FIBER COOLING CHILLER UNIT (200-230V AC)

# LP1173173

# OPERATION MANUAL

AMADA®

Y01OM1173243-10

Thank you for purchasing our Fiber Cooling Chiller Unit (200-230V AC) **LP1173173**.

- This operation manual explains its method of operation and precautions for use.
- Before using, read this operation manual carefully; after reading, save it in a proper place where you can easily access.

# Contents

| CAUTION |
| --- |
| For handling of thermo chiller and flow switch, refer to the attached operation manual. |

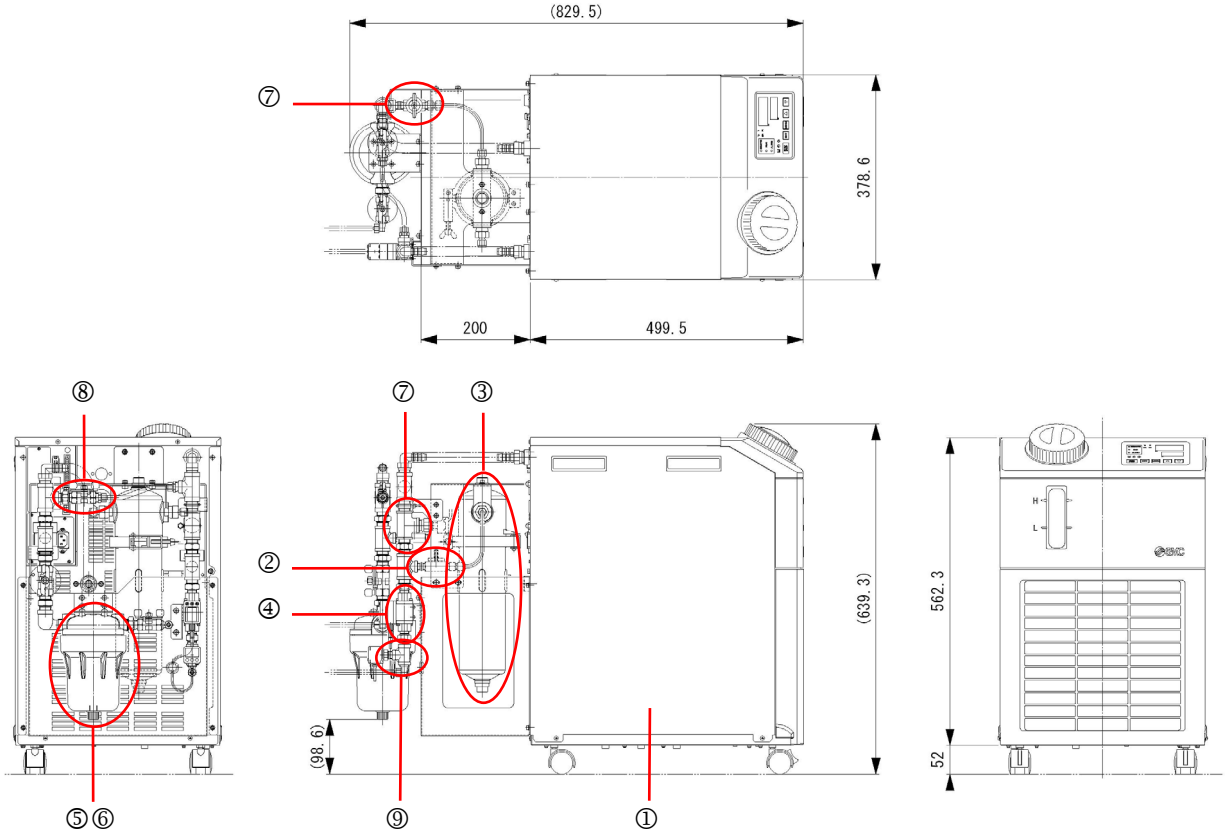
# 1. Configuration

| Part Name | Model No. | Q'ty |
| --- | --- | --- |
| Thermo chiller (HRS012-A-20-MT) | PZ1173142 | 1 |
| Alarm detecting cable (20 m) | AS1172750 | 1 |
| Different diameter coupling 8-6 for stainless pipe | SKUSDK8-6 | 4 |
| Coupling for stainless pipe | SKUTK8 | 2 |
| Insert material | SKITK8 | 10 |
| | SKITK6 | 4 |
| Polyolefin tube (20 m) | TPH0806W-20 | 2 |
| Soft polyolefin tube (1 m) | TPS0604W | 1 |
| NFH tightening spanner | PA1173184 | 1 |
| Power cable | PZ1169303 | 1 |
| DI filter cartridge | HRS-DF001 | 1 |
| Ferrule pack for reconnecting the coupling | SKFPK8 | 2 |

**Option**

| Part Name | Model No. | Item No. |
| --- | --- | --- |
| Alarm detecting cable (5 m) | AS1172751 | 1172751 |

# 2. Name and Functions of Each Section




| | |
|---|---|
| ① Thermo chiller | Controls the water temperature.<br>The recommended setting temperature is 27°C (no condensation). |
| ② Electrical resistivity sensor | Monitors the resistance value of cooling water. |
| ③ DI filter | Controls the resistance value of cooling water. |
| ④ Flow switch | Monitors the cooling water flow rate. |
| ⑤ Filter housing | Housing for the filter cartridge. |
| ⑥ Filter cartridge | Removes impurities from the cooling water. |
| ⑦ Valve | Used when replacing the filter cartridge. |
| ⑧ Flow regulator | Adjusts the flow rate. |
| ⑨ Pressure switch | Monitors the pressure of cooling water. |

# 3. Installation and Preparation

This chapter explains where to install the thermo chiller and cooling water.

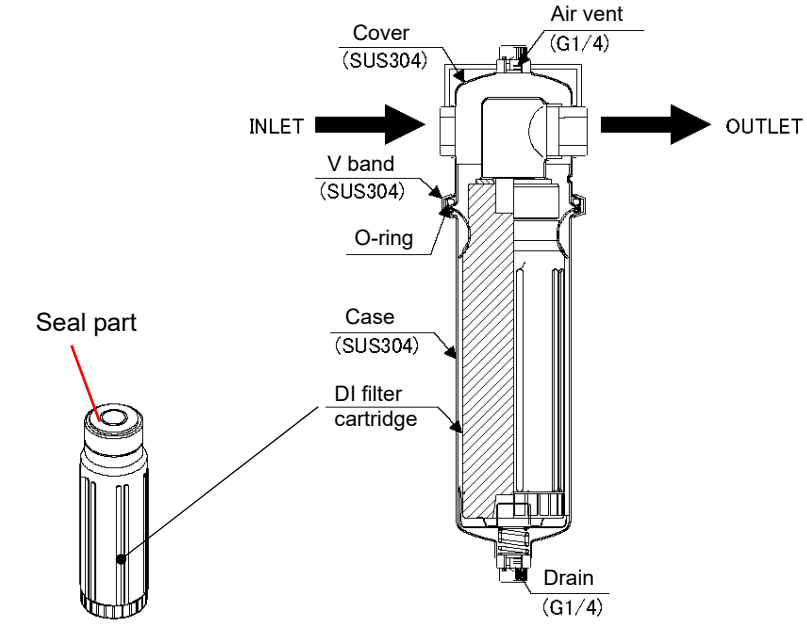
**① Installation Place**

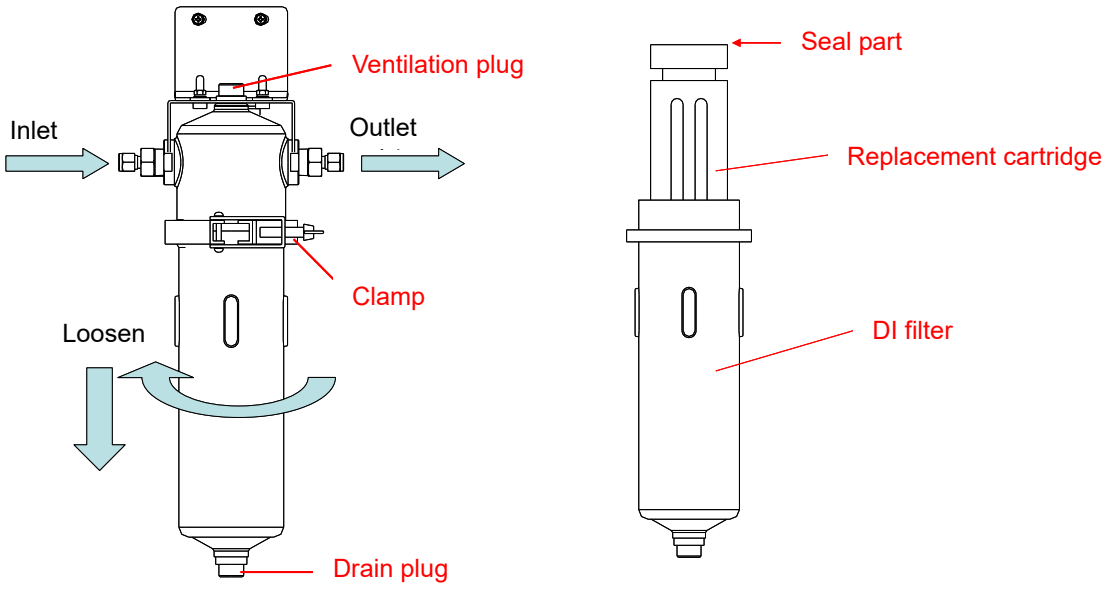
Follow the attached operation manual for the thermo chiller.

**② Mounting the DI Filter Replacement Cartridge**

Since the DI cartridge deteriorates on contact with the air, it is packed separately. Mount it before use.

1) Mount the a replacement cartridge with the seal part up. (See figure below.)



2) Mount the lower half of the DI filter with the reverse procedure to removing it.
3) Close the clamp.
4) Mount the drain plug.
5) Close the ventilation plug.
6) Start the thermo chiller with the valve of the DI filter closed.
7) Open the valve on the thermo chiller's RETURN side only.
8) Open the ventilation plug to remove air, and close it again.
9) Open the valve on the thermo chiller's OUTLET side.

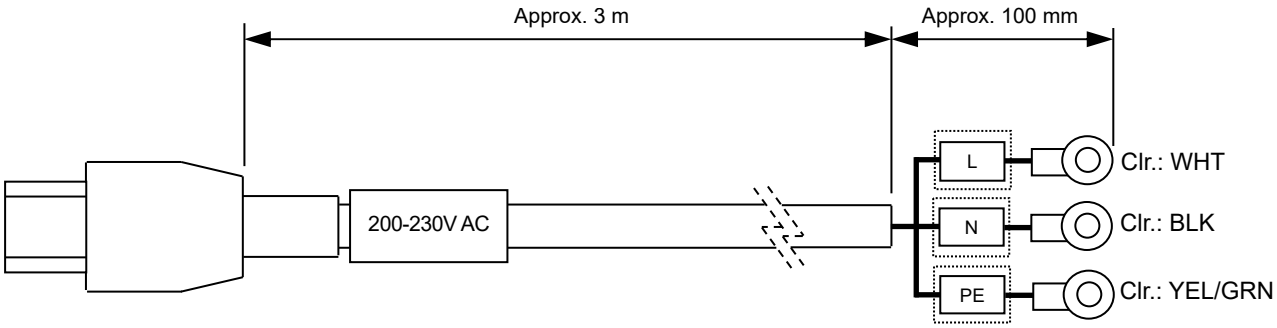
⇒ Check for leaks.
⇒ When the cartridge is replaced, the water level of the cooling water tank will drop. In that case, supply the cooling water.

**③ Cooling Water**

Use the cooling water meeting water quality standard established by Japan Refrigeration and Air Conditioning Industry Association (JRA GL-02-1994 / cooling water system - cyclic water - makeup water). (Cooling water supplied with the Laser or distilled water is recommended.)
Tap water, water for industrial use, or ground water may cause corrosion or clogging, resulting in fault of the equipment.

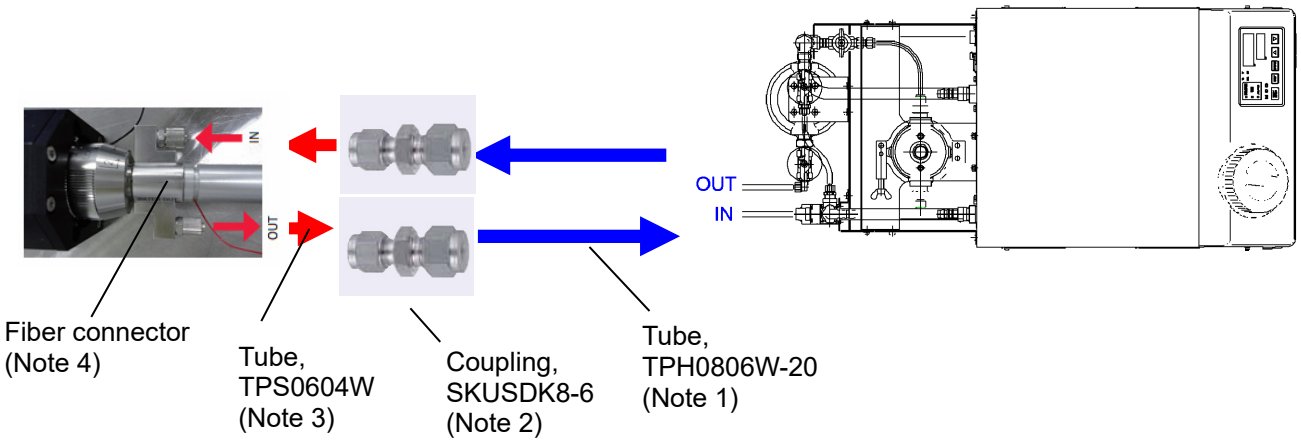
**④ Connections and Preparations of Each Section**

1) Connecting the power supply
When using the attached power cable (PZ1169303), use the terminal suitable for the terminal block on the customer side.



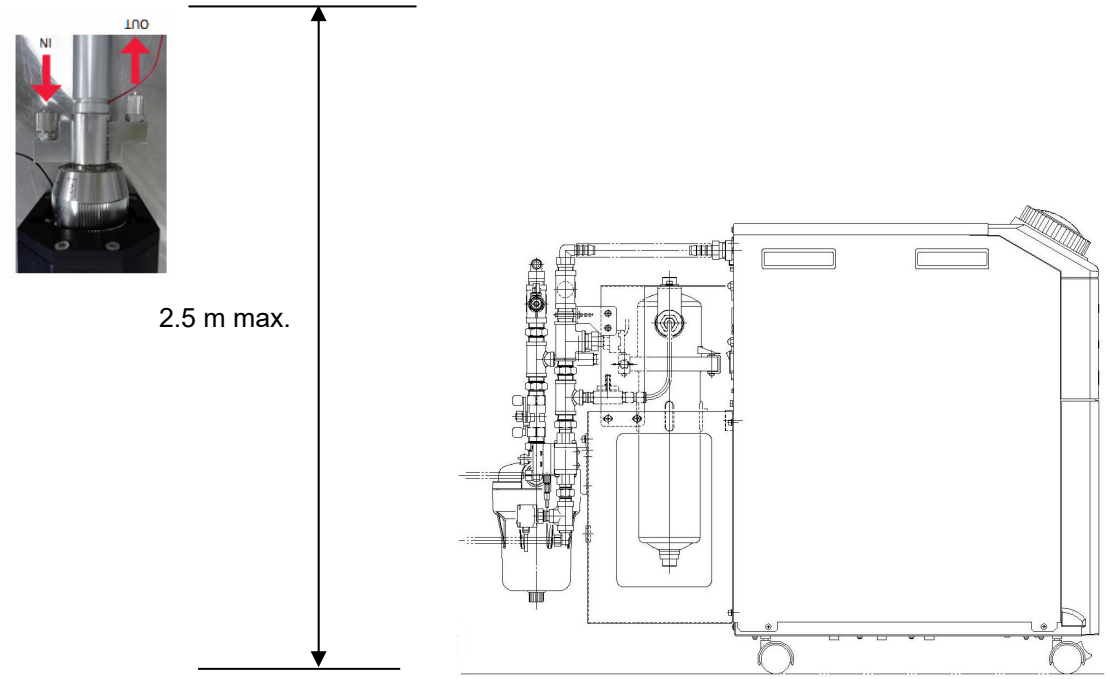

For wiring, follow the attached operation manual for the thermo chiller.

2) Connecting the tube



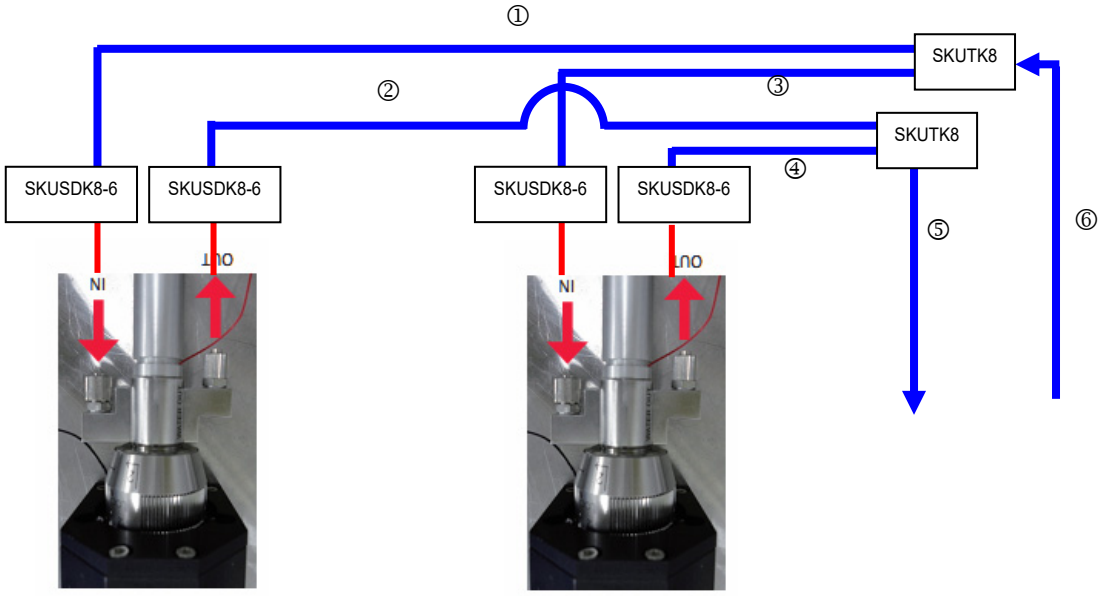

Note 1 Tube, TPH0806W-20

Cut the tube into any length in the range of 20 m on each side of IN/OUT.
(Since the required flow can not be secured with a tube over 20 m long, the flow rate error will occur.)
Install the fiber connector 2.5 m or less from the floor.
Secure the minimum bending radius 100 mm.



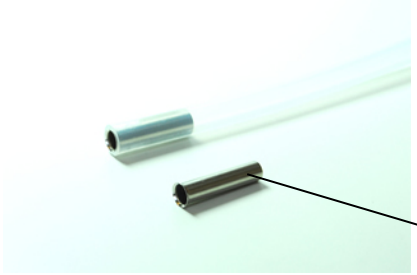
When cooling plural optical fibers:

- Up to two optical fibers can be cooled.
- Connect optical fibers in parallel as shown below.
- The maximum length of cooling tube should be 40 m in total. (①+②+③+④+⑤+⑥= 40 m max.)




Note 2 Coupling, SKUSDK8-6

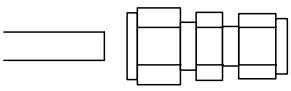
Be sure to insert the insert material (SKITK8 or SKITK6) before connection.



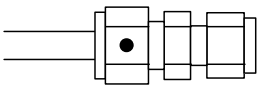
Insert material (SKITK8 or SKITK6)

**[Connection method]**

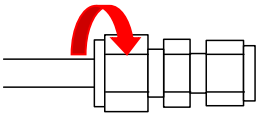
a. Without removing the nut, insert the tube into the coupling and push the end of the tube all the way in.



b. Tighten the nut with a hand until it stops moving. Put a mark in this position.



c. Rotate the nut 450 degrees clockwise with a spanner, keeping the coupling body with another spanner from moving.



**[Reconnection method]**

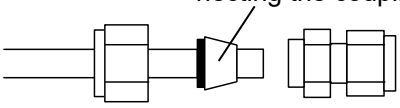
a. Before loosening the nut, check its position. (This position is used as a reference in the Step d.)

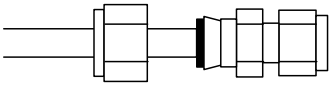
b. Remove the nut.
Check again that the front ferrule is mounted at the proper position.
Check that no foreign matter is attached to the body.

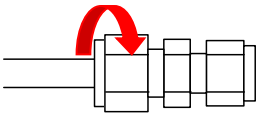
c. Insert the front ferrule until it attaches firmly to the body and tighten the nut with a hand.
Take care not to scratch the body with the end of the tube.

d. Tighten the nut with a spanner until it goes slightly over the position before loosened (15 to 30 degrees).

SKFPK8
Ferrule pack for reconnecting the coupling

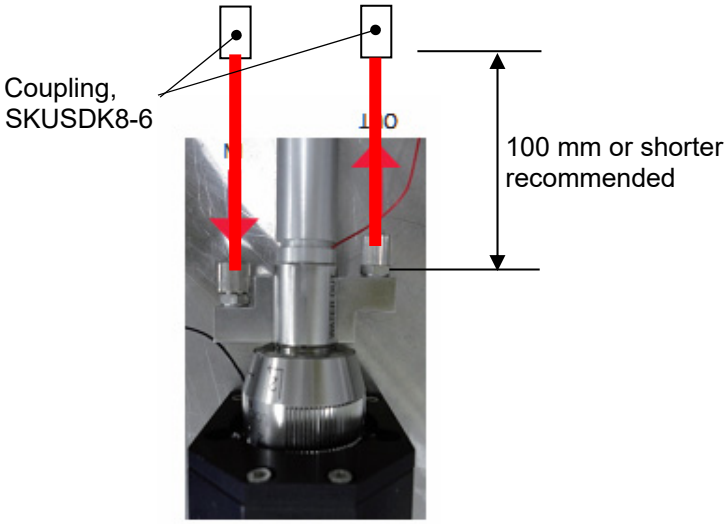






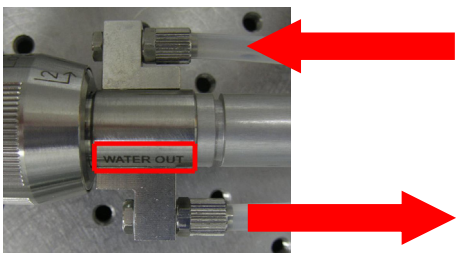
Note 3 Tube, TPS0604W

It is recommended that the length be 100 mm or shorter on each side of IN/OUT. When the length is longer than 100 mm, the pressure loss becomes greater and a flow rate error may occur.



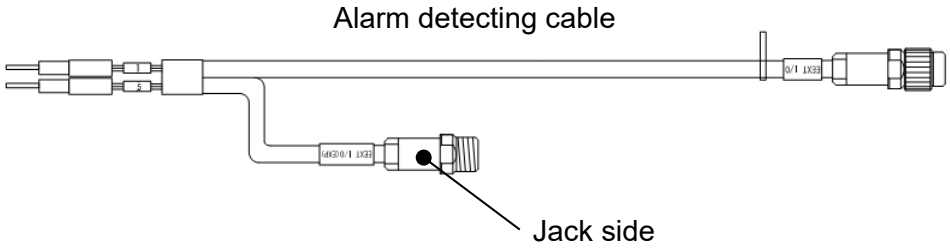

Note 4 Fiber connector

- Confirm that the optical unit is connected before fitting pipe.
- Confirm that the Laser is turned off.
- Be careful about IN and OUT.

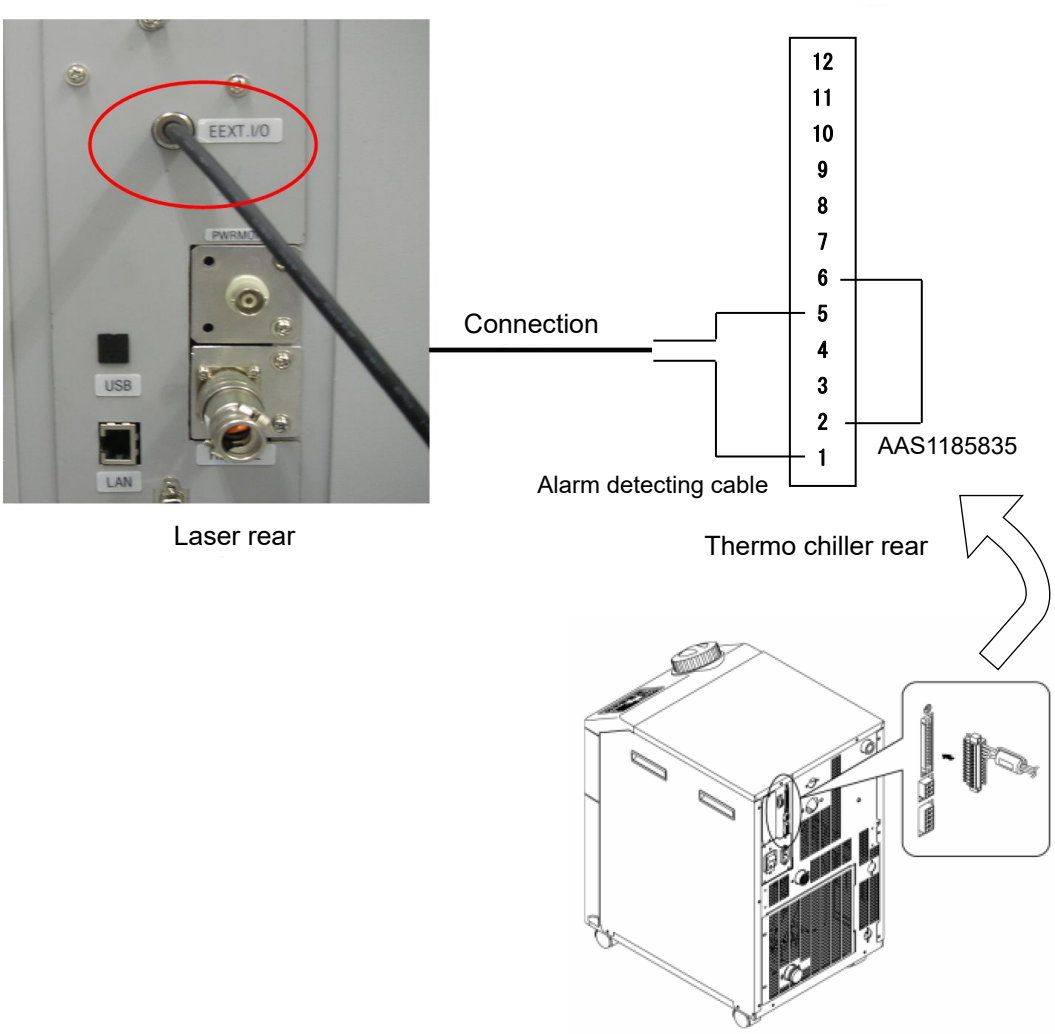


### ⑤ Wiring

- For the AC power cable connection, follow the attached operation manual for the thermo chiller.
- Connect the alarm detecting cable (attached AS1172750 (20 m) or optional AS1172751 (5 m)) to the Laser. Connect the EEXT. I/O (AS1172786) disconnected from the Laser to the jack side of the alarm detecting cable.




To detect the alarm of the thermo chiller, connect the cable to Nos. 1 and 5.

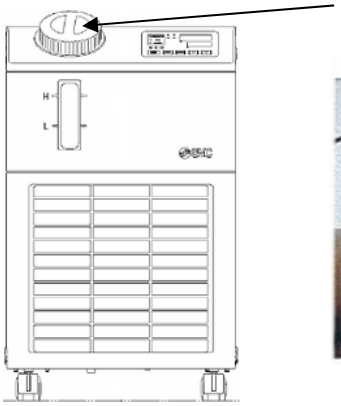


**⑥ Water Supply**

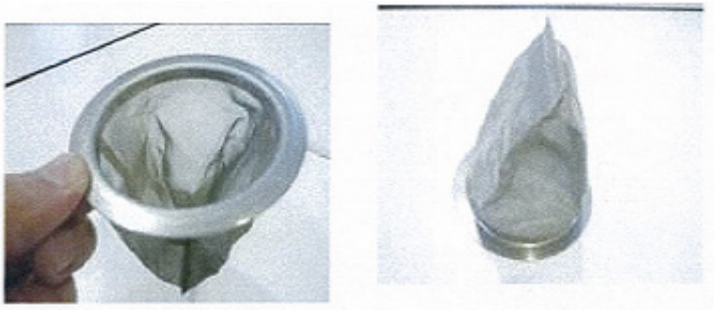
Refer to the operation manual for the thermo chiller.

⇒ When the thermo chiller is started for the first time after water supply, the water level will drop. When it is below the lower level, supply the cooling water again.

| **CAUTION** |
|---|
| Be sure to confirm that the feed-water inlet filter (HRS-PF007) is installed before supply the water.<br>Otherwise, the pump may fail due to contamination of foreign substances. |



Remove the cap and confirm that the feed-water inlet filter is installed before supplying water.



Feed-water inlet filter, HRS-PF007 (SMC)

**⑦ Operation**

- For the operation of thermo chiller and flow switch, refer to the attached operation manual.
- The factory settings are as follows.

| | |
|---|---|
| Water temperature setting | 27°C |
| Flow switch setting | 1.5 liters/min |
| Electrical resistivity setting | 0.2 MΩ·cm |
| Pressure switch setting | 0.1 MPa |

When the setting is changed, the thermo chiller may not work properly.
If you need to change the setting, contact us.

Also, the contact input of the thermo chiller has been set before shipment as shown in the table below. Note that the flow rate cannot be monitored if the setting is changed.

| **Display** | **Item** | | | **Setting** |
|---|---|---|---|---|
| Co.01 | Communication mode | | → | LOC |
| Co.15 | Contact input/output communication | Contact input signal 1 | → | SW_A |
| Co.16 | | Contact input signal 1, form | → | ALT |
| Co.17 | | Contact input signal 1, reading delay timer (delay time) | → | 30 |

| Display | Item | | | Setting |
|---|---|---|---|---|
| Co. 18 | Contact input/output communication | Contact input signal 1, OFF detection timer | → | 2 |
| Co. 19 | | Contact input signal 2 | → | SW_B |
| Co.20 | | Contact input signal 2, form | → | ALT |
| Co.21 | | Contact input signal 2, reading delay timer (delay time) | → | 30 |
| Co.22 | | Contact input signal 2, OFF detection timer | → | 2 |

**⑧ Flow Control**

Adjust the flow regulator (⑧ on page 2) so that the flow rate becomes 1.7 to 1.9 liters/min.

# 4. Maintenance

| CAUTION |
|---|
| ・ Use our genuine maintenance parts.<br>・ For defect caused by non-genuine maintenance parts or use of non-genuine maintenance parts, the repair is charged even if it is still within the maintenance contract period or the warranty period. |

Maintenance tasks are described in this chapter.
Before starting maintenance operation, be sure to turn off the power supply.
Also, turn off the breaker or the keyswitch on the Laser before starting maintenance operation.

| Part Name | Model No. | Item No. | Operation interval (standard) | Contents of operation |
|---|---|---|---|---|
| Replacement cartridge | HRS-DF001 | 1171952 | When the alarm “AL 35 Electrical resistivity low” occurs * | Replace |
| Filter cartridge | CW-50-R-125mm | 1173183 | 6 months | Replace |
| Cooling water (Recommended) | MLU-0604-00 | 1010677 | 6 months | Replace |
| Mechanical seal kit | HRG-S0211 | 1186248 | 3 years | Replace |
| Dust-proof filter | HRS-S0001 | 1186247 | Every day | Clean |
| | | | If dust is not removed | Replace |
| Union-type small line filter | UFE-04-0400 | 1710034 | 6 months | Clean |
| | | | If dust is not removed | Replace |

■ For the hatched portion, our engineer takes charge of maintenance work.

* The thermo chiller is set to raise alarm with 0.2 MΩ･cm. Do not change the setting. For details of alarm, refer to the attached operation manual.

**Preparing the Cooling Water**

| CAUTION |
|---|
| Use the cooling water meeting water quality standard established by Japan Refrigeration and Air Conditioning Industry Association (JRA GL-02-1994 / cooling water system - cyclic water - makeup water). (Cooling water supplied with the Laser or distilled water is recommended.)<br>Tap water, water for industrial use, or ground water may cause corrosion or clogging, resulting in fault of the equipment. |

**Draining Water**

| CAUTION |
|---|
| When draining water for moving the equipment, disconnect tubes to the optical fiber (both IN and OUT).<br>Flowing more than 0.1 MPa of air into the optical fiber may break the fiber. |

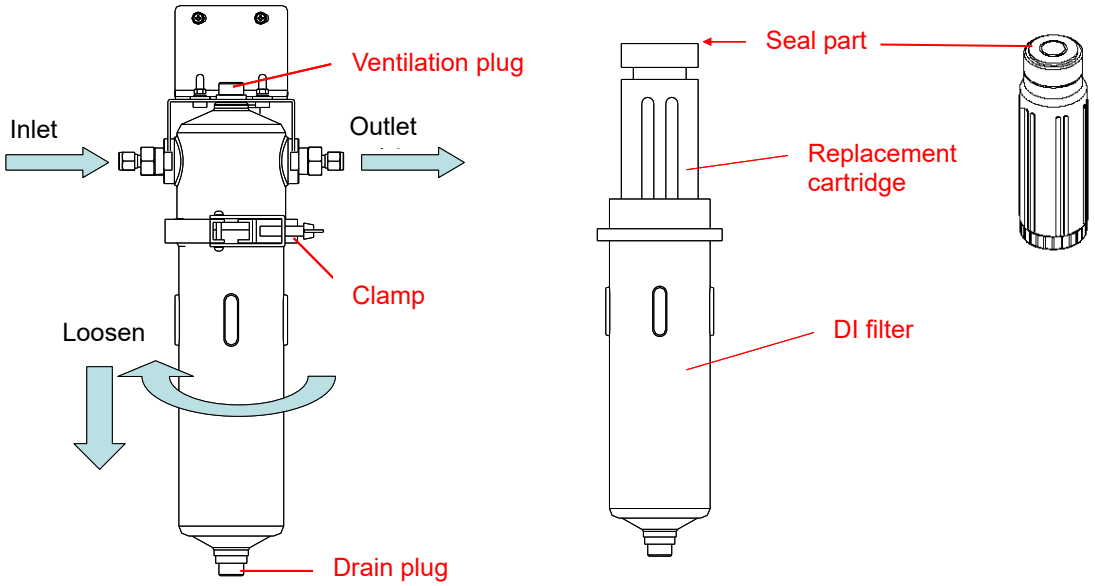
## (1) Replacing the Replacement Cartridge of the DI Filter

The replacement cartridge in the DI filter has a function to keep high purity by removing the ion generated by deteriorated cooling water. Replace it when the alarm “AL35 Electrical resistivity low” occurs in the thermo chiller.

**[Item required]**
Replacement cartridge and tray to receive water

**① Removing the DI Filter**

1) Close the branch piping valve on the thermo chiller’s OUTLET side.
2) Close the branch piping valve on the thermo chiller’s RETURN side.
3) Loosen the ventilation plug at the upper DI filter.
4) Remove the drain plug at the lower DI filter to drain water.
5) Remove the clamp.
6) Turn the lower half of the DI filter approx. 20° counterclockwise to remove it.
7) Remove the replacement cartridge.




**② Mounting a New Cartridge**

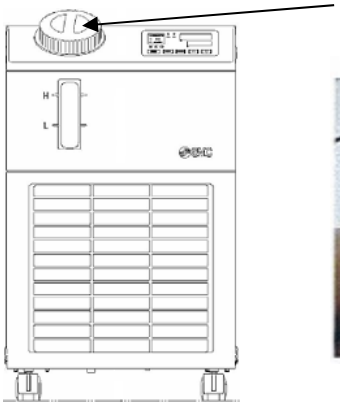
1) Mount the a new replacement cartridge on the DI filter with the seal part up.
2) Mount the lower half of the DI filter with the reverse procedure to removing it.
3) Close the clamp.
4) Mount the drain plug.
5) Close the ventilation plug.
6) Start the thermo chiller with the valve of the DI filter closed.
7) Open the valve on the thermo chiller’s RETURN side only.
8) Open the ventilation plug to remove air, and close it again.

9) Open the valve on the thermo chiller's OUTLET side.

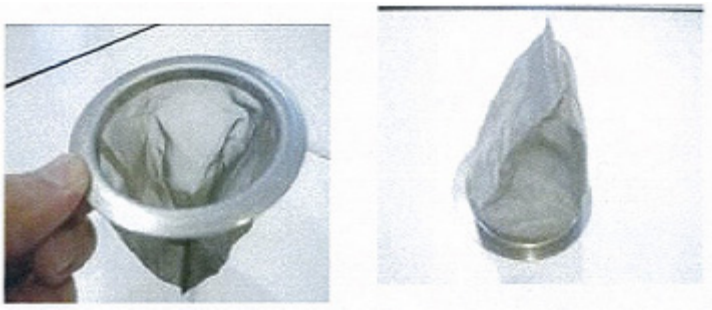
⇒ Check for leaks.

⇒ When the cartridge is replaced, the water level of the cooling water tank will drop. In that case, supply the cooling water.

| CAUTION |
| --- |
| Be sure to confirm that the feed-water inlet filter (HRS-PF007) is installed before supply the water.<br>Otherwise, the pump may fail due to contamination of foreign substances. |



Remove the cap and confirm that the feed-water inlet filter is installed before supplying water.



Feed-water inlet filter, HRS-PF007 (SMC)

## (2) Replacing the Filter Cartridge

The filter cartridge in the filter housing has a function to filtrate the cooling water. Replace it within 6 months.

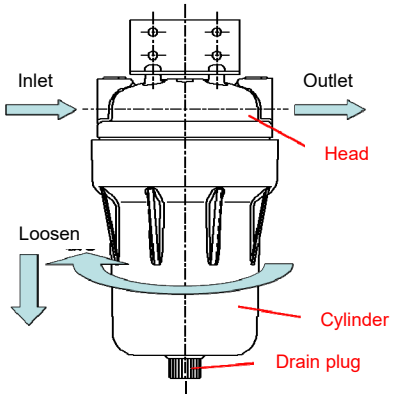
**[Item required]**
Filter cartridge, NFH tightening spanner, and tray to receive water

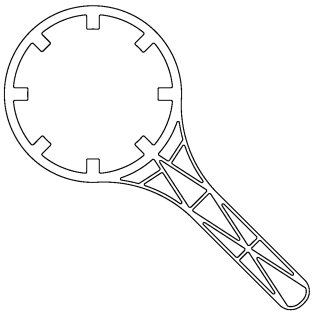
**① Removing the Filter Cartridge**

1) Close valves on both sides of the filter housing.
2) Loosen the drain plug at the lower filter cartridge to drain water.
   ⇒ Since water may spurt, loosen the drain plug slowly.
   ⇒ Take care that water does not splash over the equipment.
3) Hold the upper filter housing by hand, and loosen the cylinder with the NFH tightening spanner to remove it.
4) Remove the filter cartridge from the removed cylinder.
5) Mount the drain plug on the cylinder again.

**② Mounting a New Filter Cartridge**

1) Insert the filter cartridge into the guide at the lower cylinder of the filter cartridge.
2) Insert the top end of the filter cartridge mounted to the cylinder into the guide at the upper filter housing.
3) Hold the upper filter housing by hand, and screw the cylinder until it hits the O-ring in the cylinder.
4) Tighten the cylinder with the NFH tightening spanner, keeping holding the upper filter housing by hand.
5) Open valves on both sides and make a test run of water before operation to check for leaks.



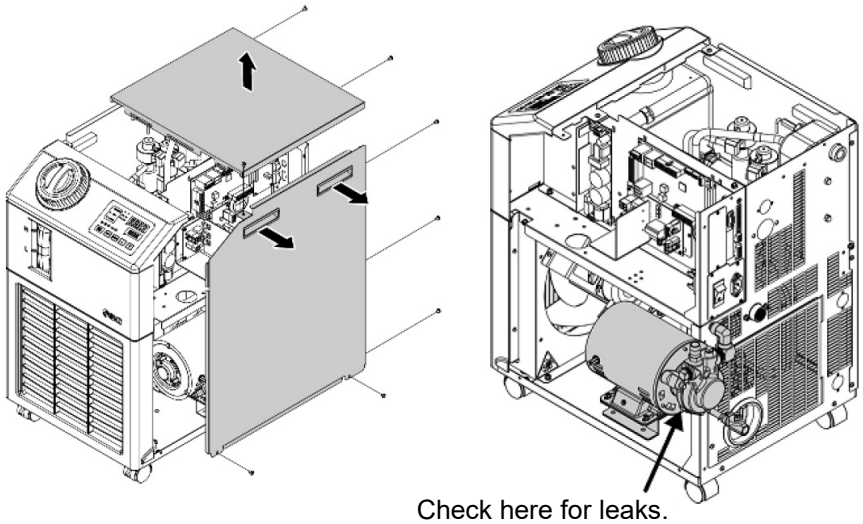
NFH tightening spanner

## (3) Inspecting Water Leaks from the Pump

Remove panels to check the pump for abnormal leaks when replacing the cooling water (every 6 months recommended).
If abnormal water leaks, consult us to return the chiller and replace the mechanical seal.

**[Item required]**
Screwdriver

| CAUTION |
| --- |
| Because of its structure, the mechanical seal cannot completely eliminate leakage. An amount of leakage is 3 cc/hour or less. |



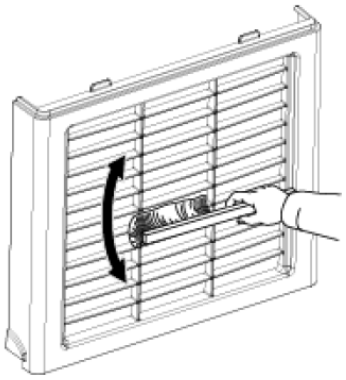
## (4) Cleaning the Dust-proof Filter

Clean the dust-proof filter everyday.

**[Item required]**
Bristle brush or air blow

| CAUTION |
| --- |
| Refer to the operation manual for the thermo chiller.<br>If dust is not removed after cleaning, replace the dust-proof filter. |

Cleaning with a bristle brush



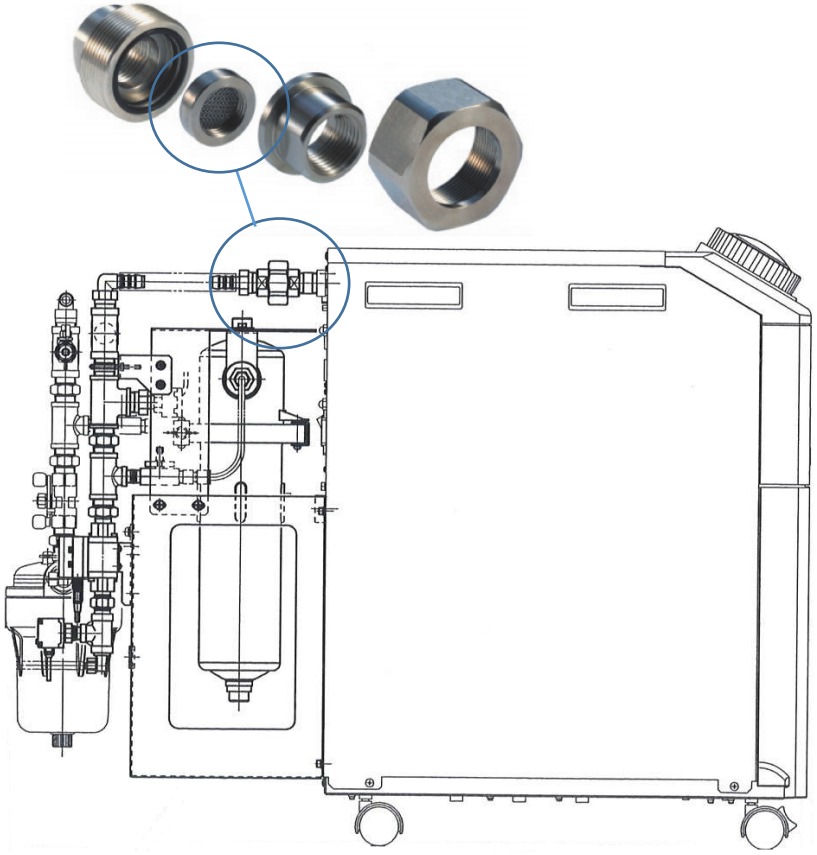
Cleaning with an air blow

## (5) Cleaning or Replacing the Union-type Small Line Filter

Clean the union-type small line filter every 6 months. Replace it when dust is not removed.

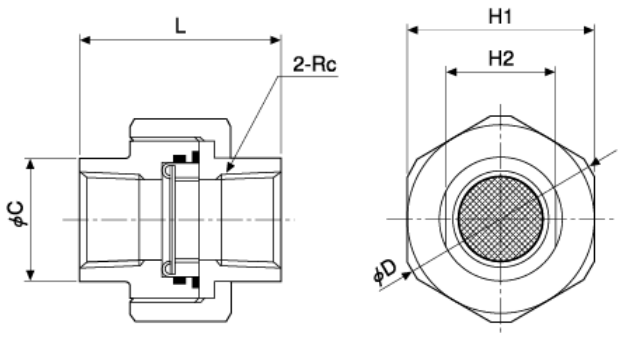
**[Item required]**
Brush or air blow and spanner

Disassemble the line filter to clean or replace the mesh part (element).



**CAUTION**

Be careful of an assembling direction after cleaning or replacement.




| Model | Rc | L | φC | φD | H1 | H2 | Element symbol |
|---|---|---|---|---|---|---|---|
| UF-04 | 1/2 | 44 | 28 | 45 | 41 | 25 | UFE-04 |

# 5. Alarm Code

For alarm codes not described below, refer to the operation manual attached to the thermo chiller.

| Alarm code | Contents of alarm | Measures |
|---|---|---|
| AL31 | Flowrate trouble:<br>< 1.5 liters/min (over 30 sec.)<br>> 2.5 liters/min (over 30 sec.) | ・Confirm that the pipe is not broken or not clogged.<br>・Confirm that the valve is not closed too tightly. |
| AL32 | Pressure trouble:<br>> 0.1 MPa (over 30 sec.) | ・Confirm that the pipe is not broken or not clogged.<br>・Adjust the valve.<br>・The union-type small line filter may be clogged. Clean or replace it. |
| AL35 | Electrical resistivity low:<br>< 0.2 MΩ・cm | ・To keep quality, the DI cartridge is separately packed at shipment. Confirm that it is installed.<br>・Refer to **"3. Installation and Preparation"** to check that the DI cartridge is installed in the right direction.<br>・At startup after the equipment has been stopped for a while, an alarm may be output until the water in the pipe is ion-exchanged. Reset the alarm after a few minutes. Cutting extra pipe makes the alarm less likely to be output. |