

## HP Series V-Purge Hydrogen Purifiers



HP Series hydrogen purifiers use palladium membranes to provide 99.999999% purity for semiconductor and photovoltaic processes. The V-Purge system enhances the performance of our HP Series purifiers for higher flow rates typical in production fabs. The patented system provides improved performance to handle any flow change, superior protection from power failures and pressure surges and fast switching from nitrogen purge to full hydrogen flow.

### Any Flow Rate – Anytime

The improved design includes preheating of the inlet hydrogen to ensure stable temperature during purification. This control allows rapid changes in flow rate with no loss of pure hydrogen output.

### Fastest Purge Performance

Residual hydrogen must be removed from the palladium membranes upon loss of power to prevent stress in the palladium lattice structure. The patented V-Purge system provides automatic purging to remove all hydrogen in minutes, well before the palladium can cool below 300°C. The patented system (US2004/0182239A1) greatly improves MTBF performance to provide longer lifetimes.

### Pressure Surge Protection

Flow orifices and programmed valve sequencing provide slow pressurization of the palladium purifier to prevent unnecessary pressure surges. This system design helps maintain stable operating conditions for the entire purifier to extend operating lifetime.

### Rapid Startup

The V-Purge System rapidly removes nitrogen when the system is ready for restart. Now, the purifier can immediately restart to full hydrogen flow in <1 minute.



**Johnson Matthey**  
Gas Purification Technology

# HP Series V-Purge Hydrogen Purifiers

## Applications:

- MOCVD epi
- Photovoltaic processes
- Silicon carbide
- Bulk gas purification

## Design Features:

- Outlet impurities: < 1 ppb, O<sub>2</sub>, H<sub>2</sub>O, CO, CO<sub>2</sub>, N<sub>2</sub>, THC
- Inlet gas purity: minimum 99.99% H<sub>2</sub>
- "Outside In" diffusion cell design
- Automated Purge requires no manual adjustments of bleed flow rate (eliminates bleed and purge bypass flowmeters)
- Separate controller & purification cabinet
- Flow rate up to 220 slpm
- Single active heater with passive preheater
- 3 operating modes – purify, idle, purge
- RS485 Network capability-modbus slave
- **CE** compliant, purifier enclosure is ATEX compliant

## Benefits:

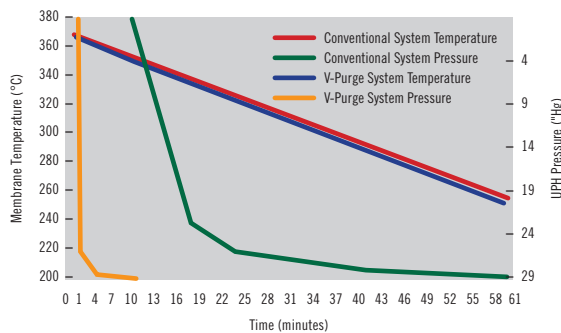
- Palladium membrane removes all impurities, provides the purest hydrogen possible
- Less than 10 minutes to remove all hydrogen when automated purge is activated
- Switches from nitrogen purge to maximum hydrogen flow capacity immediately (vs. conventional system start-up that takes over an hour to reach full flow rate)
  - No delay caused by trapped N<sub>2</sub>
  - Minimal temperature variation, ±5°C
  - Faster cycle times
- Eliminates pressure surge when switched from nitrogen purge to hydrogen service
- All H<sub>2</sub> removed prior to cell cooling
- Improved heat management maintains heat longer during power failures, dramatically slowing heat losses and the cooling effect after power to the heaters is lost

Model	Capacity SLPM <sup>1</sup>	Purge Gas	Pneumatic Supply	Electric
HP-200-VPurge	94	Nitrogen, 80 psig	Air or N <sub>2</sub> , 90 psig	240 VAC/10/50/60 Hz/10 A
HP-230-VPurge	105	Nitrogen, 80 psig	Air or N <sub>2</sub> , 90 psig	240 VAC/10/50/60 Hz/10 A
HP-400-VPurge	188	Nitrogen, 80 psig	Air or N <sub>2</sub> , 90 psig	240 VAC/10/50/60 Hz/10 A
HP-480-VPurge	220	Nitrogen, 80 psig	Air or N <sub>2</sub> , 90 psig	240 VAC/10/50/60 Hz/10 A

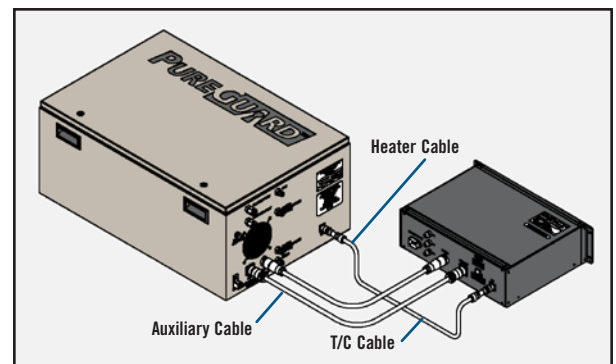
<sup>1</sup> Flow is @ 200 psig inlet pressure and 0 psig outlet pressure  
 Purifier enclosure: 30" (762mm) H x 20" (508mm) W x 13.25" (337mm) D, 110 lbs (50 kg)  
 Control module: 5.25" (134mm) H x 17" (432mm) W x 13" (330mm) D, 15.5 lbs (7 kg)

## Purge Performance

(V-Purge System vs. Conventional Purge System)



## Table Top Configuration



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 Gas Purification Technology

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