

D-ReX.

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





## **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 costeffective 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 Pol (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 1200 meters / 4000 feet.

#### » 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 (Pol)		√			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 (\*).

 $C_5F_8$ 

CH₃F

NF<sub>3</sub>

SF<sub>6</sub>

#### List of detectable gases using an EC Sensor

Formula	Gas	Nominal Range
AsH₃	Arsine	0-1 ppm
AsH₃	Arsine / no H <sub>2</sub> (no cross-sensitivity to H <sub>2</sub> )	0-1 ppm
AsH₃	Arsine LT <sup>1</sup> LDL <sup>2</sup>	0-1 ppm
$B_2H_6$	Diborane	0-1 ppm
Br <sub>2</sub>	Bromine	0-5 ppm
Cl <sub>2</sub>	Chlorine	0-10 ppm
CIF₃	Chlorine trifluoride	0-1 ppm
CIO <sub>2</sub>	Chlorine dioxide	0-2 ppm
CO	Carbon monoxide	0-500 ppm
COCl <sub>2</sub>	Phosgene	0-2 ppm
DCS	Dichlorosilane	0-30 ppm
eto	Ethylene oxide	0-20 ppm
F <sub>2</sub>	Fluorine	0-5 ppm
GeH₄	Germanium hydrogen	0-5 ppm
H <sub>2</sub>	Hydrogen	0-2000 ppm
H <sub>2</sub>	Hydrogen	0-1 Vol%
H <sub>2</sub>	Hydrogen	0-4 Vol%
H₂S	Hydrogen sulfide	0-100 ppm
H₂Se	Hydrogen selenide	0-5 ppm
HBr	Hydrogen bromide	0-30 ppm
HCI	Hydrogen chloride	0-30 ppm
HCN	Hydrogen cyanide	0-30 ppm

Long-time: Sensor with ionic liquid electrolyte for long service life, even in difficult conditions (e.g. high temperatures)

<sup>2</sup> Lower Detectable Limit: Refer to sensor data sheet for details.

#### 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

#### 1 D-ReX

- 2 Py-ReX
- 3 Ethernet-cable with PoE
- IP Code sticker
- 5 Sensor cartridge with detachable pipe flange adapter (up to 1200 meters / 4000 feet)
- **Connector cartridge** for remote sensors (M12)

» Power-over-Ethernet communication (Modbus/TCP, web interface)

Octafluorcyclopenten

Nitrogen trifluoride

Sulfur hexafluoride

Methyl fluoride

Other gases on request.

- » RS-485 (Modbus/RTU)
- » LonWorks® (optional)
- » Analog: 4–20 mA signal
- » 5x internal configurable relays (optional)

#### 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

Formula	Gas	Nominal Range	Formula	Gas
HF	Hydrogen fluoride	0-10 ppm	C₃H <sub>8</sub>	Prop
HMDS	Hexamethyl disilazane	0-0.5 Vol%	CH₄	Met
N <sub>2</sub> H <sub>4</sub>	Hydrazine	0-1 ppm		Carl
NH₃	Ammonia	0-100 ppm	<u> </u>	Carl
NH₃	Ammonia	0-1000 ppm	CO <sub>2</sub>	Call
NH₃	Ammonia	0-5000 ppm	CO <sub>2</sub>	Carl
NO	Nitrogen monoxide	0-100 ppm	CO2	Carl
NO2	Nitrogen dioxide	0-30 ppm	CO2	Carl
O <sub>2</sub>	Oxygen (5-year sensor, lead-free)	0-25 Vol%	N <sub>2</sub> O	Nitr
03	Ozone	0-1 ppm	N₂O	Nitr
O <sub>3</sub>	Ozone	0-5 ppm		
PH₃	Phosphine	0-1 ppm	List of o	dete
SiH₄	Silane	0-50 ppm	Formula	Gas
SO <sub>2</sub>	Sulfur dioxide	0-10 ppm		
TEOS	Tetraethyl orthosilicate	0-100 ppm	C <sub>2</sub> H <sub>2</sub>	Ace
TMB	Trimethyl borate	0-500 ppm	C <sub>2</sub> H <sub>4</sub>	Ethy
List of	detectable gases w	hich	C <sub>2</sub> H <sub>6</sub>	Etha
require	e a pyrolyzer		C₃H <sub>8</sub>	Prop
Formula	Gas	Nominal Range	C <sub>4</sub> H <sub>10</sub>	Buta
$C_2H_2Cl_2$	Trans-1,2 dichloroethylene (DCE)	tbd	$C_5H_{12}$	Pen
C <sub>4</sub> F <sub>6</sub>	Hexafluorobutadiene	tbd	$C_6H_{14}$	Hex

tbd

tbd

0-50

tbd

	C <sub>5</sub> H <sub>12</sub>	Pentane	
	$C_6H_{14}$	Hexane	
	CH4	Methane	
	H₂	Hydrogen	
) ppm			

#### List of detectable gases using 10.6 eV PID sensor

Formula	Gas	Nominal Range
$C_4H_8$	Isobutylene	0-200 ppm
$C_4H_8$	Isobutylene	0-2000 ppm
C <sub>7</sub> H <sub>8</sub>	Toluene	0-1000 ppm
$C_7H_{16}$	Heptane	0-3000 ppm
and other Gases.		



#### List of detectable gases using an IR Sensor

Formula	Gas	Nominal Range
C₃H <sub>8</sub>	Propane	0-2 vol %
CH4	Methane	0–5 vol %
CO2	Carbon dioxide	0–1 vol %
CO2	Carbon dioxide	0-5 vol %
CO2	Carbon dioxide	0–10 vol %
CO2	Carbon dioxide	0–25 vol %
CO2	Carbon dioxide	0-50 vol %
N₂O	Nitrous oxide	0–1000 ppm
N₂O	Nitrous oxide	0–1 vol %

#### ist of detectable gases using a CC Sensor

Acetylene

Ethylene

Ethane

Propane

Butane

Nominal Range

0-100 % LEL

### Technical Specification: D-ReX Series

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

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