

Operations and Maintenance Manual

Wall Mounted Ozone Destruct System

Revision A - July 2024

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Description of Operation

Background

Ozone gas can be used to disinfect a water supply when it is injected into a side stream of treatment water. The ozone acts as an oxidant, which sanitizes the water, in the same way as chlorine or other oxidants. The ozone is typically mixed with the water through a venturi, and then pumped into a large vessel called a contact tank, where the water is disinfected over time. The gas and liquid mixture separate in the contact tank and the ozone is degassed from the solution.

The gas exiting the contact tank still contains some ozone which was not “used up” in disinfection of the water. Thus, the ozone must be converted from O_3 to oxygen O_2 . This process is known as **Ozone Destruction**.

A destruct works by passing ozone through a bed of media known as **catalyst** which speeds up the ozone destruction back to oxygen. The catalyst bed is a proprietary material which is based on manganese dioxide. The catalyst media speeds up the reaction, but is not used-up, unless other factors damage the media, known as poisoning. Poisons to the catalyst media include VOCs, dust, and moisture. For water treatment, H_2S (Hydrogen Sulfide) & Chlorine will also destroy the catalyst media and reduce the effectiveness of the system.

Types of Destructs

Heated Destructs

If moisture passing through the destruct should be heated so that it is not able to condense on the media bed, the damage to the destruct material can be mitigated. The destruct contains a heater element and thermostat which pre-heats the media bed to a set temperature and heats the incoming gas and moisture as it passes through the bed. For water treatment, nearly all destructs will be heated, since some moisture in the off-gas stream is unavoidable.

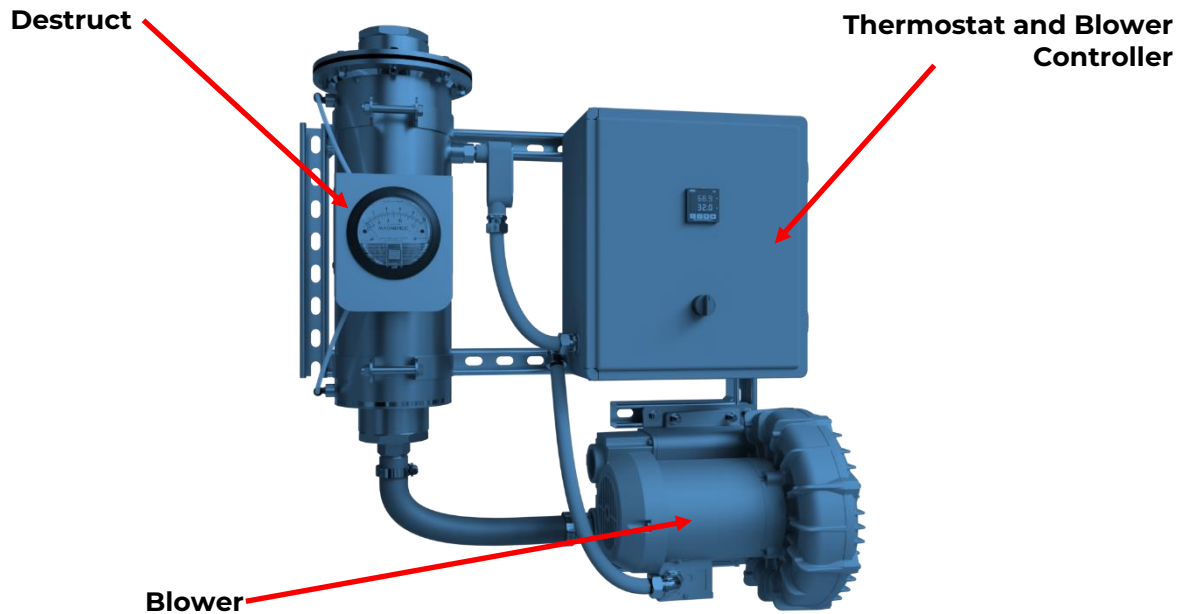
Pressure Destruct

The most common type of destruct is a pressure destruct. The off-gas flow occurs under pressure from the contact tank which allows the gas to pass through the catalyst bed.

Blower Destruct

A blower must be added when the ozone contact tank is not under pressure (for example a contact tower at atmospheric pressure). The blower is also used when high flow rates of off gas are required, that would not be achieved under small pressure alone.

Components and Layout



Engineering Design Selection

The selection of a destruct is based on four factors

- The volume flow rate of off-gas passing through the destruct.
- The percentage of ozone in the off-gas stream.
- The type of contact tank; this will determine whether a blower or pressure destruct is necessary.
- The site voltage available (120V or 240V).

To determine the flow rate of the system, assume 100% of the ozone injected into the system will off-gas.

Determine the percentage of ozone in the off-gas stream based on this flow rate. Again, assume that 100% of the ozone in the system must be off-gassed. The percentage ozone in the stream is typically between 4% - 10% depending on configuration. If the ozone concentration exceeds 10% then further calculations are required to adequately size the unit.

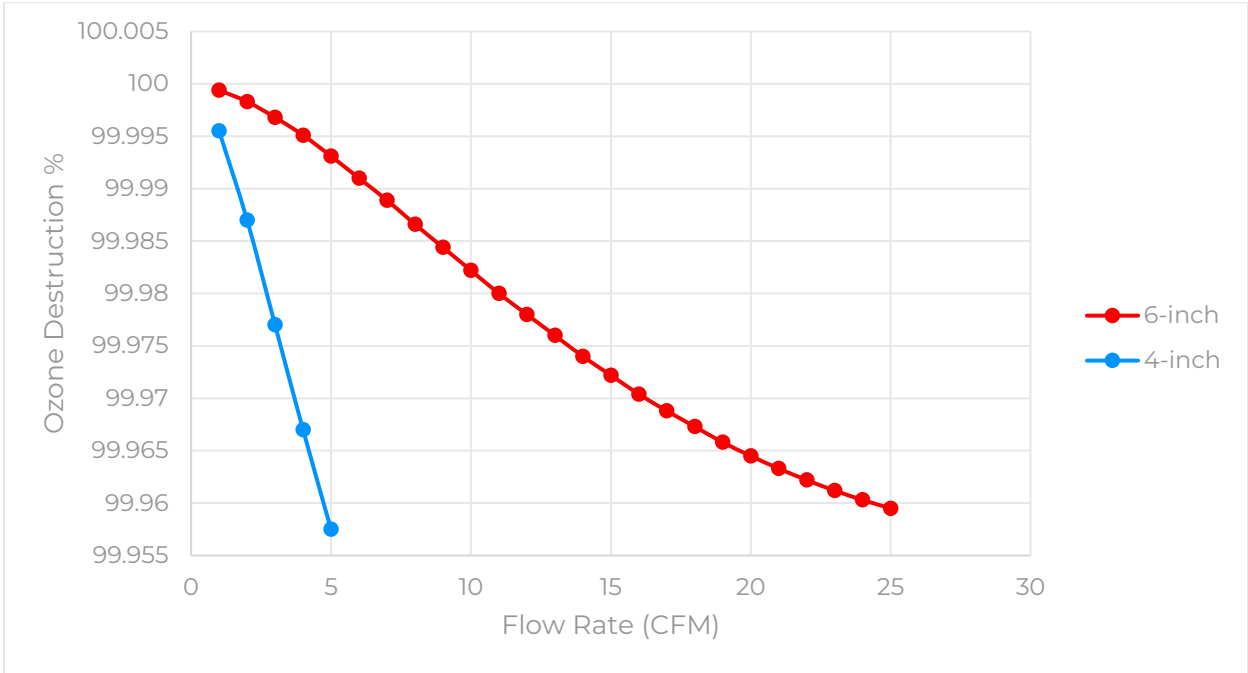
Determine the off-gas type. A pressure destruct is typical if a contact tank and degas valve is used, and a blower destruct is typical if an off-gas tower or atmospheric contact vessel is used.

Determine the site voltage and refer to the specifications to find the FLA. Size the incoming circuit breaker and wire accordingly.

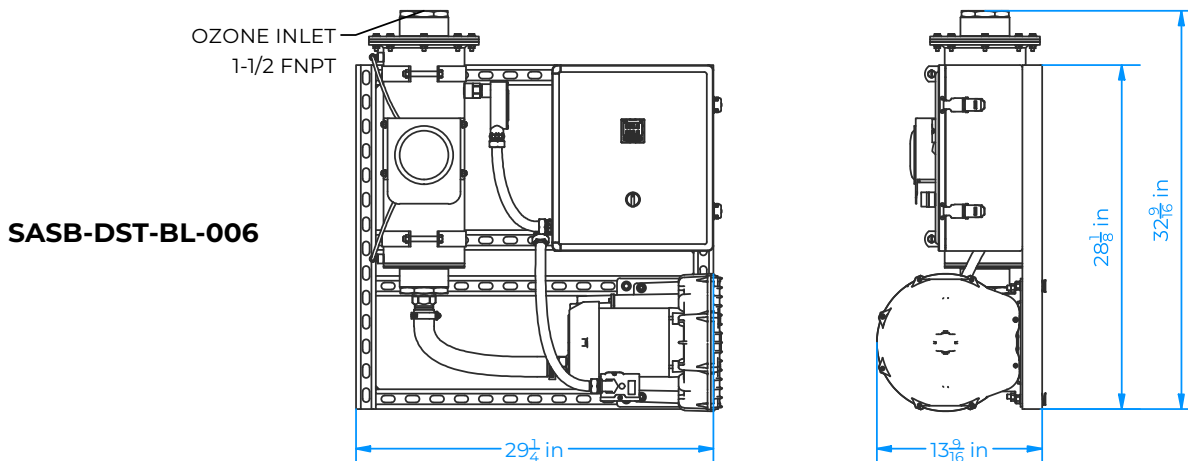
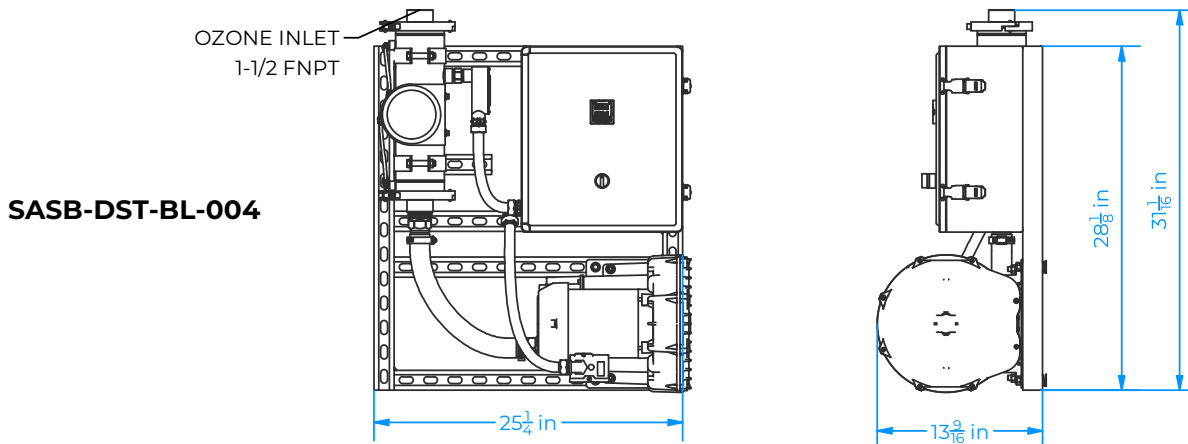
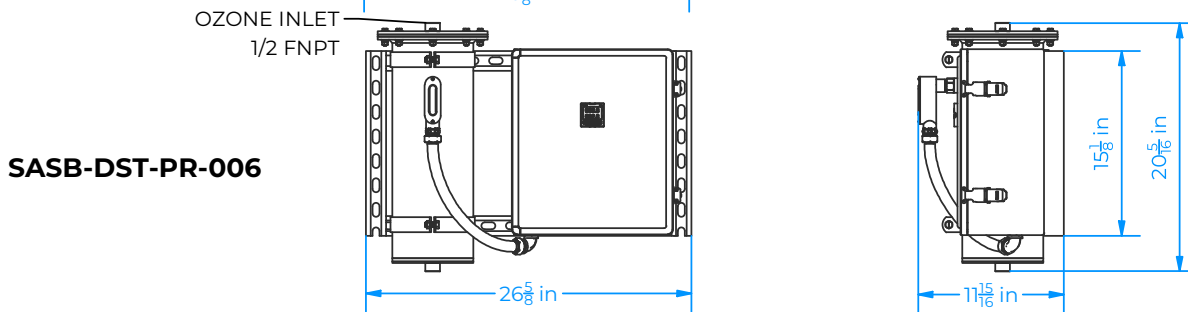
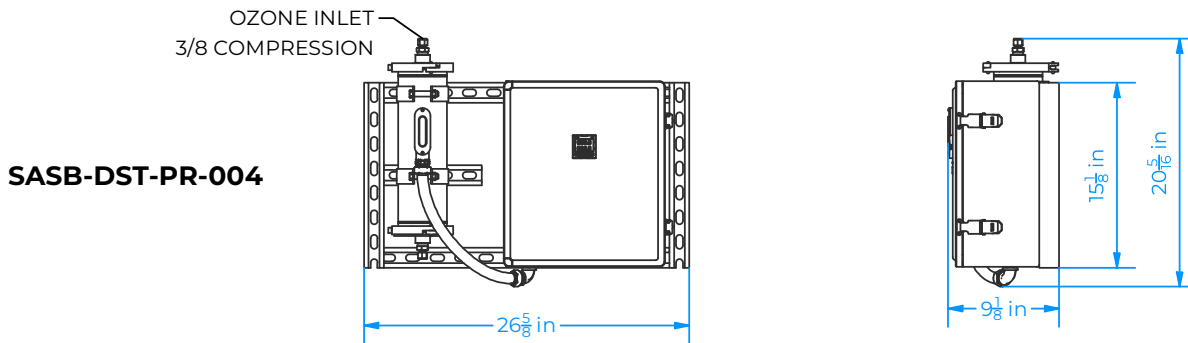
Wall Mounted Ozone Destruct System

SASB-DST-WALMT

Telchine specified ratings are based on a 10% ozone concentration and 99.96% ozone destruction.



Dimensions



Preparation for Installation

Electrical Requirements

DANGER



High voltage! Installation should be conducted by an approved electrician in accordance with relevant safety standards.

	Pressure Destruct		Blower Destruct	
Site Voltage	120 V	240 V	120 V	240 V
FLA	4.3 A	2.2 A	10.3 A	5.2 A

Consult a licensed electrical engineer familiar with all applicable electrical safety codes to determine appropriate supplemental circuit protection and wire type and size.

Installation of The Destruct System

Mounting the System to the Wall

WARNING



Ensure that proper construction techniques and equipment are used for attachment of the equipment to the wall.

The system is attached to a Unistrut frame for flexible mounting options. The best place to mount the system is on a wall. Mount securely to wall using permanent fasteners or anchors. Check material compatibility with stainless-steel Unistrut before installing.

Attaching electrical connections

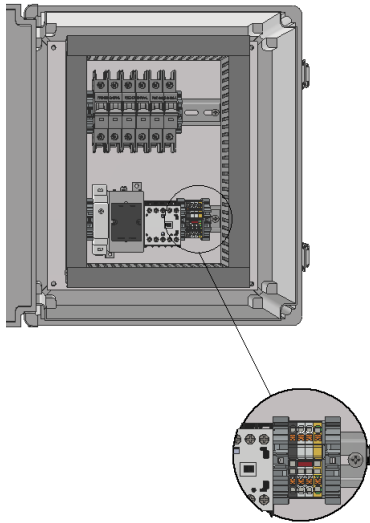
DANGER



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Wall Mounted Ozone Destruct System

SASB-DST-WALMT



There are 3 feed-through terminal blocks located in the controller for convenient wiring. The blocks are rated for up to 14 GA wire connections.

- Strip approximately 3/8 in of insulation from the end of the wire.
- Using a small screwdriver, press the orange tab while feeding the wire into the terminal.
- Tug on the wire to ensure that the connection is secure.

We recommend that installers familiarize themselves with proper installation of Phoenix Contact type PT-2,5 terminal blocks before attempting installation.

Color Chart

Black	120V or 240V Line Voltage (Hot)
White	Neutral
Green / Yellow	Earth ground

Plumbing the Ozone off-gas line

Pressure Destructs

The ozone off-gas line should be either 316L stainless-steel tube or PTFE tubing. 4-inch destructs include 3/8 OD stainless-steel compression fittings, while 6-inch destructs include a 1/2 FNPT fitting.

Run the tubing from the p-trap / demister outlet to the top of the heated destruct. Use plumbers thread tape on all threaded fittings.

Blower Destructs

The higher flow rates of the blower destruct require that a larger hard pipe be run instead of the smaller tubing. Run 1-1/2-inch PVC or CPVC tubing from the P-trap to the top of the heated destruct. Use a threaded adapter to connect to the 1-1/2" connections.

The blower comes pre-plumbed using flexible hose and threaded adapters. The bottom side of the destruct should be run to the suction side of the blower.

Commissioning and Start Up

Programming the Heater System

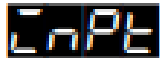


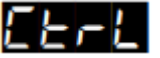
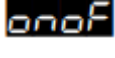
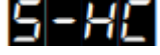
The controller comes pre-programmed to a setpoint of 300 °F as part of factory quality testing. However, if the heater controller is replaced, or the unit must be re-programmed, follow the instructions below.

1. Press and hold the SET button, the configuration menu should appear.

2. Using the  button, cycle through the menus.

3. Use the  and  buttons to adjust the values.

4. Set the following parameters.

Parameter	Value	
		K-Type Thermocouple
	F	Fahrenheit
		On/Off Control Mode
	H1H2	Use outputs 1 and 2 for heating, no outputs are used for cooling.

5. Press SET to save the changes. Do not adjust any other parameters.

Commissioning Checklist

Before Running

- ✓ The destruct is mounted to the wall securely.
- ✓ The destruct power supply wiring is connected properly.
- ✓ The circuit breakers for the components are in the ON position.
- ✓ The controller setpoint is correct, and the unit has been preheated properly.
- ✓ All threaded connections and compression fittings have been checked for leaks.
- ✓ If equipped, the blower is operating properly, and the destruct outlet is connected to the **suction** side of the blower.

Start-Up

Turn on the ozone system in purge mode (air or oxygen only) while running the injection pump.

- ✓ Ensure that the degas valve is not passing large amounts of water through the system.
- ✓ Ensure that the P-trap is not passing water to the destruct (shut off the pump immediately if this occurs).
- ✓ Check plumbing connections for leaks.

Commissioning

WARNING



Exposure to ozone gas can be toxic, even in low concentrations. Always ensure that the system has been properly and thoroughly leak tested before turning on the ozone generator. Telchine Energy Technologies highly recommends the use of a portable ozone ambient monitor while performing start-up to ensure that ozone exposure remains at safe levels.

Turn on the ozone system while running the injection pump.

- ✓ Use a portable ozone ambient monitor (if equipped) to check for ozone leaks.
- ✓ On the inside of the control panel write the commission date, and temperature setpoint in permanent marker. This can be used to troubleshoot media aging and allow programming of the controller if the setpoint is changed accidentally.

Operating the Destruct

Setting the temperature of the media bed

The controller comes pre-programmed to a setpoint of 300 °F as part of factory quality testing. However, the user may desire to change the temperature setpoint depending on installation and operational conditions.

Temperature Setpoints

Min	15°F above ambient temperature.
Recommended	300 °F

To change the setpoint

6. Use the  and  buttons to adjust the values.
7. Press SET to save changes.

Turning on and Off the Blower

On blower units, the blower may be turned on and off using the switch on the front of the controller. To turn on the blower, turn the switch clockwise until it clicks. To turn off the blower, turn the switch counterclockwise until it clicks.

This switch also serves as an interlock for the heater unit. The heater is not able to operate when the blower is not running.

Telchine recommends that the blower be operating any time that the ozone system is running. There should be no need to turn off the blower unless the system is being serviced.

Maintenance and Troubleshooting

Replacing Damaged Media

Over time, the media may foul from exposure to moisture, or less commonly VOCs, Chlorine, and Hydrogen Sulfides. If that occurs, then the media bed may need to be replaced. Contact Telchine Energy Technologies for a media bed rebuild kit, which includes detailed instructions for replacing the media bed.

After replacement, refer to **Commissioning Checklist** and re-commission the unit as if it was new. Telchine highly recommends keeping track of media replacement dates. If the bed is becoming fouled frequently, we recommend scheduling a service call to troubleshoot the exact cause of media failure.

Obtaining Manufacturer Service

In rare cases, the unit may need to be serviced or troubleshooted by Telchine. The best way to contact us is via email at info@telchine-rd.com. Our service team will create a ticket and help troubleshoot the issue. If necessary, we can schedule a service visit for our team to repair the system.

- The installation date (see inside of the controller for commissioning information).
- The model number of the unit.
- The problem that is occurring. Be detailed and specific.
- We highly recommend taking a photo or video of the failure if possible.