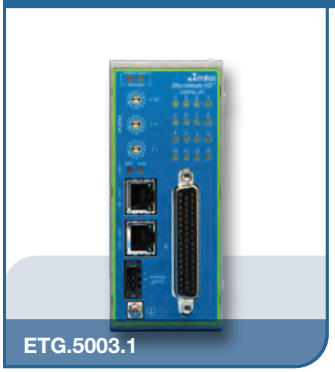
# ETHERCAT® PRODUCT SELECTION GUIDE

## NEW STANDARDS IN PERFORMANCE & FLEXIBILITY

## AUTOMATION & CONTROL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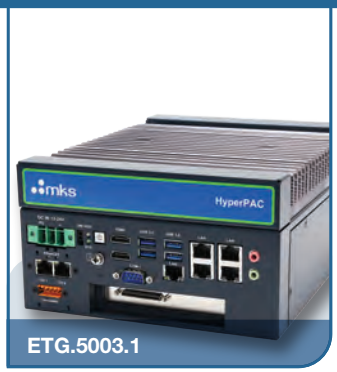
### MicroNode™ Combo
**Programmable Automation Controller**

- Each MicroNode module supports 16 DIO
- Each module supports 16-bit, 8 analog inputs, 4 analog outputs, ±10V



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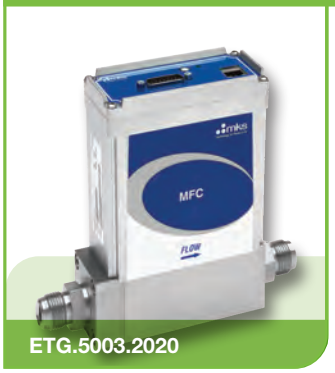
### HyperPAC
**Programmable Industrial PC**

- Ease of fieldbus protocols integration with IIoT solution
- Compact form factor
- Robust IPC
- Flexible configuration


### Custom Automation
**I/O Controller**

- Customizable architecture allows for expansion, customization, and modularity
- Remote boxes can add I/O connections in remote locations
- Supports hardwired safety interlocks or software programmable safety interlocks (TUV SIL3)

## FLOW/GAS DELIVERY



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### G Series
**Mass Flow Controllers and Meters**

- Full Scale flow rates from 5 sccm to 300 slm
- Proven, patented thermal sensor and mechanical design
- Multi-range/multi-gas capability; 1% of set point accuracy

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### G Series
**Pressure Controllers**

- Pressure control for Full Scale from 500 Torr to 100 psia
- Thermally stable pressure sensor for 1% of set point accuracy
- Digital flow control algorithm for fast response to set point

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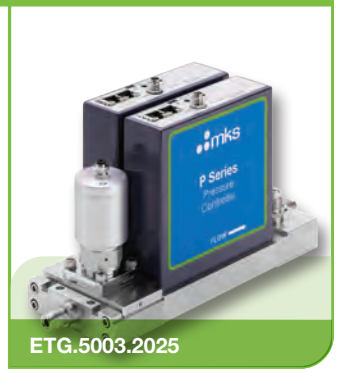
### P Series
**Pressure Controllers**

- Pressure control for Full Scale from 10 to 1000 Torr
- Thermally stable pressure sensor for 1% of set point accuracy
- Flow meter option for backside wafer pressure control applications



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### P Series
**Dual Zone Pressure Controller**

- Pressure control for Full Scale for 20, 50 or 100 Torr
- Integrated mass flow meter
- Full Scale flow measurement range for 20, 50, 100 sccm

## FLOW/GAS DELIVERY


ETG: MKS Specific

### Delta™
**Flow Ratio Controllers**

- Accurate and repeatable flow ratio control for better process optimization
- For use in cascade configurations
- Operates to temperatures up to 60°C ambient

### HA-MFV
**High Accuracy In-Situ Mass Flow Verifier**

- Flow rates up to 3000 sccm
- External volume insensitivity
- Reading measurement accuracy of 1.0% or better

## PLASMA SOURCES


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### Paragon®
**Remote Plasma Sources**

- For high gas dissociation rates (>98%) of $NF_3$
- Gas flows up to 8 slm and pressures up to 10 Torr
- Compatible with $O_2$ and $NF_3$ mixed gases

### R*evolution®
**Remote Plasma Sources**

- Up to 6kW of plasma power
- Integrated, self-contained unit for on-chamber installation
- Quartz plasma applicator, high density for oxygen species

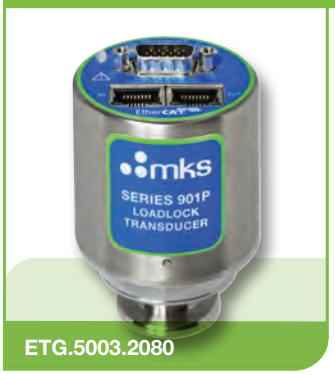
### CM12P1
**Remote Plasma Source**

- 12kW of plasma power
- Compatible with $NF_3$, $O_2$, $N_2$, and Ar
- Meets Semi F47 immunity response requirements

### CH24P1
**Remote Plasma Source**

- 24kW of plasma power
- Supports high flow applications
- Split power train for flexible installation

## PRESSURE/VACUUM MEASUREMENT

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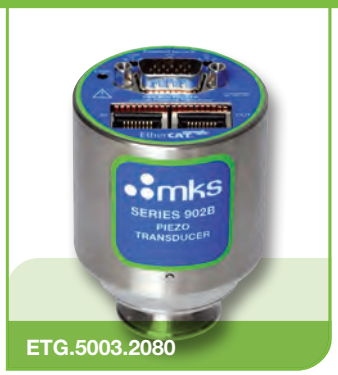
### 901P
**Load Lock Transducer**

- Designed specifically for semiconductor load lock applications
- Providing medium vacuum measurement and atmospheric switching
- Fast and accurate pressure measurement for improved cycle time and particle reduction

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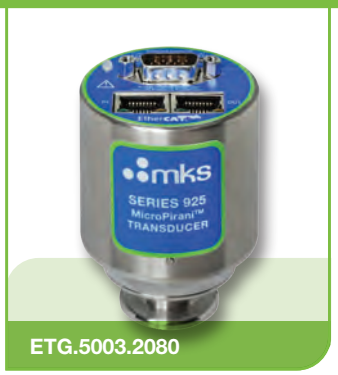
### 902B
**Vacuum Transducer**

- 1000 Torr Full Scale range
- Piezo resistive diaphragm sensor
- Stainless steel diaphragm

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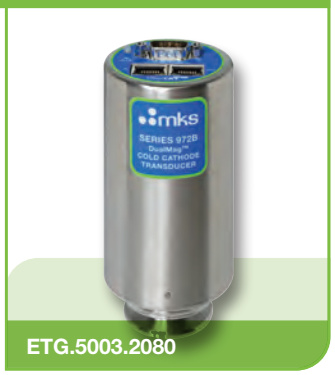
### 925 MicroPirani™
**Vacuum Transducer**

- MEMS-based technologies, including MicroPirani™ technology
- Applicable for foreline and general vacuum measurement applications
- Fast and accurate pressure measurement

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### 972B DualMag™
**Cold Cathode Transducer**

- Single transducer with wide pressure measurement range from atmosphere to ultra-high vacuum
- MEMS-based MicroPirani technology combined with cold cathode ionization technology
- Small footprint design

## PRESSURE/VACUUM MEASUREMENT


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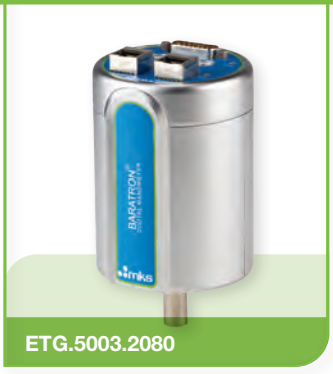
### DA03B
**Baratron® Capacitance Manometer**

- Heated at 150°C to 200°C
- Optional internally-mounted solid state process relays
- Compact design

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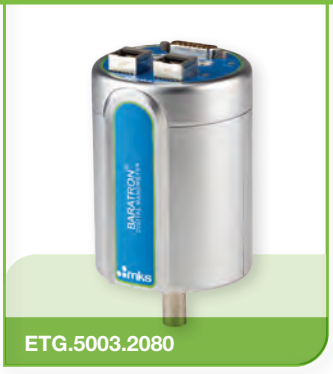
### DA05A
**Baratron® Capacitance Manometer**

- Ambient operating temperature at 60°C
- 0.1 and 0.25 Torr Full Scale ranges
- Standard sensor or etch/fluorine/deposition-friendly sensor option

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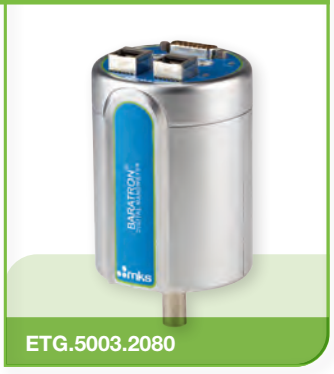
### DA06A
**Baratron® Capacitance Manometer**

- Heated at 45°C, 80°C, 100°C
- 1 Torr to 1 mTorr Full Scale ranges
- Standard sensor or fluorine/deposition-friendly sensor option

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### DA07A
**Baratron® Capacitance Manometer**

- Unheated or heated at 45°C, 80°C, 100°C
- 1 Torr to 1000 Torr Full Scale ranges
- Standard sensor or etch/flourine/deposition-friendly sensor option

## PRESSURE/VACUUM MEASUREMENT


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### 390 Micro-Ion®

**Vacuum Transducer**

- Combined Micro-Ion® ionization gauge technology, Conductron heat loss sensor, and 2 Piezo resistive sensors
- Continuous pressure measurement from high vacuum to atmosphere


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### 392 Micro-Ion®

**Vacuum Transducer**

- Combined Micro-Ion® ionization gauge technology with a miniature Pirani Conductron heat-loss sensor
- Dual ionization gauge filaments

## SENSING SOLUTIONS

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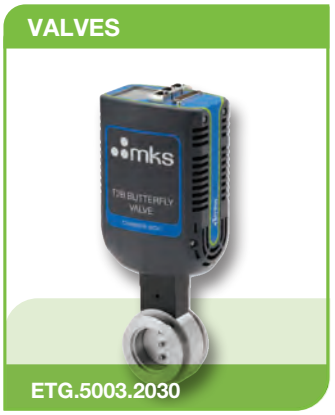
### TEMPERATURE CONVERTER

**Multichannel**

- 3 – 5 channels
- ±0.1°C (2σ) stability
- 0.01°C resolution

## VALVES

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### T2BA

**Exhaust Throttle Valve**

- Advanced model-based pressure control algorithm
- High-speed configurations available (<250 msec. open to close)
- Selectable high torque drives with soft-sealing available

| Product | Mailbox Service | Synchronization | Firmware |
|---|---|---|---|
| **Automation & Control** | | | |
| MicroNode™ Combo Programmable Automation Controller<br>HyperPAC Programmable Industrial PC | • CoE<br>• FoE | • Free Run<br>• DC Event<br>• SM Event to 500 usec | Yes |
| **Flow** | | | |
| G Series Mass Flow Controllers & Meters<br>G Series Pressure Controllers | • CoE<br>• FoE | • Free Run<br>• SM2 | Yes |
| P Series Pressure Controllers<br>P Series Dual Zone Pressure Controllers<br>Delta™ Flow Ratio Controllers | • CoE<br>• FoE | • Free Run<br>• SM2 | Via FoE |
| HA-MFV Insitu Mass Flow Verifier | • CoE<br>• FoE | • Free Run<br>• SM3 | Via FoE |
| **Pressure/Vacuum Measurement** | | | |
| 901P Load Lock Transducer<br>902B Vacuum Transducer<br>925 MicroPirani Vacuum Transducer<br>972B DualMag™ Cold Cathode Transducer<br>390 Micro-Ion® Vacuum Transducer<br>392 Micro-Ion® Vacuum Transducer | • CoE<br>• FoE | SM Event | • EtherCAT<br>• Transducer |
| DA03B Baratron® Capacitance Manometer<br>DA05A Baratron® Capacitance Manometer<br>DA06A Baratron® Capacitance Manometer<br>DA07A Baratron® Capacitance Manometer | • CoE<br>• FoE | Free Run | Yes |
| **Sensing Solution** | | | |
| Temperature Converter | CoE | Free Run | EtherCAT |
| **Valves** | | | |
| T2BA Exhaust Throttle Valve | • CoE<br>• FoE | • Free Run (to loop update)<br>• DC Event<br>• SM Event | • Via FoE<br>• Via Web GUI |

| Product | Synchronization | Monitor Parameters |
|---|---|---|
| Plasma Sources | | |
| Paragon® Remote Plasma Sources<br>Revolution® Remote Plasma Sources<br>CM12P1 Remote Plasma Source<br>CH24P1 Remote Plasma Source | Free Run | • Power<br>• Run Time / Ignition Time<br>• Faults<br>• AC/DC Line<br>• System Ready<br>• Internal Device Temperature |

## WHY MKS?

**CRITICAL TECHNOLOGIES**

World-class technology and development capabilities for leading-edge processes

**PROVEN PARTNER**

Recognized leader delivering innovative, reliable solutions for our customers' most complex problems

**OPERATIONAL EXCELLENCE**

Consistent execution across all aspects of our business

**COMPREHENSIVE PORTFOLIO**

Extensive offering of products and services for the markets we serve

**MKS INSTRUMENTS** enables technologies that transform our world. We deliver foundational technology solutions to leading edge semiconductor manufacturing, electronics and packaging, and specialty industrial applications.

We apply our broad science and engineering capabilities to create instruments, subsystems, systems, process control solutions and specialty chemicals technology that improve process performance, optimize productivity and enable unique innovations for many of the world's leading technology and industrial companies.

Our solutions are critical to addressing the challenges of miniaturization and complexity in advanced device manufacturing by enabling increased power, speed, feature enhancement, and optimized connectivity. Our solutions are also critical to addressing ever-increasing performance requirements across a wide array of specialty industrial applications.

Additional information can be found at **www.MKS.com**.

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