

GateKeeper® Gas Purification System DX Series for 20, 30, 50, and 60 Nm³/hr

Continuous flow, point-of-use purified CO₂ gas at a low cost of ownership

The GateKeeper Gas Purification System (GPS) DX series is a state-of-the-art continuous service gas purification system from Entegris that brings advanced technology to gas purification. It provides semiconductor manufacturers with an innovative solution for higher wafer yields and lower cost of ownership.

Based on the in-situ regeneration technology, GateKeeper purifiers automatically self-regenerate, guaranteeing a continuous flow of purified process gas. This eliminates the need to send a purifier back for regeneration or install a replacement purifier. As a result, this improves system safety and eliminates environmental concerns.

The GPS DX series delivers purified carbon dioxide gas to the most up-to-date scanner platforms, including immersion lithography tools. The ultra small footprint and compact design require minimal fab floor space and allow easy access to serviceable components. Its media provides outlet purity in the parts-per-trillion (ppt) levels. The system uses ambient temperature purification where heating is not required, thereby ensuring resource conservation and lower energy costs. The GPS removes contaminants such as volatile acids and bases, refractory compounds, condensable organics, non- condensable organics and moisture from CO₂ gas.



APPLICATIONS

- Photolithography
- Wet Etch and Clean
- Applications that require purified CO₂ gas

FEATURES & BENEFITS

Removal efficiency	High wafer yields • Contaminant removal efficiency ensures a cleaner process in parts-per-trillion levels • Low pressure drop means the system does not require any changes to the inlet pressure
	System reliability and low cost of ownership • Power failures will not harm the system • Use of ambient temperatures, where heating is not required, lowers energy costs, and conserves resources • Startup service facilitates integration, field maintenance and upgrades
Optimized in-situ regeneration technology	GateKeeper purifiers automatically self-regenerate, guaranteeing a continuous flow of pure gas • Eliminates the need to send a purifier back for regeneration or install a replacement purifier • Improves system safety and eliminates environmental concerns • Reduces interruptions to process gas flows
Ultra small footprint	Compact design • Uses minimal fab floor space to ensure facility cost savings • Allows customers to effectively utilize shadow footprint of process tools
	Easy access to components • Speeds up installation • Facilitates system hookups to facility
CE and SEMI® certified DX series gas purification system	Delivers purified carbon dioxide gas to the most up-to-date scanner platforms, including immersion lithography tools as well as other process tools
	Effectively removes contaminants such as volatile acids and bases, refractory compounds, condensable organics, non-condensable organics and moisture from CO₂ gas

PRODUCT SPECIFICATIONS

	GPS20DX	GPS30DX	GPS50DX	GPS60DX		
Gases purified	Carbon dioxide (CO ₂)					
Media type	Inorganic					
Contaminants removed	Volatile acids (measured as SO ₂)		<5 ppt			
	Volatile bases (measured as NH ₃)		<500 ppt			
	Refractory compounds (measured as HMDSO)		<5 ppt			
	Noncondensable organics (measured as Toluene)		<5 ppt			
	Condensable organics (measured as Decane)		<5 ppt			
	Moisture (H ₂ O)		<1 ppb			
Operating pressure range	5.51 – 17.23 bar (80 – 250 psig)					
Pressure drop	<15 psi @ 100 psig and max rated flow					
Maximum flow rate	20 Nm ³ /hr (311 SLM)	30 Nm ³ /hr (466 SLM)	50 Nm ³ /hr (776 SLM)	60 Nm ³ /hr (932 SLM)		
Gas operating temperature	15° – 40°C (60° – 104°F)					
Outlet filtration (ISO Class 1)	<10 particles per m ³ @ 0.1 µm					
	<2 particles per m ³ @ 0.2 µm					
Leak rating	1 × 10 ⁻⁹ atm cc/sec					

SAFETY FEATURES

Feature	Description	GPS series
Earth leakage circuit breaker	Provides additional electrical protection to the system.	Yes
Over temperature rise condition	Monitored via thermocouple. Heaters sized to prevent runaway conditions. As a secondary precautionary device, a high-temperature hardware interlock is included on all systems.	Yes
EMO button	When activated, power is removed from the main enclosure. The front panel and controller remain powered. Process gas flow is shut off.	Yes
Remote EMO	Provides input for remote EMO activation. In the event of an EMO shutdown, the system will send an output signal to an external sensing device that alerts the facility of the alarm.	Yes
Remote alarm	In the event of a minor alarm in the system not requiring an EMO shutdown, the system will send an output signal to an external sensing device that alerts the facility of the alarm.	Yes
Visual alarm	Alarm conditions will result in a visual alarm on the top of the system.	Yes
Audible alarm	Alarm conditions will result in an audible alarm.	Yes

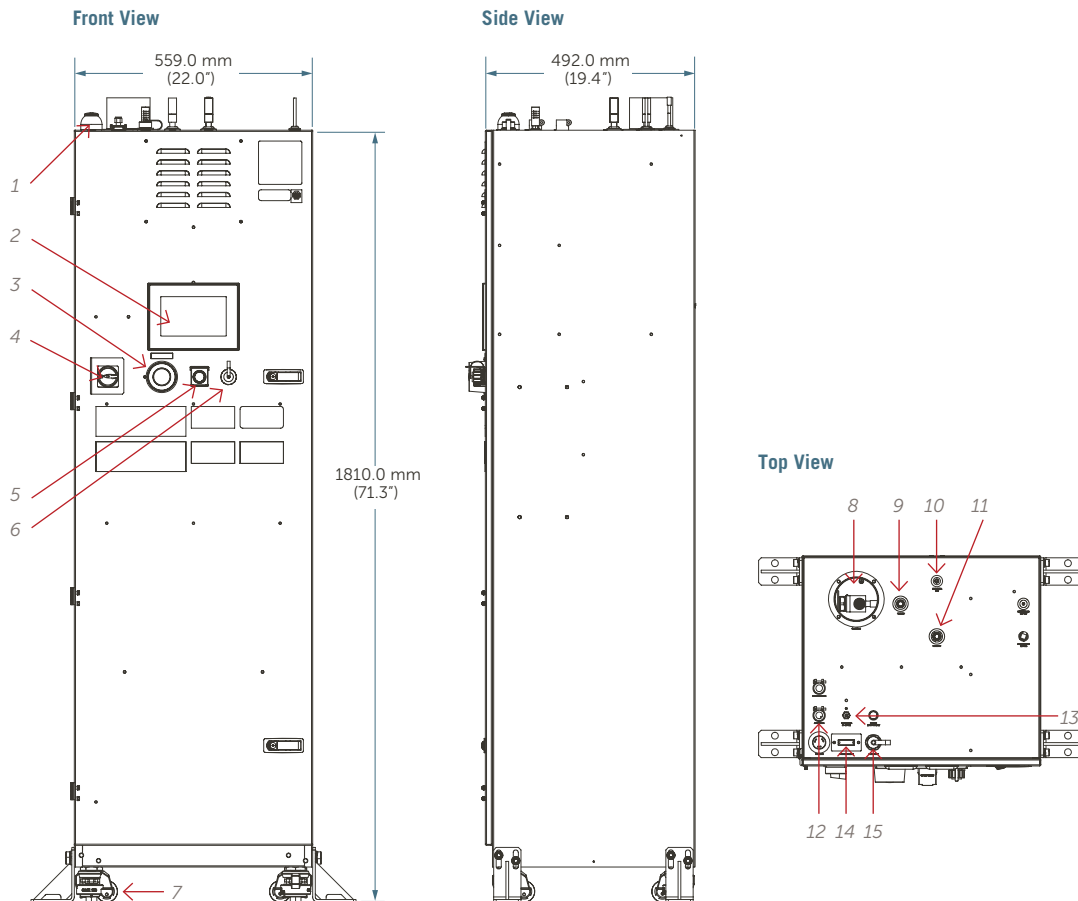
FACILITY SPECIFICATIONS

		GPS 20/30DX	GPS 50/60DX
Process gas input	Mechanical connection	1/2" tube stub	3/4" tube stub
Process gas output	Mechanical connection	1/2" tube stub	3/4" tube stub
Ventilation	Mechanical connection	4" duct	
	Exhaust flow	50 cfm	
Power requirements	Mechanical connection	3-pin mechanical disconnect	
	Power requirements	200 – 240 VAC single phase	
	Power consumption	100W at idle and online	
		700W at regen	
Regeneration	Regen duration	<24 hours for each purifier bed	
Regen gas output	Mechanical connection	3/8" tube stub	
Instrument air	Mechanical connection	1/4" compression fitting	
	Gas and pressure	CDA or N ₂ @ 6.21 – 10.34 bar (90 – 150 psig)	
Physical requirements	Mounting	Floor	
	Recommended maintenance space	3 feet in front of system	
	Operating conditions	15° – 40°C (60° – 104°F) indoor	
	Humidity	10% – 90% RH noncondensing	
Shipping weight		181 kg (400 lb)	205 kg (450 lb)

Note: It is the customer's responsibility to ensure that the equipment is installed according to local building code requirements.

DIMENSIONS

Models GPS20DX, GPS30DX, GPS50DX, GPS60DX



System features

1	Indicator light	Glows green, yellow or red to provide visual indication of system status; includes audible alarm.
2	Touch screen	Provides detailed system status and information.
3	EMO	When activated, power is removed from the cabinet. The system shuts down. The front panel and controller remain powered.
4	Main system switch	Powers the system on and off.
5	Start	Used to begin system operations and to clear alarms.
6	USB port	USB connection for data log retrieval and system updates.
7	Casters	Casters with integrated leveling feet; includes seismic restraints.
8	Exhaust vent	Allows ventilation.
9	Process gas input	Inlet gas (not purified).
10	Regen gas vent	Exhausts regen gas.
11	Process gas output	Outlet gas (purified).
12	Power	System power connection.
13	Instrument air	Supplies gas to the air-operated control valves.
14	Remote alarm interface	Allows for remote alarm input and output with female 15-pin DB connector.
15	Ethernet port	RJ-45 connector for Modbus® TCP/IP and remote browser-based web access.

ENCLOSURE INFORMATION

The GateKeeper DX series enclosure is designed for indoor applications only. The enclosure includes leveling feet with integrated casters and seismic restraint brackets to secure the system to the floor. The front door provides easy access to all serviceable components. The backup purifier is accessible from the front door.

ORDERING INFORMATION

Model	Description
GPS20DX	Enclosed model for use with applications requiring a flow rate up to 20 m ³ /hr
GPS30DX	Enclosed model for use with applications requiring a flow rate up to 30 m ³ /hr
GPS50DX	Enclosed model for use with applications requiring a flow rate up to 50 m ³ /hr
GPS60DX	Enclosed model for use with applications requiring a flow rate up to 60 m ³ /hr

Options	GPS series
Passive backup	Yes
Passive backup with integrated Gatekeeper backup purifier in series configuration	Yes
Automatic bypass valve	Yes
Automatic bypass valve with integrated GateKeeper backup purifier in parallel configuration	Yes
Inlet and outlet pressure transducers	Yes
Moisture indicator	Yes
Process gas mass flow meter with totalizer	Yes
400V input power	Yes

FOR MORE INFORMATION

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Corporate Headquarters

129 Concord Road
Billerica, MA 01821
USA

Customer Service

Tel +1 952 556 4181
Fax +1 952 556 8022
Toll Free 800 394 4083

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