



GenTwo® Multigas V2.4

Multigas Analyzer GenTwo® V2.4

M&C premium series GenTwo® features an innovative modular navigation and sensor concept

Special Features

- **Modular design for up to 6 different sensors**
- **Resistive 7" color touch display**
- **Multi-sensor enabled**
 - Paramagnetic oxygen sensor (PMA2)
 - Electrochemical oxygen sensor
 - Electrochemical H₂S sensor
 - Thermal conductivity detector (TCD)
 - NDIR/NDUV/UVRAS photometers
- **Measured value storage over one year directly in the analyzer**
- **Pressure compensation 0.8 to 1.2 bar abs.**
- **Analog signal outputs 0-20/4-20 mA**
- **Modbus and AK protocol TCP/IP**
- **Ethernet/USB**
- **User-programmable limit values**
- **Remote operation via VNC viewer**
- **Three different housings:**
 - 19" rack housing short
 - 19" rack housing long
 - Wall-mount housing

Application

The Multigas Analyzer of the GenTwo® series is suitable for continuous measurements of gases in gas mixtures.

Areas of application are in particular combustion control, process optimization in a wide variety of industries, inertization monitoring, environmental protection or laboratory measurements, each in non-explosive environments.

Description

The Multigas Analyzer is characterized by its modular design and innovative navigation concept. This enables fast intuitive understanding and adaptation of the analyzer to a wide variety of applications. Display and functions can be set according to the operator's requirements, for example language, measuring ranges, physical units, application-related designations.

The basic design of the analyzer is mounted in a 19" rack or wall-mount housing and is connected using FKM (Viton®) tubing. As an option, the internal gas paths can be ordered in PTFE or stainless steel. All device variants have a wide-range power supply, a resistive 7" color touch display and can be equipped with up to 6 measuring channels/sensors incl. the corresponding sensor and I/O electronics. Pressure transducers are used for process pressure compensation and flow monitoring. Depending on the sensor type, temperature monitoring is available.

For NDIR benches, humidity compensation can be built in if necessary.

Each measured value is available as mA signal. The Multigas Analyzer offers status and alarm outputs as well as two freely programmable limit values per measuring channel. All measured values are provided via the Modbus and AK communication protocol on the Ethernet port. A special feature is the integrated data logger function for time-resolved display and long-term recording of measurement, warning and alarm messages. The Multigas Analyzer offers the user convenient calibration functions for zero point and full scale calibration.

Sensors

– Paramagnetic oxygen sensor PMA2
The M&C oxygen transducer uses the paramagnetic properties of oxygen. The compact design of the transducer and the small measuring cell offers short response times and a long service life.

The dumbbell principle implemented here represents a physical, wear-free and proven measuring method. It is suitable for low-drift, long-term stable measurements in the range from 0 to 100 vol% or for purity measurements with suppressed zero point.

– Electrochemical oxygen sensor
This compact, fast-response, long-life sensor measures the oxygen content in a gas mixture, typically up to 25 vol% over an electrochemically generated voltage. The electrochemical oxygen sensor is CO₂-resistant.

– Electrochemical H₂S sensor
This compact sensor is available for different hydrogen sulfide concentrations from 0 to 10,000 ppm.

– Thermal conductivity detector (TCD)
This type of sensor uses the thermal properties of gases. In the design implemented here, the thermal conductivity of hydrogen in a binary gas mixture is used to determine the H₂ concentration.

– NDIR/NDUV/UVRAS photometers
With this technique, the concentration of multiatomic gases, i.e. molecules with permanent or induced electrical dipole moment, can be determined.

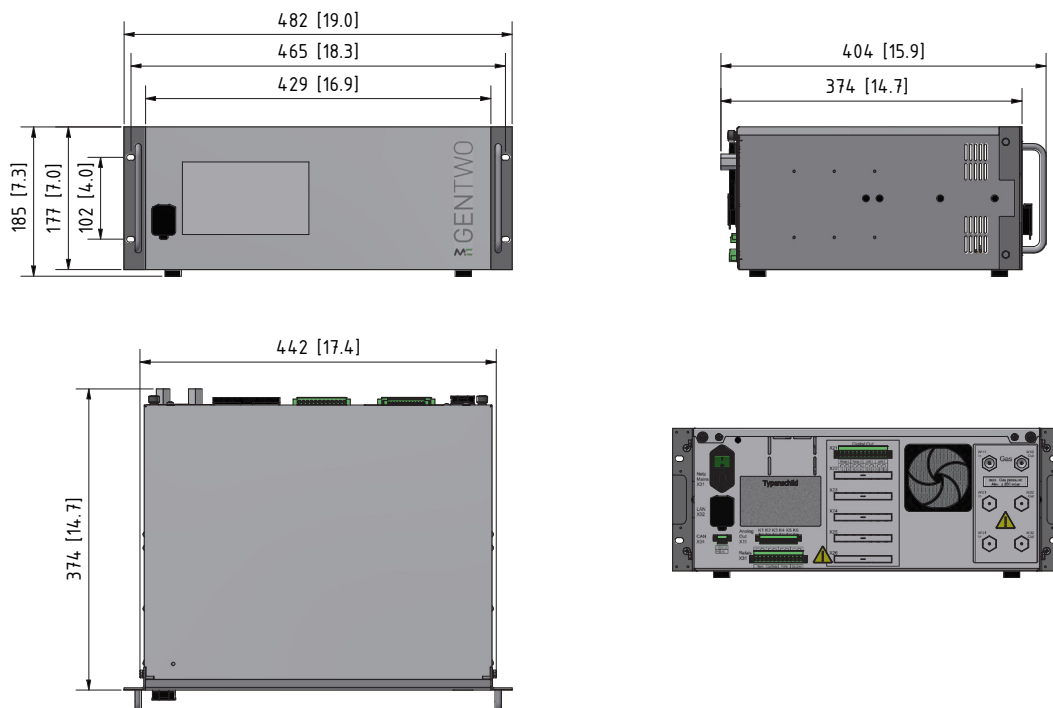
For the measurement of nitrogen monoxide (NO), the UV resonance absorption method is used. In contrast to the LED-based UV measuring benches, the UVRAS uses an electrode-free UV discharge lamp (EDL). The measuring cells are available in various lengths for different measuring ranges.

The measuring benches realized here are robust and do not require any moving parts. Up to three gases can be measured using one bench. In addition, the three basic measuring principles can be combined on one bench.

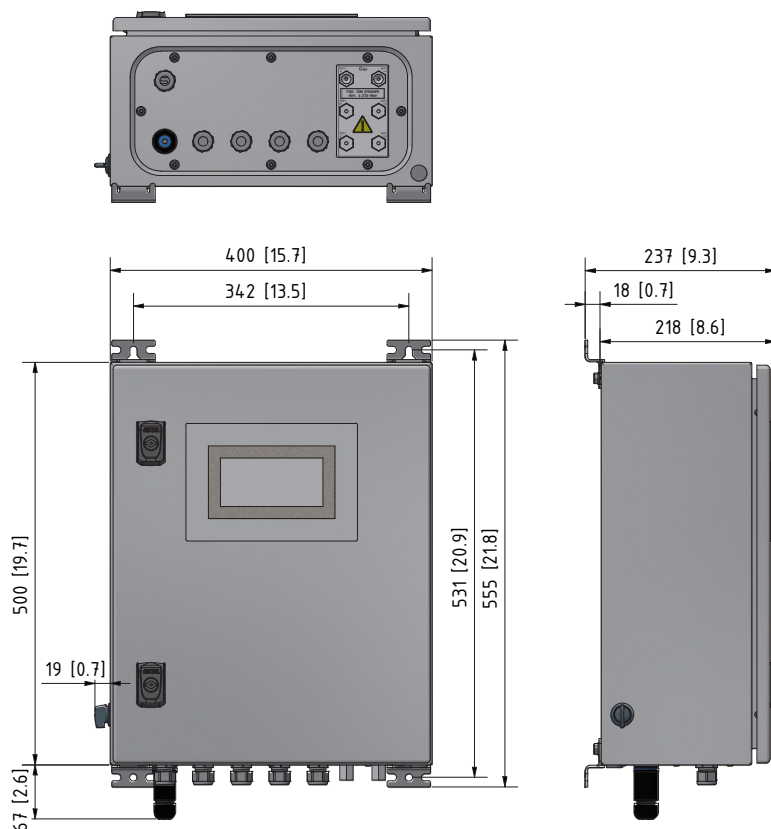
A temperature compensation at zero and end point is standard. If required, additional water vapor compensation can be added using a capacitive humidity sensor for NDIR measurements.

For increased stability of the measurement, the measurement benches can be installed in a thermobox heated to a temperature between 45 and 50 °C [113 and 122 °F]. An optional AutoZero- module for automatic cyclic zero adjustment is available.

Dimensions 19"-rack housing (long housing)

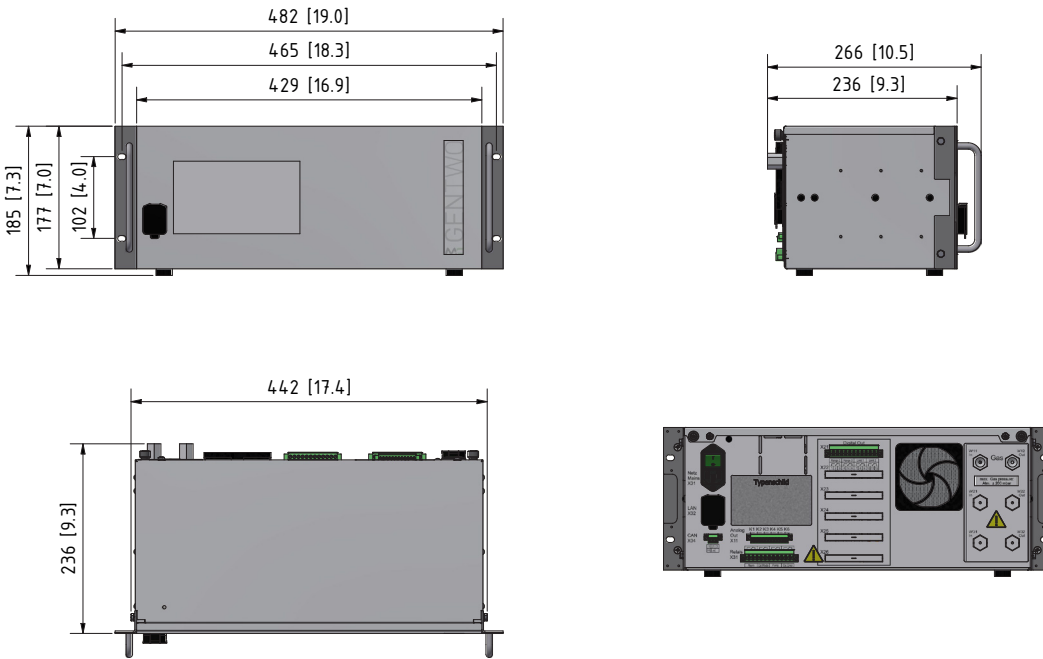


Dimensions wall-mount housing

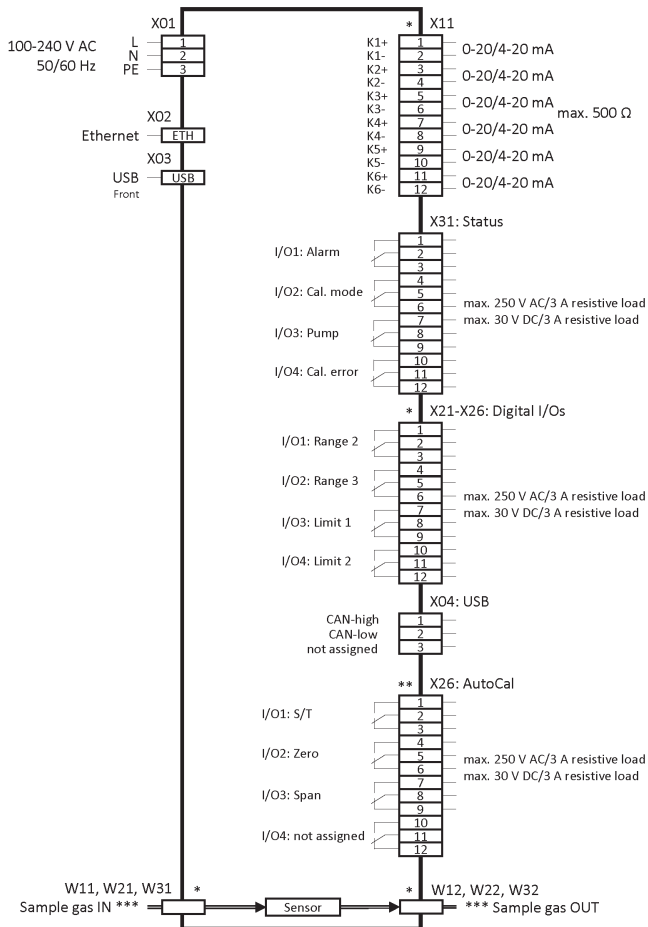


Dimensions in mm [Inches]

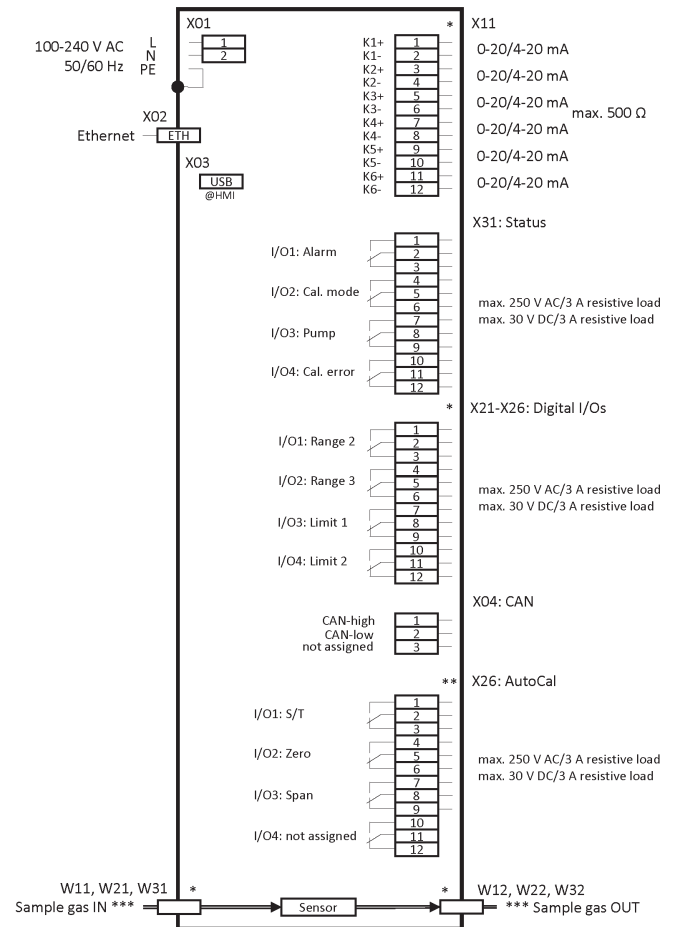
Dimensions 19"-rack housing (short housing)



Interfaces diagrams 19"-rack housing



Wall-mount housing



* Number of these interfaces depending on the application

** Only equipped with the AutoCal function

*** G 1/4" female, if internal tubing is made of Viton®/PTFE; 1/8" NPT female, if internal tubing is made of stainless steel

Technical specifications in general

Multigas Analyzers of the GenTwo® Series	GenTwo® Multigas V2.4
Basic device w/o sensors, wall-mount housing: Part No.	08A2220
Basic device w/o sensors, long housing: Part No.	08A2230
Basic device w/o sensors, short housing: Part No.	08A2240
Warm-up period	Approx. 30 min. depending on sensor configuration
Response time for 90 %	Depending on sensor used and on configuration
Sample gas flow rate	25 to max. 120 NI/h, depending on sensor used
Sample gas inlet pressure	800 to 1,200 mbar abs. pressure-compensated
Sample gas outlet pressure	Recommendation: discharge freely into atmosphere (requires higher pressure at the analyzer inlet compared to the outlet)
Sample gas temperature and characteristics	0 to +50 °C [+32 to +122 °F]; dry, oil- and dust-free gas, avoid temperature dropping below dew point
Ambient temperature	Depending on sensor configuration, for details see technical data for sensors
Relative Humidity	0 - 90 %, non-condensing
Storage temperature	-20 to +60 °C [-4 to +140 °F], non-condensing
Display	7" capacitive color touchscreen
Measuring ranges in general	4 measuring ranges, two of them adjustable, suppressed zero point possible
Analog output signals	Analog: 0-20/4-20 mA, max. 500 Ohm burden, short-circuit proof, electrically isolated
Status relay outputs	4 x relay output (1 x status, 1 x Cal. mode, 1 x pump, 1 x Cal. error) contacts: 250 V AC/3 A or 30 V DC/3 A at resistive load, change-over contact, potential-free
Digital relay outputs	4 x per measuring signal DO (2 x limit values, 2 x measuring range feedback) contacts: 250 V AC/3 A or 30 V DC/3 A at resistive load, change-over contact, potential-free
Interfaces	Ethernet/USB
Communication protocol	Modbus TCP/IP and AK protocol TCP/IP
Mains power supply	100 to 240 V AC, -15/+10 %, 50 to 60 Hz, power supply unit
Overvoltage category	OVC II
Power consumption	Max. 150 VA
Mains power connection	Wall-mount housing: 3 x 1.5 mm ² wires (customer provided), rack-housing: power cord (3 x 1.5 mm ² wires) with 3-pin IEC plug and Schuko plug (included)
Wetted materials	Platinum, epoxy resin, glass, FKM (Viton®), stainless steel 316Ti, PVDF, PPS, depending on tubing material and of the components installed
Sample gas connection	Screw-on bulkhead fitting with 1/4" internal thread, PVDF (standard)
Case protection	19" rack housing: IP20, EN 60529; wall-mount housing: IP54, EN 60529
Electrical standard	EN 61010
Housing color	19" rack housing: RAL 9003, signal white
Maximum installation altitude	2,000 m [≈ 6,561.7 ft]
Pollution degree of the intended environment	PD 2
Long housing: dimensions (W x H x D)	482 x 185 x 404 [≈ 19" x 7.3" x 15.9"], length of gas connection fittings is additional
Short housing: dimensions (W x H x D)	482 x 185 x 266 mm [≈ 19" x 7.3" x 10.5"], length of gas connection fittings is additional
Wall-mount housing: dimensions (W x H x D)	419 x 555 mm plus approx. 40 mm gas connection fitting x 237 mm [≈ 16.5" x 21.9" plus approx. 1.6" gas connection fitting x 9.3"]
Wall-mount housing: weight	Approx. 18 kg [≈ 39.7 lbs] (depending on sensor configuration)
Long housing: weight	Approx. 13 kg [≈ 29 lbs] (depending on sensor configuration)
Short housing: weight	Approx. 11 kg [≈ 24 lbs] (depending on sensor configuration)

Options (see instruction manual for complete list)	
08A2650	Front filter FPF+, for Multigas Analyzers with gas paths made of Viton®/PTFE tubing
08A2660	Flow meter FM40, for Multigas Analyzers with gas paths made of Viton®/PTFE tubing
98A2550	For 19" housing: telescopic slides in EU version
98A2500	For 19" housing: telescopic slides in US version
08A2991	GenX AutoZero basic module AZF1 VI: AutoZero base module AZF1 for automatic zero calibration, for integration into gas paths with Viton® tubing.
08A2992	GenX AutoZero basic module AZF1 PT: AutoZero base module AZF1 for automatic zero calibration, for integration into gas paths with PTFE tubing.
08A2993	GenX AutoZero basic module AZF1 SS: AutoZero base module AZF1 for automatic zero calibration, for integration into gas paths with stainless steel tubing.
08A2994	GenX valve Y8 with Cal.-Gas OUT for AZF1: Additional 3/2-way valve Y8 to upgrade the AutoZero base module AZF1 incl. separate outlet for the calibration gas.
08A2995	GenX zero gas pump SC57L for AZF1: SC-57L zero gas pump to upgrade the AutoZero base module AZF1. The pump is used to convey ambient air as zero gas.

Please note: NI/h and NI/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.
Viton® is a registered trademark of DuPont Performance Elastomere

Technical specifications sensors

Paramagnetic oxygen sensor PMA2

	GenX Sensor O2 PMA2 and sensor environments
PMA2 HL, thermostatted to 55 °C incl. preheating loop	10A4010
PMA2 HL-F01, thermostatted to 55 °C incl. pre-heating loop, Drift and noise tested according to EN 50399 Annex E.2, for gas paths in Viton® tubing only	10A4140
PMA2 HD, thermostatted to 55 °C	10A4015
PMA2 HDC with chlorine-resistant measuring cell, thermostatted to 55 °C	10A4025
PMA2 HDS with solvent resistant measuring cell, thermostatted to 55 °C	10A4035
PMA2 NL, incl. preheating loop, not thermostatted	10A4110
PMA2 ND, not thermostatted	10A4115
GenX sensor environm. O2 PMA2 VI for gas paths in Viton® tubing	08A2730
GenX sensor environm. O2 PMA2 PT for gas paths in PTFE tubing	08A2740
GenX sensor environm. O2 PMA2 SS for gas paths with stainless steel tubing	08A2750
Gas measured	O ₂
Measuring ranges (min./max. range)	0-1/0-100 vol%
Limit of detection (LOD)*	Up to 0.02 vol%
Response time for 90 % FSD**	< 3 s at 60 NI/h
Noise	≤ 0.2 % of full scale value or better
Linearity error	< ±0.1 vol%
Reproducibility deviation*	< ±0.01 vol%
Accuracy after calibration*	±1 % of full scale value or 0.02 vol% O ₂ , depending on which value is greater
Zero drift	< 0.06 vol% in 72 hours
Ambient temperature	0 - 50 °C [32 to 122 °F]
Sample gas flow rate	25-60 NI/h
Transducer temperature (for GenX Sensor O2 PMA2 H sensors only)	Factory setting +55 °C [131 °F]
Wetted materials	Glass, platinum, FKM (Viton®), stainless steel 316Ti, epoxy resin, PP, ceramic, nickel, depending on tubing material and of the components installed

Electrochemical oxygen sensor

	GenX Sensor O2 and sensor environment
GenX sensor O2 25 vol% EC IT-P03 VI/PT for Viton® or PTFE tubing	08A3060
GenX sensor O2 25 vol% EC IT-P03 SS for stainless steel tubing	08A3065
GenX sensor environm. EC for integration of up to 4 electrochemical sensors	08A3050
Gas measured	O ₂
Measuring ranges (min./max. range)	0-1/0-25 vol%
Limit of detection (LOD)*	0.1 vol%
Response time for 90 % FSD**	< 10 s, depending on the number and type of sensors used
Linearity error	0-2 vol% O ₂ : ±0.1 vol%; 2.1-25 vol% O ₂ : 0.5 % of measured value
Reproducibility deviation*	±1 vol% at 100 vol% O ₂ applied for 5 min
Accuracy after calibration*	±1 % of full scale value, not better than 0.1 vol%
Drift	< 1 % per month, averaged over 12 months
Ambient temperature	10 - 40 °C [50 to 104 °F]
Sample gas flow rate	25-60 NI/h
O ₂ sensor temperature	Not heated
Wetted parts	ABS, PVC, PPS, PVDF, PTFE, stainless steel, depending on tubing material and of the components installed
Shelf time	< 6 months recommended
Cross-sensitivities	< 20 ppm at 100 vol% CO, CO ₂ , C ₃ H ₈ , < 400 ppm at 100 vol% H ₂ (complete list on request)

* At constant ambient conditions in the compensated temperature and pressure range (±0.015 %/mbar). Additionally the limit of detection (LOD) is depending on sample gas and the selected measuring range.

** Depends on sample gas input pressure, density and flow rate at the analyzer input.

Technical specifications sensors

Electrochemical H₂S sensor

	GenX sensor H ₂ S and sensor environment
GenX sensor H2S 50 ppm EC IT-P46 VI/PT (0-50 ppm) for Viton® or PTFE tubing	08A3100
GenX sensor H2S 50 ppm EC IT-P46 SS (0-50 ppm) for stainless steel tubing	08A3105
GenX Sensor H2S 1,000 ppm EC IT-P41 VI/PT (0-1,000 ppm) for Viton® or PTFE tubing	08A3110
GenX sensor H2S 1,000 ppm EC IT-P41 SS (0-1,000 ppm) for stainless steel tubing	08A3115
GenX Sensor H2S 10,000 ppm EC IT-P43 VI/PT (0-10,000 ppm) for Viton® or PTFE tubing	08A3120
GenX Sensor H2S 10,000 ppm EC IT-P43 SS (0-10,000 ppm) for stainless steel tubing	08A3125
GenX sensor environm. EC for integration of up to 4 electrochemical sensors	08A3050
Gas measured	H ₂ S
Measuring ranges (min./max. range)	0-50/0-10,000 ppm
Response time for 90 % FSD**	< 25-90 s, depending on the number and type of sensors used
Reproducibility deviation*	< 2 % of measured value, applied for 5 min alternating test gas and dry air
Accuracy after calibration*	±1 % of full scale value, not better than 0.1 vol%
Ambient temperature	10 - 40 °C [50 to 104 °F]
Sample gas flow rate	25-60 NI/h
Sensor temperature	Not heated
Wetted parts	PP, PPS, PVDF, PTFE, stainless steel, depending on tubing material and of the components installed
Shelf time	< 3 months recommended
Cross-sensitivities	Depending on sensor type, complete list on request

Thermal conductivity detector (TCD)

	Thermal conductivity detector (TCD) and sensor environments
GenX Sensor H2 WLD MK-F200	08A2845
GenX sensor environm. TCD MK-F VI/PT for gas paths in Viton® or PTFE tubing	08A2850
GenX sensor environm. TCD MK-F SS for gas paths in stainless steel tubing	08A2860
Gas measured	H ₂
Measuring ranges (min./max. range)	0-1/0-100 vol%
Limit of detection (LOD)*	0.1 vol%
Response time for 90 % FSD**	< 1 s at 60 NI/h
Noise	< 1 % of full scale value
Linearity error	< 1 % of full scale value
Reproducibility deviation*	< 1 % of full scale value
Accuracy after calibration*	< 1 % of full scale value, not better than 0.1 vol%
Zero drift	< 2 % of full scale value per week
Ambient temperature	0 - 50 °C [32 to 122 °F]
Sample gas flow rate	25 - 60 NI/h
Sensor temperature	63 °C
Wetted parts	SS 316Ti, silicon oxinitrite (ceramic), gold, covar, epoxy, depending on tubing material and of the components installed
Cross-sensitivities	Sensor is suitable for binary gas mixtures, complete list on request

* At constant ambient conditions in the compensated temperature and pressure range (±0.015 %/mbar). Additionally the limit of detection (LOD) is depending on sample gas and the selected measuring range.

** Depends on sample gas input pressure, density and flow rate at the analyzer input.

Technical specifications sensors

Available measuring ranges: oxygen sensors, electrochemical H₂S sensor and TCD

Measuring ranges	O ₂ PMA2	O ₂ electrochemical	H ₂ S electrochemical	H ₂ TCD
0-100 vol%	x	-	-	x
0-50 vol%	x	-	-	x
0-30 vol%	x	-	-	x
0-25 vol%	x	x	-	x
0-20 vol%	x	x	-	x
0-10 vol%	x	x	-	x
0-5 vol%	x	x	-	x
0-1 vol%	x	x	x	x
0-1,000 ppm	-	-	x	-
0-50 ppm	-	-	x	-

x: Available gas and measuring range, -: Measuring range not available
Other gases on request

NDIR/NDUV/UVRAS photometers

Technical Data	NDIR	NDUV	UVRAS
Limit of detection (LOD) in % of full scale value (3 σ)*	< 0.1-1	< 0.1-0.5	< 0.1-0.5
Response time for 90 % FSD**	< 10 s		
Linearity error	< ± 1 % of full scale value		
Reproducibility deviation*	± 0.5 % of full scale value		
Long time stability (zero drift)***	< ± 2 % of full scale value per week	< ± 1 % of full scale value per 24 hours	< ± 2 % of full scale value per 24 hours
Long time stability (measuring range drift)	< ± 2 % of full scale value per month	< ± 1 % of full scale value per month	
Temperature influence: zero point****	< 1 % of full scale value per 10 Kelvin		
Temperature influence: measuring range****	< 2 % of full scale value per 10 Kelvin		
Ambient temperature	10 to 40 °C [50 to 104 °F]		
Pressure influence	< 1.5 % per 10 hPa of the measured value (with pressure compensation < 0.15 % per 10 hPa of the measured value)		
Wetted parts	Depending on the selected version: FKM (Viton®), stainless steel 1.4571, aluminium with/without protective coating, PVDF, PPS, depending on tubing material and of the components installed		
Cross-sensitivities	Internal compensation for multiple measuring benches, application-dependent, complete list on request		

Options

Pressure sensor for process pressure compensation

Capacitive H₂O sensor for internal water vapor compensation, measuring range 0-1 vol%, for selected NDIR measuring benches

* At constant ambient conditions in the compensated temperature and pressure range (± 0.015 %/mbar). Additionally the limit of detection (LOD) is depending on sample gas and the selected measuring range.

** Depends on sample gas input pressure, density and flow rate at the analyzer input.

*** The long-term zero drift can be reduced by using an AutoZero module.

**** The temperature dependence can be reduced by using a heated box (THB 50 °C).

Technical specifications sensors

Available gases and standard measuring ranges: NDIR photometers

Measuring ranges	CO ₂	CO	CH ₄	C _n H _m	N ₂ O	SF ₆	CF ₄	NO	H ₂ O
0-100 vol%	x	x	x	x	x	x	x	-	-
0-50 vol%	x	x	x	x	x	x	x	-	-
0-30 vol%	-	*	*	*	*	*	*	-	-
0-20 vol%	x	-	-	-	*	*	*	-	-
0-10 vol%	x	x	x	x	*	*	*	-	-
0-5 vol%	x	x	x	x	*	*	*	-	-
0-1 vol%	x	x	x	x	-	-	*	x	x
0-5,000 ppm	x	x	x	x	-	x	*	x	x
0-2,000 ppm	x	x	x	x	x	x	*	x	-
0-1,000 ppm	x	x	x	x	x	x	*	x	-
0-500 ppm	x	x	x	-	x	-	-	-	-
0-300 ppm	-	-	-	-	x	-	-	-	-
0-100 ppm	x	-	-	-	x	x	-	-	-
0-50 ppm	x	-	-	-	-	x	-	-	-

Available gases and standard measuring ranges: NDUV photometers

Measuring ranges	H ₂ S	SO ₂	NO ₂	Cl ₂	O ₃
0-100 vol%	-	-	-	-	-
0-50 vol%	-	-	-	-	-
0-30 vol%	-	-	-	x	-
0-20 vol%	-	-	-	-	-
0-10 vol%	*	x	-	x	-
0-5 vol%	*	x	-	x	-
0-1 vol%	*	*	-	*	-
0-5,000 ppm	x	x	x	*	-
0-2,000 ppm	x	x	x	*	x
0-1,000 ppm	x	x	x	*	x
0-500 ppm	x	x	x	x	x
0-300 ppm	-	x	x	-	-
0-100 ppm	x	x	x	-	x
0-50 ppm	-	x	x	-	x
0-10 ppm	-	-	-	-	x
0-1 ppm	-	-	-	-	x

Available gases and standard measuring ranges: UVRAS photometers

Measuring ranges	NO
0-100 vol%	-
0-50 vol%	-
0-30 vol%	-
0-20 vol%	-
0-10 vol%	-
0-5 vol%	-
0-1 vol%	-
0-5,000 ppm	x
0-2,000 ppm	x
0-1,000 ppm	x
0-500 ppm	x
0-300 ppm	x

x: Available gas and standard measuring range, *: customized range, available on request, -: Measuring range not available
Other gases on request

NDIR: non-dispersive infrared photometer, NDUV: non-dispersive ultraviolet photometer, UVRAS: ultraviolet resonance absorption spectrometer
The cross-sensitivities of the sensors depend on the individual gas composition. For a general list of cross-sensitivities, please refer to the Multigas Analyzer operating manual.
Viton® is a trademark of DuPont Performance Elastomers.