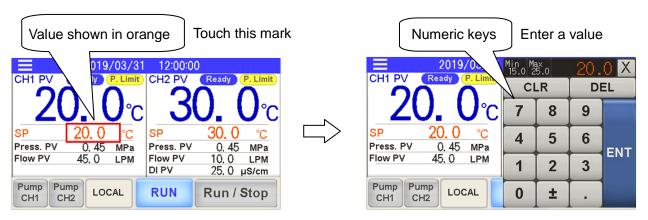


Fig. 4-8 Setting of CH1 circulating fluid temperature

4.4.2 Setting of the pump operation mode

Pump operation mode is set in the pressure control mode by default. Refer to "Pump operation mode" (P.5-32) for setting.

[By default] Pressure control mode

 CH1: The pump output (rotation) is controlled to maintain the circulating fluid discharge pressure at below.

HRL100: 0.43MPa、HRL200: 0.45MPa、HRL300: 0.45MPa

 CH2: The pump output (rotation) is controlled to maintain the circulating fluid discharge pressure at 0.45 MPa.

4.4.3 Starting the Product

CAUTION



- Allow at least 5 minutes before restarting the product.
- Operation and suspension frequency should not exceed 10 times per day.
 Frequently switching between operation and suspension may result in the malfunction of the refrigeration circuit.

When the alarm is activated, refer to "Chapter 7 Alarm Notifications and Troubleshooting" to turn off the applicable alarm.

1. Press [Run / Stop] button on the home screen.

CH1 and CH2 will start operation.

The operating condition display switches from [STOP] to [RUN] and flashes during the operation preparation.

The display turns on [RUN] when it starts operating.

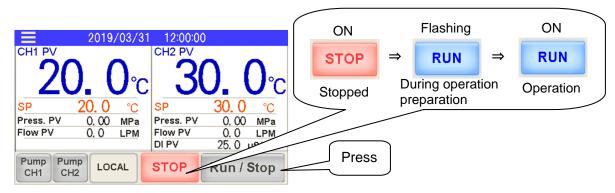


Fig.4-9 Starting the product

CAUTION

When a alarm is activated, refer to "Chapter 7 Alarm Notifications and Troubleshooting".

2. Ensure that the circulating fluid flow is at least the minimum required flow rate of applicable types.

4.4.4 Stopping the product

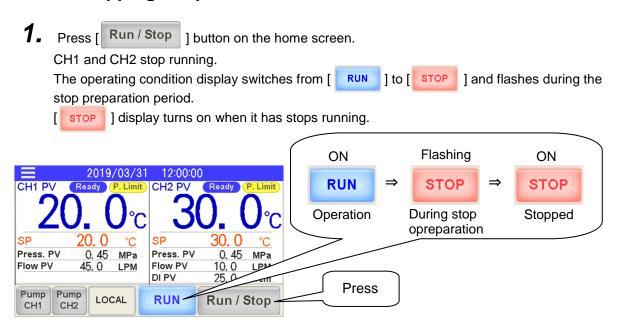


Fig. 4-10 Stopping the product

2. Please turn OFF the breaker. The touch panel turns off.

CAUTION



Except in case of an emergency, do not turn OFF the breaker before the thermo-chiller operation comes to a complete stop. As this will cause damage to the product.

4.5 Check Items during Startup

Check the following items after starting the product.

WARNING



If abnormality is detected, press [Run / Stop] key and turn OFF the facility power supply (power supply of the user's equipment) breaker.

- Confirm that there is leakage from the piping.
- Confirm that no circulating fluid is discharged from the tank drain port.
- Confirm that the circulating fluid pressure is within the specification range.
- The fluid level is within the range.

4.6 Adjusting the Circulating Fluid Flow Rate

If the circulating fluid flow rate is smaller than the minimum required, the product may fail to maintain performance, making it impossible for the compressor to operate. Refer to Figure 3-17 to find the recommended piping circuit fluid flow rate for adjustment, and adjust the manual valve while monitoring the pressure and flow rate of the user's equipment to achieve the required pressure or flow rate.

[Tips]

Refer to "9.1 Specifications" for the minimum required flow rate.

Chapter 5 Display and Setting of Various Functions

A WARNING

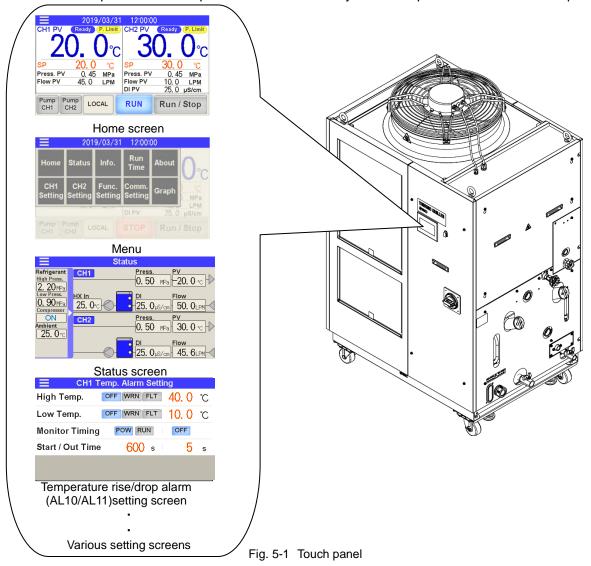


Thoroughly read and understand this manual before changing settings.

5.1 Basic Operation

5.1.1 Touch panel

The basic operations of the product are controlled by the touch panel on the front of the product.



CAUTION



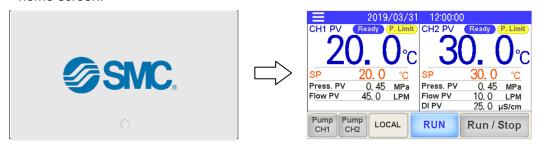
Be sure to operate the touch panel only with your fingers. Operating the panel with a sharp pointed screwdriver or ballpoint pen damages the panel.

HRL Series 5.1 Basic Operation

5.1.2 Basic operating instructions

Basic operating instructions for the touch panel of the product are described below.

1. After turning on the power, the startup screen appears on the display and changes to the home screen.

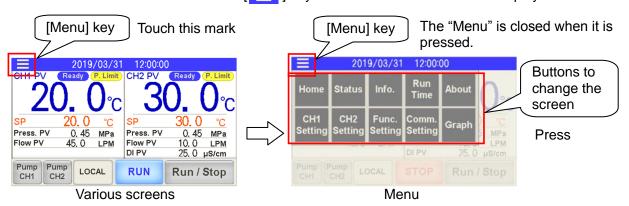


Startup the software

Home screen

2. Settings and screen display can be reviewed after the home screen changes to the respective screen. The menu is displayed when [] [] (menu key) located upper left on the screen is touched. Go to the respective screen from the menu to check the settings and screen display content.

Essentially use [] key to change the screen. [] key is located on every screen. The menu is closed when [] key is touched while the menu is displayed.



3. Press a button for example to carry out "Run/Stop," "Selection of function" or "Change the screen.

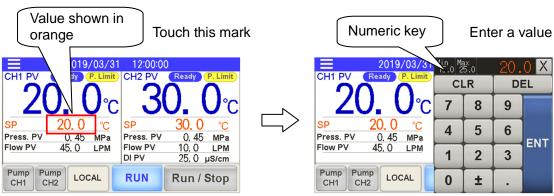
Any button-shaped section on the screen can be pressed to operate it.



5.1 Basic Operation HRL Series

Example of numeric keys

4. Touch the value in orange to display numeric keys to enter a value. Enter a set value.



Example of an orange "Value"

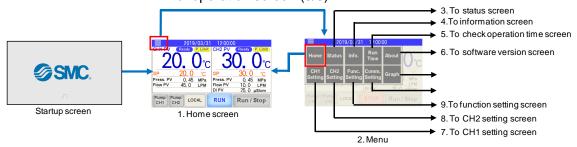
HRL Series

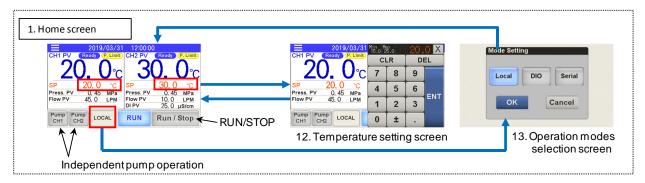
5.1 Basic Operation

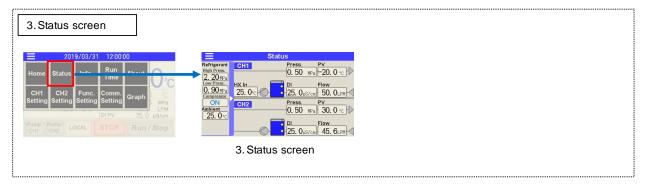
5.2 Flow Chart of the Operation Screen

5.2.1 Flow Chart of the Operation Screen

Flow chart of operation screens (touch panels) of the product are shown in from Fig.5-2 Flow chart of operation screen (1/3) to Fig.5-4 Flow chart of operation screen (3/3).







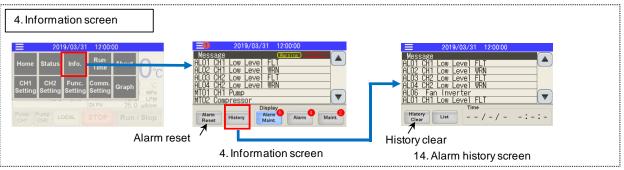


Fig.5-2 Flow chart of operation screen (1/3)

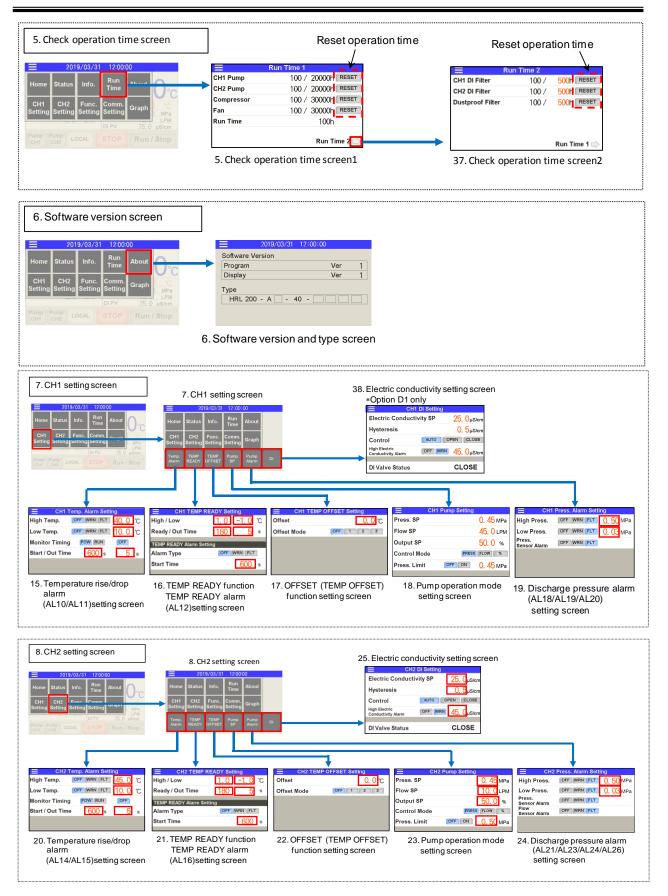
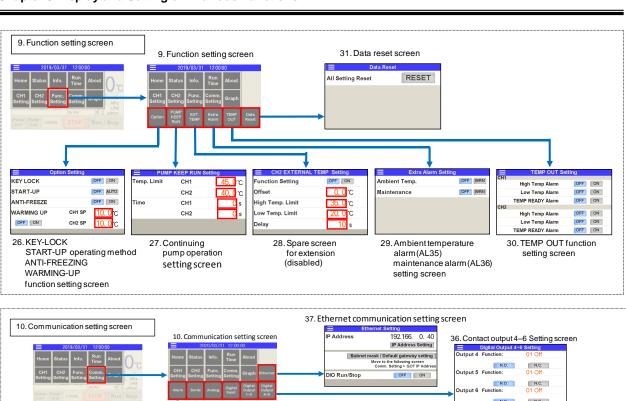
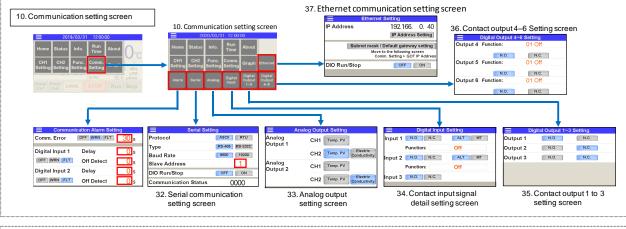


Fig.5-3 Flow chart of operation screen (2/3)





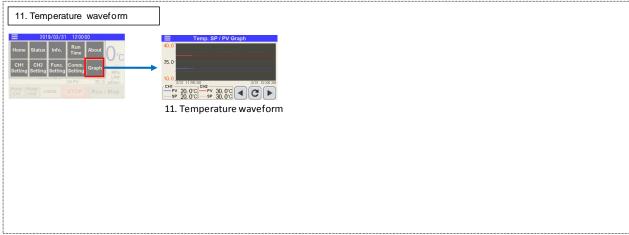


Fig. 5-4 Flow chart of operation screen (3/3)

5.3 List of Functions

Function of the product can be set as shown in Table 5.3-1 List of functions.

Table 5.3-1 List of functions

	Classification	Function	Outline	Reference page	
		Temperature setting	Allows change of the set circulating fluid temperature.		
		Temperature display	Displays the circulating fluid temperature.		
		Pressure display	Displays the circulating fluid discharge pressure.		
		, ,	Displays the circulating fluid flow rate.		
			A rough indication of the flow rate of [CH1]. It includes the		
		Flow rate display	bypass circuit.		
		1 low late dioplay	The flowmeter value of [CH2]. It does not include the bypass	Chapter	
1	Home screen		circuit.	5.4.1	
		Dun/Stan	Run/stop the product.	0.4.1	
		Run/Stop	' '		
		Pump independent operation	Independently operates the pump of CH1 or CH2.		
			Displays the operation mode.		
		Operation mode selection	·Selects the operation from touch panel or communication.		
		Operating condition display	Displays the operating status.		
^	Manue	Manu diantau	Selects a menu for various settings.	Chapter	
2	Menu	Menu display		5.4.2	
_	<u>.</u>			Chapter	
3	Status screen	Sensor value display	Displays the sensor value of the product.	5.4.3	
			Displays an alarm name when the alarm goes off.		
			Displays a maintenance reminder.	Chapter	
4	Information screen	Alarm/maintenance display	Displays previously activated alarms.	5.4.4	
			Displays previously activated alains.	5.4.4	
			<u> </u>		
			Following operation times can be checked:		
			The operation time can be reset.		
5		Chack aparation time	·Pump	Chapter	
	Check operation time screen	Check operation time screen	Check operation time	·Compressor	Chapter
		Reset operation time	·Fan	5.4.5	
			·Time of use of DI filter		
			· Time of use of dustproof filter		
		+	<u>'</u>	Chantar	
6	Software version screen	Display of software version	Software version can be checked.	Chapter	
				5.4.6	
		Temperature rise/drop alarm	Sets the temperature rise/drop alarm (AL10/AL11).		
		TEMP READY function	Sets TEMP READY signal and alarm (AL12).		
		TEMP OFFSET	Sets the offset mode.	Chapter	
7	CH1 setting screen	Pump operation mode	Sets the pump operation mode and set value.	5.4.7	
		Bisshama and a district the sale and	Sets the pump discharge pressure rise/drop alarm (AL19/AL20)	5.4.7	
		Discharge pressure rise/drop alarm	and discharge pressure sensor failure (AL18).		
		Electric conductivity	Sets the electric conductivity. *1		
		Temperature rise/drop alarm	Sets the temperature rise/drop alarm (AL14/AL15).		
		TEMP READY function	Sets TEMP READY signal and alarm (AL14/AL15).		
			, ,		
		TEMP OFFSET	Sets the offset mode.	01	
8	CH2 setting screen	Pump operation mode	Sets the pump operation mode and set value.	Chapter	
U			Sets the pump discharge pressure rise/drop alarm (AL23/AL24)	5.4.8	
O		Discharge pressure rise/drop alarm	and discharge pressure sensor failure/flow rate sensor failure		
o			•		
U			(AL21/AL26).		
o		Electric conductivity	(AL21/AL26). Sets the electric conductivity.		
		Electric conductivity	•		
			Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and		
		Electric conductivity KEY LOCK	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset".		
		Electric conductivity KEY LOCK START-UP	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power.		
		Electric conductivity KEY LOCK START-UP ANTI-FREEZE	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation.		
		Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up.	Chantar	
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function.	Chapter	
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm	Chapter 5.4.9	
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35).		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36).		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36).		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm TEMP OUT function setting Data reset	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36). Sets TEMP OUT function.		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm TEMP OUT function setting	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36). Sets TEMP OUT function. Resets set values to default settings. Sets the communication error (AL34) and contact input 1 and 2		
	Function setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm TEMP OUT function setting Data reset Communication alarm	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36). Sets TEMP OUT function. Resets set values to default settings. Sets the communication error (AL34) and contact input 1 and 2 signal detection (AL30/AL31).	5.4.9	
9	Function setting screen Communication setting screen	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm TEMP OUT function setting Data reset Communication alarm Serial communication	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36). Sets TEMP OUT function. Resets set values to default settings. Sets the communication error (AL34) and contact input 1 and 2 signal detection (AL30/AL31). Sets RS-232C and RS-485.	5.4.9 Chapter	
9	, and the second	Electric conductivity KEY LOCK START-UP ANTI-FREEZE WARMING UP PUMP KEEP RUN Ambient temperature alarm Maintenance alarm TEMP OUT function setting Data reset Communication alarm	Sets the electric conductivity. Prevents operations other than "run/stop", "change screen" and "alarm reset". Selects the operating method to turn on the power. Sets the anti-freezing operation. Sets the warming up. Sets the pump continuing operation function. Selects the enabling/disableing of ambient temperature alarm (AL35). Sets the assignment of "maintenance reminder" as an alarm signal (AL36). Sets TEMP OUT function. Resets set values to default settings. Sets the communication error (AL34) and contact input 1 and 2 signal detection (AL30/AL31).	5.4.9	

Contact output signal

*1 Only for Option D1 "CH1 with electric conductivity control".

5.4 Description of the Screen

5.4.1 Home screen

Items displayed on the home screen and setting items are shown in Table 5.4-1 List of check items in inspection monitor menu.

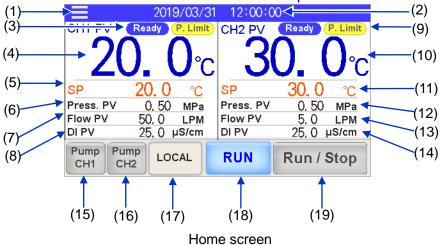
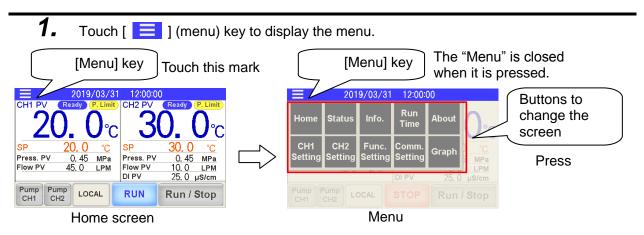


Table 5.4-1 List of check items in inspection monitor menu

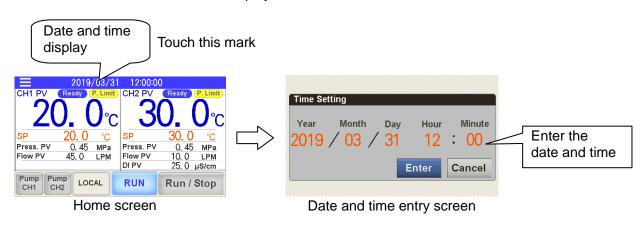
No.	CH number	ltem	Explanation	Reference page		
(1)		Menu key	Touch the key to display the menu.	P.5-9		
(2)	Common	Data and time display	Displays the date and time.	P.5-9		
(2)		Date and time display	Press the numeric section to set the date and time.	P.5-9		
(3)		Operating condition display	Displays TEMP READY status.	P.5-9		
(3)		Operating condition display	Displays the control status of the circulating fluid temperature.	F.5-9		
(4)		Current circulating fluid temperature	Displays the current temperature of circulating fluid.	P.5-10		
(5)		Circulating fluid set temperature	It indicates the set temperature.	D 5-10		
(3)		Circulating lidid set temperature	Press the numeric section to change the set temperature.	F.5-10		
(6)	CH1	Circulating fluid discharge pressure	It indicates the discharge pressure.	P.5-11		
			It indicates the fluid flow rate. This value is not			
(7)		Circulating fluid flow rate	measured by a flowmeter. It should be used as			
(')		Circulating iluid flow rate	a reference value (rough indication).	P.5-11		
					It includes the flow rate in the bypass circuit.	
(8)		Circulating fluid electrical conductivity	It indicates the electrical conductivity. *1			
(9)		Operating condition display	Displays TEMP READY status.	D 5-0		
(3)		Operating condition display	Displays the control status of the circulating fluid pressure.	1.5-9		
(10)		Current circulating fluid temperature	Displays the circulating fluid temperature.	P.5-10		
(11)		Circulating fluid set temperature	It indicates the set temperature.	D 5 10		
(11)	CH2	Circulating lidid set temperature	Press the numeric section to change the set temperature.	F.5-10		
(12)		Circulating fluid discharge pressure	It indicates the discharge pressure.	P.5-11		
(13)		Circulating fluid flow rate	It indicates the flow rate measured by a flowmeter.	D 5 11		
(13)		Circulating little flow rate	It does not include the flow rate in the bypass circuit.	P.5-11		
(14)		Circulating fluid electrical conductivity	It indicates the electrical conductivity.	P.5-11		
(15)	CH1	Independent pump operation	CH1 pump operates independently while the button is pressed.	P.5-12		
(16)	CH2	Independent pump operation	CH2 pump operates independently while the button is pressed.	P.5-12		
			To select a operation mode from the touch panel			
(17)		Operation mode	(LOCAL mode), contact input (DIO mode)	D 5 12		
(17)	Common	Operation mode		P.5-11 P.5-9 P.5-10 P.5-11 P.5-11 P.5-11 P.5-11		
	Common		or serial communication (SERIAL mode).			
(18)		Operating condition display	It indicates the run and stop status of the product.	P.5-12		
(19)		Run/Stop	To run/stop the product.	P.5-13		

^{*1} In the case of option D1 "CH1 with electrical conductivity control", it will display.



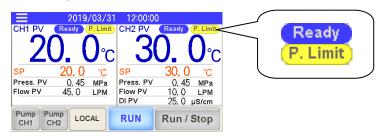


- ·Display and setting of date and time
 - **2.** Touch the date and time display to set the date and time.



- Operating condition display
 - **3.** Display "TEMP READY status" and "PRESS LIMIT status" of CH1 and CH2.

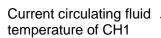
Display [Ready] if the current temperature is within a certain range. (Refer to About TEMP READY function (P.5–27) for "TEMP READY function".) Display [P.Limit] if the circulating fluid discharge pressure has reached the pressure limit value. (Refer to About control function of circulating fluid discharge pressure (P.5-32) for details of "PRESS LIMIT".)

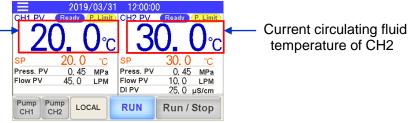


"Ready" / "P. Limit" display

Current circulating fluid temperature [PV]

4. Display the current circulating fluid temperature of CH1 and CH2.

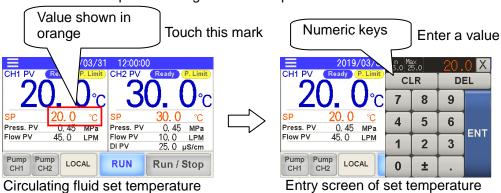




Current circulating fluid temperature

Circulating fluid set temperature [SP]

5. Display the circulating fluid set temperature of CH1 and CH2. Touch the numeric part to change the set temperature.



The set temperature ranges of CH1 and CH2 are as follows:

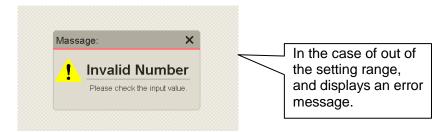
The set temperature of CH2 will be higher than CH1. The set temperature of CH2 must not be set lower than that of CH1.

Item	CH1	CH2	
Setting range	5°C to 35°C	10°C to 40°C *	*CH2 set temperature ≧CH1set
By default	20°C	25°C	temperature

[Tips]

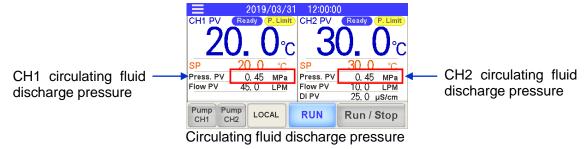
Sample set temperature:

- To change from CH1SP: 25°C and CH2SP: 30°C status, to CH2SP: 15°C, first set CH1SP to 15°C and then CH2SP to 15°C. If CH2SP is set to 15°C before setting CH1SP to 15°C, then the following message appears: Please set CH1SP first.
- Likewise, if a temperature higher than that of CH2SP is entered when setting CH1SP, then the following message appears: Please set CH2SP first in this case.

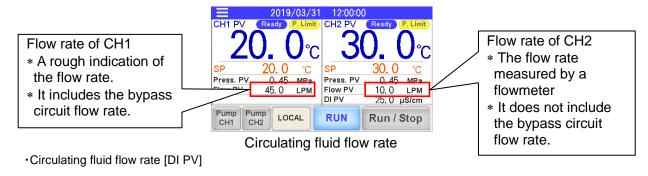


Set temperature error

- Circulating fluid discharge pressure [Press PV]
 - **6.** Display the circulating fluid discharge pressure of CH1 and CH2.

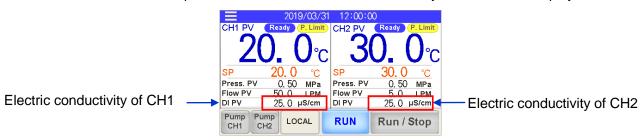


- Circulating fluid flow rate [Flow PV]
 - **7.** Display the circulating fluid flow rate of CH1 and CH2.
 - * A rough indication including the bypass circuit is shown for the flow rate of CH1.
 - * The flow rate measured by a flowmeter is shown for CH2. The bypass circuit is not included.



Display the electric conductivity of CH1,CH2.

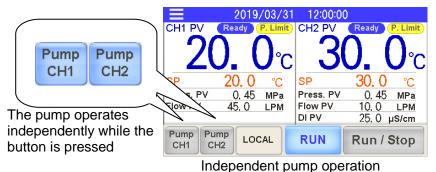
In the case of option D1 "CH1 with electrical conductivity control", it will display.



Electric conductivity

Independent pump operation [Pump]

9. Pump The pump operates independently while [] or [] button is pressed.



Operation mode [MODE]

10. Display the current run mode.

Set the operation mode.

[LOCAL] mode is set by default.

Operation mode can be selected from the following three modes:

- [LOCAL] mode: The operation is performed by the touch panel.
- Imode: The operation is performed by contact input signal.

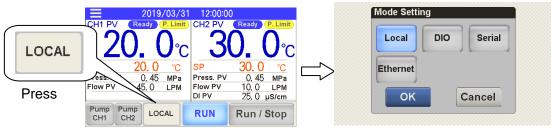
(Refer to "5.4.10 Communication setting screen" for the setting of contact input signal.)

[| SERIAL |]mode: The operation is performed by the serial communication RS-232C/RS-485.

(Refer to "5.4.10 Communication setting screen" for serial communication.)

• [Ethernet] mode: The operation is performed by the Ethernet Modbus/TCP communication.

(Refer to "5.4.10 Communication setting screen" for Modbus/TCP communication.)

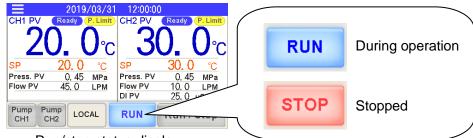


Operation mode

Operation mode selection screen

RUN/STOP display

11. Indicates whether the product is running or has stopped running.

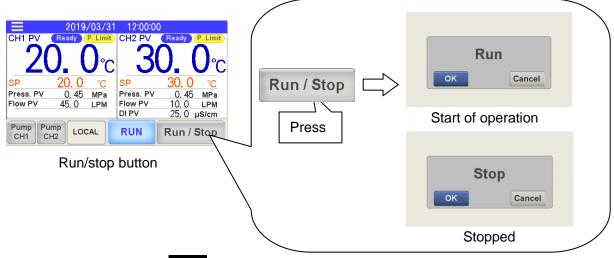


Run/stop operation

Run/stop status display

12. Run/Stop the product. Press [Run / Stop] button when the product has stopped running to display "Operation check screen". Press [OK] button to start operation. The "Operating condition display" described in 11 flashes to indicate the period before operation starts (operation preparation period).

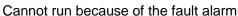
Press [Run / Stop] button when the product is running to display "Stop check screen". in 11 flashes during the period before the operations stops (stop preparation period)

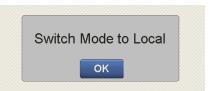


[Tips]

- If [Run / Stop] button is pressed when "Run/Stop (FLT)" alarm is activated, the "Cannot Run" message appears. Please turn off the alarm. Refer to "Chapter 7 Alarm Notifications and Troubleshooting" for turning off the alarm.
- If the "Operation mode" is set to anything other than "LOCAL", a "Switch to the local mode" message appears. Set the running mode to the "LOCAL" mode.





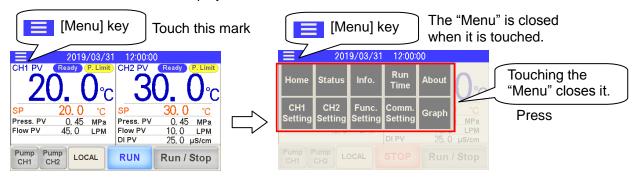


Switch to the local mode

5.4.2 Menu

[] (menu) key is located upper left on the applicable screen. Touch [] key to display the menu. Go to the applicable setting screen from the menu.

The menu is closed when [] key is touched while the menu is displayed.



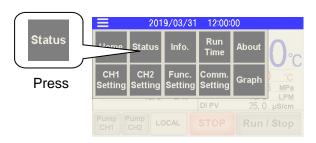
Applicable screen

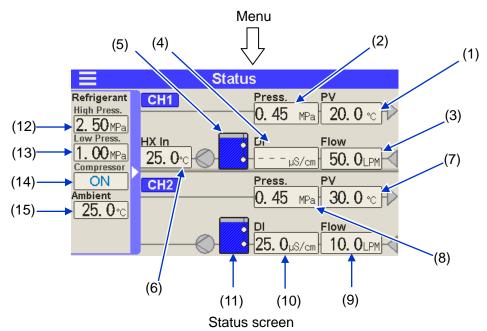
Menu

5.4.3 Status screen

Press [Status] button on the menu to display "Status" screen.

The screen display of the "Status" screen is shown in Table 5.4-2 Screen display of status screen.





5.4 Description of the Screen HRL Series

Table 5.4-2 Screen display of status screen

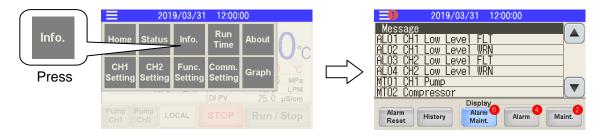
No.	CH	Item	splay of status screen Explanation		
	number	Current circulating fluid	Displays the current temperature of the		
(1)		temperature	circulating fluid outlet port.		
(2)		Circulating fluid discharge	Displays the circulating fluid		
		pressure	discharge pressure. Displays the circulating fluid flow rate.		
(3)		Circulating fluid flow rate	*A rough indication of the flow rate.		
. ,			*It includes the bypass circuit.		
(4)		Electrical conductivity	Displays the electrical conductivity of the circulating fluid. *1		
	CH1		Indicates the tank fluid level with three levels:		
			"Sufficient," "Low," or "Insufficient."		
(5)		Tank fluid level	"Sufficient" "Low" "Insufficient" Blue Yellow Red		
(6)		Heat exchanger inlet	Displays the inlet temperature of the heat		
		temperature Current circulating fluid	exchanger for the circulating fluid. Displays the current temperature of the		
(7)		temperature	circulating fluid outlet port.		
(8)		Circulating fluid discharge	Displays the circulating fluid		
. ,				pressure	discharge pressure. Displays the circulating fluid flow rate.
(9)		Circulating fluid flow rate	*The value is measured by a flowmeter.		
			*The bypass circuit is not included. Displays the electrical conductivity of the		
(10)	CH2	Electrical conductivity	circulating fluid.		
			Indicates the tank fluid level with three levels: "Sufficient," "Low," or "Insufficient."		
(11)		Tank fluid level	"Sufficient" "Low" "Insufficient" Blue Yellow Red		
(4.0)		Pressure gauge on	Displays the pressure gauge on high-pressure		
(12)		high-pressure side of compressor circuit	side of refrigerant circuit.		
4.5 - 3		Pressure gauge on	Displays the pressure gauge on low-pressure		
(13)	Common	low-pressure side of the compressor circuit	side of the refrigerant circuit.		
(14)		Compressor output	Displays the compressor output.		
(15)		Ambient temperature	Displays the ambient temperature		
(' -)			of the product.		

^{*1} In the case of option D1 "CH1 with electrical conductivity control", to display the value.

5.4.4 Information screen

Information screen is displayed when [Info.] button on the menu is pressed. The "Information" screen has the following functions:

- •To show the content of currently activated "Alarms".
- Displays the content of currently issued "Maintenance reminders".
 (Refer to "5.4.5 Check operation time screen and maintenance reminder" for details.)
- •To reset an alarm. (An alarm cannot be reset without first eliminating the cause.) Refer to "Chapter 7 Alarm Notifications and Troubleshooting" for details.)
- •To display previously activated alarms (alarm history).

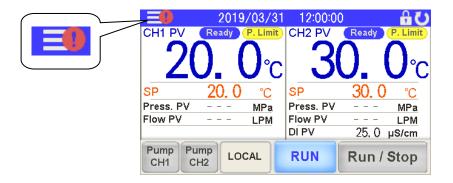


Menu Information screen

[Tips]

If an "Alarm" is activated when the product is operating, the screen automatically switches to the "Information".

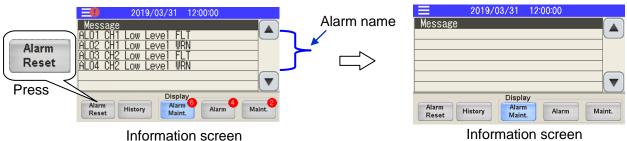
However, if the "Maintenance reminder" is issued, the screen will not switch. [] is displayed upper right on the screen if an "Alarm" is activated or a "Maintenance reminder" is issued.



Display when an "Alarm" is activated or "Maintenance reminder" is issued

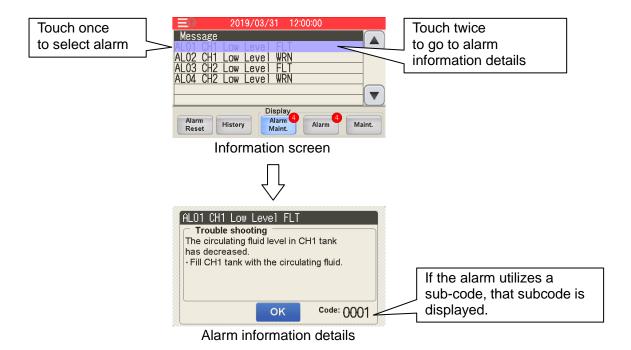
· Alarm reset

1. After eliminating the cause of the alarm, press [Alarm] button to cancel the alarm. When the alarm is turned off, alarm names disappear from the "Information" screen.



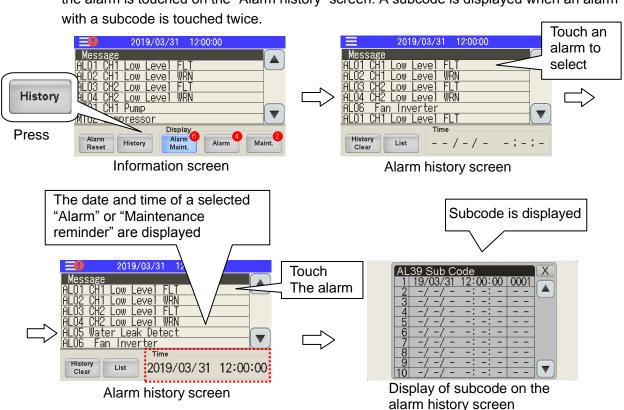
· Alarm name

2. Touch the "Alarm" on the "Information" screen to display details of the alarm. Touching alarm one time displays the alarm information. Touching alarm twice displays alarm information details. If the alarm utilizes a sub-code, this is displayed in the alarm information details.



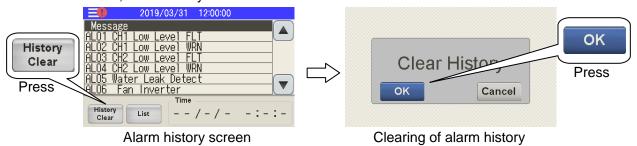
· Alarm log record

3. Previously activated "Alarm contents" are displayed if [History] button is pressed. A maximum of 300 records can be displayed. The date and time of an alarm are displayed if the alarm is touched on the "Alarm history" screen. A subcode is displayed when an alarm with a subcode is touched twice.

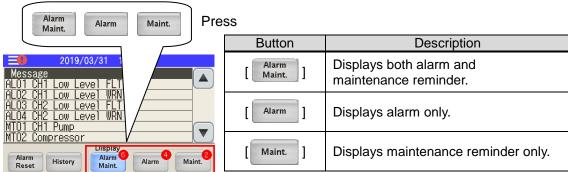


Cleaning of alarm history

4. All "Alarm" records are cleared if the "History Clear" button is pressed. However, the currently activated alarm is not cleared.



- Display of alarm/maintenance reminder
 - **5.** The "Alarm" and "Maintenance reminder" on the "Information" screen can each be individually displayed.

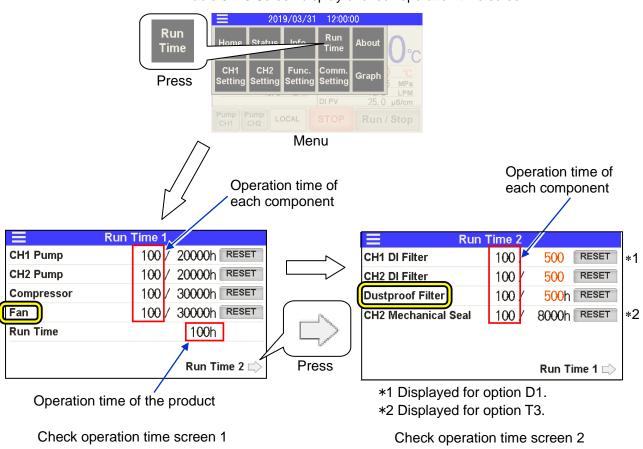


: In case of water-cooled type, displayed is "-".

5.4.5 Check operation time screen and maintenance reminder

The "Check operation time" screen is displayed if [Run Time] button on the menu is pressed.

Screen display and function of the "Check operation time" screen are shown in Table 5.4-3 Screen display of check operation time screen.



No.	Indication	Item/replacement cycle	Explanation
		Operating time	Displays the operating time for CH1 pump.
1	Pump CH1	20000 hour	Displays the recommended replacement cycle for CH1 pump.
		Operating time	Displays the operating time for CH2 pump.
2	Pump CH2	20000 hour	Displays the recommended replacement cycle for CH2 pump.
		Operating time	Displays the operating time for compressor.
3	Compressor	30000hour	Displays the recommended replacement cycle for a compressor.
		Operating time	Displays the operating time of a fan.
4	Fan *3	30000 hour	Displays the recommended replacement cycle for a fan.
5	Run Time	Operating time	Displays the operation time of a chiller.
	CH1 DI Filter	Operating time	Displays the usage time of a DI filter.
6	*1	1 to 9999 hour By default: 500 hour	The "Maintenance reminder" is issued if the usage time has reached the hours specified by the user.
		Usage time	Displays the usage time of a DI filter.
7	CH2 DI Filter	1 to 9999hour By default: 500 hour	The "Maintenance reminder" is issued if the usage time has reached the hours specified by the user.
	Dustproof	Usage time	Displays the usage time of a dustproof filter.
8	Filter *3	1 to 9999 hour By default: 500 hour	The "Maintenance reminder" is issued if the usage time has reached the hours specified by the user.
	CH2	Operating time	Displays the CH2 pump mechanical seal used time
9	Mechanical Seal *2	8000 hour	The recommended replacement cycle of the mechanical seal is displayed.
10	Reset	[RESET] button	The operation time is reset to "0 hour" when [RESET] button is pressed.

Table 5.4-3 Screen display of check operation time screen

■ About "Maintenance reminder" function

- "Maintenance reminder" is displayed on the "Information" screen if a product part in use has reached its recommended replacement cycle.
- "Maintenance reminder" is always issued if a part of the product has reached the recommended replacement cycle.
- A "Maintenance reminder" signal can be output by contact signal and by serial communication.

(Refer to "5.4.10 Communication setting screen" for details.)

• A "Maintenance reminder" signal can be output as "The AL36: Maintenance alarm". (Refer to "5.4.9 Function setting screen Ambient temperature alarm [AL35] and Maintenance Alarm [AL36]".)

^{*1} In the case of option D1 "CH1 with electrical conductivity control", to display the value.

^{*2} In the case of option T3 "CH2 High-Pressure Pump Mounted", to display the value.

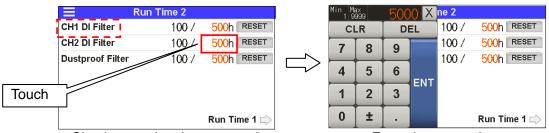
^{*3} In case of water-cooled type, displayed is "-".

- ·Setting the usage time of DI filter
 - The replacement period (usage time) for a DI filter can be set.

 "Maintenance reminder" is always issued when the filter reaches the specified time.

 Touch the numeric section of DI filter to set the time of use.

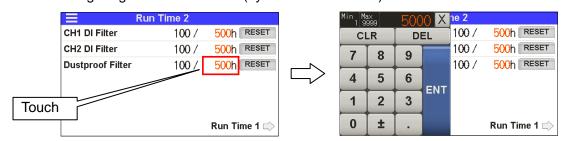
 Setting range: 1 to 9999 hours (by default: 500 hours)



Check operation time screen 2 Enter the usage time

- In the case of option D1 "CH1 with electrical conductivity control", it can be set.
- •Setting of the usage time of dustproof filter (Only for air-cooled type)
 - 2. The replacement period (usage time) for a dustproof filter can be set. "Maintenance reminder" is always issued when the filter reaches the specified time. Touch the numeric section of a dustproof filter to set the usage time.

 Setting range: 1 to 9999 hours (by default: 500 hours)

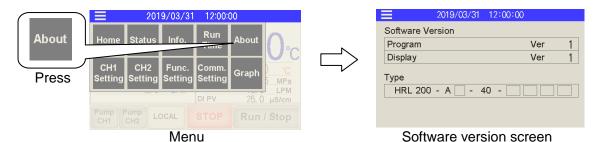


Check operation time screen 2

Enter the usage time

5.4.6 Software version screen

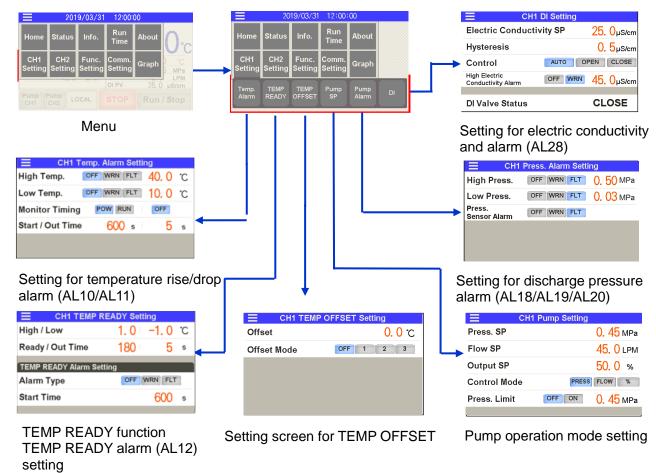
"Software version" screen is displayed if [| button on the menu is pressed. The software number and version number are displayed.



5.4.7 CH1 setting screen

A screen for shifting to the following setting screens is displayed if [setting] button on the menu is pressed.

- Setting screen for temperature rise/drop alarm (AL10/AL11)
- Setting screen for TEMP READY alarm (AL12) of TEMP READY function
- Setting screen for TEMP OFFSET
- Setting screen for pump operation mode
- Setting screen for discharge pressure alarm (AL18/AL19/AL20)
- Setting screen for electric conductivity (AL28)



- Temperature rise/drop alarm (AL10/AL11)
 - **1.** An alarm can be activated when the current temperature of circulating fluid rises/drops outside of the setting range.

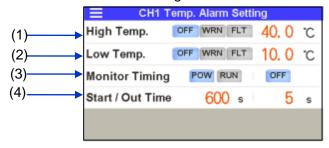
This function is OFF (deactivated) by default.

The following two types of alarm can be set on the "Temperature rise/drop alarm setting" screen:

- AL10: Alarm for CH1 circulating fluid temperature rise/drop—the alarm activates if the temperature rises above the set temperature.
- AL11: Alarm for CH1 circulating fluid temperature drop—the alarm activates if the temperature drops below the set temperature.

Following settings can also be selected: Refer to Table 5.4-4 Settings of AL10/AL11.

- Operation of the product at the time of alarm
- · Conditions to start alarm monitoring
- · Start time for alarm monitoring



Setting for temperature rise/drop alarm (AL10/AL11)

Table 5.4-4 Settings of AL10/AL11

No.	Indication	Item		Setting range	
		AL10 : CH1	OFF *	Disabled	
(1)	High Temp.	Circulating fluid	WRN	Operation continues during the alarm	5 to 55°C *45°C
	- r	temperature rise	FLT	Operation stops during alarm	
		AL11 : CH1	OFF *	Disabled	_
(2)	Low Temp.	Circulating fluid	WRN	Operation continues during the alarm	
		temperature drop	FLT	Operation stops during alarm	
			POW *	Continuous monitoring (monitoring continues even when the operation is stopped)	_
(3)	Monitor Timing	Alarm monitoring conditions	RUN	Monitoring continues only during operation. If [RUN] is selected, [OFF] or [AUTO] should be selected. Refer to About alarm monitoring timing (P.5–25) for details.	_
	Start/	No monitoring	[Start Time]	Alarm monitoring starts when the set time has passed after the start of operation.	0 to 9999sec *600sec
(4)	Out Time	No monitoring time/out time	[Out Time]	The alarm is activated when the set time has passed after the temperature rises/drops out of the alarm setting range.	

^{*} By default.

■ About alarm monitoring timing

If [RUN] is selected as (3) "Monitor Timing" alarm monitoring condition, [OFF] and [AUTO] can be additionally selected. [AUTO] is a function to start alarm monitoring when the circulating fluid temperature rises/drops within the alarm setting temperature range in the time period specified by (4) "Start Time" (no monitoring time). Specific alarm monitoring timing is shown in Figure 5-5 Alarm monitoring timing.

[Example of setting]

- Circulating fluid SP: 20°C
- (1) "High Temp." CH1 circulating fluid temperature rise (AL10): 22°C
- (2) "Low Temp." CH1 circulating fluid temperature drop (AL11): 18°C
- (3) "Monitor Timing" Alarm monitoring conditions: [RUN] and [AUTO]
- (4) "Start Time" No monitoring time: 1200 sec / "Out Time": 600 sec

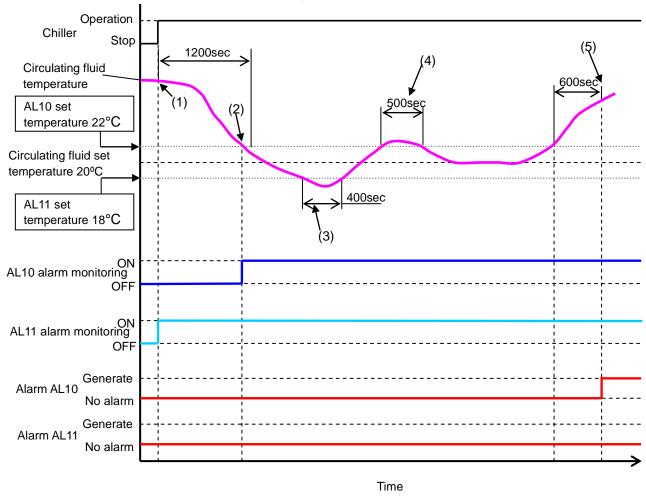


Fig. 5-5 Alarm monitoring timing

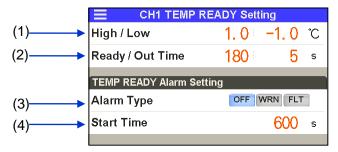
- Status (1): Start operation of the chiller. Monitoring of "AL11" starts since the temperature is 18°C or higher which is the value set for "AL11."
- Status (2): Monitoring of "AL10" starts since the temperature falls below 22°C, which is the value set for "AL10."
- Status (3): No alarm is activated since the temperature returns to the range within "Out Time" 600 seconds even though it is below 18°C, which is the value set for "AL11."
- Status (4): No alarm is activated since the temperature returns to the range within "Out Time" 600 seconds even though it is above 22°C, which is the value set for "AL10."
- Status (5): "AL10" is activated 600 seconds after the temperature rises above 22°C, which is the value set for "AL10."
 - •TEMP READY alarm (AL12) of TEMP READY function
 - **2.** "TEMP READY" signal can be output by signal contact and serial communication if the circulating fluid temperature is within the range set for the time and temperature. "TEMP READY" signal cannot be "Disabled".

[Ready] is displayed on the "Home" screen if "TEMP READY" conditions are met. (Refer to 5.4.1 Home screen Operation condition display)

The alarm "AL12: TEMP READY alarm" can be output if the temperature does not meet the TEMP READY conditions. This function is OFF (deactivated) by default.

It can be set on "TEMP READY function setting" screen.

Refer to Table 5.4-5 TEMP READY signal setting and ■ About TEMP READY function (P.5–27) for details.



TEMP READY signal (AL12) setting

Table 5.4-5 TEMP READY signal setting

No.	Indication	Item	Se	etting and selection	Setting range
(1)	High/	Upper/lower	[High]	Sets the upper temperature limit for circulating fluid SP.	+0.1 °C to +10.0 °C * +1.0 °C
(1)	Low	temperature limit	[Low]	Sets the lower temperature limit for circulating fluid SP.	
	Pondy/	Stable temperature	[Ready Time]	"TEMP READY" signal is output when the set time has passed after the circulating fluid temperature rises/drops within the range of (1) "Upper/Lower temperature limit."	
(2)	Ready/ Out Time		[Out Time]	"TEMP READY" is cleared when the set time has passed after the circulating fluid temperature rises/drops outside the range of (1) "Upper/Lower temperature limit" in the "TEMP READY" condition.	
			OFF *	Disabled	_
(3)	Alarm Type	AL12 alarm operation	WRN	Operation continues during the alarm Operation stops	
				during alarm Monitoring of "AL12: TEMP	
(4)	Start Time	Start time of AL12 alarm monitoring	[Start Time]	READY alarm" starts when the set time has passed after the start of operation.	0sec to 9999sec * 600sec

^{*} By default.

■ About TEMP READY function

The operation chart of "TEMP READY" signal is shown in Fig. 4-2 TEMP READY signal chart.

[Example of setting]

- (1) "High" Upper temperature limit: +2°C and "Low" Lower temperature limit: -2°C
- (2) "Ready Time" Stable temperature time: 300 sec and "Out Time" extra temperature time: 200 sec
- (3) "Alarm Type" Alarm operation (AL12): "WRN"
- (4) "Start Time" Start time of alarm monitoring (AL12): 1000 sec

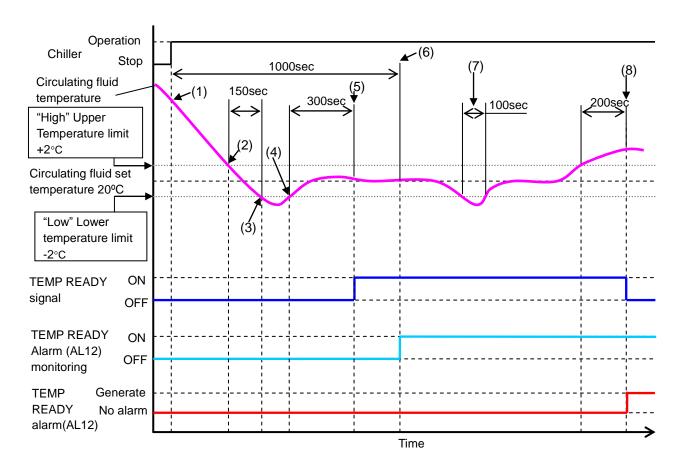


Fig. 5-6 TEMP READY signal chart

- Status (1): Start operation of the chiller.
- Status (2): The temperature is in the "High/Low" range, but no "TEMP READY" signal is generated since "Ready Time" is set at 300 sec at this point.
- Status (3): The 300 sec count for "Ready Time" is reset since the temperature is now outside of the "Low" range.
- Status (4): The 300 sec count for "Ready Time" starts since the temperature is now within the "High/Low" range.
- Status (5): "TEMP READY" signal is generated at this point since the temperature remains in the "High/Low" range for 300 sec of "Ready Time."

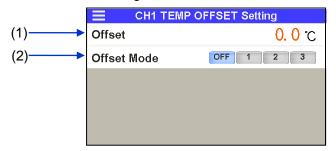
 Monitoring of "TEMP READY alarm (AL12)" does not start since "Start Time" is set at 1000 sec.
- Status (6): Monitoring of "TEMP READY alarm (AL12)" starts at this point where 1000 sec of "Start Time" has elapsed.
- Status (7): "TEMP READY" signal output continues since the temperature is now back within the "Out Time" range of 200 sec even though it was temporarily outside the "Low" range.
- Status (8): "TEMP READY" signal turns OFF when 200 sec has passed after the temperature rises above the "High" range. "TEMP READY alarm (AL12)" is simultaneously activated.

HRL Series

Offset (TEMP OFFSET) function

3. The circulating fluid temperature can be offset. Refer to ■ About offset function (P.5–29) for details.

This function can be set on "Offset setting" screen. Refer to Table 5.4-6 Offset setting for details.



Offset setting

Table 5.4-6 Offset setting

No.	Indication	Item	Explanation	Setting range
(1)	Offset Temp.	Offset temperature	Sets offset temperature.	-20.0 °C to +20.0 °C [By default] 0.0 °C
(2)	Offset Mode	Offset mode	Selects the offset mode. [OFF] Disabled [1] MODE 1 [2] MODE 2 [3] MODE 3	OFF / 1 / 2 / 3 [By default] OFF

■ About offset function

This function controls the circulating fluid discharge temperature with offset.

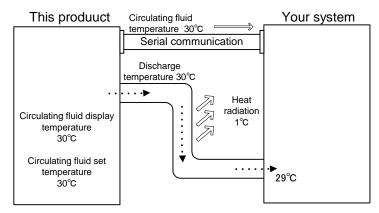
Temperature offset may occur between the thermo-chiller and the customer's device depending on the installation environment. To correct the temperature offset, three types of offset functions are available (MODE1 to 3). The default setting of this function is "OFF".

[When communication is used]

The circulating fluid temperature sent by serial communication is the circulating fluid temperature which is displayed on the thermo-chiller (the circulating fluid temperature after offset).

Example of temperature offset

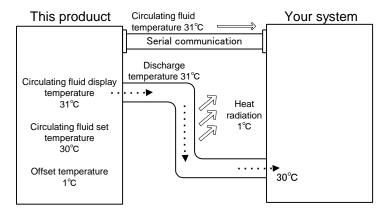
The discharge temperature of the circulating fluid is 30°C, but the fluid temperature in the customer's device is 29°C because of heat radiation during sending of the fluid.



MODE	Explanation
MODE1	Control the temperature so that the discharge temperature of the circulating fluid is circulating fluid set temperature + offset temperature. Circulating fluid temperature indicates the circulating fluid discharge temperature.
MODE2	Control the temperature so that the discharge temperature of the circulating fluid is circulating fluid set temperature. Circulating fluid temperature indicates the circulating fluid discharge temperature + offset temperature.
MODE3	Control the temperature so that the discharge temperature of the circulating fluid is circulating fluid set temperature + offset temperature. Circulating fluid temperature indicates the circulating fluid discharge temperature - offset temperature.
OFF	Control the temperature so that the discharge temperature of the circulating fluid is circulating fluid temperature set value.

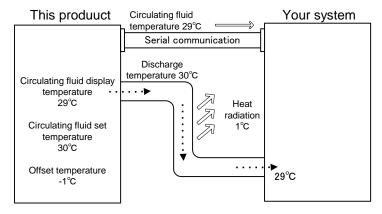
■ Example of MODE 1

When the offset temperature is 1°C, the thermo-chiller controls the temperature at 31°C (circulating fluid set temperature + offset temperature.) Even if the discharge temperature is 31°C, the circulating fluid temperature is 30°C at the customer's device because of 1°C of heat radiation during sending of the fluid. Circualting fluid display temperature and communication data is 31°C.



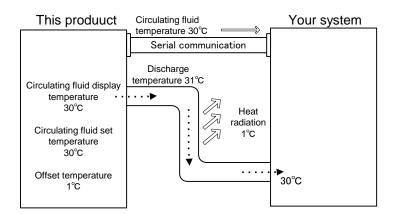
■ Example of MODE 2

When the offset temperature is -1°C, circulating fluid display temperature and the communication data is 29°C (circulating fluid discharge temperature + offset temperature), and matches the circulating fluid temperature at the customer's device.



■ Example of MODE 3

When the offset temperature is 1°C, the thermo-chiller controls the temperature at 31°C (circulating fluid set temperature + offset temperature) Even if the discharge temperature is 31°C, the circulating fluid temperature is 30°C at the customer's device because of 1°C of heat radiation during sending of the fluid. The circulating fluid display temperature and the communication data is 30°C (circulating fluid discharge temp. - offset temp.), and matches the circulating fluid temperature at the customer's device.



Pump operation mode

4. Pump operation mode can be set up.

Pump operation mode can be selected from the following three modes:

 Pressure control mode—Operates to maintain the circulating fluid discharge pressure at the set pressure. This mode is set by default.

The pressure might not rise to the set pressure if the piping resistance in the user's device and piping is too small.

 Flow control mode——Operates to maintain the circulating fluid flow rate at the set flow rate. (However, CH1 flow rate serves as a rough indication.)

The flow rate might not reach the set flow rate if the piping resistance in the user's device and piping is too large.

- Pump output setting mode—Operates to maintain the pump output (rotation) at the set output.
- ■About the control function of circulating fluid discharge pressure

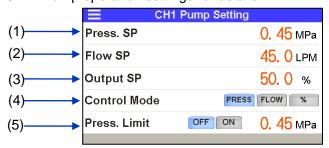
This is a function to control the pump output to maintain the circulating fluid discharge pressure within the set pressure.

This function is "Disabled" by default. If this function is "Enabled", the control pressure set by this function gets priority over the pressure, flow rate and output set by the pump operation mode.

[P. Limit] is displayed on the upper screen when the pump discharge pressure is controlled during operation.

(Refer to 5.4.1 Operation condition display on home screen.)

This can be set on "Pump operation mode setting" screen. Refer to Table 5.4-7 Pump operation settings for details.



Pump operation mode setting

No.	Indication	Item	Explanation		Se	etting range
		Cat the masses	(4) The record		HRL100	0.10 to 0.50 MPa
(1)	Press.SP while in pressure maintain the s	mp operation is controlled to he set pressure when "Control eration mode) is set [PRESS].	HRL200			
		control mode	mode (oper	ation mode) to set [HRL300	
					HRL100	
(2)	Flow SP	Set flow rate in the flow rate control mode	(4) The pump operation is controlled to maintain the set pressure when "Control mode" (operation mode) is set [FLOW].		HRL200	
					HRL300	
(2)	Output SD	Set the output in the output setting mode	(4) The pump operation is controlled to maintain the set output (rotation) when "Control mode" (operation mode) is set to		HRL100	50.0 to 100.0%
(3)	Output SP				HRL200	*50.0%
			[%].		HRL300	
			Selects the	pump operation mode		
(4)	Control Mode	Selection of pump	PRESS *	Pressure control mode		
(4)	Control Mode	operation mode	FLOW	Flow rate control mode	-	-
			%	Pump output setting mode		
			Selects ena control.	bling/disabling of the pressure	HRL100	
(5)	Press.Limit	Pressure setting for pressure control function	OFF *	Function disabled	HRL200	0.10 to 0.68 MPa *0.45 MPa 20.0 to 120.0 LPM *45.0 LPM 25.0 to 130.0 LPM *45.0 LPM 40.0 to 180.0 LPM *125.0 LPM 50.0 to 100.0% *50.0%
		Tunction	ON	Function enabled	HRL300	

Table 5.4-7 Pump operation mode setting

- * By default
- Discharge pressure alarm (AL18/AL19/AL20)
 - An alarm can be activated when the circulating fluid discharge pressure rises/drops outside the setting range. This function is set to "[FLT] (stop) at the time of alarm" by default. The following two alarms can be set on "Discharge pressure alarm setting" screen:
 - AL19: Alarm for CH1 circulating fluid discharge pressure rise—this alarm activates when the pressure rises above the set pressure.
 - AL20: Alarm for CH1 circulating fluid discharge pressure drop—this alarm activates when the pressure drops below the set pressure.

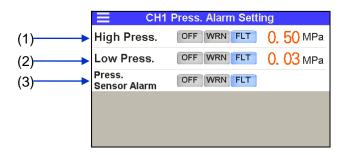
Following settings can also be selected:

Selection of product operation when an alarm occurs

The alarm "AL18: CH1 failure of circulating fluid discharge pressure sensor" activates when a failure is detected in the circulating fluid discharge pressure sensor. This allows selecting the product operation when the alarm "AL18" is activated.

This function is set to "Operation stops at time of alarm" by default.

If the operation at the time of the alarm "AL18" is set to become [OFF] (disabled) or [WRN] (operation continues at time of alarm), the pump operation mode switches to the "Pump output setting mode" (50% output) to continue operation when a pressure sensor failure is detected.



Setting of discharge pressure alarm (AL18/AL19/AL20)

Table 5.4-8 Settings for AL18/AL19/AL20

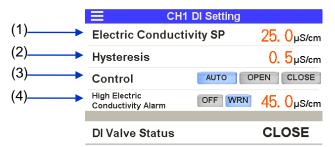
No.	Indication	Item		etting and selection	Setting range
(1)	High Press.	AL19 : CH1 Circulating fluid discharge pressure rise	OFF WRN FLT *	Disabled Operation continues during the alarm Operation stops during alarm	0.03 to 0.68MPa *0.50MPa
(2)	Low Press.	AL20 : CH1 Circulating fluid discharge pressure drop	OFF WRN FLT *	Disabled Operation continues during the alarm Operation stops during alarm	0.03 to 0.68MPa *0.03MPa
(3)	Press. Sensor Alarm	AL18: Failure of circulating fluid discharge pressure sensor	WRN FLT *	Operation continues during the alarm Operation stops during alarm	_

^{*} By default

- · Electric conductivity and alarm setting (AL28)
 - **6.** Entering value settings for electrical conductivity of circulating fluid and hysteresis causes circulating fluid to flow from the solenoid valve through to the DI filter to control the electrical conductivity.
 - *Only in the case of option D1 "CH1 with electrical conductivity control", it can be set.

The following items can be set on "Electrical conductivity and alarm (AL28) setting" screen:

- · Target electric conductivity value
- · Electric conductivity hysteresis
- Setting of solenoid valve operation during the operation of the product: "Control"/"Normally open"/"Normally closed".
- "Enabling"/"Disabling" of "AL28: CH2 electric conductivity increase" alarm function



Electric conductivity and alarm (AL28) setting

Table 5.4-9 Settings of electric conductivity (AL28)

No.	Indication	Item		Setting range		
(1)	Electric Conductivity SP	Target electric conductivity value	Sets a target	0.5 to 45.0µS/cm *25.0µS/cm		
(2)	Hysteresis	Electric conductivity hysteresis	Refer to ■ Ab	Sets an electric conductivity hysteresis. Refer to ■ About electric conductivity control (P.5–44) for details.		
(3)	Control	Solenoid valve operating method	AUTO *	Controls the solenoid valve to achieve the target value. Normally open (remains open when product is stopped)	_	
			CLOSE	Normally close		
(4)	High Electric Conductivity Alarm	AL28: Setting of CH1 electrical conductivity increase alarm	"AL28" activates when electrical conductivity increases above the set value. This sets the setting value and operation when an alarm occurs. "AL28" automatically turns off the alarm when the electrical conductivity falls below the set value. OFF Disabled WRN * Operation continues during the alarm		0.4 to 46.0μS/cm *45.0μS/cm	

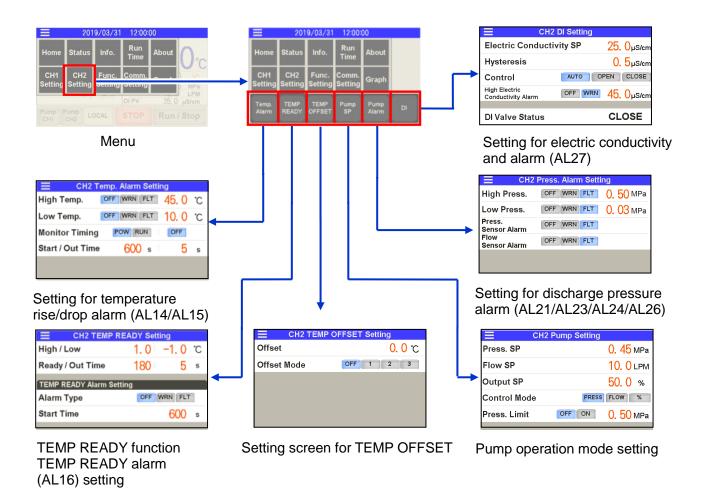
^{*}By default

For more information on electric conductivity control, refer to "■ Electrical conductivity" (P.5-44).

5.4.8 CH2 setting screen

A screen for shifting to the following setting screens is displayed if [CH2 | Setting |] button on the menu is pressed.

- Setting screen for circulating fluid temperature rise/drop alarm (AL14/AL15)
- Setting screen for TEMP READY alarm (AL16) of TEMP READY function
- Setting screen for TEMP OFFSET
- Setting screen for pump operation mode
- Setting screen for discharge pressure alarm (AL21/AL23/AL24/AL26)
- Setting screen for electric conductivity (AL27)



5.4 Description of the Screen HRL Series

Temperature rise/drop alarm (AL14/AL15) setting

1. An alarm can be activated when the current temperature of circulating fluid rises/drops outside of the setting range.

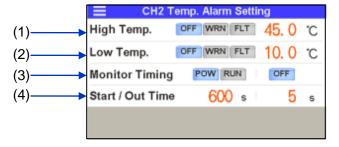
This function is OFF (deactivated) by default.

The following two types of alarm can be set on the "Temperature rise/drop alarm setting" screen:

- AL14: Alarm for CH2 circulating fluid temperature rise—this alarm activates when the temperature rises above the set temperature.
- AL15: Alarm for CH2 circulating fluid temperature drop—this alarm activates when the temperature drops below the set temperature.

Following settings can also be selected: Refer to Table 5.4-10 Settings of AL14/AL15 for details.

- Operation of the product at the time of alarm
- · Conditions to start alarm monitoring
- · Start time for alarm monitoring



Temperature rise/drop alarm (AL14/AL15) setting

Table 5.4-10 Settings of AL14/AL15

No.	Indication	Item		Setting and selection	Setting range
		AL14 : CH2	OFF *	Disabled	2.0
(1)	High Temp.	Circulating fluid temperature rise	WRN	Operation continues during the alarm	10 to 50 °C ∗45 °C
		temperature rise	FLT	Operation stops during alarm	
		AL15 : CH2	OFF *	Disabled	
(2)	Low Temp.	Circulating fluid temperature	WRN	Operation continues during the alarm	1 to 40 °C *5°C
		drop	FLT	Operation stops during alarm	
			POW *	Continuous monitoring (monitoring continues even when the operation stops)	_
(3)	Monitor Timing	Alarm monitoring conditions	RUN	Monitoring continues only during operation. If [RUN] is selected, [OFF] or [AUTO] should be selected. Refer to ■ About alarm monitoring timing (P.5–25) for details.	-
(4)	Start/	Start/ No monitoring time/extra time	[Start Time]	Alarm monitoring starts when the set time has passed after start of operation.	0 to 9999sec *600sec
	Out Time		[Out Time]	The alarm is activated when the set time has passed after the temperature rises/drops out of the alarm setting range.	0 to 600sec *5sec

^{*} By default.

2. "TEMP READY" signal can be output by signal contact and serial communication if the circulating fluid temperature is within the range set for the time and temperature.

"TEMP READY" signal cannot be "Disabled".

[Ready] is displayed on the "home" screen if "TEMP READY" conditions are met. (Refer to 5.4.1 Home screen Operating condition display.)

If the TEMP READY conditions are not met, alarm can be activated as "AL16 : TEMP READY alarm". This function is OFF (deactivated) by default.

It can be set on "TEMP READY function setting" screen.

Refer to Table 5.4-11 TEMP READY signal setting and ■ About TEMP READY function (P.5–27) for details.

[•]TEMP READY alarm (AL16) and TEMP READY function



TEMP READY signal (AL16) setting

Table 5.4-11 TEMP READY signal setting

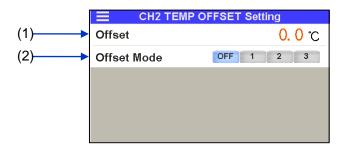
No.	Indication	Item	S	Setting range	
(1)	High/	Upper/lower temperature	[High]	Set the temperature range of the circulating fluid SP.	+0.1 °C to +10.0 °C * +1.0 °C
(1)	Low	limit	[Low]	Set the temperature range of the circulating fluid SP.	-0.1 °C to -10.0 °C * -1.0 °C
Doods!		Stable temperature	[Ready]	"TEMP READY" signal is output when the set time has passed after the circulating fluid temperature rises/drops within the range of (1) "Upper/Lower temperature limit."	10sec to 9999sec * 180sec
(2)	Ready/ Out Time	time/extra time	[Out Time]	"TEMP READY" is cleared when the set time has passed after the circulating fluid temperature rises/drops outside the range of (1) "Upper/Lower temperature limit" in the "TEMP READY" condition.	Osec to 600sec * 5sec
			OFF *	Disabled	_
(3)	Alarm Type	AL16 alarm operation	WRN	Operation continues during the alarm	_
			FLT	Operation stops during alarm	_
(4)	Start Time	Start time for AL16 alarm monitoring	[Start Time]	Monitoring of "AL16: TEMP READY alarm" starts when the set time has passed after the start of operation.	0sec to 9999sec * 600sec

^{*} By default

Offset (TEMP OFFSET) function

3. The circulating fluid temperature can be offset. Refer to ■ About offset function (P.5–29) for details.

This function can be set on "Offset setting" screen. Refer to Table 5.4-12 Offset setting for details.



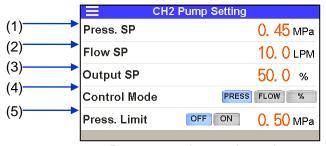
Offset setting

Table 5.4-12 Offset setting

No.	Indication	Item	Explanation	Setting range
(1)	Offset Temp.	Offset temperature	Sets offset temperature.	-20.0 °C to +20.0°C [By default] 0.0°C
(2)	Offset Mode	Offset mode	Selects the offset mode. [OFF] Disabled [1] MODE 1 [2] MODE 2 [3] MODE 3	OFF / 1 / 2 / 3 [By default] OFF

·Pump operation mode

4. Pump operation mode can be set up. Setting method is the same as "CH1 pump operation mode." Refer to "CH1 pump operation mode" (P.5–32). Setting range and default settings are shown in Table 5.4-13 Pump operation mode setting.



Pump operation mode setting

Table 5.4-13 Pump operation mode setting

Indication	ltem	Explanation	Setting range	
Press.SP	Set the pressure in the while in pressure control mode	(4) The pump operation is controlled to maintain the set pressure when "control mode" (operation mode) is set to "PRESS".	0.10 to 0.49 MPa *0.45MPa	
			2.0 to 10.0 LPM *10.0LPM	
	Set flow rate in the flow rate control mode		[Option-T2] 5.0 to 30.0 LPM *20.0LPM	
			[Option-T3] 10.0 to 60.0 LPM *40.0LPM	
			45.0 to 100.0% *45.0%	
Output SP	Set the output in the output setting mode		[Option-T2] 50.0 to 100.0% *50.0%	
			[Option-T3] 65.0 to 100.0% *65.0%	
		Selects the pump operation mode		
Control Mode	Selection of pump	T TOO GIT OF THE GO	_	
2011.01 111000	operation mode			
		- Oct output modo		
	Pressure setting for	Selects enabling/disabling of the pressure control.	0.40 to 0.50 MD-	
PressLimit	pressure control	OFF * Function disabled	0.10 to 0.50 MPa *0.50MPa	
	function	ON Function enabled		
	Press.SP Flow SP Output SP Control Mode	Press.SP Set the pressure in the while in pressure control mode Set flow rate in the flow rate control mode Output SP Set the output in the output setting mode Control Mode Selection of pump operation mode PressLimit Pressure setting for pressure control function	Press.SP Set the pressure in the while in pressure control mode Set flow rate in the flow rate control mode Set the output in the output setting mode Control Mode Selection of pump operation mode Selection mode PressLimit Pressure setting for pressure control function Pressure setting for pressure control function (4) The pump operation is controlled to maintain the set flow rate when "control mode" (operation mode) is set "FLOW". (4) The pump operation is controlled to maintain the set output (rotation) when "control mode" (operation mode) is set to "%". Selects the pump operation mode Pressure setting for pressure control function Pressure control function (4) The pump operation is controlled to maintain the set output (rotation) when "control mode" (operation mode) is set to "%". Selects the pump operation mode Pressure control mode Selects enabling/disabling of the pressure control. OFF * Function disabled	

^{*}By default

Discharge pressure alarm (AL21/AL23/AL24/AL26)

5. An alarm can be activated when the circulating fluid discharge pressure rises/drops outside the setting range.

This function is set to "[FLT] (stop) at the time of alarm" by default.

The following two alarms can be set on "Discharge pressure alarm setting" screen:

- AL23: Alarm for CH2 circulating fluid discharge pressure rise—the alarm activates if the
 pressure rises above the set pressure.
- AL24: Alarm for CH2 circulating fluid discharge pressure drop—the alarm activates if the pressure drops below the set pressure.

Following settings can also be selected.

· Selection of product operation when an alarm occurs

"AL21: CH2 failure in circulating fluid discharge pressure sensor" is activated if a failure is detected in the circulating fluid discharge pressure sensor. The product operation at the time of alarm "AL21" can be selected.

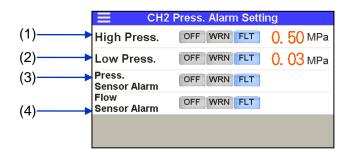
This function is set to "[FLT] (stop) at the time of alarm" by default.

If the operation at the time of the alarm "AL21" is set to be [OFF] (disabled) or [WRN](operation continues at the time of alarm), the pump operation mode switches to the "pump output setting mode" (45% output) to continue operation when a failure is detected in the circulating fluid discharge pressure sensor.

Alarm "AL26: CH2 failure of circulating fluid flow sensor" is activated if failure is detected in the circulating fluid flow sensor. The product operation at the time of alarm "AL26" can be selected.

This function is set to "Operation stops at time of alarm" by default.

If the operation at the time of the alarm "AL26" is set to be [OFF] (disabled) or [WRN](operation continues at the time of alarm), the pump operation mode switches to "Pump output setting mode" (45% output) to continue operation when a failure is detected in circulating fluid discharge pressure flow sensor.



Discharge pressure alarm (AL21/AL23/AL24/AL26)

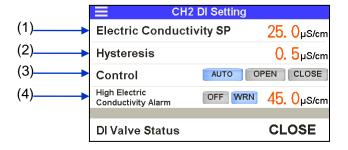
No.	Indication	I able 5.		Settings of AL21/AL23/AL24/AL26 Setting and selection		
		AL23 : CH2	OFF	Disabled	Setting range	
(1)	High Press.	Circulating fluid discharge	WRN	Operation continues during the alarm	0.03 to 0.50MPa *0.50MPa	
		pressure rise	FLT *	Operation stops during alarm		
		AL24 : CH2	OFF	Disabled		
(2)	Low Press.	Circulating fluid discharge	WRN	Operation continues during the alarm	0.03 to 0.50MPa *0.03MPa	
		pressure drop	FLT *	Operation stops during alarm		
	D	AL21 : CH2	OFF	Disabled		
(3)	Press. Sensor Alarm	Circulating fluid discharge pressure	WRN	Operation continues during the alarm	_	
	7 ((0))	sensor failure	FLT *	Operation stops during alarm		
		AL26 : CH2	OFF	Disabled		
(4)	Sensor	Flow circulating fluid	WRN	Operation continues during the alarm	_	
	Alarm		FLT *	Operation stops during alarm		

Table 5.4-14 Settings of AL21/AL23/AI 24/AI 26

6. Entering value settings for electrical conductivity of circulating fluid and hysteresis causes circulating fluid to flow from the solenoid valve through to the DI filter to control the electrical conductivity.

The following items can be set on "Electrical conductivity and alarm (AL27) setting" screen:

- · Target electric conductivity value
- Electric conductivity hysteresis
- Setting of solenoid valve operation during the operation of the product: "Control"/"Normally open"/"Normally closed".
- "Enabling"/"Disabling" of "AL27: CH2 electric conductivity increase" alarm function



Electric conductivity and alarm (AL27) setting

^{*}By default

[·] Electric conductivity and alarm setting (AL27)

Table 5.4-15	Settinas	of	electric	conductivity	/	(AL27)

No.	Indication	Item		Explanation	Setting range
(1)	Electric Conductivity SP	Target electric conductivity value	Sets a target electric conductivity value.		0.5 to 45.0µS/cm *25.0µS/cm
(2)	Hysteresis	Electric conductivity hysteresis		ric conductivity hysteresis. out electric conductivity I4) for details.	0.1 to 10.0µS/cm *0.5µS/cm
(3)	Control	Solenoid valve operating method	AUTO * OPEN CLOSE	Controls the solenoid valve to achieve the target value. Normally open (remains open when product is stopped) Normally close	_
(4)	High Electric Conductivity Alarm	AL27: Setting of CH2 electrical conductivity increase alarm	"AL27" activates when electrical conductivity increases above the set value. This sets the setting value and operation when an alarm occurs. "AL27" automatically turns off the alarm when the electrical conductivity falls below the set value. OFF Disabled WRN * Operation continues during the alarm		0.4 to 46.0μS/cm *45.0μS/cm

^{*}By default

■ About electric conductivity

An example of control of electrical conductivity control is shown in Figure 5-7 Example of electrical conductivity control.

Example operation of electric conductivity control

•Target electrical conductivity value $: 25.0 \ [\mu S / cm]$ • Electrical conductivity control hysteresis $: 5.0 \ [\mu S / cm]$

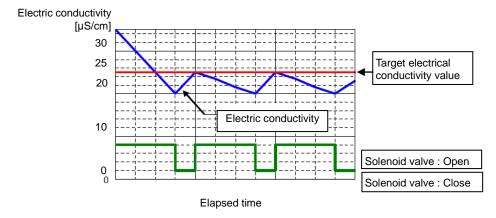
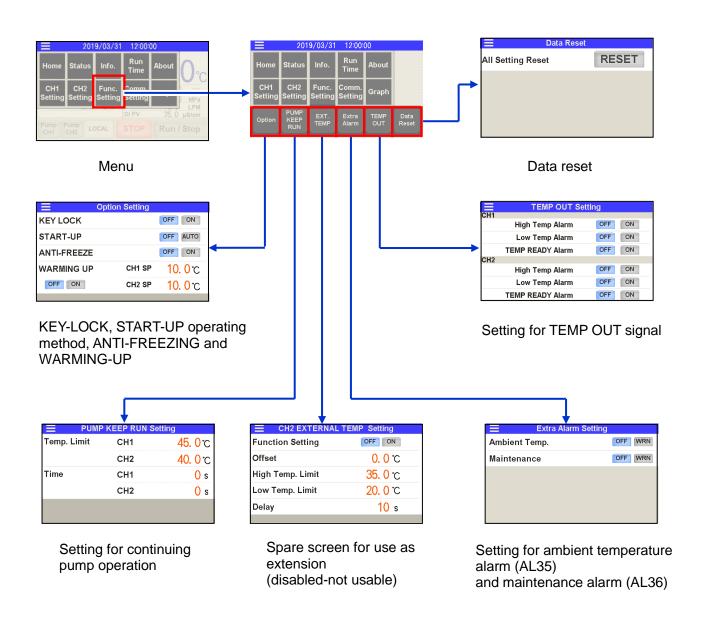


Fig.5-7 Example of electrical conductivity control

5.4.9 Function setting screen

A screen for shifting to the following setting screens is displayed if Func. | Setting |]button on the menu is pressed.

- Setting screen of KEY-LOCK/START-UP operating method/ANTI-FREEZING/WARMING-UP
- Setting screen for continuing pump operation
- Setting screen for ambient temperature alarm (AL35) and maintenance alarm (AL36)
- Setting screen for TEMP OUT signal
- Setting screen for data reset



HRL Series

•KEY-LOCK, START-UP operating method, ANTI-FREEZING and WARMING-UP

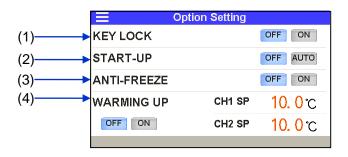
1. Following settings can be made on this product:

- START-UP operation setting— Function to restore back to the state prior to power shutdown, after the power supply is restored, when power supply had been cut off due to a power outage.
- ANTI-FREEZING——Function to prevent freezing of circulating fluid when the operation was stopped during winter time by automatic operation and by heating the circulating fluid with heat generated by pump. Pump automatic running and stopping is repeated to prevent freezing by maintaining circulating fluid temperature at 3°C to 5°C.
 - Pump automatically starts operating if the circulating fluid temperature drops below 3°C.
 - Circulating fluid is heated by the pump power generated by pump operation. When the circulating fluid temperature reaches 5°C or higher, the pump will stop operating automatically.
- WARMING-UP——— Function to maintain the circulating fluid at the
 warming-up setting temperature when operation is
 stopped during winter time or at night by conducting
 automatic operation and heating the circulating fluid
 with heat generated by the pump.
 - Pump automatically continues operating until the circulating fluid temperature rises up to +2°C, which is the warming-up setting temperature.
 - Pump automatically stops operating when the circulating fluid temperature rises up to +2°C which is the warming-up setting temperature.
 - Pump automatically restarts operation when the circulating fluid temperature drops to -2°C which is the warming-up set temperature.

A CAUTION



- The "ANTI-FREEZING" and "WARMING-UP" functions operate when the power supply is ON and the product operation is stopped.
- Fully open the valve or manual by-pass valve that was installed by the user to let the circulating fluid circulate when the pump operation automatically starts.



Setting of KEY-LOCK, START-UP operation, ANTI-FREEZING and WARMING-UP

Table 5.4-16 Settings of key-lock, startup operation, anti-freezing and warming-up

No.	Indication	Item		Explanation	Setting range
(1)	KEY LOCK	Key-lock	OFF *	Disabled	_
(1)	RETLOCK	Rey-lock	ON	Enabled	_
(2)	START-UP	Startup	OFF *	Disabled	_
(2)	STAILT-OF	operation	ON	Enabled	_
(2)	ANTI-FREEZE	7 Anti franzina	OFF *	Disabled	_
(3)	(3) ANTI-FREEZE	Anti-freezing	ON	Enabled	_
		MING UP Warming-up	OFF *	Disabled	_
			ON	Enabled	_
(4)	WARMING UP		CH1 SP	CH1 set temperature	5.0 to 35.0 °C *5.0 °C
			CH2 SP	CH2 set temperature	10.0 to 40.0 °C *10.0 °C

^{*}By default

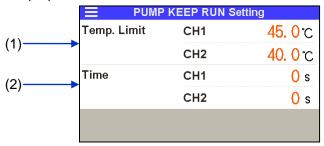
2. Continuing pump operation can be set.

Refer to ■ About continuous pump operation function (P.5–48) for this function.

This function is set to "Disabled" by default.

Following items can be set on "Continuous pump operation" setting screen:

- Pump operation sustainable temperature
- Pump operation sustainable time



Setting for continuous pump operation

Table 5.4-17 Settings for continuous pump operation

No.	Indication	Item		Explanation	Setting range
(1)	Temp. Limit	Pump operation	CH1	"Continuous pump operation"	5.0 to 50.0 °C *45.0 °C
(1)	remp. Limit	sustainable temperature	CH2	ends when the temperature reaches the set temperature.	10.0 to 45.0 °C *40.0 °C
(2)	Time	Pump CH1 operation		"Continuous pump operation" ends when the set time has elapsed.	0 to 9999sec
(2)	Time	sustainable time	CH2	Set time: 0 sec—this function is "Disabled"	*0sec

[·]Continuing pump operation

*By default

■ About continuous pump operation function

This function allows just the pump to continue operating after some alarms are activated. Alarms that allow continuous pump operation are shown in Table 5.4-18 Alarms that allow continuous pump operation (1/2) and Table 5.4-19 Alarms that allow continuous pump operation (2/2).

"Continuous pump operation" ends if any one of the following conditions is met, and the product stops operating:

- (1) After activation of the alarm, the temperature has reached the "Pump operation sustainable temperature" from the temperature at which pump-only operation starts.
- (2) After activation of the alarm, the time reached the "Pump operation sustainable time" starting from the time at which pump-only-operation started.

Table 5.4-18 Alarms that allow continuous pump operation (1/2)

	Table 5.4-18 Alarms that	t allow continuous pump o	Alarms that alle	ow continuous
Alarm	Alarm name	pump or		
No.	, talli lallo	Operation	CH1	CH2
AL01	CH1 Low Level FLT	[FLT]	×	0
AL02	CH1 Low Level WRN	[WRN]	-	-
AL03	CH2 Low Level FLT	[FLT]	0	×
AL04	CH2 Low Level WRN	[WRN]	-	-
AL06 *2	Fan Inverter	[FLT]	0	0
AL07 *3	Internal Cooling Fan	[WRN]	0	0
AL09	CH1 Hgih Temp. FLT	[FLT]	×	0
A1 40	CH1 Haib Tomp	[OFF] *1 / [WRN]	-	-
AL10	CH1 Hgih Temp.	[FLT]	0	0
A 1 44	CH4 Law Tomp	[OFF] *1 / [WRN]	-	-
AL11	CH1 Low Temp.	[FLT]	Ο	0
A1 40	CH1 TEMP READY ALARM	[OFF]*1 /[WRN]	-	-
AL12	CHI TEMP READT ALARM	[FLT]	Ο	0
AL13	CH2 High Temp. FLT	[FLT]	0	×
A1 4 4	CH2 High Tomp	[OFF] *1 / [WRN]	-	_
AL14	CH2 High Temp.	[FLT]	Ο	0
A1 45	CH2 Low Temp.	[OFF] *1 / [WRN]	-	-
AL15	CH2 Low Temp.	[FLT]	0	0
A1 40	CH2 TEMP READY ALARM	[OFF] *1 / [WRN]	-	-
AL16	CHZ TEIWIF INCADT ALARIW	[FLT]	0	0
AL17	CH1 HX In High Temp. FLT	[FLT]	×	0
AL18	CH1 Press. Sensor	[OFF] / [WRN]	-	_
AL18	CITI Fless. Selisui	[FLT] *1	×	0
A1 40	CH1 High Press.	[OFF] / [WRN]	_	_
AL19	OTT HIGH FIESS.	[FLT] *1	×	0
A1 20	CH1 Low Press.	[OFF] / [WRN]		-
AL20	OTTI LOW FIESS.	[FLT] *1	Ο	0
A1 04	CH2 Press. Sensor	[OFF]/[WRN]	-	-
AL21	OTIZ FIESS. SEIISUI	[FLT] *1	0	×

Table 5.4-19 Alarms that allow continuous pump operation (2/2)

	Table 5.4-19 Alarms that a	allow continuous pump	Alarms that allo	w continuous
Alarm	Alarm name		pump op	eration
No.		Operation	CH1	CH2
AL22	CH2 High Press. Error	[FLT]	0	×
41.00	CUD High Droop	[OFF] / [WRN]	-	-
AL23	CH2 High Press.	[FLT] *1	0	×
AL24	CH2 Low Press.	[OFF] / [WRN]	-	-
ALZ4	CH2 LOW Fless.	[FLT] *1	0	0
AL25	CH2 Low Press. Error	[FLT]	0	×
AL26	CH2 Flow Sensor	[OFF] / [WRN]	_	_
ALZO	OTIZ I IOW GETISOT	[FLT] *1	0	0
AL27	CH2 High Electric conductivity	[OFF] / [WRN] *1	_	-
AL28	CH1 High Electric conductivity (Option D1 only)	[OFF] / [WRN] *1	-	-
AL30	Digital input 1	[OFF] / [WRN]	_	-
ALSU	Digital input 1	[FLT] *1	0	0
AL31	Digital input 2	[OFF] / [WRN]	=	-
ALOT	Digital input 2	[FLT] *1	0	0
AL33	CH2 Low Flow FLT	[FLT]	0	×
AL34	Communication	[OFF] / [WRN] *1	-	-
ALOT		[FLT]	0	0
AL35	Ambient Temp.	[OFF] *1 / [WRN]	-	-
AL36	Maintenance	[OFF] *1 / [WRN]	-	-
AL37	Refrigeration Circuit	[FLT]	0	0
AL38	Sensor	[FLT]	×	×
AL39	Controller	[FLT]	×	×
AL40	Compressor Inverter	[FLT]	0	0
AL41	Compressor Inverter Comm.	[FLT]	0	0
AL42	CH1 Pump Inverter	[FLT]	×	0
AL43	CH1 Pump Inverter Comm.	[FLT]	×	×
AL44	CH2 Pump Inverter	[FLT]	0	×
AL45	CH2 Pump Inverter Comm.	[FLT]	×	×

^{*1} Default setting.

^{• &}quot;FLT": Operation stops when alarm occurs; "WRN": operation continues when alarm occurs; "OFF": alarm is disabled.

^{*2} Water-cooled type model does not generate this alarm.

^{*3} Air-cooled type model does not generate this alarm.

·Ambient temperature alarm (AL35) and maintenance alarm (AL36)

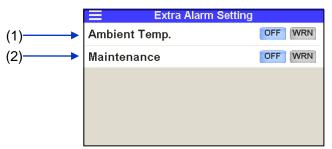
3. Following alarms can be set for this product:

 AL35: Ambient temperature alarm— the alarm "AL35" activates when the ambient temperature value of the product rises/drops out of the range between 2°C and 45°C. This function is set to "OFF" (disabled) by

default.

• AL36: Maintenance alarm——— "Maintenance reminder" can be assigned to alarm "AL36" as an alarm signal.

This function is set to "Disabled" by default.



Setting for ambient temperature alarm (AL35) and maintenance alarm (AL36)

Table 5.4-20 Settings for ambient temperature alarm (AL35) and maintenance alarm (AL36)

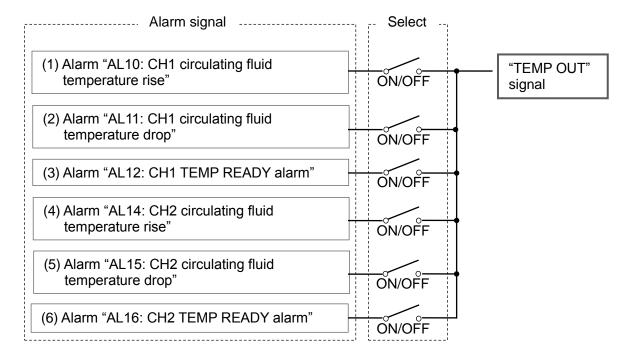
No.	Indication	Item	Explanation		Remarks	
	Ambient	AL35: Ambient temperature alarm	OFF *	Disabled	The alarm activates when the ambient temperature	
(1)	Temp.		WRN	Operation continues during the alarm	sensor is outside of the range between 2°C and 45°C.	
		AL36: Maintenance alarm	OFF *	Disabled	If "WRN" is selected, the alarm "AL36" activates	
(2)	Maintenance		WRN	Operation continues during the alarm	when "Maintenance reminder" is issued.	

^{*}By default

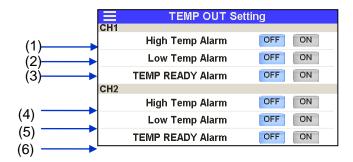
TEMP OUT signal

4. Set "TEMP OUT" signal.

"TEMP OUT" signal has a function to make an arbitrary selection from the following six alarm signals to output a "TEMP OUT" signal from a contact or serial communication. This function is set to "OFF" (disabled) by default.



TEMP OUT signal output chart



Setting screen of TEMP OUT signal

Table 5.4-21 Settings for TEMP OUT signal

No.	Ir	ndication	Explanation	Setting	
(1)		High Temp.	Alarm "AL10: CH1 circulating fluid	OFF *	Disabled
(1)		Alarm	temperature rise"	ON	Enabled
(2)	CH1	Low Temp.	Alarm "AL11: CH1 circulating fluid	OFF *	Disabled
(2)	OIII	Alarm	temperature drop"	ON	Enabled
(3)		TEMP READY	Alarm "AL12: CH1 TEMP READY alarm"	OFF *	Disabled
(5)		Alarm	Alam Actz. Gill Telvii NeAb Lalami	ON	Enabled
(4)		High Temp. Alarm	Alarm "AL14: CH2 circulating fluid	OFF *	Disabled
(4)			temperature rise"	ON	Enabled
(5)	(5) CH2	Low Temp.	Alarm "AL15: CH2 circulating fluid	OFF *	Disabled
(3)		Alarm	temperature drop"	ON	Enabled
(6)		TEMP READY	Alarm "AL16: CH2 TEMP READY alarm"	OFF *	Disabled
(0)		Alarm	AIGITI ALTO, OTIZ TEIVIF NEADT AIGITI	ON	Enabled

^{*} By default

5. Reset the product settings to the default settings.
The settings can be reset on "Data reset" setting screen.
"Date and time," "Operation time" and "Alarm history" are not reset.



Data reset setting screen

Table 5.4-22 Data reset setting

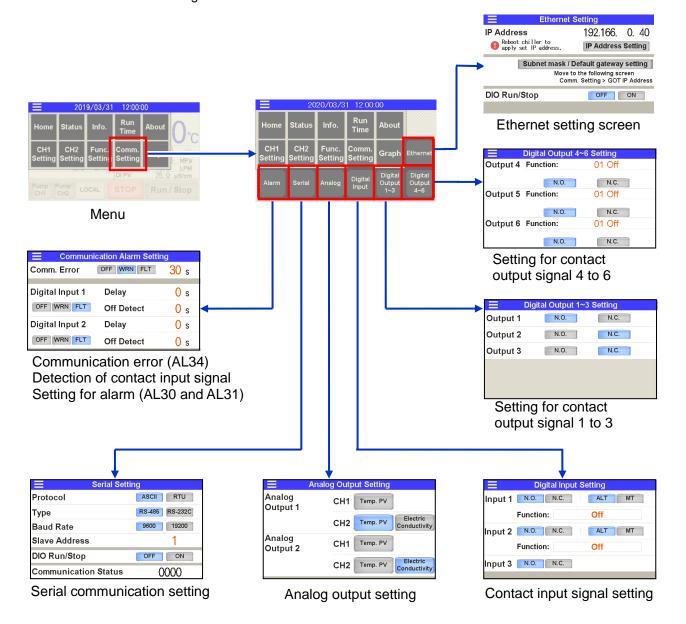
No.	Indication	Item	Explanation		
(1)	All Setting Reset	Data reset	RESET	Set values are reset to default settings.	

[·]Data reset

5.4.10 Communication setting screen

A screen for shifting to the following setting screens is displayed if [setting] button on the menu is pressed.

- Setting screen for communication error (AL34) and contact input signal detection alarm (AL30 and AL31)
- Setting screen for serial communication
- Setting screen for analog output
- Setting screen for contact input signal form
- Setting screen for contact output signal 1 to 3
- Setting screen for contact output signal 4 to 6
- Setting screen for Ethernet communication



•Setting for communication error (AL34)/contact input signal detection (AL30 and AL31)

- **1.** Set communication error (AL34) and contact input signal detection.
 - Communication error (AL34)

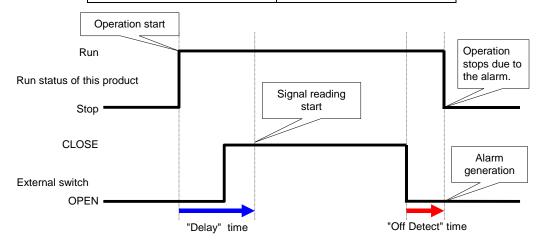
 The alarm "AL34: communication error" is activated if no request message from the host computer arrives within the wait time during use of serial communication. Operation at the time of alarm and message waiting time can be set.
 - Detection of contact input signal (AL30 and AL31)

The product has two contact inputs available to detect the contact input signal. This allows reading and monitoring the contact signal from an external switch. If abnormality is detected in an external switch, this can activate an alarm. Options to select "Continuous monitoring" or "Monitoring during operation" are available. Also, the detection start time after the start of operation and the detection end time can be set.

- If the signal of "Contact input 1" is detected: the alarm "AL30: Detection of contact input 1 signal" is activated.
- If the signal of "Contact input 2" is detected: the alarm "AL31: Detection of contact input 2 signal" is activated.
- "Delay" time: sets the start time to detect the contact input signal after the start of operation.
- "Off detect" time: sets the time between the detection of the contact input OFF signal and the activation of the alarm.

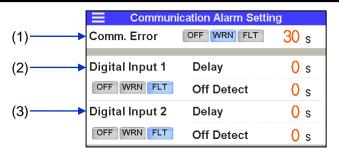
Table 5.4-23 Monitoring method for contact input signal

"Delay" time	Monitoring method
0sec	Continuous monitoring
1 to 300sec	Monitoring during operation



"Delay" time and "Off detect" time

This function is set to "Disabled" by default. Refer to "Setting of contact input signal form" (P.5–57) for details. Contact input signal can be used to perform the "Run/Stop" of the product. Refer to "Setting of contact input signal form" (P.5–57) for the setting method.



Communication error, detection of contact input signal and operation setting

Table 5.4-24 Communication error, detection of contact input signal and operation setting

No.	Indication	Item	Setting and selection		Setting range		
			OFF	Disabled			
(1)	(1) Comm. Error	Alarm "AL34: Communication error"	WRN *	Operation continues during the alarm	Waiting time	30 to 600sec *30sec	
			FLT	Operation stops during alarm			
			OFF	Disabled	Delay	0 to 300sec *0sec	
	(2) Digital Input 1	Alarm "AL30: Detection of contact input 1 signal"	WRN	Operation	-		
(2)				continues during the alarm	Off Detect	0 to 10sec *0sec	
			FLT *	Operation stops during alarm	On Detect		
			OFF	Disabled	Delay	0 to 300sec	
		Alarm "AL31: Detection of contact input 2 signal"		Operation	J	*0sec	
(3)	Digital Input 2		WRN	continues during the alarm		0 to10sec	
			FLT *	Operation stops during alarm	Off Detect *0sec		

^{*} By default

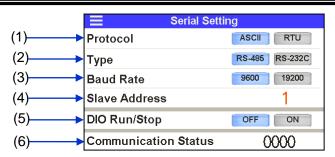
2. Set serial communication.

The following operations can be performed by the serial communication RS-232C/RS-485:

- To run/stop the product
- To change the set value of circulating fluid temperature
- To readout the circulating fluid temperature, pressure, flow rate and electrical conductivity (CH2)
- To readout the status of respective parts of the product (e.g., operation status and content of alarm)

This section describes the operation of the "Serial communication setting" screen. Refer to "Communication Function" of Operation Manual for details such as for communication messages.

[·]Serial communication setting



Serial communication setting

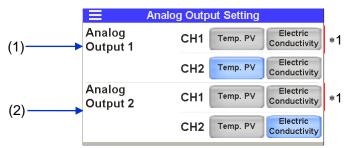
Table 5.4-25 Setting of serial communication

No.	Indication	Item	Setting, selection and display		
(1) Protocol		Communication format	ASCII *1	ASCII code	
(1)	1 1010001	Communication format	RTU	Binary data	
(2)	Turno	Standard	RS-485 *1	EIA RS-485	
(2)	Туре	Standard	RS-232C	EIA RS-232C	
(2)	Doud Data	Communication and	9600	9600 bps	
(3)	Baud Rate	Communication speed	19200 *1	19200 bps	
(4)	Slave Address	Slave address	1 to 32 1 *1	Select from 1 to 32	
(5)	DIO Run/Stop *2	"Run/stop" by contact input	OFF *1	Disabled	
(3)	DIO Run/Stop *2	Transcop by contact input	ON	Enabled	
(6)	Communication Status	Communication status	0000	Displays the communication status	

^{*1} By default

^{*2 &}quot;Run/stop" operation of the product is carried out by the contact input signal, and by reading/writing the "Change in set value of circulating fluid temperature" and "Operation status" by serial communication.

- Setting of analog output signal
 - **3.** The product has two analog outputs. The following signals can be output as analog signals:
 - Analog output signal 1— "CH1 circulating fluid temperature" or "Electric conductivity
 *1", "CH2 circulating fluid temperature" or "Electric conductivity".
 - Analog output signal 2— "CH1 circulating fluid temperature" or "Electric conductivity *1", "CH2 circulating fluid temperature" or "Electric conductivity".



Setting of analog output signal

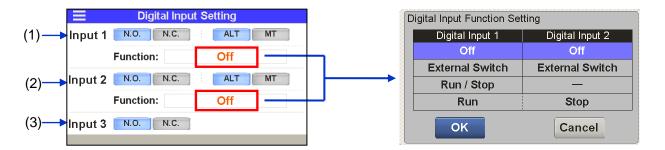
*1 In the case of option D1 "CH1 with electrical conductivity control", it can be set.

Table 5.4-26 Setting of analog output signal

No.	Indication	Item		ction and display	Output
			CH1 Temp. PV	CH1 circulating fluid temperature	0°C-100°C: 0-10 V
(1)	Analog	Angles output gissel 1	CH1 Electric *2	CH1 electric conductivity	0.1-50.0 μ S/cm: 0.02-10.0 V
	Output 1	Analog output signal 1	CH2 Temp. PV *1	CH2 circulating fluid temperature	0°C-100°C: 0-10 V
			CH2 Electric Conductivity	CH2 electric conductivity	0.1-50.0 μ S/cm: 0.02-10.0 V
		Analog output signal 2 –	CH1 Temp. PV	CH1 circulating fluid temperature	0°C-100°C: 0-10 V
(2)	Analog		CH1 Electric *2 Conductivity	CH1 electric conductivity	0.1-50.0 μ S/cm: 0.02-10.0 V
(2)	Output 2		CH2 Temp. PV	CH2 circulating fluid temperature	0°C-100°C: 0-10 V
			CH2 Electric *1	CH2 electric conductivity	0.1-50.0 μ S/cm: 0.02-10.0 V

- *1: By default.
- *2: In the case of option D1 "CH1 with electrical conductivity control".
- Setting of contact input signal form
 - The type and form of contact input signal are set. Following items can be set for contact input signal 1 and 2:
 - Contact type···selects [N.O.] (A contact) or [N.C.] (B contact)
 - Signal form····selects [ALT] (alternate) or [MT] (momentary)
 - Signal type····selects "OFF" (disabled), "External switch" (external switch signal) or "Run/Stop" (run/stop) signal.

"Operation mode" can be switched from "Local mode/Serial mode" to "DIO mode" by inputting a contact signal in contact input 3. Refer to the "Communication Function" of Operation Manual for details.



Setting of contact input signal form

Table 5.4-27 Setting of contact input signal form

No.	Indication	Item	J	Setting	and selection
			Contact	N.O. *1	A contact (normally open)
			type	N.C.	B contact (normally closed)
(1)	Input 1	Contact input	Signal	ALT *1	Alternate
(1)	input i	signal 1	form	MT	Momentary
				[Off]	Disabled
			Signal	[External Switch]	External switch signal
			type	[Run/Stop] *1	Run/stop signal
				[Run] *2	Run signal
	Input 2	Contact input signal 2	Contact type	N.O. *1	A contact (normally open)
				N.C.	B contact (normally closed)
(2)			Signal form	ALT *1	Alternate
	,			MT	Momentary
			0:	[Off]	Disabled
			Signal	[External Switch] *1	External switch signal
			type	[Stop] *2	Stop signal
(2)	Input 3	Contact input signal 3 *3	Contact	N.O. *1	A contact (normally open)
(3)			type	N.C.	B contact (normally closed)

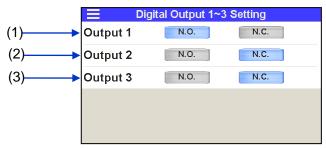
^{*1 :} By default.

^{*2 :} This setting assigns "Run" signal to "Contact input 1" and "Stop" signal to "Contact input 2".

^{*3:} The signal form of contact input 3 is "Momentary".

- Setting of contact output signal 1 to 3
 - **5.** Set contact output signal 1 to 3. Contact output signal is continuously output.

 The signal type of contact output signal 1 to 3 is fixed. Contact output signal 4 to 6 can be used to change the signal type. The contact type of the following contact output signals can be set:
 - · Contact output signal 1 "Operation status" selects "N.O." (A contact) or "N.C." (B contact).
 - · Contact output signal 2 "FLT alarm" ————selects "N.O." (A contact) or "N.C." (B contact).
 - · Contact output signal 3 "WRN alarm" ———selects "N.O." (A contact) or "N.C." (B contact).



Setting of contact output signal 1 to 3

Table 5.4-28 Setting of contact output signal 1 to 3

No.	Indication	Item		Setting and selection	
(1)	Output 1	Contact output	Operation status	N.O. *	A contact (normally open)
(1)	(1) Output 1	signal 1	signal	N.C.	B contact (normally closed)
(2)	(2) Output 2	Contact output signal 2	Operation stop (FLT) alarm status signal	N.O.	A contact (normally open)
(2)	Output 2			N.C. *	B contact (normally closed)
(2)	(Contact output		Continuous	N.O.	A contact (normally open)
(3)	Output 3	signal 3	operation "WRN" alarm status signal	N.C. *	B contact (normally closed)

^{*} By default

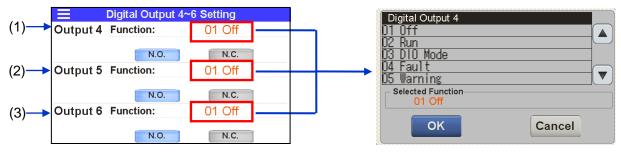
Set contact output signal 4 to 6. Contact output signal is continuously output.

A "Signal type" for contact output signal 4 to 6 can be selected by the customer. Refer to "5.4-30 Signal type for contact output signals 4 to 6."

Select the "Contact type" and "Signal type" for contact output signals 4 to 6.

- Contact output signal 4—selects "Signal type" and "N.O." (A contact) or "N.C." (B contact).
- Contact output signal 5—selects "Signal type" and "N.O." (A contact) or "N.C." (B contact).
- Contact output signal 6—selects "Signal type" and "N.O." (A contact) or "N.C." (B contact).

[·]Setting of contact output signal 4 to 6



Setting of contact output signal 4 to 6

Selection of signal type

Table 5.4-29 Setting of contact output signal 4 to 6

No.	Indication	Item	Signal type		Contact type
Output 4	Contact output		N.O. *	A contact (normally open)	
(1)	Function	signal 4		N.C.	B contact (normally closed)
(2)	(2) Output 5 Contact output signal 5	Select from "Table 5.4-29 Signal type for	N.O. *	A contact (normally open)	
(2)		signal 5	contact output signal 4 to 6" * [OFF]	N.C.	B contact (normally closed)
(2)	Output 6	Contact output		N.O. *	A contact (normally open)
(.3)	Function	signal 6		N.C.	B contact (normally closed)

^{*}By default

5.4 Description of the Screen HRL Series

Table 5.4-30 Signal type for contact output signal 4 to 6

	Table 5.4-30 Signal type for contact output signal 4 to 6				
No.	Indication	Item	Contact type	Explanation	
1	Off	Disableing	N.O.	Normally open	
		9	N.C.	Normally open	
2	Run	Operation status signal	N.O.	Operation : closed	
	Z Null	operation status signal	N.C.	Stop : closed	
3	DIO Mode	DIO mode signal	N.O.	DIO mode : closed	
		Die mede eigna	N.C.	DIO mode : open	
4	Fault	Operation stop "FLT" alarm	N.O.	the time of alarm : closed	
	- Cont	status signal	N.C.	the time of alarm : open	
5	Warning	Continuing operation "WRN"	N.O.	the time of alarm : closed	
		alarm status signal	N.C.	the time of alarm : open	
6	Alarm	alarm status signal	N.O.	the time of alarm : closed	
	7 Hairii	didini otatao oigilai	N.C.	the time of alarm : open	
7	Maintenance	maintenance reminder	N.O.	Maintenance reminders occurred : closed	
,	Walliterlance	status signal	N.C.	Maintenance reminders occurred : open	
8	CH1 TEMP READY	CH1 TEMP READY signal	N.O.	TEMP READY status : closed	
0	CHI TEMP READT	CHI TEMP READT SIGNAL	N.C.	TEMP READY status : open	
9	CH2 TEMP READY	CH2 TEMP READY signal	N.O.	TEMP READY status : closed	
9	CHZ TEWF KEADT	CHZ TEIVIF NEADT SIGNAL	N.C.	TEMP READY status : open	
10	TEMP OUT	TEMP OUT signal	N.O.	TEMP READY status : closed	
10	TEINIF OOT	TEMP OUT SIGNAL	N.C.	TEMP READY status : open	
11	EXTERNAL TEMP	None	-	_	
12	START UP	Startup setting	N.O.	Enabled : closed	
12	START OF	status signal	N.C.	Enabled : open	
13	ANTI-FREEZING	Anti-freezing setting	N.O.	Enabled : closed	
13	ANTIFI NELZING	status signal	N.C.	Enabled : open	
14	WARMING UP	Warming up setting	N.O.	Enabled : closed	
14	WARWING UP	status signal	N.C.	Enabled : open	
15	Digital Input 1	Pass through signal of the	N.O.	Output the input signal as it is	
15	Digital Input 1	contact input signal 1	N.C.	Reverse output of the input signal	
16	Digital Input 2	Pass through signal of the	N.O.	Output the input signal as it is	
10	Digital Input 2	contact input signal 2	N.C.	Reverse output of the input signal	
17	Mode Request Input	Mode request input signal(DIO) (Pass through signal of the	N.O.	Output the input signal as it is	
_ ' '	moue nequest input	contact input signal 3)	N.C.	Reverse output of the input signal	
		Colooted alarm status sissal	N.O.	Selected alarm occurrence : closed	
18	Select Alarm	Selected alarm status signal	N.C.	Selected alarm occurrence : open	
		Refer to "Table 5.4-31 List of alarm selection" for		selectable alarms.	
			N.O.	Selected maintenance	
		Maintenance reminders	N.U.	reminders occurred : closed	
19	Select Maintenance	status signal	N.C.	Selected maintenance reminders occurred : open	
		About selectable maintenance rer	minders	·	
		Refer to "Table 5.4-32 List of maintenance reminders".			

Table 5.4-31 List of alarm selection

		-31 List of alarm selection
Alarm No.	Indication	Explanation
AL01	CH1 Low Level FLT	CH1 abnormal low tank fluid level
AL02	CH1 Low Level WRN	CH1 low tank fluid level
AL03	CH2 Low Level FLT	CH2 abnormal low tank fluid level
AL04	CH2 Low Level WRN	CH2 low tank fluid level
AL06 *1	Fan Inverter	Fan failure
AL07 *2	Internal Cooling Fan	Air exhaust fan failure.
AL09	CH1 High Temp. FLT	CH1 abnormal rise of circulating fluid temperature
AL10	CH1 High Temp.	CH1 circulating fluid temperature rise
AL11	CH1 Low Temp.	CH1 circulating fluid temperature drop
AL12	CH1 TEMP READY Alarm	CH1 TEMP READY alarm
AL13	CH2 High Temp. FLT	CH2 abnormal rise in circulating fluid temperature
AL14	CH2 High Temp.	CH2 circulating fluid temperature rise
AL15	CH2 Low Temp.	CH2 circulating fluid temperature drop
AL16	CH2 TEMP READY Alarm	CH2 TEMP READY alarm
AL17	CH1 HX In High Temp. FLT	CH1 abnormal rise in heat exchanger inlet temperature
AL18	CH1 Press. Sensor	CH1 failure of circulating fluid discharge pressure sensor
AL19	CH1 High Press.	CH1 circulating fluid discharge pressure rise
AL20	CH1 Low Press.	CH1 circulating fluid discharge pressure drop
AL21	CH2 Press. Sensor	CH2 failure of circulating fluid discharge pressure sensor
AL22	CH2 High Press. Error	CH2 abnormal rise in circulating fluid discharge pressure
AL23	CH2 High Press.	CH2 circulating fluid discharge pressure rise
AL24	CH2 Low Press.	CH2 circulating fluid discharge pressure drop
AL25	CH2 Low Press. Error	CH2 abnormal drop in circulating fluid discharge pressure
AL26	CH2 Flow Sensor	CH2 failure of circulating fluid discharge flow sensor
AL27	CH2 High Electric Conductivity	CH2 electric conductivity increase
AL28	CH1 High Electric Conductivity	CH1 electric conductivity increase(Option D1 only)
AL30	Digital Input 1	Contact input 1 signal detection
AL31	Digital Input 2	Contact input 2 signal detection
AL33	CH2 Low Flow FLT	CH2 abnormal circulating fluid low flow
AL34	Communication	Communication error
AL35	Ambient Temp.	Outside of the ambient temperature range
AL36	Maintenance	Maintenance alarm
AL37	Refrigeration Circuit	Compressor circuit failure
AL38	Sensor	Sensor failure
AL39	Controller	Controller failure
AL40	Compressor Inverter	Compressor inverter error
AL41	Compressor Inverter Comm.	Compressor inverter communication error
AL42	CH1 Pump Inverter	CH1 pump inverter error
AL43	CH1 Pump Inverter Comm.	CH1 pump inverter communication error
AL44	CH2 Pump Inverter	CH2 pump inverter error
AL45	CH2 Pump Inverter Comm.	CH2 pump inverter communication error

Refer to Chapter 7 Alarm Notifications and Troubleshooting.

^{*1} Water-cooled type model does not generate this alarm.

^{*2} Air-cooled type model does not generate this alarm.

Table 5.4-32 List of maintenance reminders *1

Maintenance No.	Indication	Explanation		
MT01	CH1 Pump	CH1 pump maintenance		
MT02	Compressor	Compressor maintenance		
MT03 *4	Fan	Fan maintenance		
MT04 *4	Dustproof Filter	Dust-proof filter maintenance		
MT05	CH2 DI Filter	CH2 DI filter maintenance		
MT06	CH2 Pump	CH2 pump maintenance		
MT07	Low Battery	Battery maintenance		
MT08	CH1 Pressure Sensor	Maintenance for CH1 circulating fluid		
		discharge pressure sensor		
MT09	CH2 Pressure Sensor	Maintenance for CH2 circulating fluid		
		discharge pressure sensor		
MT10	CH2 Flow Sensor	Maintenance for CH2 circulating fluid		
		flow sensor		
MT11 *2	CH1 DI Filter	CH1 DI filter maintenance (Option D1 only)		
MT12 *3	CH2 Mechanical Seal	CH2 Mechanical Seal maintenance		

^{* 1} Refer to "5.4.5 Check operation time screen and maintenance reminder" for "Maintenance reminder".

^{*2} In the case of option D1 "CH1 with electrical conductivity control", to display.

^{*3} In the case of option T3 "CH2 High Pressure Pump Mounted", to display.

^{*4} In the case of air-cooled type, to display.

Ethernet Modbus / TCP communication settings

7. Set the Ethernet.

The following operations can be performed by the Ethernet Modbus/TCP communication:

- To run/stop the product
- To change the set value of circulating fluid temperature
- To readout the circulating fluid temperature, pressure, flow rate and electrical conductivity (CH2)
- To readout the status of respective parts of the product (e.g., operation status and content of alarm)
- To readout the model and serial number of the product.

This section describes the operation of the Ethernet Modbus/TCP communication" screen. Refer to "Communication Function" of Operation Manual for details.



Ethernet communication setting screen

Indication Item Setting, selection and display No. IP Address (1) IP Address 192.166.0.40 *1 (Current values) (2)IP Address Setting IP Address Setting IP Address Setting Subnet Subnet mask/Default Subnet mask / Default gateway setting (3)mask/Default gateway setting gateway setting OFF Disabled "Run / Stop" by

ON

Table 5.4-33 Setting of ethernet communication

DIO Run/Stop *2

(4)

contact input

Table 5.4-34 Ethernet Modbus/TCP communication parameters

Item	Setting range	Initial value	
IP Address	0.0.0.0~223.255.255.255	192.166.0.40	
Sub-net mask	0.0.0.0~255.255.255.255	255.255.255.0	
Default gateway *1	0.0.0.0~255.255.255.255	0.0.0.0	

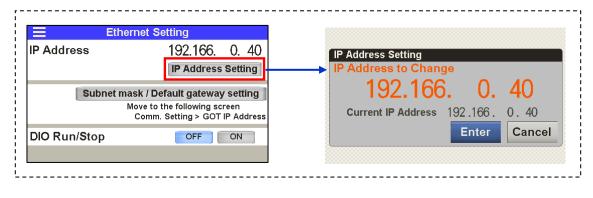
^{*1} If you do not want to use the default gateway, set it to 0.0.0.0.

Enabled

^{*1} By default.

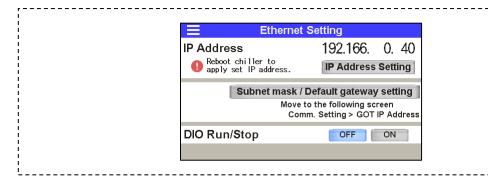
^{*2 &}quot;Run/stop" operation of the product is carried out by the contact input signal, and by reading/writing the "Change in set value of circulating fluid temperature" and "Operation status" by Ethernet Modbus/TCP communication.

5.4.11 How to set the IP address



When you press the IP Address Setting , it will open the settings window.

Change the IP address and press Enter to change it.



IP address does not change until you restart the chiller.

After changing the IP address, turn off the power and restart.

The subnet mask and default gateway settings cannot be changed during operation."

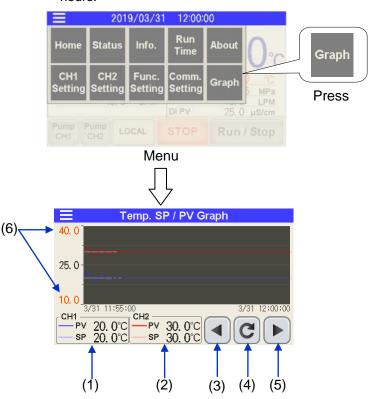
Refer to the communication specifications for how to set the subnet mask and default gateway.

5.4.12 Temperature waveform screen

Press [Graph] button on the menu to display "Temperature waveform" screen.

The "Temperature waveform" screen has following functions:

- Displays "CH1 circulating fluid temperature waveform". The sampling cycles are 1 sec. each.
- Displays "CH2 circulating fluid temperature waveform". The sampling cycles are 1 sec. each.
- "Temperature waveform" can be displayed up to approximately last 9 hours.



Temperature waveform screen

5.4 Description of the Screen HRL Series

Table 5.4-35 Temperature waveform screen

No.	. Item		Function	Explanation	
(1) CH1	CUI	PV	CH1 circulating fluid temperature	Displays the current circulating fluid temperature of CH1.	
	SP	CH1 set circulating fluid temperature	Displays the set circulating fluid temperature of CH1.		
(2)	(2) CH2	PV CH2 circulating fluid temperature		Displays the current circulating fluid temperature of CH2.	
(2)		SP	CH2 set circulating fluid temperature	Displays the set circulating fluid temperature of CH2.	
(3)	(3) Button		Time scroll	Press the button to shift the time axis to the past. This can be displayed up to approximately the last 9 hours.	
(4)	(4) Button		Update of temperature waveform	Press "Time scroll" button to stop updating the temperature waveform. Press this button to update the temperature waveform. * Collection of temperature data can continue even while the update of temperature waveform is stopped, by pressing "Time scroll" button.	
(5)	5) Button		Time scroll	Press this button to shift the time axis forward.	
(6)				A value can be entered to change the temperature range for temperature waveform.	

5.4 Description of the Screen HRL Series

Chapter 6 Option

6.1 Option-T2 [CH2 High-Pressure Pump Mounted]

Possible to choose a high-pressure pump in accordance with user's piping resistance. Total cooling capacity of CH1 and CH2 will decrease by heat generated in the pump.

Applicable Model			HRL***-A/W*-40-T2		
			CH1	CH2	
	Rated flow rate (Outlet)	L/min	Same as standard product	20 (0.45MPa)	
Pump	Maximum flow rate	L/min	Same as standard product	30	
	Maximum lifting height	m	Same as standard product	Same as standard product	
Minimum operating flow rate		L/min	Same as standard product	5	
Tank capacity		L	Same as standard product	Same as standard product	
Cooling capacity*1		W	It differs from the standard cooling capacity. Please refer to the Fig. 9-11 to Fig. 9-14 for the details.		

^{*1} Cooling capacity will decrease as pump power increases.

^{*2} When the option-T2 is selected, the weight increases by 1 kg .

^{*3} No change in external dimensions.

6.2 Option-T3 [CH2 High-Pressure Pump Mounted]

* Applicable only to HRL300-A*-40.

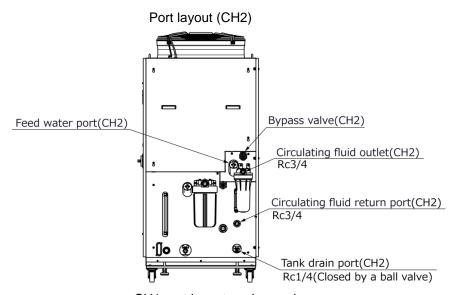
Possible to choose a high-pressure pump in accordance with user's piping resistance. Total cooling capacity of CH1 and CH2 will decrease by heat generated in the pump.

- The CH2 pump used for option T3 uses a mechanical seal.
- We will inform you of the inspection time in the maintenance notice. Please contact to service center to ask for maintenance of the pump and mechanical seal.

Applicable Model			HRL300-A*-40-T3		
			CH1	CH2	
Pump	Rated flow rate (Outlet)	L/min	Same as standard product	38 (0.45MPa)	
	Maximum flow rate	L/min	Same as standard product	60	
	Maximum lifting height	m	Same as standard product	Same as standard product	
Minimum operating flow rate		L/min	Same as standard product	10	
Tank capacity		L	Same as standard product	12	
Cooling capacity*1		W	It differs from the standard cooling capacity. Please refer to the Fig. 9-15, Fig. 9-16 for the details.		

		_	_	Standard	N *2	□ *2
Port size				Staridard		<u>'</u>
	CH1	Circulating fluid outlet port	Chiller side	1" union		
			Filter side	Rc1	NPT1	G1
		Circulating fluid return port		Rc1	NPT1	G1
		Tank drain port		Rc3/4	NPT3/4	G3/4
	CH2	Circulating fluid outlet port	Chiller side	3/4" union		
			Filter side	Rc3/4	NPT3/4	G3/4
		Circulating fluid return port		Rc3/4	NPT3/4	G3/4
		Tank drain port		Rc1/4	NPT1/4	G1/4

- *1 Cooling capacity will decrease as pump power increases.
- *2 When the piping thread type "F (G thread)" or "N (NPT thread)" is selected, it becomes "G thread " or "NPT thread ".
- *3 When the option-T3 is selected, the weight increases by 18 kg.
- *4 No change in external dimensions.



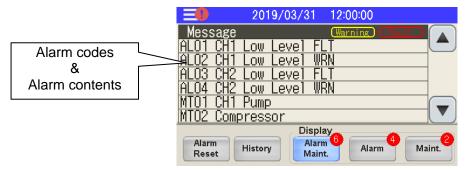
*CH1 port layout unchanged.

Chapter 7 Alarm Notifications and Troubleshooting

7.1 Alarm Notification

The product makes notifications in the order shown below when any alarm is generated.

- The screen automatically moves to the "Information" screen and displays alarm codes and alarm contents.
 (Refer to "5.4.4 Information screen" for the operation method of "Information" screen.)
- Contact signal of the contact input/output communication is output.
- It is possible to read the alarm status using serial communication.
 Refer to the Operation Manual Communication Function for more details.



Information screen

7.2 Operation of this product when an alarm occurs

When an alarm occurs, this product operates in two ways depending on the content of the alarm.

- Operation continuation alarm: When an alarm occurs, this product continues to operate. The alarm content will display "WRN".
- Operation stop alarm: When an alarm occurs, this product stops.
 The alarm content will display "FLT".

There is an alarm content that allows you to select the action when an alarm occurs. There are also alarm contents that can disable (turn off) the alarm function. Refer to "Table 7.3-1 and 7.3-2 Alarm codes and troubleshooting".

HRL Series 7.1 Alarm Notification

7.3 Troubleshooting

7.3.1 Alarm contents, causes, and troubleshooting

Troubleshooting method varies depending on which alarm has been generated. Refer to "Table 7.3-1 and 7.3-2 Alarm codes and troubleshooting".

Instructions to reset the alarms after eliminating the causes of the alarms explained below.

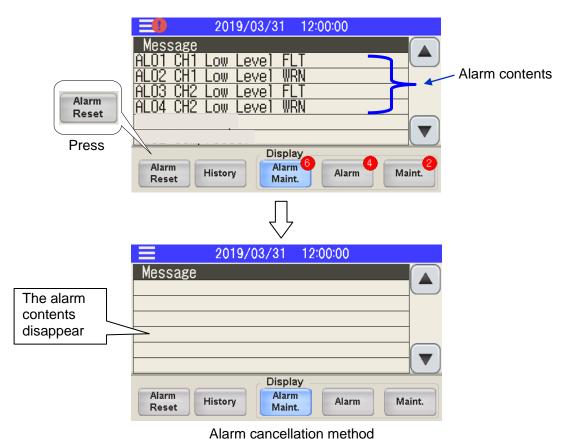
 Check the alarm contents displayed on the "Information" screen and remove the cause. Alarms can not be canceled except this screen

The alarm can be reset by serial communication.

Refer to the Operation Manual Communication Function for more details.

- [Alarm Reset]Press the button
- The alarm is reset.

Confirm that the alarm content on the "Information" screen has disappeared. The alarm signal of contact output and serial communication turns off.



Alaim cancellation method

7.3 Troubleshooting HRL Series

Table 7.3-1 Alarm codes and troubleshooting (1/2)

	Table 7.3-1		odes and trouble	
Alarm	Alarm content		Default setting	Cause/Countermeasure
code	Sub code	Operation	Threshold	(Please reset the alarm after eliminating the cause.)
AL01	CH1 Low Level FLT	FLT	-	The circulating fluid level of CH1 has decreased.
AL02	CH1 Low Level WRN	WRN	_	Refilling circulating fluid.
AL03	CH2 Low Level FLT	FLT	_	The circulating fluid level of CH2 has decreased.
AL04	CH2 Low Level WRN	WRN	_	Refilling circulating fluid.
AL06 *5	Fan Inverter	FLT	_	Check that there is no abnormality with the power supply system (e.g. ground fault, short-circuit, voltage fluctuation, abnormal interphase voltage, open phase, surge).
AL07 *6	Internal Cooling Fan	WRN	-	Air exhaust fan failure. Ask for service for the air exhaust
		<u> </u>		• Check that the ambient temperature,
AL10	CH1 Hgih Temp. FLT CH1 Hgih Temp.	FLT OFF *1	55°C 45°C *3	and heat load satisfy the specifications, and that the circulating fluid flow rate is more than the minimum flow rate.
				Please review the setting value. Charlet the effect of each instance and the control of th
AL11	CH1 Low Temp.	OFF *1	5°C *3	Check the effect of ambient temperature. Please review the setting value.
AL12	CH1 TEMP READY ALARM	OFF *1	+1/-1°C *3	 There may be causes such as large load fluctuation and flow rate fluctuation. Please review the setting value.
AL13	CH2 High Temp. FLT	FLT	50°C	 Check that the ambient temperature, and heat load satisfy the specifications, and that the circulating fluid flow rate is more
AL14	CH2 High Temp.	OFF *1	45°C *3	than the minimum flow rate. •Please review the setting value.
AL15	CH2 Low Temp.	OFF *1	5°C *3	•Check the effect of ambient temperature. •Please review the setting value.
AL16	CH2 TEMP READY ALARM	OFF *1	+1/-1°C *3	•There may be causes such as large load fluctuation and flow rate fluctuation. •Please review the setting value.
AL17	CH1 HX In High Temp. FLT	FLT	60°C	Check that the circulating fluid flow rate is more than the minimum flow rate. Check that the heat load is within the specified range.
AL18	CH1 Press. Sensor	FLT *1	-	Short-circuit or broken wire of the pressure sensor.Ask for the service.
AL19	CH1 High Press.	FLT *1	0.50MPa *3	Check that there is no bending, collapse, or clogging with the external piping. Check that there is no clogging of the particle filter.
AL20	CH1 Low Press.	FLT *1	0.03MPa *3	Restart the thermo-chiller and check if the pump runs.
AL21	CH2 Press. Sensor	FLT *1	_	Short-circuit or broken wire of the pressure sensor. Ask for the service.
AL22	CH2 High Press. Error	FLT	0.50MPa	Check that there is no bending, collapse,
AL23	CH2 High Press.	FLT *1	0.50MPa *3	or clogging with the external piping. Check that there is no clogging of the particle filter.
AL24	CH2 Low Press.	FLT *1	0.03MPa *3	Restart the thermo-chiller and check if the pump runs.
AL25	CH2 Low Press. Error	FLT	0.03MPa	(Check the flow rate display value.)
AL26	CH2 Flow Sensor	FLT *1	_	Short-circuit or broken wire of the flow rate sensor. Ask for the service.
AL27	CH2 High Electric conductivity	WRN *2	45.0µS/cm *3	Replace CH2 DI filter.
AL28 *4	CH1 High Electric conductivity	WRN *2	45.0µS/cm *3	Replace CH1 DI filter.
AL30	Digital input 1	FLT *1	-	Contact input has been detected.
AL31	Digital input 2	FLT *1	_	•
AL33	CH2 Low Flow FLT	FLT		Display flow rate: Threshold or less. Check the piping is thin, closing of external valve, collapse of piping, clogging of filter.
AL34	Communication	WRN *1	-	No request message from the host computer. Try to send the request message again.
AL35	Ambient Temp.	OFF *2	2°C/45°C	Check the environment.

HRL Series 7.3 Troubleshooting

Table 7.3-2 Alarm codes and troubleshooting (2/2)

Alarm content			eshooting (2/2) Cause/Countermeasure
		fault setting	
	Operation	Inresnoid	(Please reset the alarm after eliminating the cause.)
	_		
·		· · · · · · · · · · · · · · · · · · ·	
•		·	
		30,000h	
	_	500h *3	
	_	500h *3	
6 CH2 Pump maintenance	055 0	20,000h	"Maintenance reminder" occurred.
7 Battery maintenance	OFF *2		Please maintain the corresponding part.
			,
* '		Abnormal	
		occurrence	
	+ +		
I I		500h *3	
<u> </u>	-		
			Refrigerant circuit failed.
		0°C	·Check that the ambient temperature,
• • •	- FIT -		heat load satisfy the specifications.
<u> </u>	· - ·		Check that the circulating fluid flow rate
			is more than the minimum flow rate.
	 		•Ask for the service.
	 	_	
12 Compressor discharge temp. rise		_	
Sensor		_	
1 CH1 Circulating fluid temp. sensor		_	
2 CH1 Heat exchanger inlet temp. sensor		_	
3 Compressor discharge temp. sensor		_	
4 Compressor intake temp. sensor		_	
5 CH2 Heat exchanger outlet temp. sensor		_	Short-circuit or broken wire of the sensor.
6 Ambient temp. sensor	T FLI [_	Ask for the service.
9 Refrigeration circuit high press. sensor		_	
10 Refrigeration circuit low press. sensor		_	
12 CH2 DI sensor		_	
13 CH2 Circulating fluid temp. sensor		_	
15 CH1 DI sensor *4	1	_	
Controller		_	
1 EEPROM error	1	_	
	┪ ┝	_	Controller failed.
3 FRAM error	FLT	_	Shut off the power to this product and restart it.
	1	_	If it does not return to normal, ask for service.
`	1	_	
, , , , , , , , , , , , , , , , , , ,	FLT	_	
•			Check that there is no abnormality with
CH1 Pump Inverter	FLT	_	the power supply system (e.g. ground fault,
o amp involvoi			
CH1 Pump Inverter Comm	FIT	_	short-circuit, voltage fluctuation, abnormal
CH1 Pump Inverter Comm. CH2 Pump Inverter	FLT FLT	<u> </u>	short-circuit, voltage fluctuation, abnormal interphase voltage, open phase, surge).
	8 Maintenance of CH1 circulating fluid discharge pressure sensor 9 Maintenance of CH2 circulating fluid discharge pressure sensor 10 Maintenance of CH2 circulating fluid discharge pressure sensor 10 Maintenance of CH2 circulating fluid flow sensor 11 CH1 DI filter maintenance *4 Refrigeration Circuit 1 High compressor intake temp. 2 Low compressor intake temp. 3 Super heat temp. 5 Refrigeration circuit high press. rise 6 Refrigeration circuit low press. drop 8 Refrigeration circuit low press. drop 9 Refrigeration circuit low press. rise 11 Compressor running failure 12 Compressor discharge temp. rise Sensor 1 CH1 Circulating fluid temp. sensor 2 CH1 Heat exchanger inlet temp. sensor 3 Compressor discharge temp. sensor 4 Compressor intake temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 6 Ambient temp. sensor 9 Refrigeration circuit high press. sensor 10 Refrigeration circuit low press. sensor 10 Refrigeration circuit low press. sensor 12 CH2 DI sensor 13 CH2 Circulating fluid temp. sensor 15 CH1 DI sensor *4 Controller 1 EEPROM error 2 Internal communication error	Maintenance 1 CH1 Pump maintenance 2 Compressor maintenance 3 Fan maintenance *6 4 Dust-proof filter maintenance *6 5 CH2 DI filter maintenance *6 6 CH2 Pump maintenance 7 Battery maintenance 8 Maintenance of CH1 circulating fluid discharge pressure sensor 9 Maintenance of CH2 circulating fluid discharge pressure sensor 10 Maintenance of CH2 circulating fluid discharge pressure sensor 11 CH1 DI filter maintenance *4 Refrigeration Circuit 1 High compressor intake temp. 2 Low compressor intake temp. 3 Super heat temp. 5 Refrigeration circuit high press. rise 6 Refrigeration circuit low press. drop 9 Refrigeration circuit low press. drop 9 Refrigeration circuit low press. rise 11 Compressor running failure 12 Compressor discharge temp. rise Sensor 1 CH1 Circulating fluid temp. sensor 2 CH1 Heat exchanger inlet temp. sensor 3 Compressor discharge temp. sensor 4 Compressor intake temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 10 Refrigeration circuit high press. sensor 10 Refrigeration circuit high press. sensor 11 CH2 DI sensor 13 CH2 Circulating fluid temp. sensor 15 CH1 DI sensor 14 CH2 DI sensor 15 CH1 DI sensor 15 CH1 DI sensor 16 Ambient temp. sensor 17 CH2 DI sensor 17 CH2 DI sensor 18 CH2 Circulating fluid temp. sensor 19 Refrigeration circuit high press. sensor 10 Refrigeration circuit high press. sensor 10 Refrigeration circuit high press. sensor 10 Refrigeration circuit high press. sensor 11 CH2 DI sensor 12 CH2 DI sensor 13 CH2 Circulating fluid temp. sensor 15 CH1 DI sensor *4 Controller 1 EEPROM error 2 Internal communication error 3 FRAM error 5 Ref. memory error 6 Cir. memory error 7 Compressor Inverter 7 FLT	Maintenance 1 CH1 Pump maintenance 2 Compressor maintenance 3 Fan maintenance *6 4 Dust-proof filter maintenance *6 5 CH2 Diffilter maintenance *6 6 CH2 Pump maintenance 7 Battery maintenance 8 Maintenance of CH1 circulating fluid discharge pressure sensor 10 Maintenance of CH2 circulating fluid discharge pressure sensor 11 CH1 DI filter maintenance *4 Refrigeration Circuit 1 High compressor intake temp. 2 Low compressor intake temp. 3 Super heat temp. 5 Refrigeration circuit high press. rise 6 Refrigeration circuit low press. rise 11 Compressor unning failure 12 Compressor discharge temp. sensor 1 CH1 Circulating fluid temp. sensor 4 Compressor intake temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 10 Refrigeration circuit high press. sensor 11 CH1 Circulating fluid temp. sensor 4 Compressor discharge temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 10 Refrigeration circuit high press. sensor 11 CH1 Circulating fluid temp. sensor 4 Compressor intake temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 10 Refrigeration circuit high press. sensor 11 CH1 Circulating fluid temp. sensor 4 Compressor intake temp. sensor 5 CH2 Heat exchanger outlet temp. sensor 5 CH2 DI sensor 13 CH2 Circulating fluid temp. sensor 10 Refrigeration circuit high press. sensor 11 CH1 DI sensor *4 Controller 1 EEPROM error 2 Internal communication error 3 FRAM error 5 Ref. memory error 6 Cir. memory error 6 Cir. memory error 7 Compressor lineter

- *1 : Select from "OFF" / "WRN" / "FLT"
- *2 : Select from "OFF" / "WRN"
- *3: The setting value can be changed.
 *4: Setting the electrical conductivity only when option 'D1' is selected on CH1.
- *5 :Only for water-cooled type.
- *6 :Only for air-cooled type.

7.3 Troubleshooting HRL Series

7.4 Other Errors

■ How to check other errors

Possible causes and countermeasures for failures with no alarm code display are shown in "Table7.4-1".

Table 7.4-1 Possible causes and countermeasures for failures without alarm code

Content of failure	Possible cause	Countermeasure	
	The breaker of the user's power supply or/and the optional breaker is/are not turned ON.	Turn ON the breaker.	
	Breaker of this product is broken	Replace the breaker.	
Touch panel displays nothing.	No power supply. (e.g. Breaker(s) in the power supplying route has not been turned ON.)	Supply the power.	
	The breaker for the user's facility or the optional breaker has tripped due to short-circuit or leakage of electricity.	Repair the short-circuited part or the electricity leaking part.	
	The DC power supply has failed.	Replace the DC power.	
The product does not operate after pressing the [Run/Stop] button.	Communication setting has been turned ON.	Check the setting of the operation mode.	

HRL Series 7.4 Other Errors

7.4 Other Errors HRL Series

Chapter 8 Control, Inspection and Cleaning

8.1 Quality Control of Circulating Fluid and Facility Water

▲ WARNING



Use specified fluids only. If other fluids are used, they may damage the product, causing fluid leakage, or result in hazards such as electric shock or leakage of electricity.

When using clear water (tap water), ensure that it satisfies the water quality criteria shown in the table below.

If the water quality standards are not met, clogging or leakage in the facility water piping, or other problems such as refrigerant leakage, etc., may result.

Table 8.1-1 Quality criteria for clean water (tap water)

	Table 6.1-1 Qualit		Criterion			
	ltem	Unit				
	itom	Onic	Circulating fluid	Facility water		
	pH (at 25 °C)	_	6.0 to 8.0	6.5 to 8.2		
	Electric conductance (at 25 °C)	[µS/cm]	100 to 300	100 to 800		
	Chloride ion	[mg/L]	50 or less	200 or less		
Standard	Sulphate ion	[mg/L]	50 or less	200 or less		
item	Acid consumption (at pH 4.8)	[mg/L]	50 or less	100 or less		
	Total hardness	[mg/L]	70 or less	200 or less		
	Calcium hardness	[mg/L]	50 or less	150 or less		
	Ionic silica	[mg/L]	30 or less	50 or less		
	Iron	[mg/L]	0.3 or less	1.0 or less		
	Copper	[mg/L]	0.1 or less	0.3 or less		
Referential	Sulfide ion	[mg/L]	Should not be	Should not be		
item	Sullide Ion	[IIIg/L]	detected any	detected any		
пеш	Ammonium ion	[mg/L]	0.1 or less	1.0 or less		
	Residual chlorine	[mg/L]	0.3 or less	0.3 or less		
	Free carbon dioxide	[mg/L]	4.0 or less	4.0 or less		

^{*} Quoted from the standard "JRA-GL-02-1994", The Japan Refrigeration and Air Conditioning Industry Association.

CAUTION



Replace the circulating fluid and/or the facility water if any problems are found during the regular check. Even if no problems are found, some of the water in the tank evaporates and impurity concentration in the circulating fluid increases. Replace the circulating fluid in the tank once every 3 months. Refer to the section "8.2 Inspection and Cleaning" for regular inspection.

8.2 Inspection and Cleaning

▲ WARNING



- Do not perform key operation or setting of this equipment with wet hands. Do not touch the electrical parts such as the power supply plug. It may cause an electric shock.
- Do not splash water directly on the product or do not wash with water. It might cause electric shock, fire, or etc.
- Do not touch the fins directly when cleaning the dust-proof filter. It may cause injury.

WARNING



- Shut off the power supply to this product before performing cleaning, maintenance or inspection, or it may cause electric shock, injury, burn, or etc.
- When the panel has been removed for the purpose of inspection or cleaning, mount the panel after the work is completed. If the product is operated with the panel removed or open, it may cause injury or electric shock.

8.2.1 Daily check

Check the items listed below. If any abnormality is found, stop the operation of the product and turn the power supply OFF, and ask for service.

Table 8.2-1 Daily check items

Iadie 8.2-1 Daily Check Items						
Item		Contents of check				
Installation condition	Check the installation condition of the product.	-Check that there is no heavy object on the product or excessive force appying to the pipingTemperature should be within the specification range of the productMake sure the ventilation grille is not obstructed. (For air-cooled type)				
Fluid leakage	Check piping connections.	Check that there is no fluid leakage from the connected parts of the piping.				
Amount of circulating fluid	Check the fluid level gauge.	Fluid level should be between "HIGH" and "LOW" levels of the fluid level gauge.				
Touch panel	Check the indications on the display.	The display on the screen is clear.				
Circulating fluid temperature	Check on the touch panel.	There should be no problem for operation.				
Circulating fluid discharge pressure	Check on the touch panel.	There should be no problem for operation.				
Circulating fluid flow rate	Check on the touch panel.	There should be no problem for operation. If flow rate has become smaller, check for any clogged of the particle filters.				
Operating condition	Check the operating condition of the product	-There should be no abnormality with noise, vibration, smell, or generation of smoke That the alarm has not occurred				
Facility water (for water-cooled type)	Check the facility water condition.	Check that the temperature, puressure and flow rate are within the specification ranges.				

8.2 Inspection and Cleaning HRL Series

8.2.2 Monthly check

Table 8.2-2	Contents of	monthly	/ check
-------------	-------------	---------	---------

Item	Contents of check					
Ventilating condition (air cooled type)	Clean the ventilating grilles.	Make sure the ventilating grilles are not clogged with dust, etc.				
Facility water	Check the facility	Make sure the facility water is clean and contains				
(water cooled type)	water.	no foreign matter.				

Cleaning of air ventilation port (For air-cooled type)

CAUTION



If the fins of the air-cooled condenser become clogged with dust or debris, heat radiation performance declines. This will result in the reduction of cooling performance, and may stop the operation because the safety device is triggered.

Clean the dust-proof filters with a long bristled brush or by air blow to prevent the fins from being deformed or damaged.

- Removal of the dust-proof filter (For air-cooled type)
 - 1. The dust-proof filters are installed on the front and left sides of the product.
 - **2.** They can be removed as shown in the drawing below.

 Care should be taken not to deform or scratch the air cooled condenser (fins) while removing the filters.

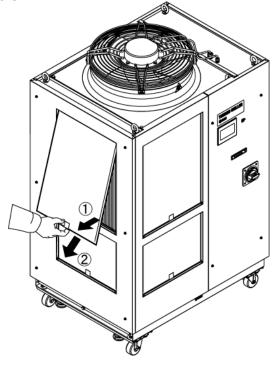
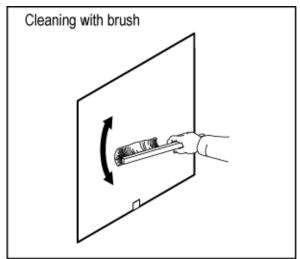


Fig. 8-1 Removal of the dust-proof filter

Cleaning of dust-proof filter

Clean the dust-proof filters with a long bristled brush or by air blow.



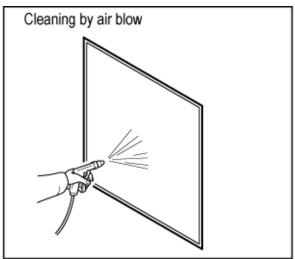


Fig. 8-2 Cleaning of the dust-proof filter

Mounting of dust-proof filters

Reassemble the filters in the reverse order to the removing procedure.

8.2.3 Inspection every 3 months

Table 8.2-3 Contents of every 3 months check

Item		Contents of check
Power supply	Check the power supply voltage.	Make sure the supply voltage is within the specification range.
Replace the circulating Circulating fluid (clean/tap water) periodically.		 Ensure that the fluid has not been contaminated and that there is no algae growth. Circulating fluid inside the tank must be clean and there must not be foreign matter inside. Use clean/tap water or pure water. The water quality must be within the range shown in Table 8.1-1 Quality criteria for clean water (tap water). * It is recommended to replace the circulating fluid every 3 months when periodic maintenance is performed.
Facility water (For water-cooled type)	Check the water quality	 Ensure that the water is clean and contains no foreign matter. Also check that the water has not been contaminated and there is no algae growth. The water quality must be within the range shown in Table 8.1-1 Quality criteria for clean water (tap water).

Replacement of circulating fluid

- Replace the circulating fluid with new clean fluid periodically, to prevent algae or decompose.
- Circulating fluid to be supplied in the tank should satisfy the water quality specified in "Table 8.1-1 Quality criteria for clean water (tap water)".
 - If the particle filter element is dirty, replace the element. (Refer to "8.4.1 Replacing Particle Filter".)

8.2 Inspection and Cleaning HRL Series

- Cleaning of the facility water system (For water-cooled type)
 - Clean the customer's facility water system and replace facility water.
 - Facility water quality must satisfy the criteria specified in "Table 8.1-1 Quality criteria for clean water (tap water)"

CAUTION



If there is foreign matter accumulated or clogging in the facility water system, pressure loss increases with less flow rate, and it may damage the screen mesh.

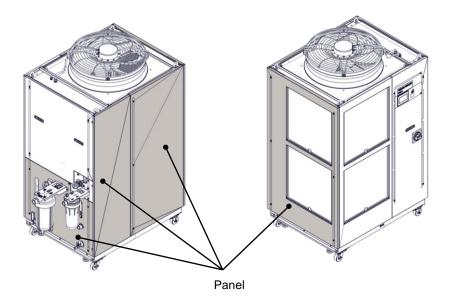
8.2.4 Inspection every 6 months

Check for water leakage from pump (For option T3 [CH2 High-Pressure Pump Mounted])

Remove the panels and check the pump for excessive leakage. If the leakage is found, replace the mechanical seal.

CAUTION

- Leakage from the mechanical seal
 It is impossible to prevent the leakage from the mechanical seal completely because of its structure. Although the leakage is described as 3cc/hr or less.
- The recommend life time of the mechanical seal before needing replacement is 6000 to 8000 hours (usually 1 year)



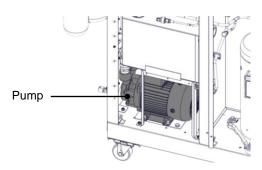


Fig. 8-3 Leak check

8.3 Operation Stop for an Extended Period of Time

If there is a concern that the product will not be operated for an extended period of time or there is a possibility of freezing during winter time, take measures according to the instructions shown below.

- **1.** Turn OFF the earth leakage breaker of the user's power supply. Turn off the power supply breaker of this product.
- 2. Discharge all the circulating fluid completely from the thermo-chiller.

 Refer to "8.3.1 Discharge of the circulating fluid" for the method of drain the circulating fluid from the product.
- **3.** After discharging the circulating fluid, cover the product with a sheet (to be prepared by user) before storing the product.

8.3.1 Discharge of the circulating fluid

WARNING



- Before discharging the circulating fluid, stop the user's equipment and release the residual pressure.
- Be sure to wear protective shoes and gloves to prevent injury with the edge of the panel.
- 1. Turn OFF the breaker of the user's power supply.
- 2. Open the supply port cap.
- **3.** Open the ball valve of the tank drain port to drain the circulating fluid.

4. Remove the particle filter element.

1) Use the maintenance handle, remove the filter case.

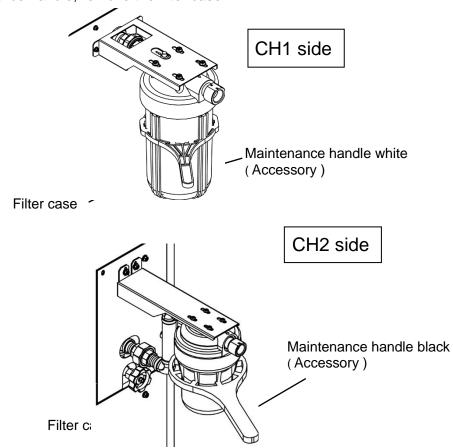


Fig. 8-4 Particle filter removal

- 2) Drain the circulating fluid in the filter case and take out the element. When reusing the removed element, dry it and store it separately.
- 3) Attach the filter case by hand tighten.



A CAUTION



- Mounting of the case should be performed by hand-tighten. When the case is tightened excessively by tools or handle, the case might crack or be damaged.
- Make sure that the case is held manually by hand when removing and mounting the case. If the case is dropped, it may result in cracking or breakage.

5. Remove the DI filter.

- Remove the maintenance panel and remove the DI filter.
 (Refer to "8.4.2 Replacing the DI filter".) Store the removed DI filter separately.
- 2) Install the DI filter temporary piping that was installed at the time of delivery.

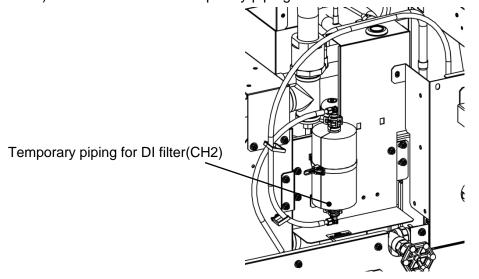


Fig. 8-5 Temporary pipe installation for DI filter

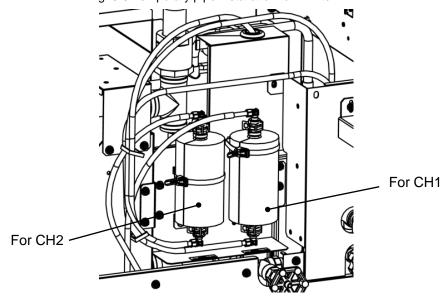


Fig. 8-6 Temporary pipe installation for DI filter(For option D1)

- **6.** After confirming that the circulating fluid has been sufficiently discharged from the product, customer's facilities and piping, perform an air purge (pressure less than 0.1 MPa, about 1 minute) from the circulating fluid outlet of the product.
 - Purge both CH1 and CH2, Circulating fluid is drained from the drain port.
- **7.** Close the ball valve after draining the circulating fluid.
- **8.** Close the supply port cap.

8.3.2 Discharge of the facility water (Water-cooled type)

▲ WARNING

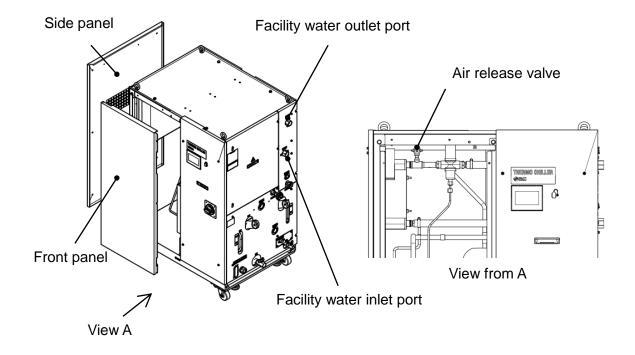


- Before discharding the facility water, stop operation of the user's equipment and release the residual pressure.
- Wear protective equipments like gloves to avoid getting injure like a cutting hand by sharp edge of panel

CAUTION

For relocation or long-term storage, drain the residual liquid in the piping as much as possible. Residual liquid may drip during movement or installation.

- 1. Turn OFF the earth leakage breaker of the user's power supply.
- **2.** Stop supplying the facility water, and make sure that there is no pressure applied inside the piping.
- **3.** Remove the piping from the inlet and outlet ports of the facility water
- **4.** Open the side panel and front panel, and open the air release valve to discharge the facility water.



5. After discharging all the facility water, close the air release valve and mount the panel of the electric unit back to the product.

8.4 Replacement of consumables

WARNING



- Before discharging the circulating fluid, stop the user's equipment and release the residual pressure.
- Be sure to wear protective shoes and gloves to prevent injury with the edge of the panel.

8.4.1 Replacing Particle Filters

To replacing the element of the particle filter, it is necessary to discharge the circulating fluid.

Remove the filter case and replace the element according to steps 1 to 4 of "8.3.1 Discharge of the circulating fluid".

8.4.2 Replacing the DI filter

Connect DI filter inside this product. In the delivery state, "Temporary piping for DI filter" is connected. Install the attached

"DI filter" according to the following procedure.

- 1. Turn off the earth leakage breaker of this product.
- **2.** Remove the maintenance panel. Loosen the fixing screws. Also, remove the fixing screws.

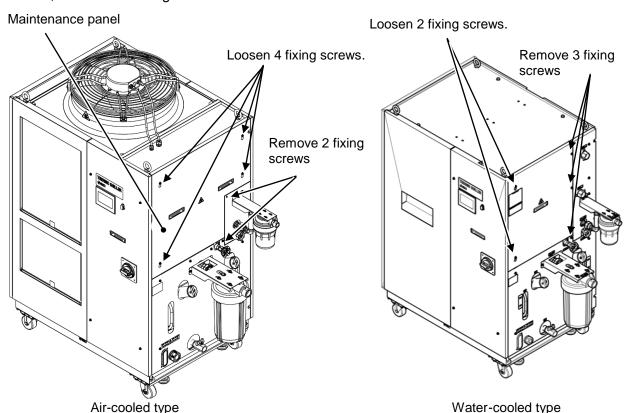
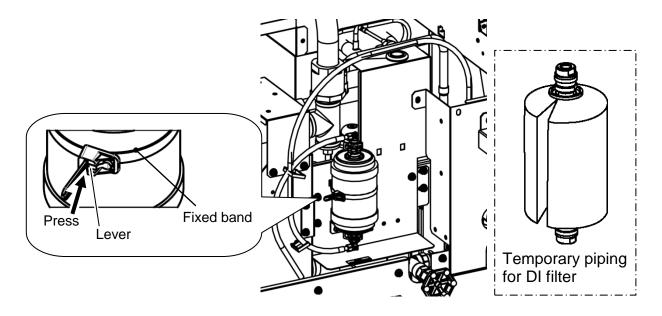


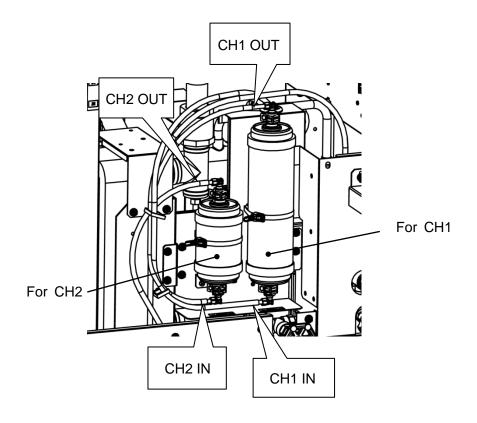
Fig. 8-7 Maintenance panel removal

3. Remove DI filter fixed band by pushing lever on the band.

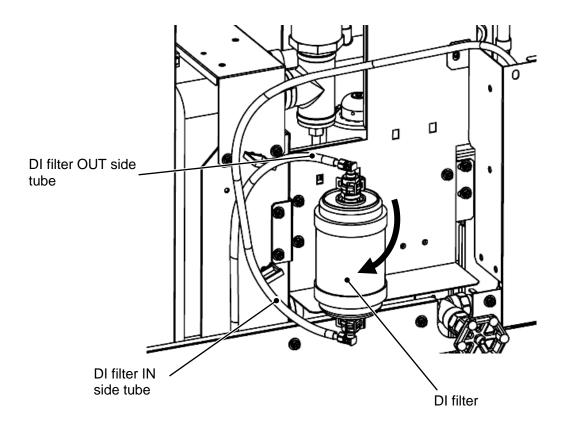
(The temporary piping for DI filter is connected at the time of delivery. "Temporary piping for DI filter" is used for long term storage of this product. Please keep it in a safe place.)



■ For option D1 "CH1 with electrical conductivity control" In the case of option D1, DI filters are located as shown in the figure below.



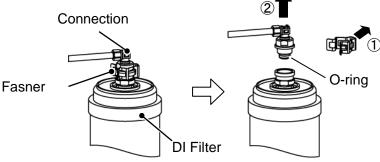
4. Pull out the DI filter to the front. The DI filter has been connected to the tube. Please allow excessive force is not applied to the tube.



5. The connection fitting of the DI filter and the tube is connected by a fastener. O ring is used for the connection fitting. After removing the fastener, remove the connection fitting. Be careful not to apply force to the tube at this time. Also, please be careful not to damage the Oring.

Both the IN side and the OUT side have the same shape. Remove the connection





- 6. Install the DI filter in the reverse order of removal. The DI filter has no flow direction. The DI filter IN-side tube on the lower side of the DI filter, please connect the DI filter OUT-side tube on the upper side. If connected reversely, the air in the DI filter will not escape, The DI filter function may not work properly.
- **7.** Secure the DI filter in a fixed band.
- 8. Install the maintenance panel. (Recommended tightening torque:3.0N·m)

8.4.3 Consumables

Table 8.4-1 Consumables

Part number	Name	Qty.	Remarks
HRS-S0213	Dust-proof filter (Lower)	1 pc.	HRL200-A: 2 pcs. are used per unit
HRS-S0214	Dust-proof filter (Upper)	1 pc.	HRL100/200-A: 2 pcs. are used per unit
HRS-S0185	Dust-proof filter	1 pc.	HRL300-A: 4 pcs. are used per unit
HRS-PF006	Particle filter element	1 pc.	Common to each model: For CH1
EJ202S-005X11	Particle filter element	1 pc.	Common to each model: For CH2
EJ302S-005X11	Particle filter element	1 pc.	For option-T3: For CH2
HRR-DF001	DI filter replacement cartridge	1 pc.	Common to each model: For CH2
HRR-DF002	DI filter replacement cartridge	1 pc.	Common to each model: For CH1 (Option D1 only)

Chapter 9 Documents

9.1 Specifications

9.1.1 HRL100/200/300-A*-40

Table 9.1-1 Specifications

	Tau			Tab	HRL100-A*-40		HRL200-A*-40		HRL300-A*-40		
		Model			CH1	CH2	CH1	CH2	CH1	CH2	
Cooling metho	od				Air-cooled refrigeration						
Refrigerant							R410A				
Quantity of re				kg	1.	1.4 1.8 2.5					
Control metho							PID c				
Ambient temp	erature			°C			2 to				
Circulating fluid						CH2 : C	ear water *1, D Dear water *1,	DI water (pur	e water)		
		erature range		°C		CH1: 5 to 35 / CH2: 10 to 40					
		apacity*2		kW	9	1 *8	19	1 *8	26	1 *8	
	Heating of	capacity*3		kW	1.5	1	4.0	1	6.0	1	
	Tempera	ture stability *		°C		CH1 : ±0.1 CH2 : ±0.5					
	Pump	Rated flow ra (Outlet)	ate	L/min	45 (0.43MPa)	10 (0.45MPa)	45 (0.45MPa)	10 (0.45MPa)	125 (0.45MPa)	10 (0.45MPa)	
	capacity *13	Maximum flo)W	L/min	120	16 *12	130	16 *12	180	16 *12	
	*13	Maximum lift height	ting	m	50	49	55	49	68	49	
0: 1:	Settable _I	pressure rang	e *5	MPa	0.10 to 0.50	0.10 to	0.10 to	0.10 to 0.49	0.10 to 0.68	0.10 to 0.49	
Circulating	Minimum	operating flo	v roto *6	L/min	20	0.49	0.55 25	2	40	2	
fluid system	Minimum operating flow rate *6		w rate *0	I L/IIIIII	42	7	42	7	60	7	
System	Tank capacity*14 By-pass (With valve)				built-in						
	Electric conductivity			μS/ cm	0.5 to 45 *9	0.5 to 45	0.5 to 45 *9	0.5 to 45	0.5 to 45 *9	0.5 to 45	
	setting ra Particle fi		article filter filtration accuracy		5	5	5	5	5	5	
	(Accesso	ry)		μm							
		g fluid outlet,			CH1 : Rc1 (Symbol F:G1,Symbol N:NPT1)						
	Circulatin	g fluid return	port*14		CH2: Rc1/2 (Symbol F:G1/2,Symbol N:NPT1/2)						
	Tank drai	n port*14			CH1: Rc3/4 (Symbol F: G3/4,Symbol N: NPT3/4) CH2: Rc1/2 (Symbol F: G1/2,Symbol N: NPT1/2)						
	Wetted material				CH1: Stainless steel, Copper (Brazing filler metal for the heat exchanger) *10, Brass *10,Bronze *10,Fluoropolymer,PP,PBT,POM,PU,PC,PVC, EPDM,NBR, Ion-exchange resin *9 CH2: Stainless, Alumina ceramic, Carbon, Fluoropolymer,PP,PBT,POM,PU, PVC,PPS,AS,PS,EPDM,NBR, Ion-exchange resin						
Power supply				3-phase 380 to 415VAC(50/60Hz) Allowable voltage range ±10%(No continuous voltage fluctuation) 3-phase 460 to 480VAC(60Hz) Allowable voltage range +4%,-10%(Max. voltage less than 500V and no continuous voltage fluctuation)					,		
Electrical system	Applicabl	e earth	Rated current	А	2	0	3	0	4	0	
	leakage b	oreaker	Sensitivity current	mA			3	30			
	Rated op	erating currer	nt *4	Α	8	.5	1:	5	1:	9	
	Rated power consumption *4			kW (kVA)	5.6			10.2)	12.3 (13.0)	
Noise level (F	ront: 1m, he	eight: 1m) *4		dB(A)	7		7:		7		
Accessories			Operation manual (for installation/operation) (English 1, Japanese 1) Particle filter set for CH1 Particle filter set for CH2 Anchor bracket 2pcs. (including 6 pcs. of M8 bolts) *7								
Weight (in the	dry state) a	<u></u> ⊧11		ka	Appro		Appro		Appro	x.330	
weight (in the	Weight (in the dry state) *11 kg				Applic	7.ZTU	Applo	۸.۷00	Applo	۸.۵۵۵	

HRL Series 9.1 Specifications

Chapter 9 Documents

- *1 Use fluid for circulating fluid that conforms to:
 - Clean water: Water Quality Standards of the Japan Refrigeration and Air Conditioning Industrial Association (JRA GL-02-1994)
- *2 (1) Ambient temperature: 32°C,(2) Circulating fluid: Clean water, (3) Circulating fluid temperature: CH1 20°C /CH2 25°C,
 - (4) Circulating fluid flow rate: Rated flow rate, (5) Power supply: 400 VAC
 - In the case of option T2 or T3 "CH2 High-Pressure Pump Mounted", refer to chapter 6.
- *3 (1) Ambient temperature:32°C,(2) Circulating fluid: Clean water, (3) Circulating fluid flow rate: Rated flow rate,(4) Power supply: 400 VAC
- *4 (1) Ambient temperature:32°C,(2) Circulating fluid: Clean water, (3) Circulating fluid temperature: CH1 20°C/CH2 25°C,
 - (4) Load: Refer to the specified cooling capacity, (5) Circulating fluid flow rate: Rated flow rate, (6) Power supply: 400 VAC,
 - (7) Piping length: Minimum
- *5 With the pressure control mode that controls the pressure automatically with the inverter. If the pressure control mode is not necessary, use the flow control function or the pump output setting function.
- *6 Required flow rate to maintain the cooling capacity. When the flow rate is lower than the rated flow, use a by-pass piping set. In the case of option T2 or T3 "CH2 High-Pressure Pump Mounted", refer to chapter 6.
- *7 The anchor brackets (including M8 bolt x 6pcs.) are used for fixation with the skid when this product is packed. The anchor bolts are not attached.
- *8 Up to 1.5kW. However, when 1.5kW heat load is applied, the colling capacity of CH1 will decrease by 0.5kW.
- *9 Option D1 "with electrical conductivity control function" only
- *10 In the case of option D1 " with electrical conductivity control function", it is not included.
- *11 The weight will increase by 1kg when option D1 "With electrical conductivity control" and option T2 "CH2 High-Pressure Pump Mounted" is selected.

 The weight will increase by 1kg when option T3 "CH2 High-Pressure Pump Mounted" is selected.
- *12 The usable flow rate range is varied depending on the Pump control mode. Refer to Pump capacity curve (Fig.9-16) for details.
- *13 In the case of option T2 or T3 "CH2 High-Pressure Pump Mounted", refer to chapter 6.
- *14 In the case of option T3 "CH2 High-Pressure Pump Mounted", refer to chapter 6.

9.1 Specifications HRL Series

9.1.2 HRL100/200-W*-40

Table 9.1-1 Specifications

	Table 9.1-1 Specifications							
		Model			HRL100-W*-40 HRL200-W*-40			
Cooling metho	.d				CH1 CH2 CH1 CH2			
Refrigerant	a				Air-cooled refrigeration R410A(HFC)			
Quantity of ref	rigerant			kg	1.8 1.8			
Control metho							control	
Ambient tempe	erature			°C			0 45	
	Circulating fluid						Ol water (pure	
	Set temp	erature range		°C			DI water (pur CH2 : 10 to 4	
		capacity*2		kW	10	1 *8	21.5	1 *8
		capacity*3		kW	1.5	1	4.0	1
	Tomporo	ture stability *	4	°C		CH1	: ±0.1	•
	тепірега			Ŭ			: ±0.5	
		Rated flow ra	ate	L/min	45 (0.43MPa)	10 (0.45MDa)	45 (0.45MDa)	10 (0.45MDa)
	Pump	(Outlet) Maximum flo	w			(0.45MPa)	(0.45MPa)	(0.45MPa)
	capacity *13	rate		L/min	120	16 *12	130	16 *12
	*13	Maximum lift	ing	m	50	49	55	49
		height						
	Settable	pressure rang	e *5	MPa	0.10 to	0.10 to	0.10 to	0.10 to
	o mazio	p. 000 a. 0		🛎	0.50	0.49	0.55	0.49
Circulating		operating flow	v rate *6	L/min	20	2	25	2
fluid	Tank cap			L	42	7	42	7
system		(With valve)				bui	lt-in	
		conductivity		μS/	0.5 to 45 *9	0.5 to 45	0.5 to 45 *9	0.5 to 45
	setting ra	inge ilter filtration a	couracy	cm			010 10 10	
			ccuracy	μm	5	5	5	5
	(Accessory) Circulating fluid outlet,				CH1 : Rc1 (Symbol F:G1,Symbol N:NPT1)			
	Circulating fluid outlet, Circulating fluid return port							
	·				CH2: Rc1/2 (Symbol F:G1/2,Symbol N:NPT1/2) CH1: Rc3/4 (Symbol F:G3/4,Symbol N:NPT3/4)			
	Tank drai	in port			CH2: Rc1/2 (Symbol F: G1/2,Symbol N: NPT1/2)			
	Wetted n	naterial			CH1: Stainless steel, Copper (Brazing filler metal for the heat exchanger) *10, Brass *10, Bronze*10,Fluoropolymer,PP,PBT,POM,PU, PC,PVC,EPDM,NBR, Ion-exchange resin *9 CH2: Stainless, Alumina ceramic, Carbon, Fluoropolymer,PP,PBT,POM,PU,PVC,PPS, AS,PS,EPDM,NBR, Ion-exchange resin			
	Tempera	ture range		°C	AS		o 35	ange resin
İ	Pressure			MPa			0 0.5	
İ	Required			L/min	2	25		60
Facility water		et pressure di	fferential of	MPa		0.31	more	
sysmem	facility wa			ŭ				
	Port size				Stainless		c1 r (Brazing fille	r metal for
	Wetted m	naterial					inger) *10, Br	
					Bronze*10,PTFE,NBR,EPDM			
							115VAC(50/60H 10%(No continu	
					Allowable v		iation)	ious voitage
	Power su	apply				3-phase 460 to	480VAC(60Hz	
							,-10%(Max. vo	
Electrical			Rated				ous voltage fluct	
system	Applicabl	le earth	current	Α	3	0	3	0
	leakage l		Sensitivity	mA		2	30	
	Dot		current		4.0))
	Rated operating current *4		A kW	12.7			3.3	
	Rated po	wer consump	tion *4	(kVA)	7.9	(8.8)	8.6	(9.2)
Noise level (Fr	ont: 1m, h	eight: 1m) *4		dB(A)		2		2
					Operation		installation/o	peration)
Accessories							Japanese 1) r set for CH1	
70003301163							r set for CH2	
						ket 2pcs. (incl	uding 6 pcs. of	M8 bolts) *7
Weight (in the	dry state)	*11		kg	Appro	x.250	Appro	x.250

HRL Series 9.1 Specifications

Chapter 9 Documents

- *1 Use fluid for circulating fluid that conforms to:
 - Clean water: Water Quality Standards of the Japan Refrigeration and Air Conditioning Industrial Association (JRA GL-02-1994)
- *2 (1) Facility water temperature:32°C,(2) Circulating fluid: Clean water, (3) Circulating fluid temperature: CH1 20°C /CH2 25°C, (4) Circulating fluid flow rate: Rated flow rate, (5) Power supply: 400 VAC

 - In the case of option T2 "CH2 High-Pressure Pump Mounted", refer to chapter 6.
- *3 (1) Facility water temperature:32°C,(2) Circulating fluid: Clean water, (3) Circulating fluid flow rate: Rated flow rate,(4)Power supply: 400 VAC
- *4 (1) Facility water temperature: 32°C,(2) Circulating fluid: Clean water, (3) Circulating fluid temperature: CH1 20°C/CH2 25°C,
 - (4) Load: Refer to the specified cooling capacity, (5) Circulating fluid flow rate: Rated flow rate, (6) Power supply: 400 VAC,
 - (7) Piping length: Minimum
- *5 With the pressure control mode that controls the pressure automatically with the inverter.If the pressure control mode is not necessary,use the flow control function or the pump output setting function.
- *6 Required flow rate to maintain the cooling capacity. When the flow rate is lower than the rated flow, use a by-pass piping set. In the case of option T2 "CH2 High-Pressure Pump Mounted", refer to chapter 6.
- *7 The anchor brackets (including M8 bolt x 6pcs.) are used for fixation with the skid when this product is packed. The anchor bolts are not attached.
- *8 Up to 1.5kW. However, when 1.5kW heat load is applied, the colling capacity of CH1 will decrease by 0.5kW.
- *9 Option D1 "with electrical conductivity control function" only
- *10 In the case of option D1 " with electrical conductivity control function", it is not included.
- *11 The weight will increase by 1kg when option D1 "With electrical conductivity control" and option T2 "CH2 High-Pressure Pump Mounted" is selected.
- *12 The usable flow rate range is varied depending on the Pump control mode. Refer to Pump capacity curve (Fig.9-16) for details.
- *13 In the case of option T2 "CH2 High-Pressure Pump Mounted", refer to chapter 6.

9.1 Specifications HRL Series

Refrigerant with GWP reference 9.1.3

Table 9.1-2 Refrigerant with GWP reference

	Global Warming Potential (GWP)					
Refrigerant	Regulation (EU) No 517/2014 (Based on the IPCC AR4)	Revised Fluorocarbons Recovery and Destruction Law (Japanese law)				
R134a	1,430	1,430				
R404A	3,922	3,920				
R407C	1,774	1,770				
R410A	2,088	2,090				

Note:

Communication specifications 9.1.4

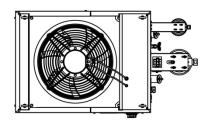
- For contact input/output communicatins, refer to 3.3.4 Contact input/output communication wiring
- For serial communication specifications, refer to Operation Manual Communication Function, HRX-OM-Y120.

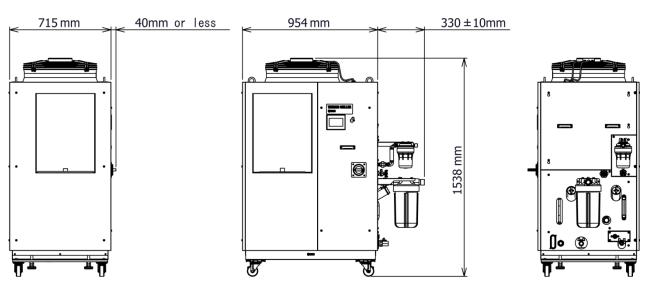
HRL Series 9.1 Specifications

This product is hermetically sealed and contains fluorinated greenhouse gases.
 See specification table for refrigerant used in the product.

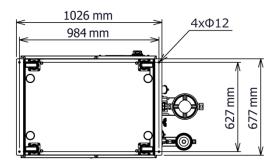
9.2 Dimensions

9.2.1 HRL100-A*-40









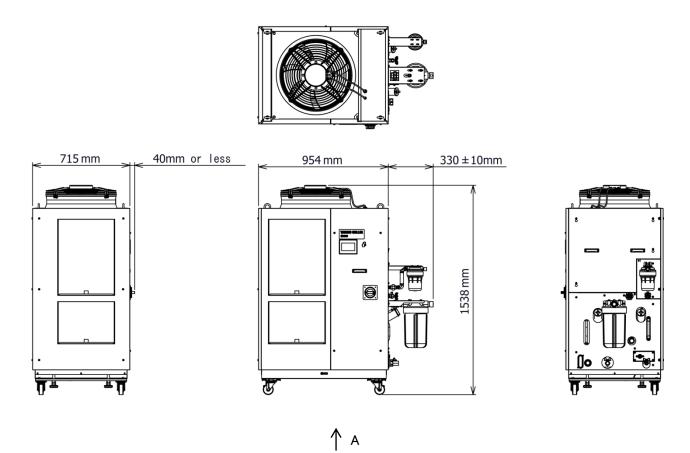
Dimensions for the positions of the anchor bolts (View A)

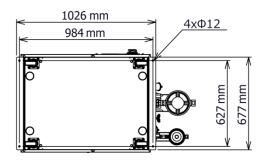
Fig. 9-1 Dimensions

9.2 Dimensions

HRL Series

9.2.2 HRL200-A*-40



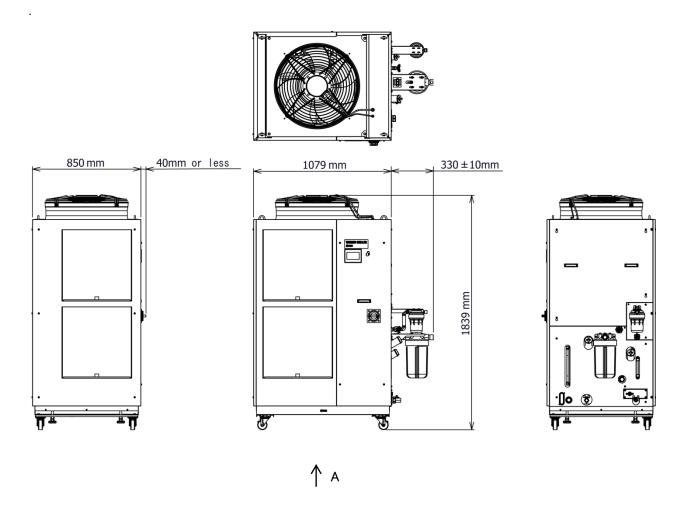


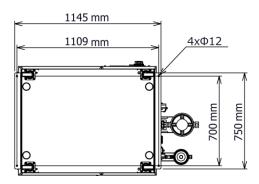
Dimensions for the positions of the anchor bolts (View A)

Fig. 9-2 Dimensions

HRL Series 9.2 Dimensions

9.2.3 HRL300-A*-40





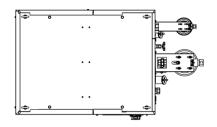
Dimensions for the positions of the anchor bolts (View A)

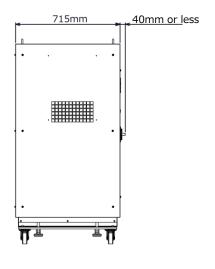
Fig. 9-3 Dimensions

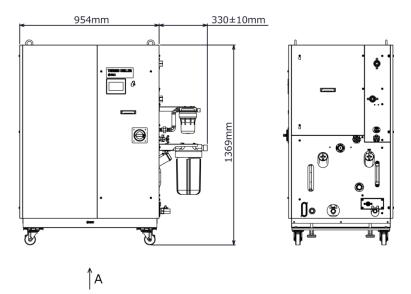
9.2 Dimensions

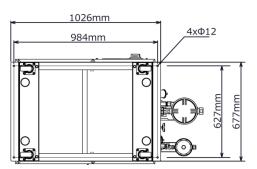
HRL Series

9.2.4 HRL100/200-W*-40









Dimensions for the positions of the anchor bolts (View A)

Fig. 9-4 Dimensions

HRL Series 9.2 Dimensions

9.3 Flow Diagram

9.3.1 HRL***-A*-40-*

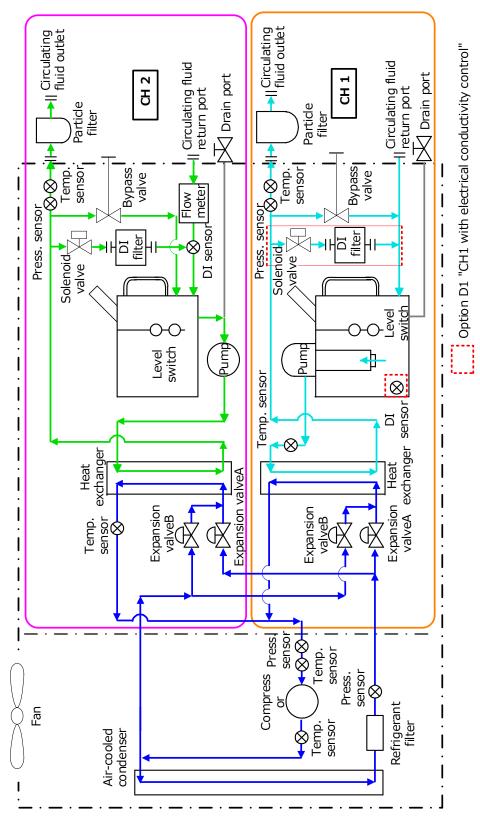


Fig. 9-5 Flow Diagram (HRL***-A*-40)

9.3 Flow Diagram HRL Series

9.3.1 HRL***-W*-40-*

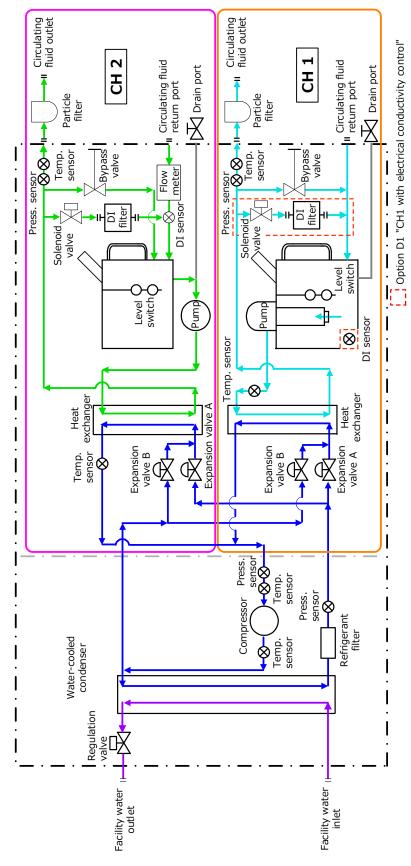
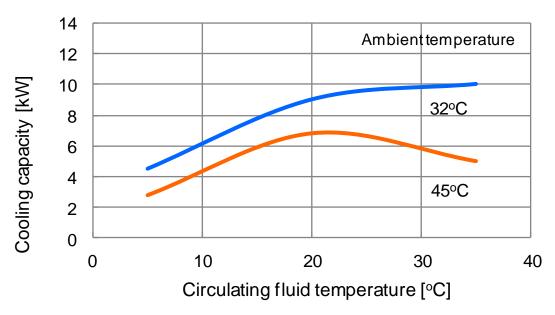


Fig. 9-6 Flow Diagram (HRL***-W*-40)

HRL Series 9.3 Flow Diagram

9.4 Cooling Capacity

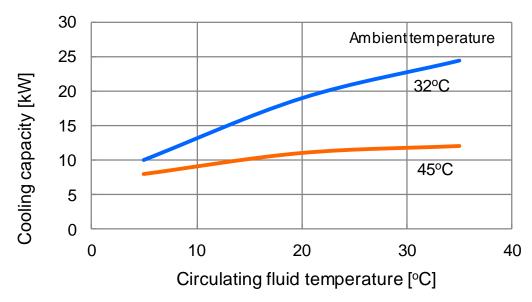
9.4.1 HRL100-A*-40 CH1



*This is the cooling capacity of the CH1 side when 1 Kw heat load is applied to the CH2 side.

Fig. 9-7 Cooling Capacity (HRL100-A*-40 CH1)

9.4.2 HRL200-A*-40 CH1



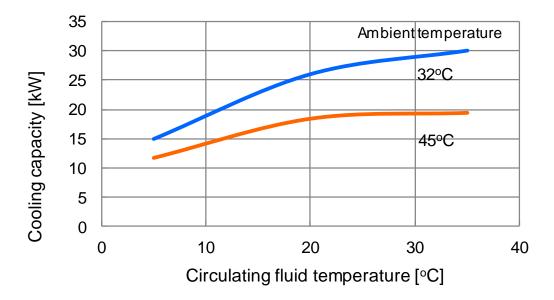
*This is the cooling capacity of the CH1 side when 1 Kw heat load is applied to the CH2 side.

Fig. 9-8 Cooling Capacity (HRL200-A*-40 CH1)

9.4 Cooling Capacity

HRL Series

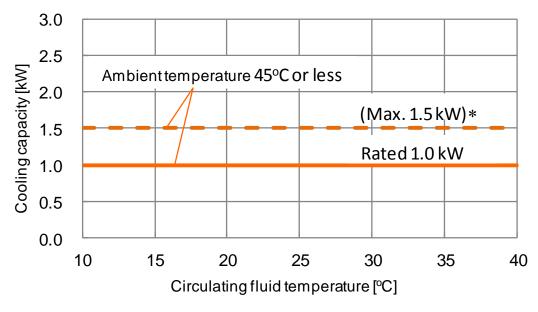
9.4.3 HRL300-A*-40 CH1



*This is the cooling capacity of the CH1 side when 1 Kw heat load is applied to the CH2 side.

Fig. 9-9 Cooling Capacity (HRL300-A*-40 CH1)

9.4.4 HRL100/200/300-A*-40 CH2

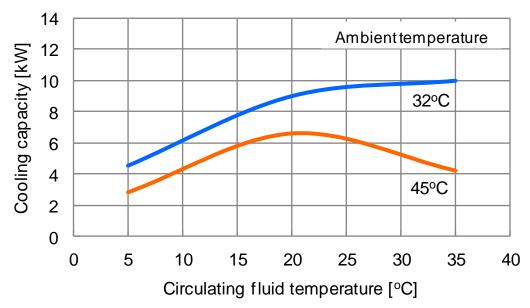


*Up to 1.5kW.However,when 1.5kW heat load is applied, the cooling capacity of CH1 will decrease by 0.5kW.

Fig. 9-10 Cooling Capacity (HRL100/200/300-A*-40 CH2)

HRL Series 9.4 Cooling Capacity

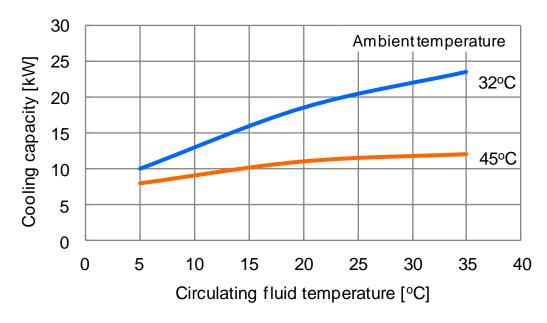
9.4.5 HRL100-A*-40-T2 CH1



*This is the cooling capacity of the CH1 side when 1 Kw heat load is applied to the CH2 side.

Fig. 9-11 Cooling Capacity (HRL100-A*-40-T2 CH1)

9.4.6 HRL200-A*-40-T2 CH2



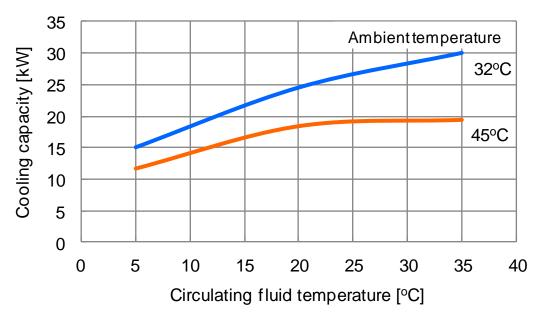
*This is the cooling capacity of the CH1 side when 1 Kw heat load is applied to the CH2 side.

Fig. 9-12 Cooling Capacity (HRL200-A*-40-T2 CH1)

9.4 Cooling Capacity

HRL Series

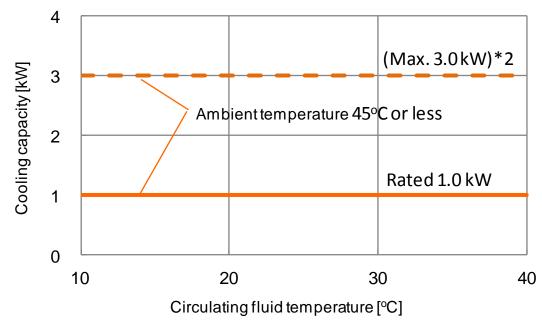
9.4.7 HRL300-A*-40-T2 CH1



*This is the cooling capacity of the CH1 side when 1 Kw heat load is applied to the CH2 side.

Fig. 9-13 Cooling Capacity (HRL300-A*-40-T2 CH1)

9.4.8 HRL100/200/300-A*-40-T2 CH2

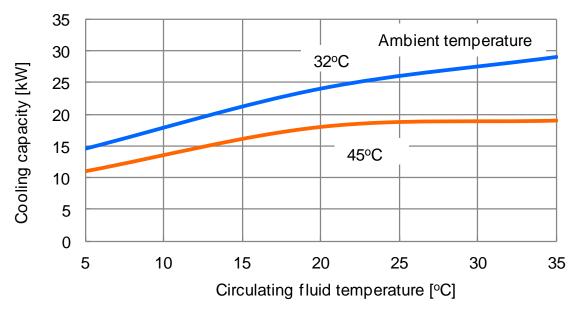


*Up to 3.0kW.However,when 3.0kW heat load is applied, the cooling capacity of CH1 will decrease by 2.0kW.

Fig. 9-14 Cooling Capacity (HRL100/200/300-A*-40-T2 CH2)

HRL Series 9.4 Cooling Capacity

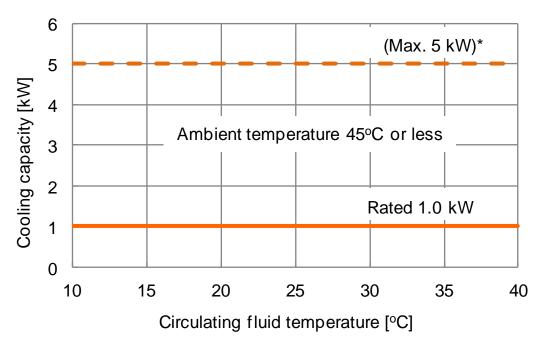
9.4.9 HRL300-A*-40-T3 CH1



*This is the cooling capacity of the CH1 side when 1 kW heat load is applied to the CH2 side.

Fig. 9-15 Cooling Capacity (HRL300-A*-40-T3 CH1)

9.4.10 HRL300-A*-40-T3 CH2



*Up to 5.0kW.However,when 5.0kW heat load is applied, the cooling capacity of CH1 will decrease by 4.0kW.

Fig. 9-16 Cooling Capacity (HRL300-A*-40-T3 CH2)

9.4 Cooling Capacity

HRL Series

9.4.11 HRL100-W*-40 CH1

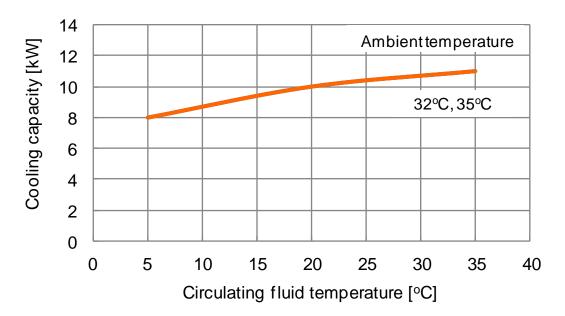


Fig. 9-17 Cooling Capacity (HRL100-W*-40 CH1)

9.4.12 HRL200-W*-40 CH1

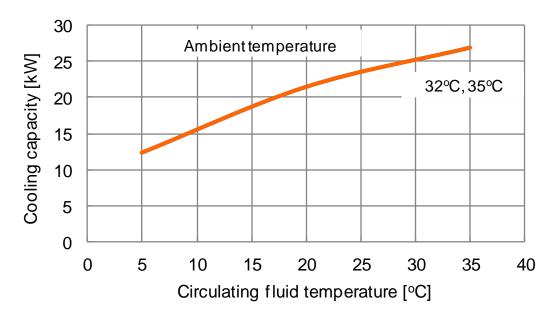
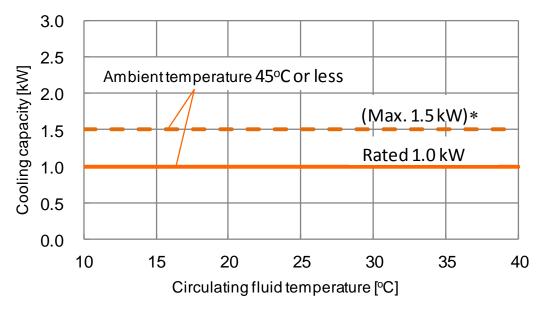


Fig. 9-18 Cooling Capacity (HRL200-W*-40 CH1)

HRL Series 9.4 Cooling Capacity

9.4.13 HRL100/200-W*-40 CH2



*Up to 1.5kW.However,when 1.5kW heat load is applied, the cooling capacity of CH1 will decrease by 0.5kW.

Fig. 9-19 Cooling Capacity (HRL100/200-W*-40 CH2)

9.4.14 HRL100-W*-40-T2 CH1

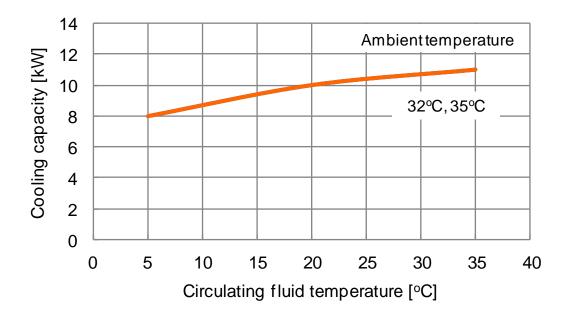


Fig. 9-20 Cooling Capacity (HRL100-W*-40-T2 CH1)

9.4 Cooling Capacity

HRL Series

9.4.15 HRL200-W*-40-T2 CH1

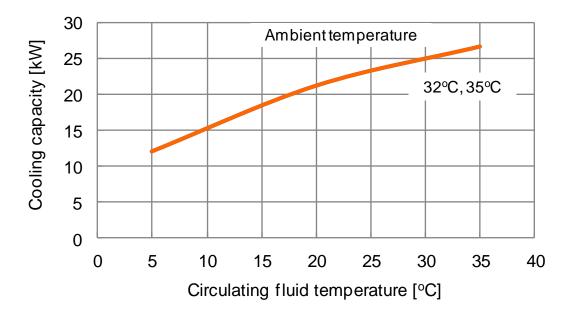
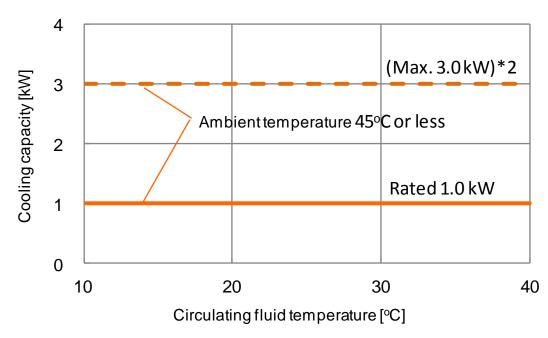


Fig. 9-21 Cooling Capacity (HRL200-W*-40-T2 CH1)

9.4.16 HRL100/200-W*-40-T2 CH2



*Up to 3.0kW.However,when 3.0kW heat load is applied, the cooling capacity of CH1 will decrease by 2.0kW.

Fig. 9-22 Cooling Capacity (HRL100/200-W*-40-T2 CH2)

HRL Series 9.4 Cooling Capacity

9.5 Pump Capacity

9.5.1 HRL100-A/W*-40 CH1

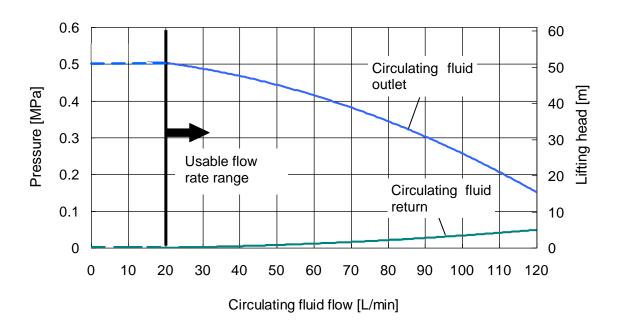


Fig. 9-23 Pump capacity(HRL100-A/W*-40 CH1)

9.5.2 HRL200-A/W*-40 CH1

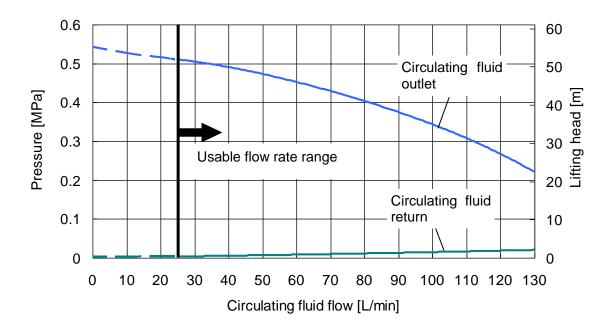


Fig. 9-24 Pump capacity(HRL200-A/W*-40 CH1)

9.5 Pump Capacity

HRL Series

9.5.3 HRL300-A*-40 CH1

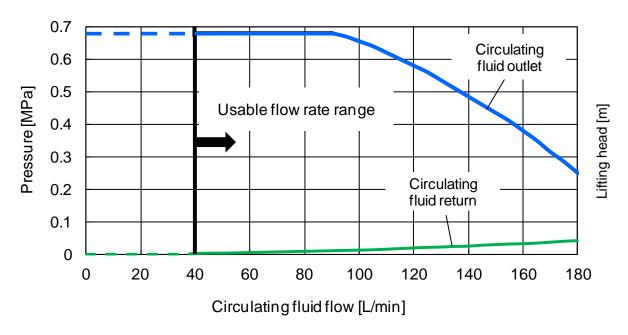


Fig. 9-25 Pump capacity(HRL300-A*-40 CH1)

9.5.4 HRL***-A/W*-40 CH2

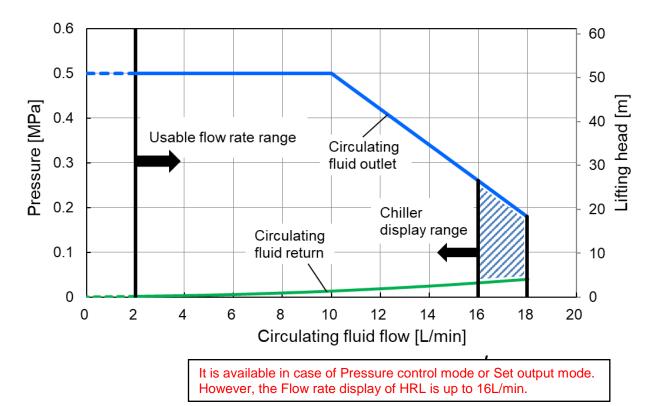


Fig. 9-26 Pump capacity(HRL100/200/300-A/W*-40 CH2)

HRL Series 9.5 Pump Capacity

9.5.5 HRL100/200/300-A/W*-40-T2 CH1

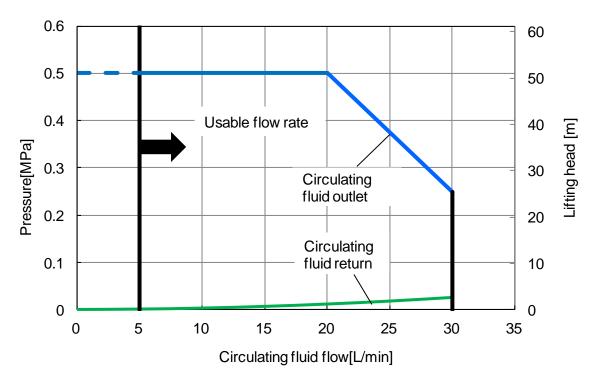


Fig. 9-27 Pump capacity(HRL100/200/300-A/W*-40-T2 CH1)

9.5.6 HRL300-A*-40-T3 CH2

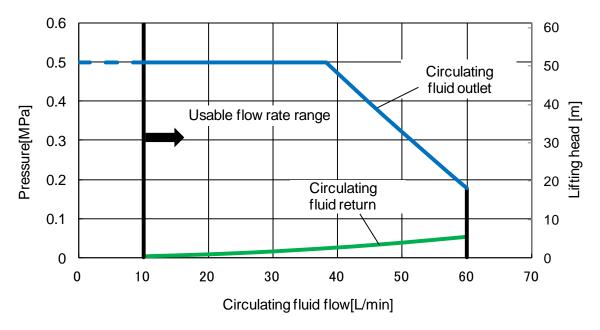


Fig. 9-28 Pump capacity(HRL300-A*-40-T3 CH2)

9.5 Pump Capacity

HRL Series

9.6 Types of Hazard Labels

To ensure the safety of the operators, potential hazards are classified and marked with warning labels.

Read this section before starting any work on the product.

Electric shock warning

WARNING



This symbol stands for danger of electric shock.

The product has some uncovered terminals applied with high voltage inside.

- Do NOT operate the product without the cover panels mounted.
- Do NOT work on the parts inside the product unless you have been trained for the product service.
- Do NOT work inside this product unless you have been trained to do so.
- **■** High temperature warning

▲ WARNING



This symbol stands for danger of burns.

The product has surfaces that can reach high temperatures during operation. Even after the power is turned off, there can still be residual heat in the product., which causes burns.

- Do NOT operate the product without cover panels fitted.
- Do NOT start working on the parts inside the product until the temperature has decreased sufficiently.
- Rotating objects warning (Air-cooled type only)

▲ WARNING



This symbol stands for a danger of your fingers/hand being cut or getting caught by the rotating objects.

• The product contains a cooling fan that rotates during operation of the product (for air-cooled type).

The fan may stop and restart intermittently during operation. Do NOT operate the product without the cover panels mounted.

Warning related to those other than shown above

WARNING



This symbol stands for a multiplex danger.

Electric shock: The product has some uncovered terminals applied with high voltage.

Rotary fan: This product has a rotating object inside the cover panel. <Water-cooled refrigerated type>

High pressure inside: This product contains high pressure liquid in the piping and the tank.

- Do not operate the product without the cover panels mounted.

9.6.1 Positions of danger warning label

Confirm the positions of the danger warning labels on the product to show the potential danger before starting operation.

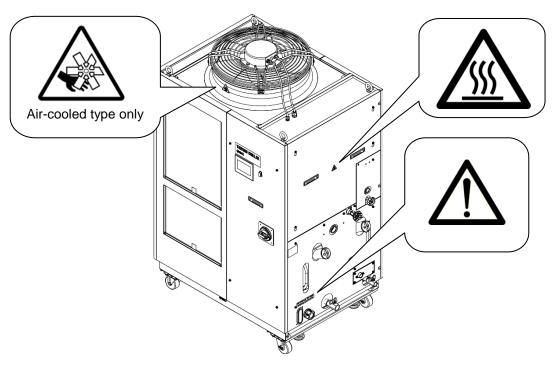


Fig. 9-29 Positions of danger warning label

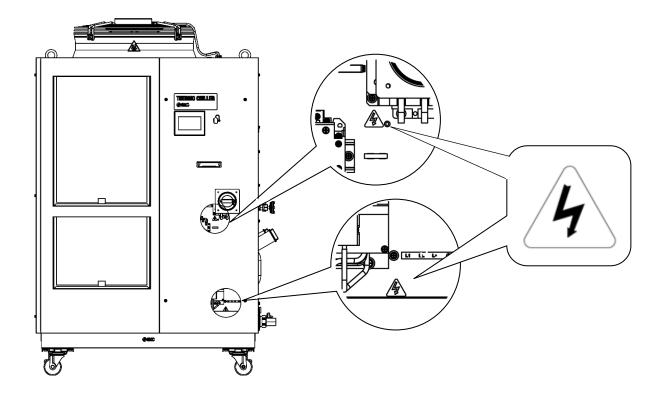


Fig. 9-30 Positions of danger warning label

9.6 Types of Hazard Labels HRL Series

9.7 Standards

This product complies with the standards shown below.

Table 9.7-1 Standards

Standard							
CE Mark	EMC Directive Machinery Directive	2014/30/EU 2006/42/EC					
NRTL *1	E112803(UL61010-1)						

^{*1:} Except option-T2 and T3,water-cooled type.

HRL Series 9.7 Standards

SWC

Thermo-chiller Daily Check Sheet

For information about how to perform daily checks of the thermo chiller, refer to section "8.2.1 Daily check" of the operation manual. Check and record the condition at start right after setting up.

Model no. Mfg. code

_						 	 	 	 	 	 	
		Result										
(out the	oned type	Inlet pressure	МРа									
Contility water (Ear water Joseph Australia	roi watei -c	Flow rate	L/min									
rotow villoci	r acility water	Temperature	ပွ									
onotilogo goitoxog	Operation conditions	Presence of error	Present/Not present									
amot birilt paritalization		ွပ	•									
	Operation parier	Operation										
iteraco		Display										
tanomo binin	רוטום מוווסמוונ	Inside/Outside of liquid level indicator	Inside/Outside									
operated bind	riuid leanaye	Present/	Not present									
adoitionada	Setting up conditions	Humidity	%									
O Sci	dn fillinac	Temperature	ပွ									
		Performed by Temperature										
		Date		Right after setting up (initial value)								

Chapter 10 Product Warranty

Period

The warranty period of the product is 1 year in service or 1.5 years after the product is delivered whichever comes first.

2. Scope

For any failure reported within the warranty period which is clearly SMC's responsibility, replacement parts will be provided. In that case, removed parts shall become the property of SMC.

This guarantee applies only to SMC's product independently, and not to any other damage incurred due to the failure of the product.

3. Contents

- SMC guarantees that the product will operate normally if it is installed under maintenance and control in accordance with the Operation Manual, and operated under the conditions specified in the catalog or contracted separately.
- SMC guarantees that the product does not have any defects in components, materials or assembly.
- 3. SMC guarantees that the product complies with the outline dimensions provided.
- 4. The following situations are out of scope of this warranty.
 - (1) The product was incorrectly installed or connected with other equipment.
 - (2) The product was under insufficient maintenance and control or incorrectly handled.
 - (3) The product was operated outside of the specifications.
 - (4) The product was modified or altered in construction.
 - (5) The failure was a secondary failure of the product caused by the failure of equipment connected to the product.
 - (6) The failure was caused by a natural disaster such as an earthquake, typhoon, or flood, or by an accident or fire.
 - (7) The failure was caused by operation different from that shown in the Operation Manual or outside of the specifications.
 - (8) The checks and maintenance specified (daily checks and regular checks) were not performed.
 - (9) The failure was caused by the use of circulating fluid or facility water other than those specified.
 - (10) The failure occurred naturally over time (such as discoloration of a painted or plated face).
 - (11) The failure does not affect the functioning of the product (such as new sounds, noises and vibrations).
 - (12) The failure was due to the "Installation Environment" specified in the Operation Manual.
 - (13) The failure was caused by the customer disregarding "6. Request to Customers".

4. Agreement

If there is any doubt about anything specified in "2. Scope" and "3. Contents", it shall be resolved by agreement between the customer and SMC.

5. Disclaimer

- (1) Expenses for daily and regular checks
- (2) Expenses for repairs performed by other companies
- (3) Expenses for transfer, installation and removal of the product
- (4) Expenses for replacement of parts other than those in this product, or for the supply of liquids
- (5) Inconvenience and loss due to product failure (such as telephone bills, compensation for workplace closure, and commercial losses)
- (6) Expenses and compensation not covered in "2. Scope".

HRL Series Product Warranty

6. Request to Customers

Proper use and maintenance are essential to assure safe use of this product. Be sure to satisfy the following preconditions. Please note that SMC may refuse to carry out warranted repair if these preconditions have been disregarded.

- (1) Use the product following the instructions for handling described in the Operation Manual.
- (2) Perform checks and maintenance (daily checks and regular checks) specified in the Operation Manual and Maintenance Manual.
- (3) Record the check and maintenance results on the daily check sheet attached to the Operation Manual and Maintenance Manual.

7. Request for Warranted Repair

For warranted repair, please contact the supplier you purchased this product from.

Warranted repair shall be on a request basis.

Repair shall be provided free of charge in accordance with the warranty period, preconditions and terms defined above. Therefore, a fee will be charged for any repairs if a failure is detected after the end of the warranty period.

Product Warranty HRL Series

		Revi	ision	
Revisi	on C:[A	UG 2021]	

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