Fixed gas detection systems

smart
GasDetection
Technologies

D-ReX®

# State-of-the-art monitoring of gases in the semiconductor industry


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GERMANY

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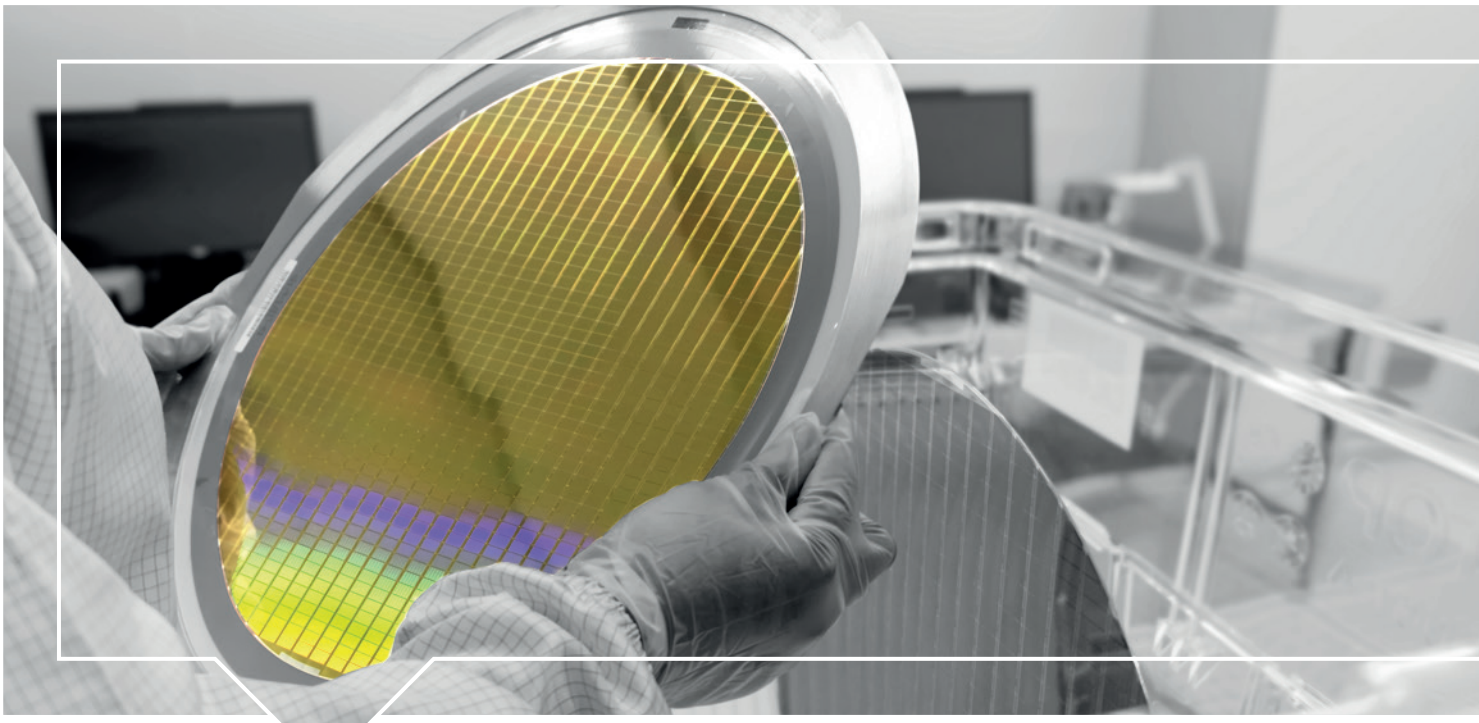

# D-ReX® Designed for Versatility

Gases are used in many areas of application and process steps of the semiconductor industry. This results in a wide variety of associated requirements for measuring methods, sensors, measuring ranges and communication.

The D-ReX allows you to select the ideal combination of measurement method and sensor for every requirement. Benefit from the DIN-rail mounted gas detector's easy-to-understand user interface, its modern, future-proof technology, and simple and cost-effective maintenance.

## Versatility in measurement methods

The D-ReX gas detector series lets you choose between different measuring methods to ensure you are using the ideal solution for every requirement.

» **D-ReX PoU (Point of Use)**
Monitoring of gases at the point of use using the diffusion method.

» **D-ReX PoI (Point of Installation)**
Monitoring of gases by diffusion method using a remote sensor cartridge. Distance between the D-ReX and the cartridge can be up to 30 meters.

» **D-ReX PoS (Point of Sampling)**
Monitoring of gases via extraction using a built-in pump (suction distance up to 30 meters). The sensor is situated within the D-ReX. Furthermore, the D-ReX PoS is the only gas detector in the world that offers optional monitoring of the hose line for leaks. The Line Integrity Monitoring (LIM) technology continuously works to prevent unnoticed absorption of secondary air.

» **D-ReX PoS with pyrolyzer**
The Py-ReX is the matching pyrolyzer for the D-ReX PoS to monitor gases that are either too toxic or chemically inactive to be measured directly. The Py-ReX is simply mounted between the suction hose and the D-ReX and breaks the monitored gas down into harmless, easy-to-detect components.

## D-ReX versions and options

| D-ReX Version | Internal Sensor (Diffusion) | External Sensor (Diffusion) | Pump module (eXtraction Module) | Py-ReX | Internal Relays | LonWorks |
|---|---|---|---|---|---|---|
| Point of Use (PoU) | ✓ | | | | 5 (option) | (option) |
| Point of Installation (PoI) | | ✓ | | | 5 (option) | (option) |
| Point of Sampling (PoS) | ✓ | | ✓ | ✓* | 5 (option) | (option) |

* Required for certain gases

## Versatility in gases and measuring ranges

A wide range of durable smart sensors, covering all important gases of the semiconductor industry as well as the relevant measuring ranges, is available for the D-ReX. The following list is merely a selection of these. Please note that a pyrolyzer is needed for the detection of some gases (*).

### List of detectable gases using an EC Sensor

| Formula | Gas | Nominal Range |
|---|---|---|
| $AsH_3$ | Arsine | 0-1 ppm |
| $AsH_3$ | Arsine / no $H_2$ (no cross-sensitivity to H2) | 0-1 ppm |
| $B_2H_6$ | Diborane | 0-1 ppm |
| $Br_2$ | Bromine | 0-5 ppm |
| $Cl_2$ | Chlorine | 0-10 ppm |
| $ClF_3$ | Chlorine trifluoride | 0-1 ppm |
| $ClO_2$ | Chlorine dioxide | 0-2 ppm |
| CO | Carbon monoxide | 0-500 ppm |
| $COCl_2$ | Phosgene | 0-2 ppm |
| DCS | Dichlorosilane | 0-30 ppm |
| ETO | Ethylene oxide | 0-20 ppm |
| $F_2$ | Fluorine | 0-5 ppm |
| $GeH_4$ | Germanium hydrogen | 0-5 ppm |
| $H_2$ | Hydrogen | 0-2000 ppm |
| $H_2$ | Hydrogen | 0-1 Vol.-% |
| $H_2$ | Hydrogen | 0-4 Vol.-% |
| $H_2S$ | Hydrogen sulfide | 0-100 ppm |
| $H_2Se$ | Hydrogen selenide | 0-5 ppm |
| HBr | Hydrogen bromide | 0-30 ppm |
| HCl | Hydrogen chloride | 0-30 ppm |
| HCN | Hydrogen cyanide | 0-30 ppm |
| HF | Hydrogen fluoride | 0-10 ppm |
| HMDS | Hexamethyl disilazane | 0-0.5 Vol.-% |
| $N_2H_4$ | Hydrazine | 0-1 ppm |
| $NH_3$ | Ammonia | 0-100 ppm |
| $NH_3$ | Ammonia | 0-1000 ppm |
| $NH_3$ | Ammonia | 0-5000 ppm |
| NO | Nitrogen monoxide | 0-100 ppm |
| $NO_2$ | Nitrogen dioxide | 0-30 ppm |
| $O_2$ | Oxygen (5-year sensor, lead-free) | 0-25 Vol.-% |
| $O_3$ | Ozone | 0-1 ppm |
| $O_3$ | Ozone | 0-5 ppm |
| $PH_3$ | Phosphine | 0-1 ppm |
| $SiH_4$ | Silane | 0-50 ppm |
| $SO_2$ | Sulfur dioxide | 0-10 ppm |
| TEOS | Tetraethyl orthosilicate | 0-100 ppm |
| TMB | Trimethyl borate | 0-500 ppm |

Other gases on request.

### List of detectable gases which require a pyrolyzer

| Formula | Gas | Nominal Range |
|---|---|---|
| $C_2H_2Cl_2$ | Trans-1,2 dichloroethylene (DCE) | tbd |
| $C_4F_6$ | Hexafluorobutadiene | tbd |
| $C_5F_8$ | Octafluorcyclopenten | tbd |
| $CH_3F$ | Methyl fluoride | tbd |
| $NF_3$ | Nitrogen trifluoride | 0-50 ppm |
| $SF_6$ | Sulfur hexafluoride | tbd |

### List of detectable gases using an IR Sensor

| Formula | Gas | Nominal Range |
|---|---|---|
| $C_3H_8$ | Propane | 0–2 vol % |
| $CH_4$ | Methane | 0–5 vol % |
| $CO_2$ | Carbon dioxide | 0–1 vol % |
| $CO_2$ | Carbon dioxide | 0–5 vol % |
| $CO_2$ | Carbon dioxide | 0–10 vol % |
| $CO_2$ | Carbon dioxide | 0–25 vol % |
| $CO_2$ | Carbon dioxide | 0–50 vol % |
| $N_2O$ | Nitrous oxide | 0–1000 ppm |
| $N_2O$ | Nitrous oxide | 0–1 vol % |

### List of detectable gases using a CC Sensor

| Formula | Gas | Nominal Range |
|---|---|---|
| $C_2H_2$ | Acetylene | 0–100 % LEL |
| $C_2H_4$ | Ethylene | 0–100 % LEL |
| $C_2H_6$ | Ethane | 0–100 % LEL |
| $C_3H_8$ | Propane | 0–100 % LEL |
| $C_4H_{10}$ | Butane | 0–100 % LEL |
| $C_5H_{12}$ | Pentane | 0–100 % LEL |
| $C_6H_{14}$ | Hexane | 0–100 % LEL |
| $CH_4$ | Methane | 0–100 % LEL |
| $H_2$ | Hydrogen | 0–100 % LEL |

| Formula | Gas | Nominal Range |
|---|---|---|
| $C_4H_8$ | Isobutylene | 0-2000 ppm |
| $C_7H_8$ | Toluene | 0-1000 ppm |
| $C_7H_{16}$ | Heptane | 0-3000 ppm |

## Versatility in communication

A simple, straightforward visual display of readings, alarms and error messages as well as the capability to be easily integrated into alarm and monitoring systems are what make good gas detectors.

**The D-ReX offers:**

- A high-resolution color display
- Plain text information instead of cryptic codes
- Bluetooth® for easy maintenance and access to all relevant information via app
- Power-over-Ethernet communication (Modbus/TCP, web interface)
- RS-485 (Modbus/RTU)
- LonWorks® (optional)
- Analog: 4–20 mA signal
- 5x internal configurable relays (optional)

1. **D-ReX**
2. **Py-ReX**
3. **Ethernet-cable with PoE**
4. **IP Code sticker**
5. **Sensor cartridge with detachable pipe flange adapter (up to 1200 meters / 4000 feet)**
6. **Connector cartridge for remote sensors (M12)**
7. **Sensor cartridge with detachable diffusion mode adapter**
8. **Integrated pump (aspiration tube of up to 30 m / 100 feet)**
9. **Mounting bracket**
10. **Touch protection insert for sensors**
11. **Pipe flange saddle**
12. **Lower housing covers**

# **Technical Specification:** D-ReX Series

| | |
|---|---|
| Gases: | See gas list |
| Measuring Principle: | Sensor dependent; available options:<br>EC = electrochemical \| CC = catalytic combustion \| IR = infrared \| PID = photoionization |
| Sampling Method:<br>PoU<br>PoI<br>PoS | Depending on configuration<br>» Diffusion<br>» Remote sensor<br>» Extraction with pump (if applicable, in combination with Py-ReX) |
| Display and Interface: | Display: 2.4" full color TFT (320 x 240 pixels)<br>Interface: 5 push buttons |
| Selectable Languages: | German, English (more languages coming soon) |
| Communication: | » Analog outlet: 4–20 mA output<br>» Analog inlet 4-20 mA for Py-ReX (D-ReX PoS only)<br>» Digital: RS-485 (Modbus/RTU)<br>» 10/100 Mbit Ethernet (Modbus/TCP)<br>» Bluetooth<br>» LonWorks® (option)<br>Relays: 5x internal (configurable) form C relays (option)<br>Max. 2 A / 30 V DC<br>Min. 10 mA / 5 V<br>can optinally be upgraded with an external relaymodule with up to 16 relays each |
| Response Time: | Varies by sensor (see sensor data sheet) |
| Expected Average Life of the Sensor: | Varies by sensor (see sensor data sheet) |
| Operating Temperature:<br><br>Operating Humidity:<br>Operating Pressure: | -10 to +40 °C<br>14 to 104 °F<br>5 to 90 % RH<br>70 to 130 kPa |
| Power Supply: | 12 to 30 V DC SELV/PELV<br>PoE = 48 V DC |
| Housing:<br>Protection Class:<br><br><br><br>Mounting:<br>Weight:<br>Dimensions:<br>(W x H x D) | Plastic<br>PoS-Version: base unit IP30 (optionally IP64) / gas sensor IP64<br>PoU-Version: base unit IP30 (optionally IP64) / gas sensor IP43<br>PoI-Version: base unit IP30 (optionally IP64) / gas sensor IP40–IP64,<br>depending on installation situation<br>(DIN) rail IEC/EN<br>650 g up to 850 g<br>145 x 105 x 78 mm<br>5.7 x 4.1 x 3.0 in |
| Labelling: | CE, FCC, IC |

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