

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

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

The GateKeeper® Gas Purification System (GPS) EX 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 EX series delivers ultrapure hydrogen gas to the most critical applications, including EUV photolithography. 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 effectively removes contaminants such as H₂O, O₂, CO, CO₂ and non-methane hydrocarbons from hydrogen gas.



APPLICATIONS

- EUV Photolithography
- Metal Organic Chemical Vapor Deposition (MOCVD)
- Atomic Layer Deposition (ALD)
- Low Temperature Epitaxy (LTE)

FEATURES AND BENEFITS

Features	Benefits
Removal efficiency	<p>High wafer yields</p> <ul style="list-style-type: none">• 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 <hr/> <p>System reliability and low cost of ownership</p> <ul style="list-style-type: none">• 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	<p>GateKeeper purifiers automatically self-regenerate, guaranteeing a continuous flow of pure gas</p> <ul style="list-style-type: none">• This 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	<p>Compact design</p> <ul style="list-style-type: none">• Uses minimal fab floor space to ensure facility cost savings• Allows customers to effectively utilize shadow footprint of process tools <hr/> <p>Easy access to components</p> <ul style="list-style-type: none">• Speeds up installation• Facilitates system hookups to facility
CE and SEMI® certified HX series gas purification system	<p>Delivers ultrapure hydrogen gas to the most critical semiconductor applications</p> <hr/> <p>Effectively removes contaminants such as H₂O, O₂, CO, CO₂ and non-methane hydrocarbons from hydrogen</p>

PRODUCT SPECIFICATIONS

Model	GPS20EX	GPS30EX	GPS50EX	GPS60EX
Gases purified	Hydrogen (H ₂)			
Media type	Inorganic			
Contaminants removed	Moisture (H ₂ O)		<100 ppt	
	Carbon monoxide (CO)		<1 ppb	
	Carbon dioxide (CO ₂)		<100 ppt	
	Oxygen (O ₂)		<250 ppt	
	CxHy (45–100 amu)		<5 ppt	
	CxHy (>100 amu)		<1 ppt	
	Refractory compounds		<1 ppt	
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

Features	Descriptions	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

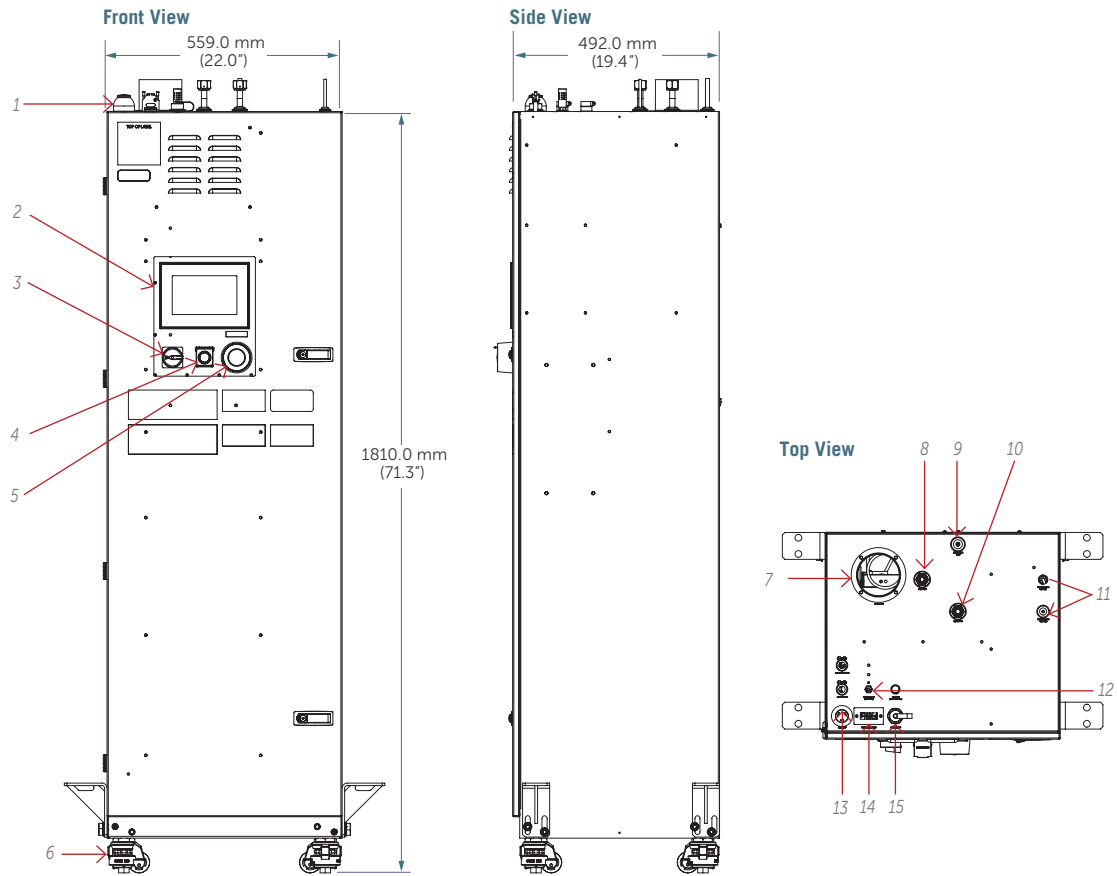
FACILITY SPECIFICATIONS

		GPS 20/30EX	GPS 50/60EX
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 phas	
	Power consumption	100W at idle and online	
		500W at regen	
Regeneration	Regen duration	<24 hours for each purifier bed	
Regen gas input	Mechanical connection	3/8" tube stub	
	Gas	Nitrogen	
	Pressure	N ₂ : 4.00 – 4.27 bar (58 – 62 psig)	
Regen gas output	Mechanical connection	1/4" 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		20/30 240 kg (530 lbs)	
		50/60 274 kg (605 lbs)	

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

DIMENSIONS

Models GPS20EX, GPS30EX, GPS50EX, GPS60EX



System features	Descriptions	System features	Descriptions
1. Indicator light	Glows green, yellow, or red to provide visual indication of system status, includes audible alarm.	8. Process gas input	Inlet gas (not purified).
2. Touch screen	Provides detailed system status and information.	9. Regen gas vent	Exhausts regen gas.
3. EMO	When activated, power is removed from the cabinet. The system shuts down. The front panel and controller remain powered.	10. Process gas output	Outlet gas (purified).
4. Main system switch	Powers the system on and off.	11. Regen gas inputs	Customer-supplied regeneration gas line for nitrogen.
5. Start	Used to begin system operations and to clear alarms.	12. Instrument air	Supplies gas to the air-operated control valves.
6. Casters	Casters with integrated leveling feet; includes seismic restraints.	13. Power	System power connection.
7. Exhaust vent	Allows ventilation.	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 EX 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	Descriptions
GPS20EX	Enclosed model for use with applications requiring a flow rate up to 20 m ³ /hr
GPS30EX	Enclosed model for use with applications requiring a flow rate up to 30 m ³ /hr
GPS50EX	Enclosed model for use with applications requiring a flow rate up to 50 m ³ /hr
GPS60EX	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

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

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