

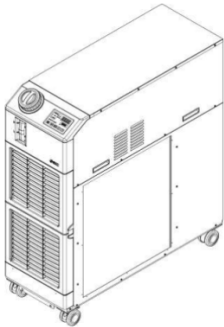


ORIGINAL INSTRUCTIONS

Instruction Manual

Thermo-Chiller

HRS090-A*/W*-40/46-*



This product used a built-in pump to circulate a liquid such as water, adjusted to a constant temperature by the refrigeration circuit. This circulating liquid cools parts of customer's machine that generate heat.

1 Safety Instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of "Caution," "Warning" or "Danger." They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC)⁽¹⁾, and other safety regulations.

⁽¹⁾ ISO 4414: Pneumatic fluid power - General rules relating to systems.
ISO 4413: Hydraulic fluid power - General rules relating to systems.
IEC 60204-1: Safety of machinery - Electrical equipment of machines. (Part 1: General requirements)
ISO 10218-1: Robots and robotic devices - Safety requirements for industrial robots - Part 1: Robots.

- Refer to product catalogue, Operation Manual and Handling Precautions for SMC Products for additional information.

- Keep this manual in a safe place for future reference.

| | | |
|--|----------------|------------------------------------------------------------------------------------------------------------------------|
| | Caution | Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. |
| | Warning | Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
| | Danger | Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. |

Warning

- Always ensure compliance with relevant safety laws and standards.
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 Product Specification

HRS090-A*-40/46-*

| Model | | HRS090 -A*-40-* | HRS090 -A*-46-* |
|----------------------------------------|-----------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Cooling method | | Air-cooled refrigerant type | |
| Refrigerant | | R410A (HFC) | |
| Quantity of refrigerant (kg) | | 1.15 | |
| Control method | | PID control | |
| Ambient temperature ¹⁾ (°C) | | 5 to 45 | |
| Circulating fluid system | Circulating fluid ²⁾ | Tap water, Ethylene glycol aqueous solution 15%, Deionised water | |
| | Operating temperature range ¹⁾ (°C) | 5 to 35 | |
| | Cooling capacity 50/60Hz ³⁾ (kW) | 8.0 / 9.0 | |
| | Heating Capacity ⁴⁾ 50/60Hz (kW) | 1.7 / 2.2 | |
| | Temperature stability ⁵⁾ (°C) | ±0.5 | ±0.1 |
| | Pump Capacity | Rated flow rate 50Hz (Outlet) ⁶⁾ (L/min) | 29 / 45 |
| | | Maximum flow rate 50Hz (L/min) | 55 / 68 |
| | | Maximum lifting height (m) | 50 |
| | Minimum operating flow rate 50/60Hz ⁷⁾ (L/min) | 29 / 45 | |
| | Tank Capacity (L) | 18 | |
| Electric system | Circulating fluid outlet, circulating fluid return port | Rc1 (Symbol F: G1, Symbol N: NPT1) | |
| | Drain port | Rc1/4 (Symbol F: G1/4, Symbol N: NPT1/4) | |
| | Wetted materials | | Stainless steel, Copper (heat exchanger brazing), Brass, Bronze, PTFE, FKM, EPDM, PVC, NBR, POM, PE, PP, Carbon, Ceramic |
| | | | |

2 Specifications – continued

| Model | | HRS090 -A*-40-* | HRS090 -A*-46-* |
|--------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Electric system | Power supply | 3-phase | |
| | | 380-415VAC 50 / 60Hz | 380-415VAC 50 / 60Hz, 460-480VAC 60Hz (+4%, -10%, Max. <500VAC) |
| | | Allowable voltage fluctuation ±10% (No continuous voltage fluctuation) | |
| | Earth leakage breaker | 20 | |
| | Sensitivity (mA) | 30 | |
| | Rated operating current 50/60Hz ⁵⁾ (A) | 8.4 / 9.1 | |
| Sound level (Front 1m/Height 1m) ⁵⁾ (dB(A)) | 75 | | 72 |
| | Accessory | | |
| Accessory | | Alarm code list table 2pc. (English 1pc. / Japanese 1pc.), Operation manual 2 pc. (English 1pc. / Japanese 1pc.), Y-strainer (40 mesh) 25A, Barrel nipple 25A, Anchor brackets 2pc. (including M10 bolts 4pc.) ⁸⁾ | |
| Weight (dry condition) (kg) | | 136 | |
| Compliance standard | CE Marking | 2014/30/EU | |
| | EMC directive Machinery directive | 2006/42/EC | |

Notes:

- *1: Use 15% ethylene glycol aqueous solution if operating in a place where the circulating fluid temp. or ambient temperature is lower than 10°C.
- *2: Use fluid in condition below as the circulating fluid.
Tap water: Standard of The Japan Refrigeration And Air Conditioning Industry Association (JRA GL-02-1994)
15% ethylene glycol aqueous solution: diluted by tap water in condition above without any additives such as antiseptics.
Deionized water: Conductivity 1μS/cm and higher (electrical resistivity 1MΩ · cm and lower)
- *3: (1) Operating ambient temp.: 32°C, (2) Circulating fluid: Tap water. (3) Circulating fluid temp.: 20°C, (4) Circulating fluid flow rate: Rated flow rate, (5) Power supply: AC400V for HRS090-A*-40/46-*.
*4: (1) Operating ambient temp.: 32°C, (2) Circulating fluid: Tap water, (3) Circulating fluid flow rate: Rated flow rate, (4) Power supply: AC400V
*5: (1) Operating ambient temp.: 32°C, (2) Circulating fluid: Tap water, (3) Circulating fluid temp.: 20°C, (4) Heat load: Same as the cooling capacity, (5) Circulating fluid flow rate: Rated flow rate, (6) Power supply: AC400V, (7) External piping length: Minimum.
*6: When circulating fluid outlet port pressure = 0.5MPa.
*7: Fluid flow rate to maintain the cooling capacity and to keep the circulating fluid outlet port pressure to 0.5MPa or less. If the actual flow rate is lower than this, please install a bypass piping.
*8: The anchor brackets (including M10 bolts) are used for fixation with the skid when this product is packed. The anchor bolts are not attached.

HRS090-W*-40/46-*

| Model | | HRS090 -W*-40-* | HRS090 -W*-46-* |
|----------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Cooling method | | Water-cooled refrigerant type | |
| Refrigerant | | R410A (HFC) | |
| Quantity of refrigerant (kg) | | 1.15 | |
| Control method | | PID control | |
| Ambient temperature ¹⁾ (°C) | | 5 to 45 | |
| Circulating fluid system | Circulating fluid ²⁾ | Tap water, Ethylene glycol aqueous solution 15%, Deionised water | |
| | Operating temperature range ¹⁾ (°C) | 5 to 35 | |
| | Cooling capacity 50/60Hz ³⁾ (kW) | 9.0 / 10.5 | |
| | Heating Capacity ⁴⁾ 50/60Hz (kW) | 1.7 / 2.2 | |
| | Temperature stability ⁵⁾ (°C) | ±0.5 | ±0.1 |
| | Pump Capacity | Rated flow rate 50/60Hz (Outlet) ⁶⁾ (L/min) | 29 / 45 |
| Circulating fluid system | Minimum operating flow rate 50/60Hz ⁷⁾ (L/min) | 29 / 45 | |
| | | Tank Capacity | 18 |
| | Circulating fluid outlet, circulating fluid return port | Rc1 (Symbol F: G1, Symbol N: NPT1) | |
| | Drain port | Rc1/4 (Symbol F: G1/4, Symbol N: NPT1/4) | |
| Facility water system | Wetted material | | Stainless steel, Copper (Hear exchanger brazing), Brass, Bronze, PTFE, FKM, EPDM, PVC, NBR, POM, PE, PP, Carbon, Ceramic |
| | Temperature range (°C) | 5 to 40 | |
| | Pressure range (MPa) | 0.3 to 0.5 | |
| | Required flow 50/60Hz | 25 / 25 | |
| Electric system | Facility water pressure differential (MPa) | More than 0.3 | |
| | Facility water inlet, outlet port | Rc1/2 (Symbol F: G1/2, Symbol N: NPT1/2) | |
| | Wetted material | | Stainless steel, Copper (heat exchanger brazing), Bronze, Brass, PTFE, NBR, EPDM |
| | | | |
| Power supply 50Hz | 3-phase | | 380-415VAC 50/60Hz |
| | | | 460-480VAC 60Hz (+4%, -10%, Max. <500VAC) |
| | Allowable voltage fluctuation ±10% (No continuous voltage fluctuation) | | |
| Earth leakage breaker ⁸⁾ | Rated Current (A) | 20 | |
| | Sensitivity (mA) | 30 | |

2 Specifications - continued

| | | | |
|--------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| Rated operating current 50/60Hz ⁵⁾ (A) | 13 / 14 | | 6.4 / 6.7 |
| | Rate power consumption 50/60Hz ⁵⁾ (kW [kVA]) | | 3.3 / 4.2 [4.4 / 4.9] 3.4 / 4.2 [4.4 / 4.7] |
| Sound level (Front 1m/Height 1m) ⁵⁾ (dB(A)) | | 65 | |
| Accessory | | Alarm code list table 2pc. (English 1pc. / Japanese 1pc.), Operation manual 2 pc. (English 1pc. / Japanese 1pc.), Y-strainer (40 mesh) 25A, Barrel nipple 25A, Anchor brackets 2pc (including M10 bolts 4pc.) ⁸⁾ . | |
| Weight (dry condition) | | 124 | |
| Compliance standard | CE Marking | 2014/30/EU | |
| | EMC directive Machinery directive | 2006/42/EC | |

Notes:

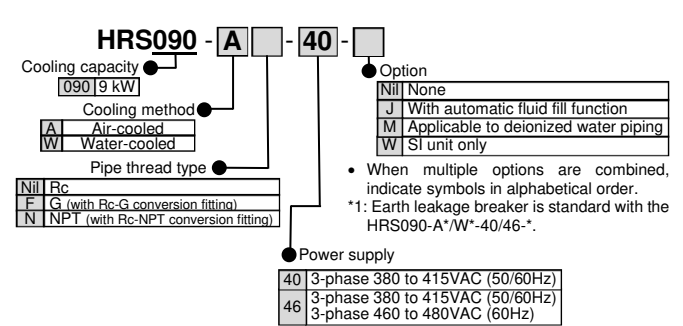
- *1: Use 15% ethylene glycol aqueous solution if operating in a place where the circulating fluid temp. or ambient temperature is lower than 10°C. Please discharge the facility water from the facility water circuit when there is a risk of freezing.
- *2: Use fluid in condition below as the circulating fluid.
Tap water: Standard of The Japan Refrigeration And Air Conditioning Industry Association (JRA GL-02-1994)
15% ethylene glycol aqueous solution: diluted by tap water in condition above without any additives such as antiseptics.
Deionized water: Conductivity 1μS/cm and higher (electrical resistivity 1MΩ · cm and lower)
- *3: (1) Facility water temp.: 32°C, (2) Circulating fluid: Tap water, (3) Circulating fluid temp.: 20°C, (4) Circulating fluid flow rate: Rated flow rate, (5) Power supply: AC400V for HRS090-W*-40/46-*.
4: (1) Facility water temp.: 32°C, (2) Circulating fluid: Tap water. (3) Circulating fluid flow rate: Rated flow rate, (4) Power supply: AC400V for HRS090-W-40/46-*.
5: (1) Facility water temp.: 32°C, (2) Circulating fluid: Tap water, (3) Circulating fluid temp.: 20°C, (4) Heat load: Same as the cooling capacity, (5) Circulating fluid flow rate: Rated flow rate, (6) Power: AC400V for HRS090-W-40/46-*, (7) External piping length: Minimum.
*6: When circulating fluid outlet port pressure = 0.5MPa.
*7: Fluid flow rate to maintain the cooling capacity and to keep the circulating fluid outlet port pressure to 0.5MPa or less. If the actual flow rate is lower than this, please install a bypass piping.
*8: To be prepared by the customer. A specified earth leakage breaker is installed for option B [Earth leakage breaker] of each model.
*9: The anchor brackets (including M10 bolts) are used for fixation with the skid when this product is packed. The anchor bolts are not attached.

2.1 Product Serial Number Code

The product serial number code printed on the label indicates the month and the year of production as per the following table:

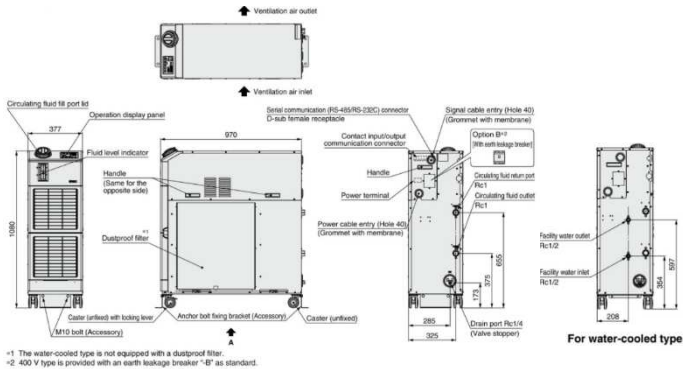
| Year | | 2021 | 2022 | 2023 | .... | 2026 | 2027 | 2028 | .... |
|-------|---|------|------|------|------|------|------|------|------|
| Month | | Z | A | B | .... | E | F | G | .... |
| Jan | o | Zo | Ao | Bo | .... | Eo | Fo | Go | .... |
| Feb | p | Zp | Ap | Bp | .... | Ep | Fp | Gp | .... |
| Mar | Q | ZQ | AQ | BQ | .... | EQ | FQ | GQ | .... |
| Apr | R | ZR | AR | BR | .... | ER | FR | GR | .... |
| May | S | ZS | AS | BS | .... | ES | FS | GS | .... |
| Jun | T | ZT | AT | BT | .... | ET | FT | GT | .... |
| Jul | U | ZU | AU | BU | .... | EU | FU | GU | .... |
| Aug | V | ZV | AV | BV | .... | EV | FV | GV | .... |
| Sep | W | ZW | AW | BW | .... | EW | FW | GW | .... |
| Oct | X | ZX | AX | BX | .... | EX | FX | GX | .... |
| Nov | y | Zy | Ay | By | .... | Ey | Fy | Gy | .... |
| Dec | Z | ZZ | AZ | BZ | .... | EZ | FZ | GZ | .... |

3 How to Order



4 Outline Dimensions

4.1 Outline Dimensions for HRS090*-40/46



5 Name of Parts and Accessories

5.1 Accessories Table

| | | | |
|---|--------------------------------------------------------|--------------------------------------|--|
| 1 | Alarm code list label | 2pcs. (English 1pc. / Japanese 1pc.) | |
| 2 | Operation manual | 2pcs. (English 1pc. / Japanese 1pc.) | |
| 3 | Y strainer (40 mesh) 25A | 1pc. | |
| 4 | Barrel nipple 25A | 1pc. | |
| 5 | For HRS090-AF-*, G thread adapter set (HRS-EP019) | 1 set | |
| | For HRS090-AN-*, NPT thread adapter set (HRS-EP018) | 1 set | |
| | For HRS090-AF-*, J, G thread adapter set (HRS-EP021) | 1 set | |
| | For HRS090-AN-*, J, NPT thread adapter set (HRS-EP020) | 1 set | |
| | For HRS090-WF-*, G thread adapter set (HRS-EP023) | 1 set | |
| | For HRS090-WN-*, NPT thread adapter set (HRS-EP022) | 1 set | |
| 6 | For HRS090-WF-*, J, G thread adapter set (HRS-EP025) | 1 set | |
| | For HRS090-WN-*, J, NPT thread adapter set (HRS-EP024) | 1 set | |
| 6 | Anchor brackets *The anchor bolts are not attached. | 2pcs. | |

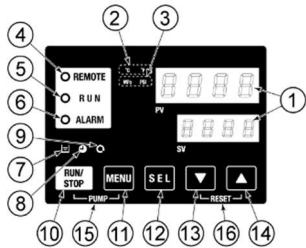
5.2 Function of Parts

| Name | Function |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operation display panel | Runs and stops the product and preforms settings such as the circulating fluid temperature. For details, refer to Operation Manual section "2.4 Operation display panel". |
| Fluid level gauge | Indicates the circulating fluid level of the tank. Confirm the level is between HIGH and LOW. For details, refer to Operation Manual section "3.5 Circulating Fluid Supply". |
| Product label | Shows the product information such as model number and serial number. For details, refer to Operation Manual section "1.4 Product Label". |
| Circulating fluid outlet port | The circulating fluid flows out from the outlet port. |
| Circulating fluid return port | The circulating fluid returns to the return port. |
| Drain port | The drain port to drain the circulating fluid out of the tank and the pump. |
| Automatic fluid fill port | Piping to the automatic fluid filling port enables easy supply of the circulating fluid through the ball tap in the reservoir. The supply pressure should be within the range of 0.2 to 0.5MPa |
| Overflow port | Be sure to connect piping from this port to sump pit to discharge the excess circulating fluid that is caused by fluid level rising. |
| Dust-proof filter | Inserted to prevent that the dust and contamination are clung on the air-cooled condensers directly. Clean the filter periodically. For details, refer to Operation Manual section "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 Operation Manual section "3.3.2 Electrical wiring" and "3.3.3 Preparation and wiring of power supply cable". |
| Power terminal | Insert the power cable to power cable entry and connect it to the signal connectors. For details, refer to Operation Manual section "3.3.5 Wiring of run/stop signal input · Remote signal input", "3.3.6 Wiring of external switch signal input", "3.3.7 Wiring of contact output signal", "3.3.8 RS-485 communication wiring", "3.3.9 RS-232C communication wiring" or the operation manual communication function |
| Signal cable entry | Insert the power cable to power cable entry and connect it to the signal connectors. For details, refer to Operation Manual section "3.3.5 Wiring of run/stop signal input · Remote signal input", "3.3.6 Wiring of external switch signal input", "3.3.7 Wiring of contact output signal", "3.3.8 RS-485 communication wiring", "3.3.9 RS-232C communication wiring" or the operation manual communication function |
| Signal connectors | Insert the power cable to power cable entry and connect it to the signal connectors. For details, refer to Operation Manual section "3.3.5 Wiring of run/stop signal input · Remote signal input", "3.3.6 Wiring of external switch signal input", "3.3.7 Wiring of contact 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 | Shuts off the power supply to the internal equipment of the product. (Parts energised remained in the product). For details, refer to Operation Manual section "3.3.2 Electrical wiring" for the earth leakage breaker. |
| Facility water inlet port | Supply facility water to the inlet port |
| Facility water outlet port | Facility water is discharged from the outlet port and returns to the user's facility water system. |
| Automatic water-fill port | Piping to the automatic fluid filling port enables easy supply of the circulating fluid through the built-in solenoid valve. The supply pressure should be in a range of 0.2 to 0.5MPa. |
| Overflow port | This is necessary when automatic fluid filling function. Discharge excess circulating fluid when the fluid level in the tank rises. (Option JI is selected.) |

5 Name of Parts and Accessories - continued

5.3 Operation Panel

The operation panel on the front of the product controls the basic operation of the product.



| No | Description | Function |
|----|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Digital display (7 segment, 4 digits) | PV Displays the temperature and pressure of the circulating fluid and alarm codes. |
| | | SV Displays the set temperature of the circulating fluid and the set values of other menus. |
| 2 | [°C °F] light | Displays the units of the display temperature (°C or °F). |
| 3 | [MPa PSI] light | Displays the units of the display pressure (MPa or PSI). |
| 4 | [REMOTE] light | Turns on during remote operation by communication. |
| 5 | [RUN] light | <ul style="list-style-type: none">Turns ON when the product is started in an operation. Turns OFF when the product stops.Blinks during standby for stop (Interval 0.5 seconds).Blinks during independent operation of the pump (Interval 0.3 seconds).Blinks while the anti-freeze function is being set (During standby: Interval 2 seconds, During operation: Interval 0.3 seconds).Blinks during warming up function (During standby: Turns ON for 0.5 seconds and OFF for 3 seconds, During operation: Interval 0.3 seconds). |
| 6 | [ALARM] light | Blinks with buzzer when alarm occurs (Interval 0.3 seconds). Blinks while AL25 is OFF (Turns ON for 0.5 seconds and OFF for 3 seconds). |
| 7 | [L] light | Turns ON when the fluid level lowers below "L" (low) level. |
| 8 | [⊕] light | Turns ON while the run timer or stop timer function is working. |
| 9 | [⊗] light | Turns ON when the product is in automatic operation. |
| 10 | [RUN/STOP] key | Makes the product start or stop. |
| 11 | [MENU] key | Moves from the main menu (display which shows circulating fluid temperature, pressure, etc.) to the other menus (entry of set values and monitor screen). |
| 12 | [SEL] key | Changes the item in the menu and enters the set value. |
| 13 | [▼] key | Decrease the set value. |
| 14 | [▲] key | Increases the set value. |
| 15 | [PUMP] key | When the [MENU] and [RUN/STOP] buttons are held down simultaneously, the pump starts running independently. |
| 16 | [RESET] key | Press the [▼] and [▲] keys simultaneously. This will stop the alarm buzzer and turn off the [ALARM] light. Keep the [▼] and [▲] keys pressed down simultaneously for 3 seconds to reset AL46 and AL48. (After resetting AL48, WAIT (WAITING) will be displayed and the product cannot start running for 40 seconds. Restart 40 seconds later after resetting. |

6 Transportation

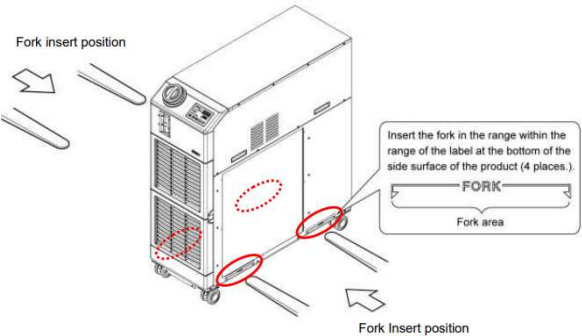
- Warning
- Only persons who have sufficient knowledge and experience about the product and system are allowed to transport and set up the product.
 - Especially pay attention to personal safety.

- Warning
- When moving the product by a forklift, insert the fork into the right positions referring to section "6.1 Transporting Using Forklift and Hanging". Moving by forklift and slinging should be done by persons who have the licenses.
 - Be sure to use all four eye bolts when slinging the product.
 - The slant angle of each rope should be 60 degrees or less.

- Cation
- Never lay the product on its side. The compressor oil will leak into the refrigerant piping, which may cause early failure of the compressor.
 - Drain the residual fluid from the piping as much as possible to prevent any spillage.
 - When the product is carried by using forklift, make sure that the fork does not damage the cover panels and piping ports.

6.1 Transportation Using Forklift and Hanging

- Warning
- The product is a heavy object (refer to section "2. Specification" for weight of the product). Moving by forklift and slinging should be done by persons who have the licenses.

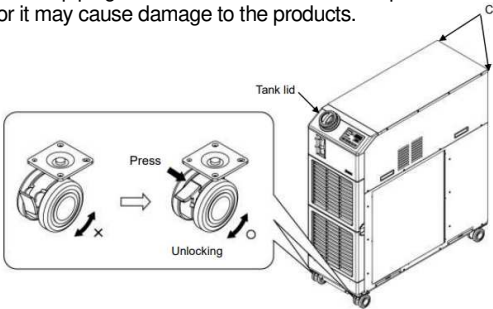


6 Transportation - continued

6.2 Transportation Using Casters

- Warning
- This is a heavy object (refer to section "2. Specification" for weight of the product).
 - Moving the product by casters should be done by 2 persons or more.
 - Do not impact the casters by bump. It will damage the casters and the base of the Themo chiller.

- Cation
- Raise the adjuster feet and push the corners of the product when moving the product using casters.
Do not hold the piping connections or handles of the panels when moving by casters, or it may cause damage to the products.



7 Installation

- Warning
- Do not set up the product in places possibly exposed to leakage of flammable gas. Should any flammable gas stay around the product, the product may cause a fire.

- Cation
- Keep the product upright on a rigid and flat floor which can resist the weight of the product. Take precautions 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 if the product between 5 to 45°C. Operation out of this ambient temperature range may cause a malfunction of the product. Operating the product in an ambient temperature greater than 45°C may reduce the heat discharging

- efficiency of the heat exchanger and the safety device may activate. This will result in the product stopping operation.
- The installer/end user is responsible for carrying out an acoustic noise risk assessment on the equipment after installation and taking appropriate measures as required.

7.1 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.
The product is not designed for clean room. The pump and ventilating fan inside the product generate particles.
- 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, chemic 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: 5 to 45°C
 - Location where condensation forms on the inside if 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 subject to abrupt changes in temperature.
 - Location that is subject to strong electromagnetic noise (intense electric field, intense magnetic field, or surges).
 - Location that is subjected to strong high frequencies radiation (microwaves).
 - Location that is subject to potential lightning strike.
 - 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 manufacturing as required.
 - For operation in an ambient temperature of 10°C or less, use ethylene glycol solution at 15% concentration as the circulating fluid.

7 Installation - continued

7.1.1 Installation at altitudes of 1000m or more

Due to the lower air density, the heat radiation efficiencies of the devices in the product will be lower in the location at altitude of 100m or higher. So, the maximum ambient temperature for the thermo-chiller operation and the cooling capacity will be reduced. See table below for details.

| Altitude | Max. ambient temp. (°C) | Cooling capacity correction coefficient |
|-------------------------|-------------------------|-----------------------------------------|
| Less than 1000m | 45 | 1.00 |
| 1000m – less than 1500m | 42 | 0.85 |
| 1500m – less than 2000m | 38 | 0.80 |
| 2000m – less than 2500m | 35 | 0.75 |
| 2500m – less than 3000m | 32 | 0.70 |

7.2 Location

- Cation
- Do not install in a location which can be subjected to any of the conditions in section "7.1 Environment".

- Cation
- If the air-cooled product 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 affect the performance and life of the product. To prevent this, ensure that suitable ventilation is available (see below).
- 7.2.1 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.
- 7.2.2 Installation at indoor site**
- In case of facility having a large installation area (that can vent air naturally) – Make an air outlet on a wall at a high level and an air inlet at a low level, to allow for adequate air flow.
 - In case of facility having a small installation area (that cannot vent 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.
 - Using ducts to exhaust the air – In case the indoor site cannot accept the exhaust 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. Leave a space which is equal or greater than the duct's diameter. Use a fan for the duct that considered the ventilation resistance of the duct.

7.2.3 Radiation and Ventilation for Air-cooled Products

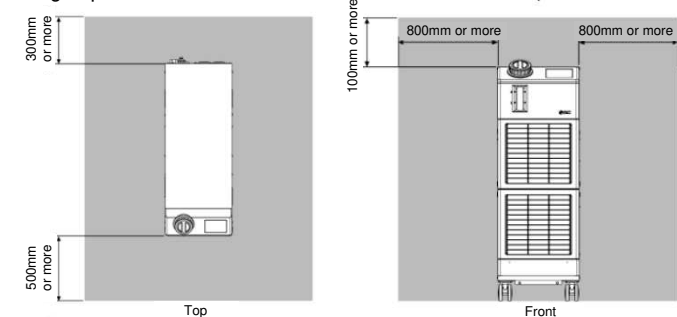
| Model | Heat radiation (kW) | Required ventilation amount m³/min | |
|-------------------|---------------------|---------------------------------------------------------------------------|---------------------------------------------------------------------------|
| | | Differential temp. of 3°C between inside and outside if installation area | Differential temp. of 6°C between inside and outside if installation area |
| HRS090-A*-40/46-* | Approx. 17 | 290 | 145 |

7.2.4 Radiation and Facility Water for Water-cooled Products

| Model | Heat radiation (kW) | Facility water specifications |
|-------------------|---------------------|--------------------------------------|
| HRS090-W*-40/46-* | Approx. 17 | Refer to section "2. Specifications" |

7.3 Installation and Maintenance Space

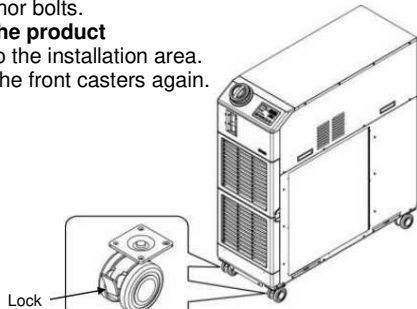
- Cation
- Have enough space for the ventilation for the product. Otherwise, it may cause a lack of cooling capacity or/and stoppage of the product. Have enough space for maintenance.



7 Installation - continued

7.4 Installation Procedure

- Cation
- Install the product on a horizontal and level floor.
Prepare M10 anchor bolts that are appropriate to the material of the floor that the product will be installed. Drive the anchor bolts at least two places of the left and right side of the product (four places in total). Refer to Operation Manual section "9.2 Outline dimensions" for the dimensions for the position of the anchor bolts.
- 7.4.1 How to mount the product**
- Move the product to the installation area.
 - After moving, lock the front casters again.



7.5 Electrical Wiring

- Warning
- Do not modify the internal electrical wiring of the product. Incorrect wiring may cause electrical shock or fire. Also modifying the internal wiring will void the product's warranty.
 - NEVER connect the ground to a water line, a gas pipe or a lightning conductor.
- Warning
- The installation of electrical equipment and wiring work should only be performed 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 information in section "7.5.1 Power Supply Specifications, Power Supply Cable and Earth Leakage Breaker". The wiring must be firmly secured into the product to prevent the external force of cables being applied to the terminals. Incomplete wiring or improper securing of wiring may cause electric shocks, 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 section "7.5.1 Power Supply Specifications, Power Supply Cable and Earth Leakage Breaker" for details.
- Use a power supply suitable for the specification of the product. 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 if 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. If the voltage rate of increase (dv/dt) at zero crossing exceeds 40V/200µsec, it may cause malfunction.

7.5.1 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.

| Model | Power supply voltage | Terminal block screw diameter | Recommended crimp terminal | Cable qty. x size ² | Earth leakage breaker ¹ | |
|----------------|---------------------------------------------|-------------------------------|----------------------------|-------------------------------------------------------|------------------------------------|----------------------------------|
| | | | | | Rated current (A) | Sensitivity of leak current (mA) |
| HRS090-**-40-* | 3 phase 380 to 415 VAC (50/60Hz) | M5 | R5.5-5 | 4 cores x AWG10 (4 cores x 5.5 mm²) *including ground | 20 | 30 |
| HRS090-**-46-* | 3 phase 380-415VAC (50/60Hz), 460-480V 60Hz | | | | | |

7 Installation - continued

- Notes:
- *1: A specified earth leakage breaker is installed for option B of each model. If the product is not option B, please prepare an earth leakage breaker by the user's side. A specified earth leakage breaker is installed for HRS090-**-40/46-.*
 - *2: Cable specification are the example when using the product at a continuous allowable operating temperature of 70°C, with an operating voltage of 600V and two kinds of plastic insulated wires at an ambient temperature of 30°C. Please select the proper size of cable according to the actual condition.

7.6 Preparation and Wiring of Power Supply Cable

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 power supply. Operation with voltages, capacities and frequencies other than the specified values can cause fire and electrical shock.
- Wire with an applicable cable size and terminal. Forcefully mounting with an unsuitable size may result in heat generation or fire.

Warning

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

Warning

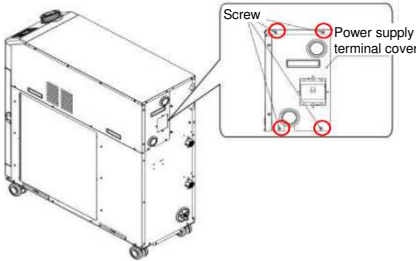
Be sure to connect the power supply cable from the product side first, and then connect the breaker of the facility power supply (the user's machine power supply).

Caution

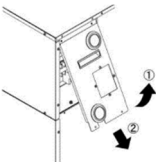
When the panel is removed or mounted, be sure to wear protective shoes and gloves to prevent injury with the edge of the panel.

7.6.1 Power Supply Cable Wiring

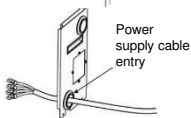
- Remove four screws to remove the power supply terminal cover.



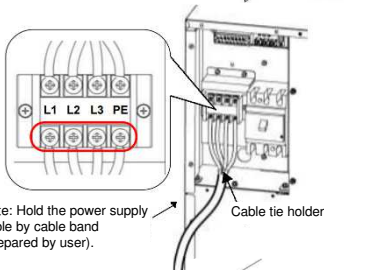
- Hold the handle and pull the bottom of the cover forward and remove it moving the cover downwards.



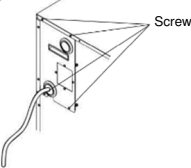
- Insert the power supply cable and ground cable to the power supply cable entry of the power supply terminal cover (grommet with film).



- Connect the power supply and ground cable as shown in the figure right.



- Mount the power supply terminal cover using four screws.



7.7 Piping

Caution

- Connect piping firmly. Incorrect piping might cause leakage of supplied or drained fluid and wet surrounding area and facility.
- Use caution not to allow dust, chips, cutting oil and other foreign matter to enter the water circuit, etc. during connection of piping.
- During piping work, residual liquid may drip from the circulating fluid circuit or facility water circuit. Prepare a drain pan near the pipe connection so that the residual liquid can be received.

7 Installation - continued

- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Securely connect the piping at the piping port with specific wrench when tightening.
- Incorrect piping can burst in service.
- Use non-corrosive material for fluid contact parts of circulating fluid and/or facility water.
- Do not use corrosive material such as aluminium or iron for fluid contact parts, such as piping. Using such materials may lead to clogging or leakage in the circulating fluid and facility water circuits. Also, it may cause refrigerant leak and other unexpected problems.
- Do not generate a rapid change of pressure by water hammer, etc. Internal parts of the product and/or the piping may be damaged.
- Facility water temperature of the facility water outlet port might rise to approximately 60°C.

7.7.1 Piping Port Size

| Name | Port size | Recommend tightening torque | Recommended piping specification |
|------------------------------------------|-----------|-----------------------------|-----------------------------------------------------------------|
| Circulating fluid outlet port | Rc1 | 36 to 38N·m | 1.0MPa and more |
| Circulating fluid return port | Rc1 | 36 to 38N·m | 1.0MPa and more |
| Facility water inlet port ^{*1} | Rc1/2 | 28 to 30N·m | 1.0MPa and more (Supply pressure: 0.3 to 0.5 MPa) |
| Facility water outlet port ^{*1} | Rc1/2 | 28 to 30N·m | 1.0MPa and more (Automatic fluid fill pressure: 0.2 to 0.5 MPa) |
| Automatic fluid fill port ^{*2} | Rc3/8 | 22 to 24N·m | 1.0MPa and more (Automatic fluid fill pressure: 0.2 to 0.5 MPa) |
| Overflow port ^{*2} | Rc3/4 | 28 to 30N·m | ID19mm and more |
| Drain port | Rc1/4 | 8 to 12N·m | --- |

Notes: *1: Water cooled type only. *2: For Option J [Automatic fluid filling].
For HRS***-AN/WN-: A set of thread adapters that converts the connectors from Rc to NPT is enclosed as an accessory. For NPT thread, be sure to use this adapter.
For HRS***-AF/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.

7.8 Circulating Fluid Supply

Caution

- When tap water is used, refer to Operation Manual section "8.1 Quality Control of Circulating Fluid and Facility Water".
- When 15% ethylene glycol aqueous solution is used, dilute pure ethylene glycol with water. Additives cannot be used.
- When deionised water is used, the conductivity should be 1µS/cm or higher (Electrical resistivity: 1MΩ·cm or lower).
- Confirm that the fluid level is between "HIGH" and "LOW" level of the fluid level gauge.

- Confirm that the valve of the drain port is closed to prevent the supplied circulating fluid from draining out.
- When the set circulating fluid temperature and/or the ambient temperature is lower than 10°C, use a 15% aqueous solution of ethylene glycol. Tap water may be frozen in the thermo-chiller which may damage the product.

7.8.1 15% Aqueous Solution of Ethylene Glycol

When a 15% aqueous solution of ethylene glycol is used, prepare the ethylene glycol aqueous solution separately.

To control the density of the ethylene glycol aqueous solution, a densitometer is available (sold separately) from SMC.

| Item | Part No | Remarks |
|--------------------------------------|-----------|-------------------------------------------------|
| Ethylene glycol aqueous solution 60% | HRZ-BR001 | Please dilute to 15% with tap water and use it. |
| Densitometer | HRZ-BR002 | --- |

Caution

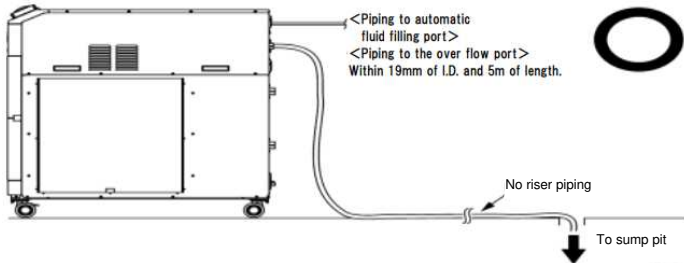
When a 15% aqueous solution of ethylene glycol is used, check the density periodically because the density will be lower due to the automatic fluid-fill function.

7.8.2 Automatic Fluid-Fill Function

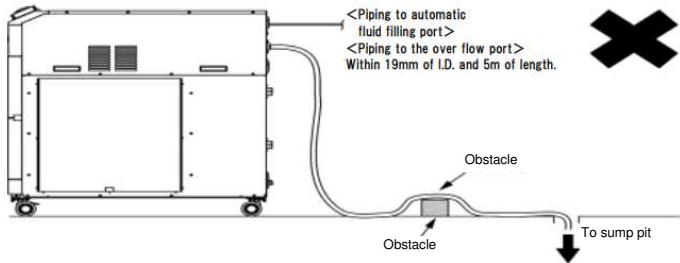
Automatic fluid filling port and overflow port need to be connected when optional automatic fluid filling is selected.

Caution

- Be sure to connect the piping from the overflow port to the sump pit to drain the excessive amount of the fluid from the tank.
- When using a 15% aqueous solution of ethylene glycol, collect the overflowed fluid in the recycling pit and dispose it according to the local law of the country and area that the product is installed.



7 Installation - continued



| Piping name | Port size | Piping specification |
|---------------------------|-----------|-------------------------------------------------------------------------------------------------|
| Automatic fill fluid port | Rc3/8 | Supply pressure: 0.2 to 0.5MPa Supply temperature: 5 to 40°C |
| Overflow port | Rc3/4 | The piping should be within Ø19mm ID and 5 meters in length, Avoid riser piping (trapping part) |

8 Starting the Product

8.1 Before Starting

Caution

Only people who have sufficient knowledge and experience about the product and its accessories are allowed to start and stop the product. Check the following points before starting

- Installation state
 - Check 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 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.
- Piping to automatic fluid-fill port
 - Confirm that the piping to the automatic fluid-fill port is correctly connected
- Piping to overflow port
 - Piping must be connected to the overflow port regardless of using or not using the automatic fluid-fill function.
 - Confirm that the piping to the overflow port is correctly connected.

- Fluid level gauge
 - Confirm that the fluid level is between "HIGH" and "LOW" levels of the fluid level gauge.
- Facility water piping (For water cooled type)
 - Check that the piping is correctly connected to the facility water inlet and outlet ports.
 - Confirm that the facility water source is in operation.
 - Confirm that the facility water circuit is not closed with a valve, etc.

Note: A water control valve is mounted inside the water-cooled thermo-chiller. For the water-cooled type, facility water may not run without operating the product.

Caution

Facility water quality must satisfy the quality standard shown in Operation Manual section "8.1 Quality Control of Circulating Fluid and Facility Water" and the conditions shown in section "2. Specifications".

8.2 Preparing for Start

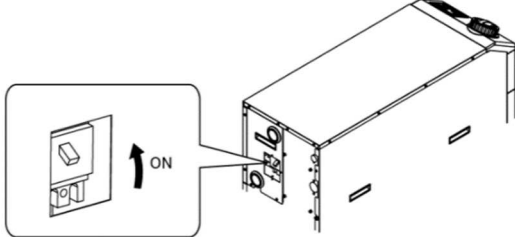
8.2.1 Power Supply

Turn ON the breaker of the user's power supply. When the product is switched ON, the operation panel display operates as shown below:

- The initial screen (HELLO screen) is displayed for 8 seconds on the operation display panel. Then, the display moves to the main display which shows the circulating fluid outlet temperature.
- The set circulating fluid temperature is displayed as SV on the digital display.
- The present circulating fluid temperature is displayed as PV on the digital display.

8.2.2 Option B [Earth leakage breaker], HRS090-**-40/46-*

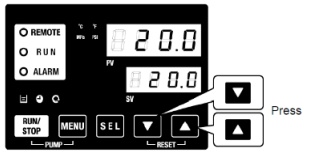
Turn on the breaker switch on the back of the product.



9 Starting the Product - continued

9.1.1 Setting the Circulating Fluid Temperature

Press the [▼] and [▲] button on the operation panel to change the SV to the required value. When setting the circulating fluid temperature by communication, refer to Operation Manual Communication Function.



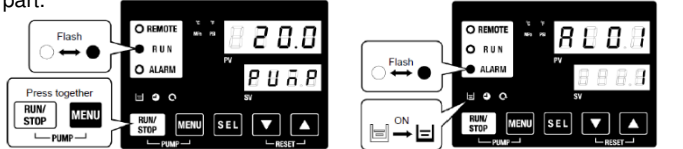
9.2 Preparation of Circulating Fluid

Circulating fluid is supplied only inside of the product at the time of installation of the thermo-chiller. When the product starts operation in this condition, circulating fluid level will be reduced as the fluid in the level gauge goes down. This is due to the fluid supply to the user's equipment from the thermo-chiller, so additional fluid needs to be supplied to the thermo-chiller.

- Press the [PUMP] button on the operation panel (press the [RUN/STOP] button and the [MENU] button simultaneously). The pump operates independently while the [PUMP] button is being pressed. The [RUN] light (green) blinks while the pump is operating independently and the circulating fluid in the tank is being supplied to the user's equipment and piping. This finds out leakage from the piping as well as discharges air from the piping. If the fluid in the tank reaches the lower limit, a buzzer will be generated, and the alarm number "AL01 (low level in tank)" is displayed as PV on the digital display. The [ALARM] light (red) blinks, the [H] light turns ON, and independent operation of the pump stops.

Caution

When any external fluid leakage is found with the piping during this operation, stop the individual operation of the pump and fix the leaking part.



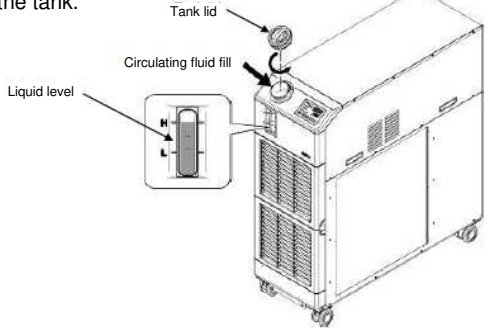
- Press the [RESET] button (press the [▼] and [▲] buttons simultaneously) to stop the alarm buzzer.



Caution

Reset alarms on the "Alarm menu" screen. Alarm reset is not accepted from any screen except the "Alarm menu" screen. Refer to Operation Manual section "5.2.1 Key Operations".

- Open the tank lid and supply the circulating fluid up to the "H" mark on the tank.



Caution

Check the drain port is plugged or closed by the valve to prevent the supplied circulating fluid from draining out. When the fluid level falls lower than "L", the alarm will be generated.

8 Starting the Product - continued

4. Press the [RESET] button (press the [▼] and [▲] buttons simultaneously) to reset the alarm. Pressing these buttons at the same time resets the alarm (Low level tank) and turns OFF the [ALARM] LED (red) and the [] LED. The display returns to the initial main menu screen. Press the [PUMP] button (press the [RUN/STOP] button and the [MENU] button simultaneously) again to operate the pump individually.



5. Repeat steps 1 to 4 to supply the circulating fluid to the user's equipment and piping. Keep the fluid level in the tank between "HIGH" and "LOW" levels of the fluid level gauge of this product.

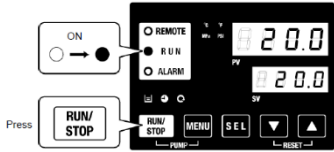
8.3 Operation Start and Stop

8.3.1 Starting the Product

Caution

Allow at least 5 minutes before restarting the product.

1. Press the [RUN/STOP] key on the operation panel. The [RUN] LED (green) turns ON and the product starts running. The circulating fluid discharge temperature (PV) is controlled to the set temperature (SV).



Caution

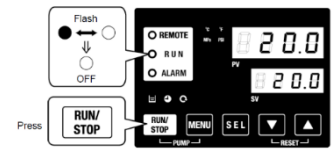
When any alarm is generated, refer to Operation Manual section "7 Alarm Notification and Troubleshooting".

2. Be sure to confirm that the circulating fluid level satisfies the minimum required flow rate specified for each model with the check monitor menu.

8.3.2 Stopping the Product

1. Press the [RUN/STOP] key on the operation panel. The [RUN] light on the operation panel blinks green at 1 second intervals, and

continues operation prepare to stop. After approximately 20 seconds, the [RUN] light turns OFF and the operation stops completely.



2. Turn off the earth leakage breaker of the user's power supply.

Caution

Except in case of emergency, do not turn off the breaker until the product has stopped completely. Otherwise, it may cause a failure.

9 Alarms and Troubleshooting

9.1 Alarm Notification

The product makes a notification in the following order when any alarm is generated:

- The [ALARM] light blink
- The alarm buzzer sounds
- The alarm number is displayed in the PV window on the digital display.
- Contact signal of the contact input/output communication is output.

Refer to the Operation Manual Communication Function for more detail. This product has two types of operation depending on the alarm being generated. Some of the alarms stop the product operation and some of them do not stop the operation with the alarm being generated.

Refer to Operation Manual "Table 7-1 to Table 7-3". When the operation shops due to the alarm, it is not possible to restart the operation until the alarm is reset.

- When multiple alarms are generated, the alarm codes are displayed one by one by pressing the [SEL] button

9.2 Alarm Buzzer Stop

An alarm buzzer sounds to warn when any alarms are generated. How to stop the alarm buzzer is explained below.

- Confirm that the alarm display is shown. The alarm buzzer can be stopped only on this screen.
- Press the [▼] and [▲] buttons simultaneously, and the alarm buzzer stops.

9 Alarms and Troubleshooting - continued

Alarm buzzers can be set not to make a sound. Refer to Operation Manual section "5.18 Alarm Buzzer Sound Setting". It is not necessary to follow the buzzer stop instruction when the alarm buzzer sound is set to OFF. If this procedure is performed when the cause of the alarm has been eliminated before stopping the alarm buzzer, the alarm will be reset at the same time.

9.3 Alarm contents, Causes, and Troubleshooting

Troubleshooting method varies depending on which alarm has been generated. Refer to Operation Manual "Table 7-1 to Table 7-3 Alarm codes and troubleshooting". Instructions to reset the alarms after eliminating the cause of the alarms is explained below.

- Confirm that the alarm display is shown. Alarms can only be reset on this screen.
- Press the [▼] and [▲] buttons simultaneously.
- The alarm is reset, and the [ALARM] light turns OFF. The operation panel displays the circulating fluid temperature and the set circulating fluid temperature. Contact signal output for the contact input/output communication stops. (Refer to the Operation Manual Communication Function for more details.)
- Operation status of the thermo-chiller during the alarm is being generated can be customised by the user. Refer to Operation Manual section "5.21 Alarm Customizing Function" for more details.

10 Maintenance

10.1 General Maintenance

Warning

Use specified fluids only. If other fluids are used are used, they may damage the product, caused fluid leakage, or result in hazards such as electric shock or leakage of electricity. When using clear water (tap water), ensure that it satisfied the water quality criteria shown in the Operation Manual table "8-1 Quality criteria for clean water (tap water)". 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.

Caution

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

10.2 Inspection and Cleaning

Warning

- Do not preform button 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, etc.
- Do not touch the fins directly when cleaning the dust-proof filter. It may cause injury.
- 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.

10.2.1 Daily Check

| Item | Contents of check | |
|----------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Installation condition | Check the installation condition if the product | Check that there is no heavy object on the product or excessive force applying to the piping. Temperature should be within the specification range of the product. |
| Fluid leakage | Check the connected parts of the piping. | Check that there is no fluid leakage from the connected parts of the piping. |
| Amount if circulating fluid | Check the liquid level indicator. | Fluid level should be between "HIGH" and "LOW" levels of the fluid level meter. |
| Operation panel | Check the indications on the display. Check the functionality. | The numbers shown on the display should be clear and legible. Check that the buttons, [RUN/STOP], [MENU], [SEL], [▼] and [▲] operate correctly. |
| Circulating fluid temperature | Check the operation panel. | There should be no problem for operation. |
| Circulating fluid flow rate | Check the operation panel. | There should be no problem for operation. If flow rate has become smaller, check for any clogging of the Y-strainer and clean it. |
| Operating condition | Check the operating condition of the product. | There should be no abnormality with noise, vibration, smell, or generation of smoke. |
| Facility water (for water-cooled type) | Check the facility water condition. | Check that the temperature, pressure and flow rate are with the specification ranges. |

10.2.2 Monthly Check

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

10 Maintenance - continued

Cleaning of Air Ventilation

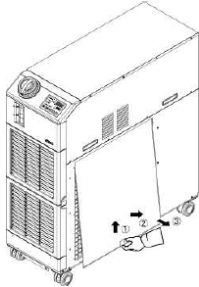
Caution

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 damaged or deformed.

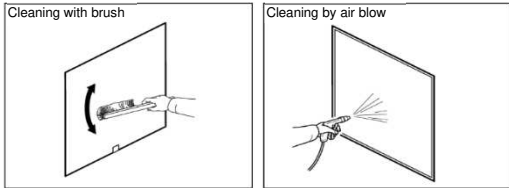
Removal of the Dust-proof Filter

1. The dust-proof filter is installed on the right side of the product.
2. Hold the pull tab at the bottom of the dustproof filter and lift the filter. Pull the filter forward, and lift it, then pull it downward. Care should be taken not to deform or scratch the air-cooled condenser (fins) while removing the filter.



Cleaning of Dust-proof Filter

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



Mounting of Dust-proof Filters

Assemble the filter in the reverse order to the removing procedure.

10.2.3 Inspection Every 3 Months

| Item | Contents of check | |
|----------------------------------------|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power supply | Check the power supply voltage. | •Make sure the supply voltage is within the specification range. |
| Circulating fluid | Replace the circulating water (clean water) periodically | •Ensure that the water has not been contaminated and that there is no algae growth. •Circulating water inside the tank must be clean and there must not be foreign matter inside. •Use clean water or pure water. The water quality must be within the range shown in the Operation Manual "Table 8-1" * It is recommended to replace the circulating fluid every 3 months when periodic maintenance is performed. |
| | Density control (When using 15% concentration ethylene glycol aqueous solution) | • Density must be within the range of 15% +5/-0. |
| 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 the Operation Manual "Table 8-1" |

Replacement of Circulating Fluid

- Replace the circulating fluid with new clean fluid periodically, or it may get algae or decompose.
 - Circulating fluid to be supplied in the tank should satisfy the water quality specified in the Operation Manual "Table 8-1"
 - When using 15% ethylene glycol solution, check that the concentration is within the range of 15% +5/-0.
 - Do NOT use chlorine-based or such types or detergents or cleansers.
 - When using the Y strainer provided as an accessory for piping, clean the screen mesh inside the strainer at the same time as when replacing the circulating fluid.
- Ensure that there is no circulating fluid in the thermo-chiller, user's equipment, and piping. Remove the cap and take out the screen mech inside and clean the screen mesh with compressed air or detergent. Use cation not to cause damage to the screen mesh.

Clean the Customer's Facility Water System (Water-cooled Type)

- Clean the customer's facility water system and replace facility water.
- Facility water quality must satisfy the criteria specified in the Operation Manual "Table 8-1".

10 Maintenance - continued

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.

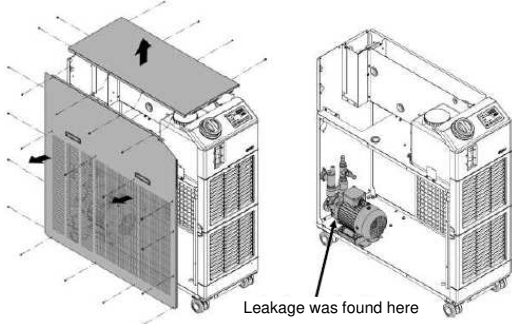
10.2.4 Inspection Every 6 Months

Check for Water Leakage from Pump

Remove the panel and check the pump for excessive leakage. If the leakage is found, replace the mechanical seal. Order the mechanical seal described in section "10.3 Consumables"

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 recommended lifetime of the mechanical seal before needing replacement is 6000 to 8000 hours.



10.3 Consumables

| Part number | Name | Qty. | Remarks |
|-------------|---------------------|------|---------------------------------------|
| HRS-S0306 | Dust-proof filter | 1 pc | 1 pc is used per unit |
| HRS-S0307 | Mechanical seal set | 1 pc | 1 set is used per unit |
| HRS-S0350 | Mechanical seal set | 1 pc | 1 set is used per unit (For option M) |

11 Limitation of Use

11.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

Caution

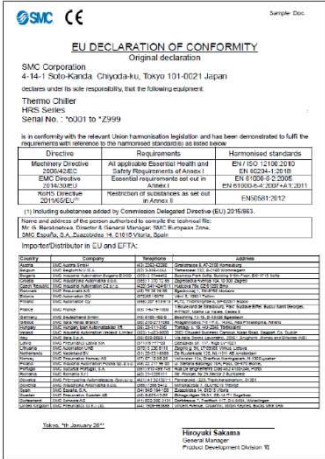
Refer to section "2. Specifications" for the product limitations of use.

12 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose this product correctly, in order to reduce the impact on human health and the environment.

13 Declaration of Conformity

Below are sample Document of Conformities (DoC) used for this product.



14 Contacts

Refer to www.smcworld.com or www.smc.eu for your local distributor/importer.

SMC Corporation

URL : <https://www.smcworld.com> (Global) <https://www.smc.eu> (Europe)
SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan
Specifications are subject to change without prior notice from the manufacturer.
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