

## PS4-MT50-N

### PS4-MT Series Nitrogen Gas Purifier, 100 slpm

#### General Description

The MonoTorr® Nitrogen Gas Purifier is a getter-based purifier designed specifically to provide ultra-high purity (UHP) gas for semiconductor applications. Outlet impurity levels for O<sub>2</sub>, H<sub>2</sub>O CO, CO<sub>2</sub>, H<sub>2</sub> and CH<sub>4</sub> are reduced to low parts per billion (ppb) levels or below.

The patented getter alloy operated at elevated temperatures, removes impurities by forming irreversible chemical bonds. Impurities will not be released under any circumstances when the purifier is operated within specification.

The purifier will continuously supply ultra pure gas at rated flows provided that inlet impurities are within specified levels, until getter cartridge replacement is necessary.

#### Features

- **Fully Automated Microprocessor Controller** continually monitors system operation providing fault detection, temperature control and valve sequencing ensuring purifier reliability while minimizing operator involvement.
- **HMI (Human Machine Interface)** displays valve operation, purifying sequences, warning & alarm status, system temperature, heater power levels, and purification time.
- **System Alarms** detect potential hazards to ensure system integrity. Alarm and warning conditions are indicated on the HMI and accompanied by an alarm beeper
- **High Temperature Hardware Interlock** for the getter column
- **Electric Gas Preheater** decrease temperature gradients in the getter bed allowing maximum purification efficiency and uniform expenditure of getter material.
- **Closed-Loop Temperature Controls** provide accurate control of the getter column to maximize heater lifetime and energy efficiency.
- **All Metal Enclosure with Doors** allowing access to internal components.
- **Instrument Air Pressure Switch** detects and warns of low instrument air pressure.
- **Metal 0.003 micron particle filter** included standard
- **Standard Customer Interface Connections:**
  - Alarm Relay** - Fail safe relay contacts allow remote detection of alarms and warning conditions
  - Remote Contact Shutdown** - allows remote shutdown of the purifier

**Optional Equipment**

- **MODBUS Data communication port** provides operational data output
- **Emergency Manual Off (EMO)** allows instantaneous emergency shutdown

| <b>Process Gas Specifications</b>  |                        |
|--|------------------------|
| <b>Specification</b>   | <b>SPG Standard</b>    |
| Flow Rate: (maximum purified gas delivered)  | 100.0 slpm             |
| Flow Rate: (minimum)*  | 5.0 slpm               |
| Minimum Inlet Pressure   | 2.8 bar (~40 psig)     |
| Maximum Inlet Pressure   | 10.3 bar (~150 psig)   |
| Max. Allowable Pressure Drop @ 2.8 bar (40 psig) inlet pressure and maximum rated flow | < 0.55 bar (~8.0 psid) |
| Inlet Gas Temperature Range  | 0° - 35°C (32° - 95°F) |
| Outlet Gas Temperature (maximum)   | 66°C (151°F)           |

\* The minimum flow is the lowest flowrate at which SAES will guarantee that outlet gas purity will be met.

| <b>Facilities Requirements – Electrical</b>                   |  |
|---|--|
| <b>Specification</b>  | <b>SPG Standard</b>                                      |
| Main Power<br>(Customer to specify voltage at time of order.) | 208 VAC, 1 Phase, 50/60 Hz<br>240 VAC, 1 Phase, 50/60 Hz |

| <b>Facilities Requirements – General</b>                                  |  |
|---|--|
| <b>Specification</b>  | <b>SPG Standard</b>                                      |
| Instrument Air Pressure:<br>(clean dry air or nitrogen filtered to 10 µm) | 4.1 bar (~60 psig) minimum<br>7.6bar (~110 psig) maximum |
| Ambient Temperature Range   | 5° / 35°C (41° / 95°F)                                   |

| <b>Analytical Specifications (based on 99.9995% pure inlet gas)</b> |                             |
|---|-----------------------------|
| <b>Impurity</b>   | <b>SPG Standard Outlets</b> |
| O <sub>2</sub>  | < 1.0 ppb                   |
| CO  | < 1.0 ppb                   |
| CO <sub>2</sub>   | < 1.0 ppb                   |
| H <sub>2</sub> O  | < 1.0 ppb                   |
| H <sub>2</sub>  | < 1.0 ppb                   |
| CH <sub>4</sub>   | < 1.0 ppb                   |
| Max # of Particles  | 1 ppcf                      |
| Particle Size   | @ 0.1 μm                    |

| <b>General Purifier Specifications</b> |   |
|--|---|
| Purifier Height (envelope)             | 113 cm (~44.5 inches)   |
| Purifier Width (envelope)              | 53 cm (~21 inches)  |
| Purifier Length (envelope)             | 30 cm (~12 inches)  |
| Purifier Weight                        | < 70 kg (<154 pounds)   |
| Feed Gas Inlet                         | 0.5 inch VCR Male   |
| Purified Gas Outlet                    | 0.5 inch VCR Male   |
| Getter Bed Operating Temperature       | 350°C (nominal)   |
| Outlet Particle Filter                 | 0.003 μm absolute all metal filter media  |
| Instrument Air Inlet                   | 3/8 inch FNPT   |
| Pressure Relief Vent                   | ¼ VCR Male  |
| Clearance Around Purifier              | 1 meter (39.4 inches) Minimum Front   |
| Installed Power @ 240v                 | 2.4 KW  |
| Average Power & Heat Load              | 1.0 KW  |
| Gas Wetted Surface Finish              | Up and Downstream of Getter Vessels = 316L SST, Electropolished, 12 Ra Maximum, 10 Ra Average for tubing and tube fittings  |
| Control System                         | Microprocessor Based with Digital Inputs & Outputs plus Thermocouple (TC) Inputs. Control & Display Interface, Automatic Alarm Response & Display. Includes Valve Operation, System Temperatures, Heater Power Levels, Warning and Alarm Status and Total Purify Time Readouts. |

|                              |   |
|------------------------------|---|
| Applicable Codes & Standards | ASME Pressure Vessel Code Section VIII<br>US National Electric Code<br>CE Marking |
|------------------------------|---|