



PHASOR® X HEAT EXCHANGER

Installation and use manual

Introduction

The pHasor® X heat exchanger provides maximum heat transfer for process chemicals while preserving absolute fluid purity. It is ideal where controlled fluid temperature is desired or fluid temperature must be maintained to the point-of-use.

Features

- Excellent chemical compatibility enables heating and cooling of a wide variety of chemicals
- Ultra-clean construction ensures high levels of purity can be maintained during use in processes
- Device heat transfer efficiency much higher than most other plastic heat exchangers
- Compact footprint for easy installation and tool space savings
- Rapid startup and recovery times

Applications

- Process fluid heating or cooling
- Photochemical temperature control
- CMP slurry loop temperature control
- Precise DI water temperature control for immersion lithography (Entegris LiquidLens™)
- Single wafer process fluid temperature control
- Hot DI water cooling
- Recirculated bath temperature control
- Waste chemical drain cooling
- Corrosive gas heating or cooling
- Process equipment heating or cooling

Specifications

Please refer to pHasor X datasheet for device specifications. The pHasor X official datasheet can be found at Entegris' website: <http://www.entegris.com>



Safety

Perform all operations with standard gas and liquid handling procedures in accordance with all local codes for safety and ventilation. You **MUST** wear appropriate clothing and safety apparatus for the gas and liquids you are using.

Installation

CAUTION! Inspect, but **DO NOT** unwrap any parts until installation. Contact your Entegris representative with any concerns.

1. Components are double wrapped for cleanroom use. Handle components according to your cleanroom procedures.
2. The heat exchanger should be securely mounted in the position most convenient for your space, which can be vertical, horizontal or at an angle. To allow for proper venting, the shell side inlet position should always be lower than the shell side outlet position, as shown in Figure 1.

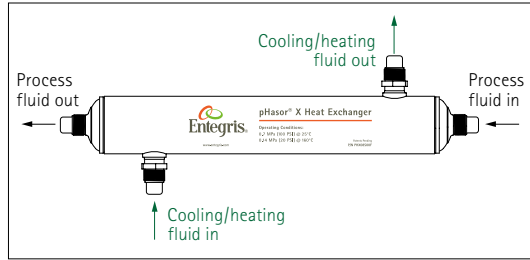


Figure 1. Counter flow (horizontal installation).

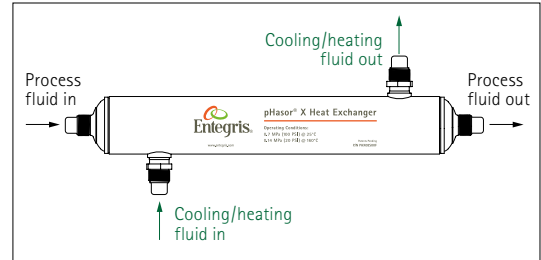


Figure 3. Parallel flow (horizontal installation).

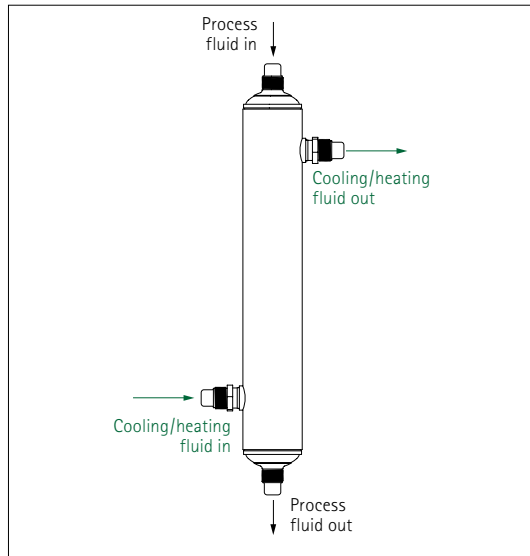


Figure 2. Counter flow (vertical installation).

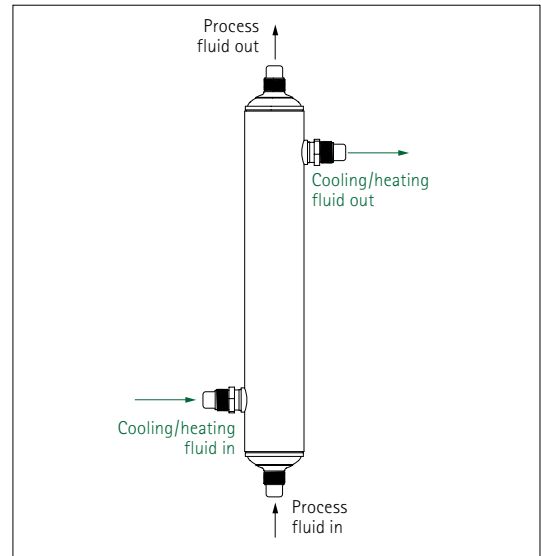


Figure 4. Parallel flow (vertical installation).

3. For best heat transfer efficiency, a counter flow configuration should be used, where the direction of flow through the shell side is opposite to the direction of flow through the tube side, which is shown in Figures 1 and 3. The heat exchanger can also be used in a parallel flow configuration, where the direction of flow through the shell is the same as the direction of flow through the tubes, which is shown in Figures 2 and 4.
4. Mount the heat exchanger as close as possible to the process (point-of-use) and secure with two clamps. Standard 2.5" schedule 80 pipe clamps can be used, but are not included.
5. To preserve cleanliness, keep the caps on until the flare tubes are ready for connection.
6. Slide the nuts onto the shell and lumen (tube) side tubes, flare the tubing, and tighten the nuts to create a leakproof seal. **DO NOT overtighten.**

Maintenance

1. The heat exchanger may be reused for more than one application, or stored after use, if proper maintenance and care is taken to ensure the cleanliness of the device after usage.
2. To maintain cleanliness of the heat exchanger after use, the heat exchanger should first be flushed with deionized water several times, on both the shell and tube side of the device.
3. After flushing the heat exchanger with water, the water should be completely drained from the device.
4. The heat exchanger should be dried after draining water from the device.
5. To dry the heat exchanger, first run nitrogen sweep gas through the tube side of the device for at least an hour.

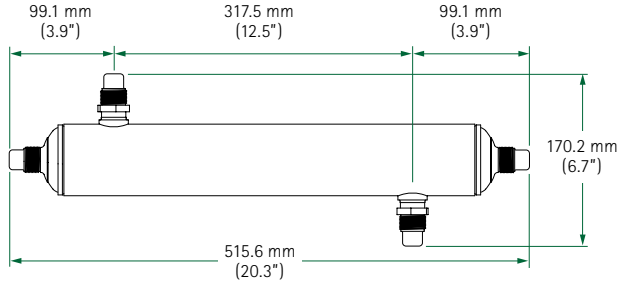
6. After running nitrogen sweep gas through the heat exchanger, the device should be placed in an oven at a temperature of around 90°C, but no more than 120°C, for at least a day.
7. The drying step is essential to ensure no water remains in the heat exchanger. Any moisture left in the device would promote bacterial growth, which would cause both contamination in the process and a loss of heat transfer efficiency when the device is used again.

Troubleshooting

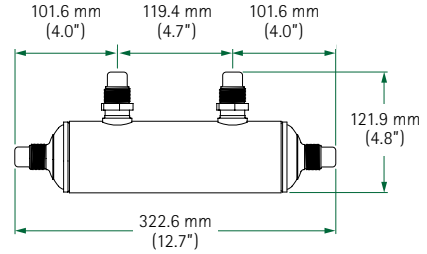
| Problem | Possible Cause | Solution |
|--|---|--|
| Temperature in process fluid outlet too low/high | Heating/cooling fluid flow rate is not at optimal value. | At a given process fluid flow: <ul style="list-style-type: none"> • To decrease the temperature of the process fluid increase the cooling fluid flow or decrease the heating fluid flow depending on applications. • To increase the temperature of the process fluid, increase the flow rate of the heating fluid or decrease the cooling fluid flow. |
| | Heating/cooling fluid temperature is not at optimal value. | At a given process fluid flow: <ul style="list-style-type: none"> • To decrease the temperature of the process fluid, decrease the temperature of the heating/cooling fluid. • To increase the temperature of the process fluid, increase the temperature of the heating/cooling fluid. |
| | Process fluid flow is not at optimal value. | At a given heating or cooling condition: <ul style="list-style-type: none"> • To decrease the temperature of the process fluid, increase the flow rate of the process fluid. • To increase the temperature of the process fluid, decrease the flow rate of the process fluid. |
| Low heat transfer efficiency | Device used in parallel flow configuration. | Change flow configuration to counter flow. |
| | Heating/cooling fluid flow rate is less than the volume of fluid in the tubing. | <ul style="list-style-type: none"> • For the PH08X, use a flow rate of at least 400 mL/min for the heating/cooling fluid. • For the PH03X, use a flow rate of at least 200 mL/min for the heating/cooling fluid. |
| | Heat exchanger too far from the point-of-use. | Move heat exchanger closer to the point-of-use. |
| | Air trapped in the shell side of the device (heating or cooling fluid). | Fully vent the shell side of the device. |

Dimensions

S-line Flow Path Configuration



U-line Flow Path Configuration



Ordering Information

| Part Number | Media Exchange Area | Flow Path Configuration | Inlet/Outlet Fitting Size | Fitting Style |
|-------------|---------------------|-------------------------|---------------------------|--------------------------------|
| PHX03U00F | 0.3 m ² | U-line flow path | 3/4" | Flaretek® flare tube fitting |
| PHX03U00P | 0.3 m ² | U-line flow path | 3/4" | Super 300 Type Pillar® fitting |
| PHX08S00F | 0.8 m ² | S-line flow path | 3/4" | Flaretek flare tube fitting |
| PHX08S00P | 0.8 m ² | S-line flow path | 3/4" | Super 300 Type Pillar fitting |
| PHX08U00F | 0.8 m ² | U-line flow path | 3/4" | Flaretek flare tube fitting |
| PHX08U00P | 0.8 m ² | U-line flow path | 3/4" | Super 300 Type Pillar fitting |
| PHX03U00PL | 0.3 m ² | U-line flow path | 3/4" | Super 300 Type Pillar fitting |

Note: Other connection sizes are available. Please consult the factory for more information.

For More Information

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit www.entegris.com and select the Customer Service link for the center nearest you.

Terms and Conditions of Sale

All purchases are subject to Entegris' Terms and Conditions of Sale. To view and print this information, visit www.entegris.com and select the Legal Notices link from the footer.

Product Warranties

For Product Warranties, visit www.entegris.com and select the Legal Notices link from the footer.

Entegris®, the Entegris Rings Design®, Creating a Material Advantage®, Flaretek®, pHasor® and LiquidLens™ are trademarks of Entegris, Inc. Pillar® is a registered trademark of Nippon Pillar Packaging Company, Ltd. U.S. Patent Nos. 7,308,932; 8,091,618; patents pending.

ENTEGRIS, INC.

Corporate Headquarters | 129 Concord Road | Billerica, MA 01821 USA
Customer Service Tel. +1 952 556 4181 | Customer Service Fax +1 952 556 8022
In North America 800 394 4083 | www.entegris.com