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XTREMEFREEZ XFT-4/XFT-8 REFRIGERATED VAPOR TRAP

USER'S MANUAL

XFT-10052021 - V. 1

WARRANTY

Ideal Vacuum warrants to the original purchaser, this product to be free from defects in workmanship and materials for a period of one year from the original delivery date. The liability of Ideal Vacuum under this warranty is limited to servicing, adjusting, repairing or replacing any unit or component part which, at Ideal Vacuum's sole discretion, is determined to have failed during normal, intended use. This warranty does not cover improper installation, process related damage, product use in any way other than defined in this manual, or any misuse, abuse, negligence, accident, or customer modification to the product.

Prior to returning any product, we require that you contact us by phone or email to determine if the issue can be resolved quickly. A technical support representative will work with you to resolve the problem. If the issue cannot be resolved in that manner, we will issue an RMA number and provide product return instructions.

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CUSTOMER SERVICE AND SUPPORT

If you have any questions concerning the installation or operation of this equipment, or if you need warranty or repair service, please contact us. Customer Service and Technical Support is available weekdays, from 8am-5pm, Mountain Time.

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SAFETY

IMPORTANT SAFETY INFORMATION

Thank you for purchasing this equipment from Ideal Vacuum Products. We want you to operate it safely.

- **Read this manual and all associated equipment manuals before installing or operating this equipment. Failure to follow the warnings and instructions may result in serious injury or equipment damage.**
- **Keep this manual in a safe location for future reference.**
- **This equipment should only be installed and operated by trained, qualified personnel, wearing appropriate protective equipment.**
- **Follow all codes that regulate the installation and operation of this equipment.**

WARNING SYMBOLS AND DEFINITIONS

This is the universal safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER	**Indicates an imminently hazardous situation that, if not avoided, will result in death or severe injury.**
WARNING	**Indicates an imminently hazardous situation that, if not avoided, could result in death or severe injury.**
CAUTION	**Indicates a potentially hazardous situation that, if not avoided, could result in moderate or minor injury. It may also be used to alert against unsafe practices.**
NOTICE	**Indicates a potentially hazardous situation that, if not avoided, could result in equipment or property damage.**
NOTE	**Indicates helpful tips and recommendations, as well as information for efficient, trouble-free operation.**

Internationally recognized safety symbols may be used with safety warnings to specify the type of hazard or a safety protocol to follow. For example:

Indicates an electric shock hazard

Indicates safety glasses are required

1. OVERVIEW

1.1 DESCRIPTION

The Ideal Vacuum XtremeFreez refrigerated vapor trap, with digital temperature display, protects vacuum roughing pumps from harmful vapors which can damage the pump or shorten its life. The trap uses mechanical refrigeration which is efficient, cost effective, and saves energy. It eliminates the ongoing need for expensive and potentially dangerous consummables, such as liquid nitrogen or dry ice.

When vapors, such as water vapor, volatile alcohols, petrochemicals, or any other condensable gaseous compound mix with the vacuum pump's lubricating oil, the oil breaks down, lubricity is decreased, and the pump's lifespan is reduced.

The XtremeFreez vapor trap uses two compressors in a cascading refrigeration configuration to chill the wall of a built-in, round, insulated, stainless steel vessel (trap). Refrigerant flows through copper piping wrapped around, and brazed onto the walls of the trap. The walls are cooled to -90°C.

The trap is sealed by a removeable top cover plate or glass insert with two through ports. Air or gas from the chamber enters the trap through the central port. Condensable vapors with a freezing point above -90°C are condensed on the trap's cold wall where they freeze and become ice. Remaining non-condensable vapors are pulled through the second port of the trap's top plate and into the roughing pump's inlet.

The compact XtremeFreez vapor trap is available in two models. The XFT-4 has a 4 liter vessel, and the larger XFT-8 model has an 8 liter vessel.

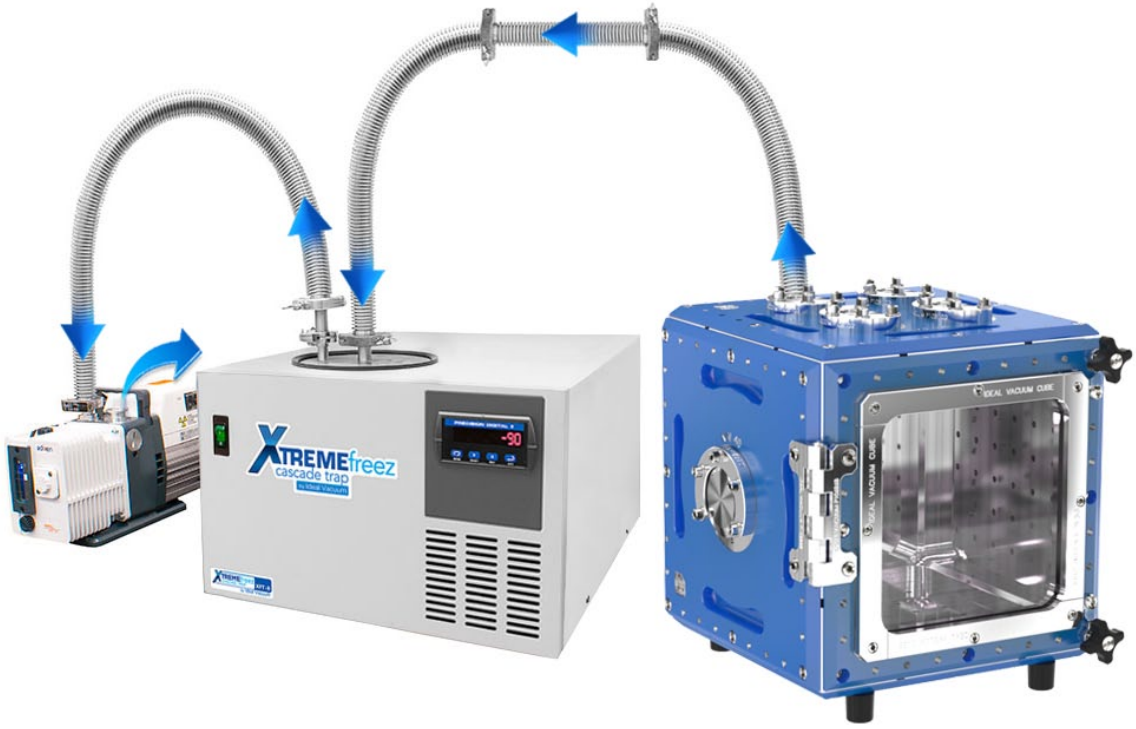

Figure 1 - Gas flow through vapor trap

1.2 SPECIFICATIONS

Description	XFT-4	XFT-8
Lowest Temperature	-90°C (-130°F)	-90°C (-130°F)
Vessel Volume	4 liters	8 liters
Trapping Rate	3 liters/day	5 liters/day
Compressors	Two, 1/4 hp	Two, 1/4 hp
Digital Temperature Readout	Yes, °C or °F	Yes, °C or °F
Maximum Vacuum Speed	250 liters/min. (9 cfm)	250 liters/min (9 cfm)
Operating Temperature	12°C - 29°C (54°F - 84°F)	12°C - 29°C (54°F - 84°F)
Operating Humidity	5% - 80%, Relative	5% - 80%, Relative
Electrical	120 VAC, 60 Hz, 7 A	120 VAC, 60 Hz, 7 A
Weight	39 kg (85 lb.)	39 kg (85 lb)
Dimensions (LxWxH)	48.3 x 61 x 33 cm	48.3 x 61 x 33 cm
	19 x 24 x 13 in.	19 x 24 x 13 in.

Table 1 - Technical specifications

1.3 ACCESSORIES

The XtremeFreez vapor trap requires a ported top plate or liner which is not included with the trap itself. There are several standard options available, illustrated in Figure 2, and described below in Table 2. Please contact an IVP sales representative if you require a custom top plate.

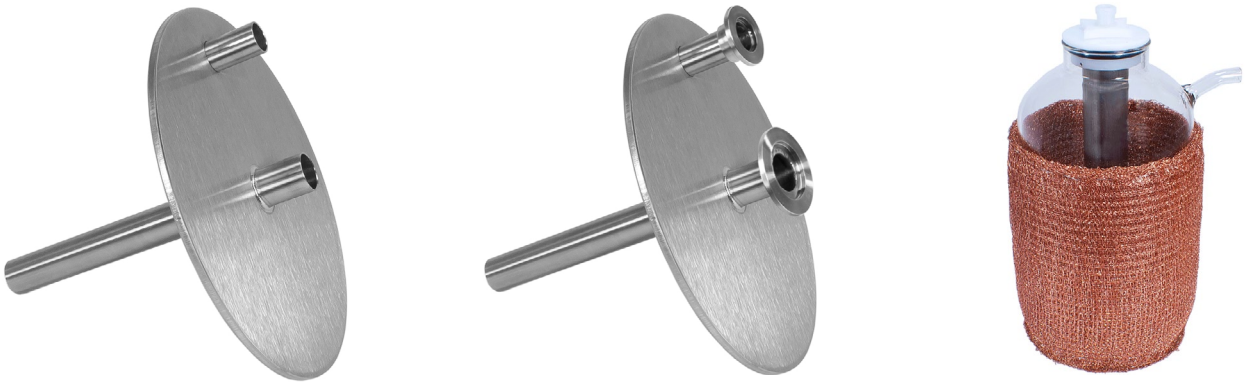

Figure 2 - L to R: Top plate w/straight tubes, w/KF flanges, glass insert w/jacket

Description	Details	Part #
304 SS top plate for XFT-8 (8 liter trap)	3/4” inlet, 5/8” outlet	P1010549
304 SS top plate for XFT-8 (8 liter trap)	KF-25 inlet, KF-16 outlet	P1010550
304 SS top plate for XFT-4 (4 liter trap)	3/4” inlet, 5/8” outlet	P103929
304 SS top plate for XFT-4 (4 liter trap)	KF-25 inlet, KF-16 outlet	P103930
Glass liner with copper mesh jacket for XFT-4 (4 liter trap)	1/2” inlet & outlet, Titanium down tube	P103928

Table 2 - Vapor trap accessories

2. PREPARATION

2.1 INSTALLATION

Upon receipt of the vapor trap, check for any damage. If you suspect any damage, keep all packing materials and immediately contact the freight carrier and your Ideal Vacuum representative.

The vapor trap should only be used indoors and situated on a stable, level surface that can handle the weight of the unit. **The unit is heavy. Use two people to lift it.**

The onboard compressors and condensor are air cooled and ample space around the unit is required to allow for proper air circulation. Note that ambient temperature effects the efficiency of the unit. Above 22°C (72°F), a reduction of 1% per degree in cooling capacity will occur.

The XtremeFreez trap should always be connected to its own supply circuit with an appropriate circuit breaker installed.

2.2 SET UP WITH TOP PLATE

If you are setting up the vapor trap with a ported top plate, plumb the system as shown in Figure 1, page 5. Prior to fitting the top plate on the trap, apply a light coating of vacuum grease, such as Apiezon L Ultra High Vacuum Grease (P102545), onto the vessel's black gasket ring. Connect the vacuum line from the chamber to the center port of the plate. Connect the line to the roughing pump inlet to the plate's offset port.

2.2 SET UP WITH GLASS INSERT

The glass insert option is desirable for users who need to trap corrosion causing vapors.

Begin by fitting the copper mesh jacket into the trap. The bottom of the mesh should touch the bottom edges of it. Next, place the included circular mesh into the bottom of the trap. Carefully slide the glass bottle insert into the trap until it touches the bottom mesh. If it does not fit relatively easily, check to make sure that the mesh isn't folded or pushed down under the glass.

Once the insert is in place, carefully pour heat transfer fluid over the copper mesh between the glass and trap wall. Any fluid can be used, as long as its freezing point is lower than -90°C (-130°F). Ethanol or methanol is often chosen since it is inexpensive and easily obtained. **Take proper precautions if using a flammable liquid.**

Apply a light coating of vacuum grease onto the O-ring of the bottle's cap and push the cap onto the insert. The cap has a titanium tube extending from its underside.

Connect a vacuum line between the chamber and vertical cap port. Use 1/2" compression connectors, such as Swagelok® Ultra-Torr®-to-KF flange adapters (P1011573). Or, use 1/2" vacuum hose (P102139) with hose clamps and barbed-to-KF adapters (P108726 or P108727) .

Similarly, connect a vacuum line between the roughing pump inlet and the insert's 1/2" side port.

3. OPERATION

Once all vacuum connections are secure and the unit is plugged in, it can be energized immediately.

Press the rocker switch to the ON position. It will illuminate green, the system will immediately begin to chill the trap, and the temperature gauge will turn on and display the current trap temperature.

The system will operate continuously until the rocker switch is toggled to the OFF position.

When the trap becomes full of ice it will need to be defrosted.

Wear eye protection and gloves when defrosting the trap. Touching the extremely cold trap or insert can result in immediate frostbite. Depending on the condensate that is collected, it may be necessry to wear a respirator.

To defrost, turn off the machine and the roughing pump. Bring the vacuum system to ambient atmosphere. Pull out the drain hose from under the front left of the machine. Remove the drain plug. Hold the hose while twisting the plug out to keep it from disconnecting internally. Place a bucket under the open hose end to catch the melted ice.

Figure 3 - Drain hose location

3.1 DEFROST - TOP PLATE INSTALLED

Once the system is at ambient atmosphere, the trap cover plate with its attached plumbing can be removed and put aside while the trap is draining.

The most rapid way to defrost the trap is to pour hot water directly into it which will melt the ice (unless this will cause an undesirable chemical reaction). The melt will drain out of the hose.

Repeat the process of adding hot water and allowing it to drain until the ice separates from the trap wall. When separated, the ice block can be lifted out of the trap. Make sure to dispose of the ice block properly.

After removing all the ice from the trap, make sure to clean and dry it to prevent corrosion.

3.2 DEFROST - GLASS INSERT INSTALLED

Once the system is at ambient atmosphere, carefully disconnect the insert's cap along with the chamber vacuum hose. Next, disconnect the vacuum hose from the bottles side port.

The glass insert must be defrosted quickly. If it is defrosted slowly it will break due to expansion as the condesnsate changes states (from solid ice to liquid).

The most rapid way to defrost the glass insert is to immerse it in hot water without getting any water inside. This will cause the ice in contact with the glass to melt quickly, providing space for the condensate to expand and melt without cracking the glass. Be careful. If any hot water gets inside the glass it will break.

When all the ice is melted, pour out the liquid into a suitable container and dispose of it properly.

Clean and dry the interior of the insert.

Note: It is advantageous for continuous processing to have a second glass insert available and alternate inserts as they become full.

3.3 UNLOCK THE DISPLAY

In order to change the temperature measurement units, or recalibrate the temperature meter, the display must be unlocked. The password is the last four digits of the unit's serial number, found on the back of the machine.

Figure 4 - Temperature display

To unlock the display:

1. Press **MENU**.
2. Press **MAX** (up arrow) until **PASS** (password) is on the screen.
3. Press **ACK** (accept). The display will show **LoCd** (locked).
4. Press the **ACK** button again. The display will show **0000**.
5. Enter the password.

   Press the up arrow to increase the value of the digit that's highlighted. Press the right arrow to move to the next digit.
6. Press **ACK**. The display will show **unLC** (unlocked).
7. Press **MENU** to show the current temperature.

3.4 LOCK THE DISPLAY

The password is used to make it more difficult to inadvertantly change the meter's calibration. We recommend that the display be locked after making changes in the temperature units or calibration.

To lock the display, complete steps 1-5 of the unlock instructions on the previous page. When **ACK** is pressed in step 6, the display will show **LoCd**. Press **MENU** to show the current temperature.

3.5 CHANGE THE PASSWORD

To change the password, the display must be unlocked. Follow the steps in Section 3.3, p. 9, to unlock the display.

1. Press **MENU**.
2. Press **MAX** (up arrow) until **PASS** (password) is on the screen.
3. Press **ACK** (accept). The display will show **unLC** (unlocked).
4. Press the **ACK** button again. The display will show **0000**.
5. Enter a new password.
6. Press the up arrow to increase the value of the digit that's highlighted. Press the right arrow to move to the next digit.
7. Press **ACK**. The display will show **LoCd** and the new password is stored.
8. Press **MENU** to show the current temperature.

3.6 CHANGE THE TEMPERATURE UNITS

The default temperature units are °C. To change the temperature units to °F, the display must be unlocked. Follow the steps in Section 3.3, p. 9, to unlock the display.

1. Press **MENU**.
2. Press **MAX** (up arrow) until **SETu** (setup) is on the screen.
3. Press **ACK** (accept).
4. Press **MAX** (up arrow) until the display shows **F C.**
5. Press **ACK** (accept).
6. Press **MAX** (up arrow) to change the temperature units from **°C** to **°F**.
7. Press **ACK**.
8. Press **MENU** to show the current temperature in **°F**.

3.7 METER CALIBRATION

The temperature meter (display) is factory calibrated before shipping using equipment certified to NIST traceable standards.

We recommend performing recalibration yearly using a thermocouple simulator traceable to NIST standards. The simulator should accept a Type T (blue) thermocouple.

Before recalibrating the meter, turn on the vapor trap and let it run for at least 30 minutes to allow the temperature to stabilize. Unlock the display using the instructions in Section 3.3 p. 9, and change the temperature units to Farenheit using the instructions in Section 3.6, p. 10. Note: The Farenheit scale provides greater accuracy than Celcius when calibrating.

The cover must be removed to calibrate the unit:

1. Remove the black rubber ring around the trap vessel.
2. Use a #2 Phillips screwdriver to remove the five (5) short screws securing the cover to the base: two on either side and one in the back.
3. Slide the cover straight off the back of the machine.
4. To expose the thermocouple connector, peel off the insulated tape adhered to the trap insulation on the right side of the machine (compressor side).

⚠ CAUTION **Burn Hazard. The compressors and copper tubing are extremely hot. Avoid contact with any exposed machine parts.**

Figure 5 - Location of Type T Thermocouple

Disconnect the thermocouple.

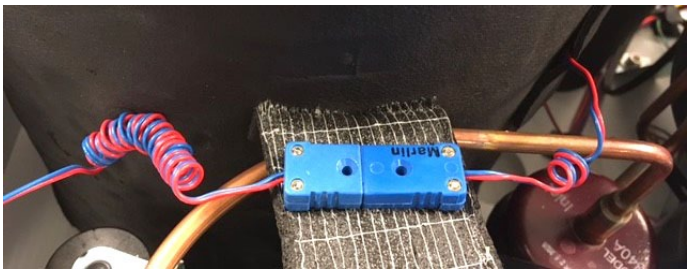

Figure 6 - Disconnect the thermocouple

Connect the thermocouple simulator to the female thermocouple connector. This is the connector that goes to the temperature meter.

Calibration is performed at two temperatures. We recommend using -130°F (-90°C) for the low temperature (Input 1), and 68°F (20°C) for the high temperature (Input 2).

Set the low calibration temperature:

1. Press **MENU**.
2. At **SETu** press **ACK**.
3. Press **MAX** (up arrow) until **ProG** is on the screen.
4. Press **ACK** (accept).
5. At **CAL** (calibrate) press **ACK**.
6. When the display shows **inP1** (Input 1), set the thermocouple simulator to -130°F.
7. Press **ACK**. The display will begin flashing **inP1**.
8. When the display stops flashing, it will show **DiS1**.
9. Press **ACK**.
10. Use the up and right arrow buttons to set the display temperature to -130°F.
11. Press **ACK**.
12. The display will show **inP2** (Input 2).

Set the high calibration temperature:

13. Set the thermocouple simulator to 68°F.
14. Press **ACK**. The display will begin flashing **inP2**.
15. When the display stops flashing, it will show **DiS2**.
16. Press **ACK.**
17. Use the up and right arrow buttons to set the display temperature to 68°F.
18. Press **ACK**.
19. The display will begin flashing **CJr**.
20. When the display stops flashing, the calibration is complete.
21. Disconnect the thermocouple simulator and reconnect the vapor trap's thermocouple.
22. The temperature units can be changed back to °C now (see Section 3.6, p. 10).
23. Relock the display (see Section 3.4, p. 10).

4. MAINTENANCE AND TROUBLESHOOTING

Simple, regular preventive maintenance will keep the Xtremefreez vapor trap unit in top operating condition for many years.

Periodically wipe off the outside of the unit with a damp rag and mild cleaning solution.

Clean and dust the inside of the machine yearly. Unplug the unit and let sit for at least 30 minutes to allow the compressors and condensor (radiator) to cool. Then, remove the cover:

1. Remove the black rubber ring around the trap vessel.
2. Use a #2 Phillips screwdriver to remove the five (5) short screws securing the cover to the base: two on either side and one in the back.
3. Slide the cover straight off the back of the machine.

Dust off the inside of the cover and all screen openings. Use a vacuum cleaner to remove dirt and dust from all components. From the top down, blow compressed air to dislodge any remaining dirt and debris from inside the unit. GENTLY blow compressed air through the radiator. Be careful not to use too much pressure which will bend the thin radiator fins and reduce cooling efficiency.

Let any dust settle before replacing the cover and reconnecting power.

Use the troubleshooting table below if you experience any issues with the unit. There are no user serviceable parts inside the machine.

Issue	Possible Cause(s)	Possible Solution(s)
Compressor shuts off then turns back on in 3-4 minutes	Low voltage	Check the input voltage under load. Voltage must be within 5% of nominal
	Ambient temperature too high	Check to make sure the ambient temperature is within nominal operating requirements
	Dirty condensor fins	Clean condensor fins
	Fan not working	Remove the cover, plug in the unit, and check for to see if the fan is on (carefully). If the fan is not turning, contact IVP for service.
Compressor does not restart after being off	pressure too high in the refrigeration system	Wait for 5-10 minutes then try again.
Gradual temperature loss	Diry condensor fins	Clean condensor fins
	Ambient temperature too high	Check to make sure ambient temperature is within nominal operating requirements
	Refrigerant leaking or lost	Contact IVP for service

Table 3 - Troubleshooting

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