thermo scientific

Ultra Low Temperature Freezers

Water Cooled Option

Installation and Operation

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ThermoFisher SCIENTIFIC

IMPORTANT Read this instruction manual. Failure to follow the instructions in this manual can result in damage to the unit, injury to operating personnel, and poor equipment performance.

CAUTION All internal adjustments and maintenance must be performed by qualified service personnel.

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Contents

Introduction

This manual describes installation and maintenance procedures for water cooling connections for Thermo Scientific Ultra-Low Temperature Freezers.

CAUTION: Be sure to read these instructions carefully before installing and using the water connections, and be sure to read the Ultra-Low Freezer Installation and Operation Manual before operating the freezer.

Use this product only in the way described in the product literature and in the user manuals. Before using it, verify that this product is suitable for the users intended application.

Unpacking

Upon unpacking, make sure that all specified water line fittings are included with the unit:

- 1/2" MNPT x 3/8" MNPT fitting (Quantity 2)
- 1/2" FNPT x 1/2" MBSPT adapter (Quantity 2)

Figure 1. 1/2" MNPT x 3/8" MNPT

Figure 2. 1/2" FNPT x 1/2" MBSPT

The 3/8" MNPT goes into the freezer at both the inlet and the outlet.

Operating Requirements

Water Flow Rate

The minimum water flow rate is 0.5 GPM (gallons per minute) if temperature of the water is less than 25°C and 1 GPM if temperature of the water is above 25°C.

Water Pressure

The water pressure should not exceed 90 psi or 620.5 kpa.

Note: This limit is not to be exceeded even though the components may be rated up to 150 psi.

Water Temperature Range

+12.0°C to +30.0°C (+53.6°F to +86°F)

Water Quality

Water must be free of particulates, which could cause a blockage or impair function of the regulating valve or heat exchanger. The pH level of water must be between 7.0 and 8.0. The optimum pH level is 7.4.

Use a suitable inline strainer in the inlet pipe to minimize particulates in the water supply. We recommend a strainer with a screen between 16 to 20 mesh, preferably stainless steel or brass. When the strainer is installed, water flow rate must still exceed the minimum water flow rates described in the **Water Flow Rate** section.

Water Drainage

If the water return line labeled PROCESS OUTLET is not connected to a closed loop chiller system, connect the return line water to a reservoir tank or drain. This will hold/dispose of the water from the unit to avoid flooding.

Monitoring Equipment

To verify operating requirements, you will need:

- A flowmeter capable of measuring up to at least 5.3 gallons (20 liters) per minute to measure flow rates at the water return line labeled PROCESS OUTLET.
- A pressure gauge ranging from 0 to 300 psig to measure pressure at the water inlet labeled PROCESS INLET.

Installation

Clearance

Before installing the water connections, be sure that the unit is positioned with an extra 2" (5 cm) of clearance in back to leave room for a hose.

This is in addition to the 6" (15 cm) back clearance recommended in the main user manual.

Water Connections

To install the water connections:

1. Uncap the PROCESS INLET/PROCESS OUTLET fittings on the freezer.

Figure 3. Water line connections on the freezer

2. Check fittings and remove any particles and/or debris.
3. Finger tighten the fittings, then turn 1/8 to 1/4 turn with an adjustable wrench.

   Note: Thread sealant or Teflon tape is highly recommended for use on threaded fittings.
4. Check for leaks; if found, repeat the 1/8 turn to 1/4 turn until the leaks stop. **Do not overtighten.**

Figure 4. Fittings installed on freezer

5. Make sure the water line is clear from blockage and debris.
6. Install a strainer with a 16-20 mesh screen to the water-line PROCESS INLET.
7. Connect the incoming water supply line to the PROCESS INLET fitting.
8. Connect the water return/drain line to the PROCESS OUTLET fitting.
9. Adjust to specified operating standards (pressures, temperature).
10. Turn on the water flow to unit.
11. Check for any leakage.
12. Refer to the user manual for further startup instructions. **Make sure that you have read the main user manual carefully before starting up the freezer**.
13. Adjust the water flow rate. Note that water will not flow through the outlet until after the first stage compressor is running.

Note: Except for maintenance tasks described in the following section, do not turn on the freezer without water connected and flowing. You will not see water flowing through PROCESS OUTLET until after the first stage compressor is running.

Operation

Refer to the main ultra-low freezer user manual for all details about operation, parameter settings, general maintenance, user access, and troubleshooting.

Maintenance

The maintenance tasks described in this section should only be performed by qualified personnel.

Cleaning the Water-Cooled Condenser

Cleaning solutions can be used, depending on the type of deposits or build-up to be removed. Do not use liquids that are corrosive to stainless steel or the brazing material (copper or nickel).

The condenser should be cleaned at least once a year, more frequently when the environmental conditions are relatively high in particulates.

CAUTION: Do not use products containing hydrochloric acid or muriatic acid.

CAUTION: Cleaning solutions can be irritating to exposed skin. Take precautions as recommended by the manufacturer.

To clean the condenser:

1. Remove product from cabinet.
2. Disconnect the unit from the water supply.
3. Drain the unit by leaving it turned on until all of the water is out of the system, then turning the unit off **immediately**.
4. Hook up the water lines, turn on the unit, and rinse with fresh water.
5. Drain the unit again and turn it off.
6. Fill with fresh water and start the unit with water flowing.
7. Add cleaning agent to the water supply line labeled “PROCESS INLET”. Choose the solution and concentration depending on the amount of deposits or build-up.
8. Circulate the cleaning solution.
9. Drain the cleaning solution.
10. Add and circulate a passivating liquid (phosphoric acid 5% or oxalic acid) for corrosion inhibition of plate surfaces. Drain this liquid.
11. Rinse with clear water and drain.
12. Reconnect the water supply and fill the unit.
13. Return to service.

Replacing the Water Supply Line Strainer

Recommended frequency of replacement depends on the operating conditions. If the water line being fed is clean, then the strainer should be replaced approximately every three months.

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Great Britain

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Thermo Fisher Scientific Inc.
275 Aiken Road
Asheville, NC 28804
United States

Find out more at thermofisher.com/cold

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