GateKeeper® GPU Ozone Gas Purifiers

Installation and operation manual

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OVERVIEW

These instructions provide clear guidelines on proper operation and maintenance of GateKeeper® GPU Ozone Purifiers. Read this manual carefully as there are important safety and product performance topics that are discussed. Failure to follow these instructions may result in damage to the product or an unsafe condition.

SAFETY

Read Carefully

NOTE: Completely read this manual before installation and operation.

DANGER! High-pressure fluids are dangerous. Any accidental release of pressure can propel objects at high speed and may cause damage to equipment or injure personnel. Ensure that proper safety precautions are taken in order to prevent and/or mitigate hazardous conditions. Ensure the area is well-ventilated to prevent asphyxiation.

DANGER! USE THIS PURIFIER WITH APPROVED GASES ONLY. If this product is exposed to an incompatible gas, an exothermic or other adverse reaction may occur. It is the user's responsibility to install all safety equipment to prevent and mitigate the effects of such a condition.

WARNING! Always pressurize and depressurize a purifier slowly in order to prevent damage to the filter membrane.

CAUTION! Never use purifiers with multiple process gases. If this is required, contact Entegris to ensure safe operation.

CAUTION! DO NOT exceed the maximum flow rate for the purifier. See the *Mechanical Specifications* section (page 6).

CAUTION! DO NOT exceed the maximum or minimum operating temperatures. See the Mechanical Specifications table in the *Mechanical Specifications* section (page 6).

CAUTION! DO NOT leave the purifier uncapped for more than 60 seconds.

INSTALLATION PROCEDURES

SITE PREPARATION

⚠ **CAUTION!! Use stainless steel gaskets for fitting connection. The use of other gaskets may cause abnormal heat generation of the purifier.**

1. Modify the gas line prior to purifier installation using a qualified high-purity mechanical contractor.
2. Purge the lines upstream of the purifier to remove any atmospheric contaminants.
3. Do not remove the fittings until indicated in this instruction manual.
4. Minimize exposure to atmosphere when loosening or removing the sealing fittings.
5. Use the proper installation tools and unplated stainless steel face seal gasket. If possible, avoid using adjustable wrenches, as they often damage fittings.
6. Please note, **never reuse** face seal gaskets.

INSTALLATION

⚠ **CAUTION! Take care not to contaminate the purifier wetted parts with any foreign substances during installation. The contamination may cause abnormal heat generation of the purifier.**

1. Verify that the gas line has the proper clearance dimensions for the purifier and adjust if needed, and all face seals are undamaged.
2. Orient the purifier in the gas line with the flow arrow pointing in the direction of the gas flow.
3. Prepare two new stainless steel face seal gaskets before removing purifier caps. Be sure to work quickly, completing the next five steps without interruption. This will minimize the purifiers exposure to atmosphere.
4. Inspect inlet and outlet face seals for damage.
5. Insert a new metal seal gasket for the outlet and hand tighten the connection.
6. Insert a new metal seal gasket for the inlet and hand tighten the connection.

   NOTE: Take care to not rotate the purifier body. This may damage the sealing surface, which could lead to a leak.

7. Using the proper wrenches, tighten the inlet and then the outlet connections an additional ⅛ of a turn (45°) past finger tight to seal the connection. The purifier must be held stationary while turning the mating fitting. Do not over tighten as this may cause damage to the fittings.
8. Perform the leak test according to procedure that is defined at site.

BEFORE STARTUP

Ensure the purifier has been leak checked and installed as recommended. Also ensure the purifier is being operated within its operating limits, such as temperature and pressure.

FLOWING OZONE GAS

⚠ **CAUTION! Monitor the purifier surface temperature when starting service in ozone gas. If the purifier is contaminated with any foreign substances during installation, the purifier may experience abnormal heat generation.**

1. Flow a minimum of 20 liters of ozone gas in the purifier inlet through the outlet for a minimum of five minutes.
2. Ensure the purifier surface temperature is lower than 40°C (104°F) while ozone gas is flowing. If the surface temperature exceeds 40°C (104°F), immediately turn off ozone gas flow and remove the purifier according to the following decommissioning procedure.
3. Purifier is now ready for use.

DECOMMISSIONING PROCEDURE WHEN HEATED

When the purifier generates heat, decommission the purifier immediately following this procedure.

1. Turn off ozone gas flow.
2. Purge the purifier with a minimum of 20 liters of inert gas for a minimum of 10 minutes.
3. Ensure the surface temperature goes down to a safe temperature for handling.
4. Remove the purifier according to the procedure defined at the operating site.
5. Cap the purifier tightly with metal caps.

⚠ **CAUTION! DO NOT REUSE the decommissioned purifier.**

MANAGING REPLACEMENT AND PURIFIER LIFETIME

Since the series does not have an end-of-life indicator, it is recommended that they be put on a Preventative Maintenance (PM) cycle based on the estimated lifetime.

In order to determine the purifier's lifetime, please visit *www.entegris.com* or contact your local Entegris office for assistance.

DISPOSAL

All purifiers should be purged with an inert gas before disposal.

⚠ **CAUTION! When the purifier is serviced in ozone gas that is produced by an ozone generator using nitrogen as a dopant, nitric acid may accumulate in the purifier.**

TROUBLESHOOTING GUIDE

SYMPTOM	POSSIBLE CAUSE	SOLUTION
The purifier generates abnormal heat.	Ozone reactive substances are captured in the purifier.	Turn off the ozone gas flow and replace the purifier with a new purifier.
Outlet metal concentration does not meet specified performance.	Downstream parts generate metals after purification.	Install the purifier near the use point to avoid metal generation by downstream parts.
	Purifier flow rate is too high.	Verify that the maximum flow rate is not exceeded.
Outlet purity level degrades with time.	Purifier has exceeded its useful life.	Replace the purifier with a new purifier.
Ozone concentration declines after purification.	The inertness of the purifier is degraded by ozone reactive substances captured in the purifier, or by the accumulation of impurities in the purifier.	Replace the purifier with a new purifier.

MECHANICAL SPECIFICATIONS

Materials of construction	Filter membrane	PTFE
	Purification media	Porous inorganic material
	Housing	316L stainless steel
	Surface finish, internal	Ra <0.17 µm (electropolished)
Retention	Volatile metals	Cr and Mn
	Volatile metal removal efficiency	>99% for Cr
	Particles	>99.9999999% for particles ≥0.003 µm
Connection	¼" gasket seal	
Gas	Ozone (O_3) <300 g/Nm³ concentration	
Inlet metal level	Cr: <1 ppm	
Recommended flow rate	5 to 25 slm	
Operating conditions	Maximum operating pressure: 20 kPa (2.9 psi) Operating temperature: 20° to 30°C (68° to 86°F)	

Please consult Entegris Account Managers for flow rate and O_3 gas concentration exceeding specifications.

GPU OPTIONS

Part number	Description
GPUS200TOZ04R11CA	For vacuum conditions
GPUS200TOZ04R12CA	For pressurized conditions

LIMITED WARRANTY

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