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Product Highlights.

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Product Highlights

Gas Sample Probe Series SP®

Electrically heated, compact version with protection cover and test gas connection as standard SP180-H/MA for special applications aboard ships

SP180-H/MA

Special Features

- DNV Type Examination Certificate VI-7-2 for application aboard ships
- Sampling of dust-loaded process gases
- Small volume, fast response time
- Self-regulating electrical heating
- Alarm contact for low temperature
- With test gas connection according to EN 14181 (test gas feeding via filter element)
- Easy mounting and maintenance
- Sample tube made of Hastelloy® optional

Application

The M&C gas sample probe version SP180-H/MA is suitable for continuous gas sampling. The compact design of the SP180-H/MA requires only limited space. The gas sample probe has a DNV Type Approval Certificate for special application aboard ships.

Description

The design of the M&C gas sample probe version SP180-H/MA guarantees easy mounting, safe operation and problem-free maintenance.

Changing of the external filter element does not require tools or disassembling of the gas sample line. To change the filter element, the complete filter assembly can be removed out of the probe head. The gaskets can easily be checked for leaks, the filter housing is easy to clean, and the sample tube can be removed without dismounting the entire sample probe. These are only a few advantages of the M&C probe.

The 0.1 micron glass fibre filter is placed in a heated stainless steel filter housing. Other filter element materials and filter porosities are available on request. The compact design and the new all-round heat insulation and protection cover ensures an optimised heat distribution, as well as a safe operation by keeping the temperature above the dew point in the filter or flange area.

Specially designed self-regulating heating elements are heating the gas sample probe to 180 °C (356 °F) within the range of 110 V to 240 V without switching. There is no external temperature controller or temperature limitation necessary. The terminals of the electrical connections are inside a junction box.

The gas sample probe SP180-H/MA is equipped with a calibration gas connection according to EN14181 (regulation for calibration of emission measuring systems). With this standard feature, calibration gas can enter the gas sample probe via the filter element.

Please select the sample tube, which is right for your application, from the table "Sample Tubes" in this data sheet.

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Technical Data

Series SP®	Version SP180-H/MA	Version SP180-H/MA SS
Part No.	02S1860	02S1865
DNV Type Approval Certificate	TAA00002J3	
Protection cover	Yes	
Outdoor mounting	Not for mounting on open deck	
Degree of protection	IP66 EN60529	IP66 EN60529
DNV: Location classes	Temperature D, Humidity B, Vibration B, EMC A, Enclosure B	
Ambient temperature category H	-25 °C to +60 °C (-13 °F to +140 °F)	
Vibration/Shock for sample tubes (optional)	4 g, classified acc. to GL (Germanischer Lloyd) (GL-2012 VI section 7, Tab 3.16, characteristic curve 2a)	
Sample pressure	0.4 to 1.5 bar abs.	
Sample temperature	Max. 600 °C (1112 °F)*	
Gas Flow	Max. 500 Nl/h	
Dust load	Max. 1 g/m³*	
Filter chamber volume	70 ml (4.27 in³)	
Filter element	Type S-0,1GF, filter porosity 0.1 µm, fibre (other filter elements on request)	
Probe heating	+180 °C (356 °F) self-regulating	
Ready for operation	After 2 hours	
Low temperature alarm contact, alarm point	< 160 °C (< 320 °F), NO	
Low temperature alarm contact, contact rating	250 V - 3 A AC, 30 V - 3 A DC	
Connection sample outlet	1/4" NPT inside with Swagelok tube connector for 6 mm (approx. 0.24") tube (DN 4/6)	
Connection calibration gas	Swagelok® tube connector for 6 mm tube (DN 4/6), connection including sealing plug	
Power supply	110 V up to 240 V, 50/60 Hz	
Power consumption	Start up: 400 VA, during operation: 100 VA, fuse 6 A	
Terminal box	Aluminium	Stainless steel VA
Electrical connection	Terminals max. 2.5 mm² (0.0039 in²), 1 x M20, 1 x M16 cable glands	
Electrical equipment standard	EN 61010, EN 60335-1	
Flammability test protection cover	Needle-flame test method IEC 60695-11-5:2005 severity level: 30 s	
Mounting flange	DN 65 PN 6, Form B stainless steel 316Ti	
Material of sample contacting parts	Stainless steel 316 / 316Ti, FKM, glass fiber	
Dimensions (W x H x D)	Approx. 270 mm (with calibration gas connection) x 280 mm x 225 mm, (10.63" x 11.02" x 8.86")	
Weight	Approx. 7.5 kg (approx. 16.5 lbs)	

* Standard, other versions on request.

Swagelok® is a registered trademark for tube fittings by Swagelok Company, USA.

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C (32 °F), 1013 mbar.

ΔP and T90 at flow of:	100	200	500	Nl/h
ΔP pressure loss with new filter element 0,1 GF	< 4	7	15	mbar
T90 time-without sample tube/prefilter	4,0	2,5	<1,0	s

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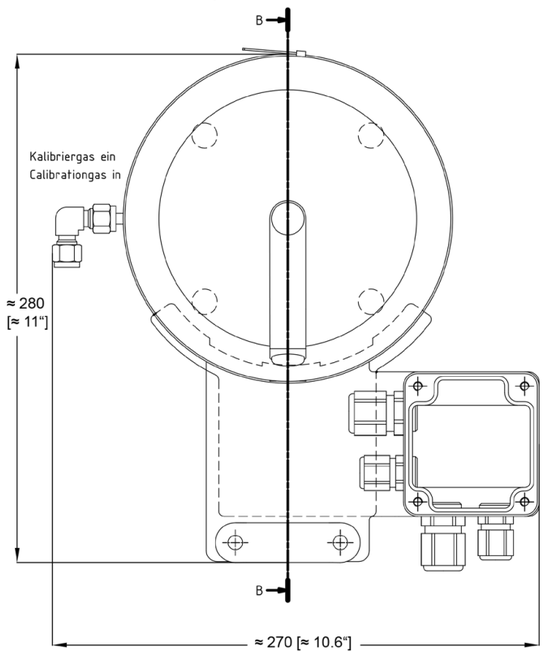
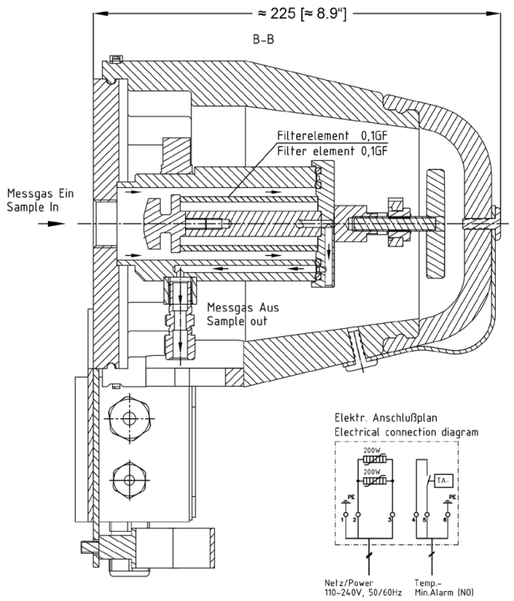
Dimensions SP180-H/MA





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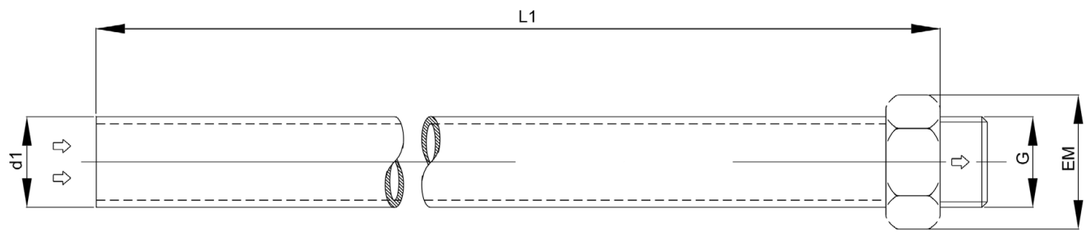
Probe – Gas Sample Probe Series SP

Option: Sample Tubes



Classified according to GL (Germanischer Lloyd) GL-2012 VI section 7, Tab 3.16, characteristic curve 2b)

Classified acc. to GL (Germanischer Lloyd) GL-2012 VI section 7, Tab 3.16, characteristic curve 2b)							
M&C Probe Sample Tube Type	Part-No.	max. Temperature °C	Material Tube / Connection	Length "L1" mm	Connection Thread "G"	Tube ø d1 outer/inner mm	Connection ø a "EM" mm
SP180M/HC/400	92S0040	600 (1112 °F)	Hastelloy®	400 (15.75")	G 3/4"a	27/20	40
SP180M/HC/600	92S0060	600 (1112 °F)	Hastelloy®	600 (23.62")	G 3/4"a	27/20	40
SP180M/HC/800	92S0080	600 (1112 °F)	Hastelloy®	800 (31.5")	G 3/4"a	27/20	40

Hastelloy® is the brand name of a nickel-based alloy from Haynes International.

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Gas Sample Probe Series SP®

Electrically heated, compact version with protection cover and test gas connection as standard
SP180-H-EX1 T2, SP180-H-EX1 T3, SP180-H-EX1 T4

SP180-H-EX1

Special Features

- 3 EX2 versions: T2/T3/T4 with Ex certification according to ATEX, suitable for use in Ex zone 2
- 3 EX1 versions: T2/T3/T4 with Ex certification according to ATEX, suitable for use in Ex zone 1
- IECEX for zone 1
- Sampling of dust-loaded process gases
- Small volume, fast response time
- Self-regulating electrical heating
- Alarm contact for low temperature
- With test gas connection according to EN 14181 (test gas feeding via filter element)
- Easy mounting and maintenance
- Sample tube and pre-filter optional

Application

The M&C gas sample probe version SP180-H-EX1 is applicable for continuous gas sampling. The compact design requires only limited space. The gas sample probe is equipped with a new protective cover and thus also suitable for outdoor mounting.

Description

The design of the M&C probe version SP180-H-EX1 guarantees simple mounting, safe operation and problem-free maintenance.

Changing the external filter element needs no tools and no disassembling of the sample line. For the change of the filter element, the complete filter assembly is removed out of the probe head. Easy checkup of the filter element and the gaskets, cleaning the filter area of the probe head and the in-situ probe tube respectively without dismounting the sample probe are only a few advantages of the M&C probe. In the heated filter housing out of stainless steel, the 2 micron ceramic filter element is located.

More filter element materials are available as option. The compact design and the new all-round heat insulation and weather protection ensure an optimized heat distribution as well as safe operation in the filter or flange area without dew point underrun.

The gas sample probe can be heated up to 180 °C [356 °F] with special self-regulating heating elements within a range of 110 V to 240 V without switching. Neither a temperature controller nor a temperature limitation is necessary. The separate thermoswitch of the SP180-H enables a low temperature monitoring (< 160 °C [320 °F], NO). For electrical connection, a junction box with terminals is mounted.

The gas sample probe SP180-H-EX1 has a calibration gas connection as standard according to EN14181 (regulation for calibration of emission monitoring systems) that enables calibration gas feeding via the filter element of the gas sample probe.

The three versions are suitable for usage in Ex zone 1. The alarm contact for low temperature corresponds to the temperature classes of the Ex versions.

The stainless steel in-situ probe tube SP210/SS (option) is screwed into the DN 65 PN 6 mounting flange. The maximum operating temperature of the tube out of stainless steel is 600 °C [1112 °F].

To solve specific sampling problems you can find more filter elements, probe tubes and pre-filters in our wide range of M&C probe accessories (see data sheets for sample tubes with G 3/4" connection thread and pre-filters with G 3/4" connection, with flange connection and with tube connection).

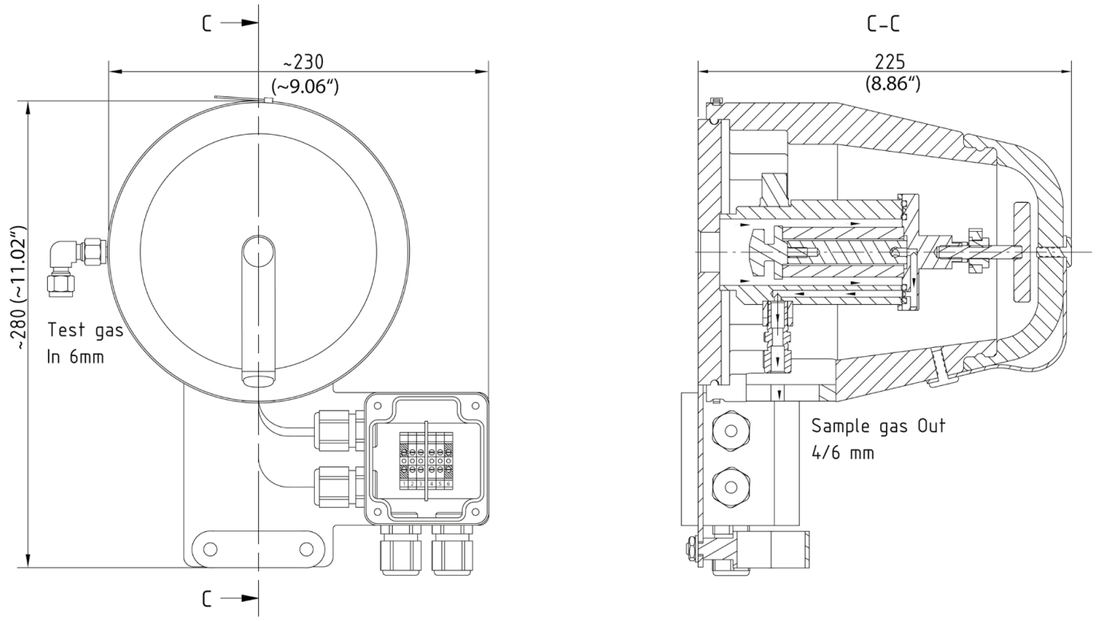
Technical Data SP180-H-EX1

Series SP®	SP180-H-EX1 T2	SP180-H-EX1 T3	SP180-H-EX1 T4
Part No.	02S1874	02S1872	02S1870
Protective cover	Yes		
Outdoor mounting	Yes		
Sample temperature	Max. 600 °C [1112 °F]*		
Sample pressure	0.4 to 6 bar abs.		
Ambient temperature	-20 to +80 °C [-4 to +176 °F]	-20 to +80 °C [-4 to +176 °F]	-20 to +80 °C [-4 to +176 °F]
Dust load	Max. 1 g/m³		
Filter chamber volume	70 ml		
Filter element	Type S-2K, filter porosity: 2 µm, ceramic (others on request)		
Probe heating	+150 to +180 °C [+320 to +356 °F] self-regulating	+120 to +160 °C [+266 to +320 °F] self-regulating	+90 to +120 °C [+194 to +248 °F] self-regulating
Ready for operation	After 2 hours		
Low temperature alarm contact, alarm point	< 90 °C [266 °F], NO	< 90 °C [266 °F], NO	< 90 °C [194 °F], NO
Low temperature alarm contact, contact rating	250 V - 1.5 A AC 0.5 A DC		
Connection sample outlet	1/4" NPT inside with Swagelok tube connector ø 6 x 1 mm (DN 4/6)		
Connection calibration gas	Swagelok tube connector ø 6 x 1 mm (DN 4/6), connection including sealing plug		
Power supply	110 up to 240 V 50 / 60 Hz, rated current 3.5 A		
Power consumption	Typically: 100 VA, (fuse 6 A)		
Electrical connection	Terminals max. 2.5 mm², 1 x M20, 1 x M16 cable glands		
Mounting flange	DN 65 PN 6, B stainless steel 316Ti		
Material of sample contacting parts	Stainless steel 316 / 316Ti, FPM, ceramic		
Degree of protection / Electrical equipment standard	IP54 EN 60529 / EN 61010		
Ex Certification	EX II 2G Ex eb mb IIC T2 Gb	EX II 2 G Ex eb mb IIC T3 Gb	EX II 2G Ex eb mb IIC T4 Gb
	EXAM BVS 18 ATEX E 043		
	IECEX BVS 18.0034		
Dimensions (W x H x D)	230 x 280 x 225 mm [9.06" x 11.02" x 8.86"]		
Weight	Approx. 7.5 kg [approx. 16.53 lb]		
Flow	Max. 500 Nl/h		
Options			
02S9200	In-situ probe tube out of stainless steel 316Ti type SP210/SS, connection: G 3/4" o, ø 10/12, length: 1 m [3.28"]*, incl. flange gasket		

* Standard, other versions on request.

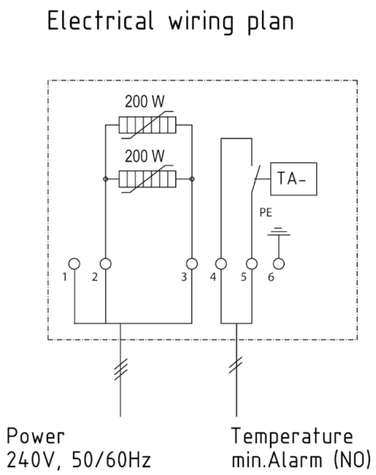
ΔP and T90 at flow of:	100	200	500	Nl/h
ΔP pressure loss with new filter element S-2K	4	7	15	mbar
T90 time with insitu probe tube SP210/SS	4.0	2.5	<1.0	sec.

Dimensions SP180-H and EX versions



Dimensions in mm

Wiring diagram



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Peltier Gas Cooler Series ECP®

Version ECP1000C with 1 x 150 Nl/h
Version ECP2000C with 2 x 150 Nl/h
Version ECP3000C with 1 x 350 Nl/h

ECP2000C with two SR25.2W peristaltic pumps

Special Features

- Ambient temperature from +5 to +50 °C [41 to 122 °F] (no extra charge)
- Outlet dew point adjustable from +2 to +15 °C [35.6 °F to 59 °F]
- Dew point stability ± 0.1 °C [± 0.18 °F]
- Control set point selectable between: absolute value mode or ΔT mode
- Optional measurement of the gas outlet temperature in the gas path
- Ready for use in less than 3 minutes
- Option: config. mA output (no shielding necessary)
- Integrated evaluation for liquid alarm sensors type LA1 or LA1S
- Configurable, potential-free alarm output
- Universal power supply
- Mounting option for up to two SR25.2W peristaltic pumps below the unit
- Compact design, low weight
- Jet-Stream heat exchangers available in various materials
- Compatible with previous version

Application

The M&C gas coolers of the ECP® series are used in analytical technology to reduce the dew point of humid gases in order to prevent condensation in the analyzer. By setting an extremely stable gas outlet dew point, water vapor cross-sensitivities and volumetric errors are minimized.

The compact, lightweight design makes the ECPX000C units particularly suitable for portable and compact stationary gas conditioning systems.

Description

With the upgraded version ECPX000C, M&C combines the solid advantages of the ECPX000 devices with new future-oriented features, a significant increase in cooling power, more functions and improved service friendliness. The ECPX000C gas cooler can be operated in ambient temperatures of up to 50 °C as standard.

It is characterized by a very high dew point stability of < ±0.1 °C.

The broadband power supply makes the cooler universally usable. Plug-in electrical connections for power and alarm relays are standard. The connections of the configurable mA outputs (optional) are also supplied as plug-in versions.

The ECPX000C is equipped with a wear-free, capacitive control and display panel for improved handling of the cooler.

The absolute value control implemented by the previous ECPX000 version has been extended by the differential temperature mode.

The cooling capacity has almost doubled compared to the previous version. The ECPX000C gas cooler is ready for use in less than 3 minutes under normal operating conditions.

The housings of the three ECPX000C devices have the same compact dimensions and are compatible with previous versions.

The units can be opened from the front for easier maintenance.

The condensate can be discharged externally by peristaltic pumps, traps or collecting vessels. Up to two peristaltic pumps for condensate removal can be mounted directly below the unit.

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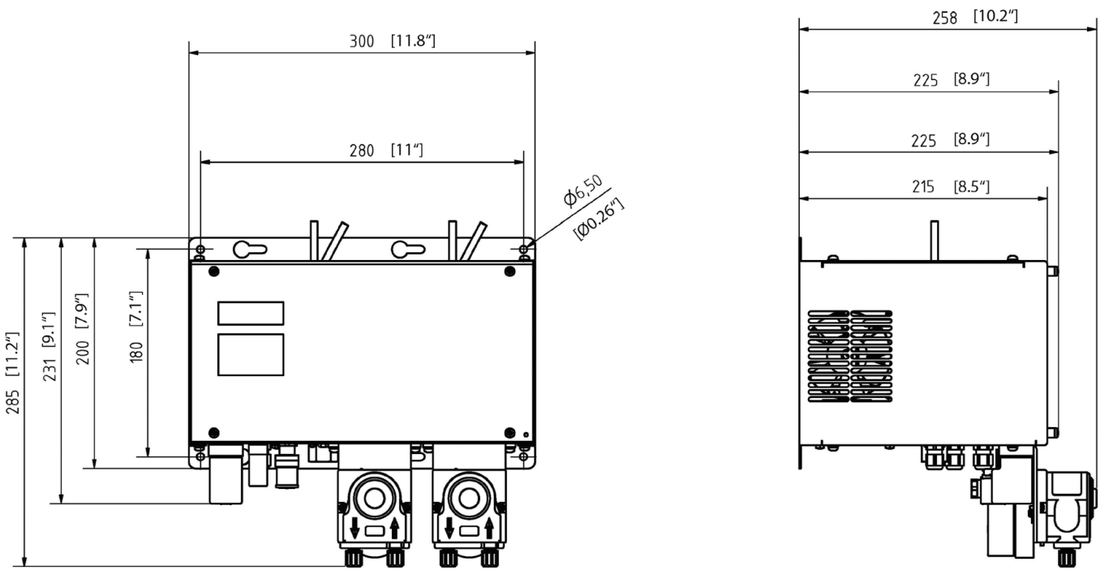
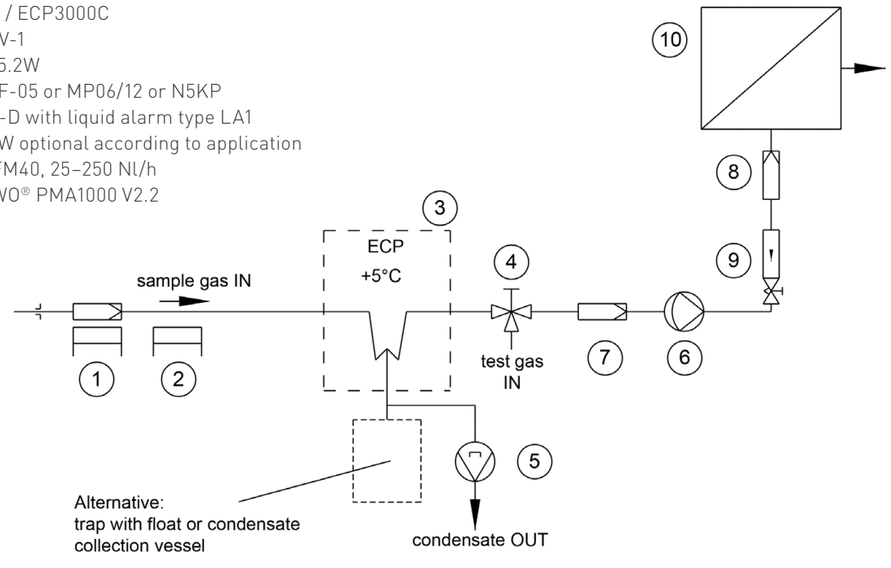
Dimensions ECP1000C / 2000C / 3000C*



* Drawing shows ECP2000C with two optional SR25.2W peristaltic pumps. Dimensions in mm [inches]

Application example for ECP1000C / ECP3000C

1 Gas sample probe SP180-H or SP2000-H
2 Heated sample line 4M4/6
3 Gas cooler ECP1000C / ECP3000C
4 3-way ball valve 3L/PV-1
5 Peristaltic pump SR25.2W
6 Diaphragm pump MPF-05 or MP06/12 or N5KP
7 Universal filter FP-2T-D with liquid alarm type LA1
8 Aerosol filter CLF-5 /W optional according to application
9 Flow meter FM10 or FM40, 25–250 Nl/h
10 Analyzers e.g. GENTWO® PMA1000 V2.2



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Cooler – Peltier Gas Cooler Series ECP

Technical Data

Gas Cooler Serie EC®	ECP1000C	ECP2000C	ECP3000C
Part number without heat exchangers	01K1400x	01K2400x	01K3400x
Number of possible heat exchangers	1	2	1
Gas flow rate per heat exchanger	Max. 150 Nl/h*	2 x Max. 150 Nl/h*	Max. 350 Nl/h*
Ambient temperature	+5 to +50 °C [41 to 122 °F]		
Storage temperature	-20 to +60 °C [-4 to 140 °F]		
Sample outlet dew point	Range of adjustment: +2 to +15 °C [35.6 to 59 °F], factory setting: +5 °C [41 °F]		
Dew point stability	±0.1 °C [±0.18 °F] at constant conditions		
Sample inlet temperature	Max. 180 °C [356 °F]*		
Sample inlet dew point	Max. 80 °C [176 °F]*		
Total cooling power at +25 °C ambient	110 kJ/h	2 x 90 kJ/h	110 kJ/h
Δ P per heat exchanger at	1 mbar at 150 Nl/h	1 mbar at 150 Nl/h	5 mbar at 350 Nl/h
Stagnant space per heat exchanger	50 ml	2 x 50 ml	100 ml
Power consumption	150 VA	275 VA	150 VA
Power supply	115–230 V AC ±10%, 50/60 Hz		
Ready for use	< 3 min. (at 25 °C ambient temperature and with no load applied)		
Max. loudness	58 dBA		
Electrical connection	Power: Pluggable via solenoid valve plug type A Alarm relay: Pluggable via solenoid valve plug type B mA: When purchasing the mA option, pluggable via Phoenix circular connector 1681101		
Signal input and output	One mA output per channel possible (no shielding required) One M&C LA liquid alarm sensor type LA1 or LA1S can be connected per channel. The evaluation is integrated as standard.		
Status alarm: 2 changeover contacts	Contact rating: 250 V, 2 A, 500 VA, 50 W		
Case protection	IP20; EN 60529		
Electrical standard	EN 61010		
EMV standard	EN 61326		
Case color	RAL 9003		
Method of mounting	Wall-mount		
Case dimensions (W x H x D)	300 x 200 x 225 mm [11.8" x 7.9" x 8.9"]		
Weight without heat exchangers	6.5 kg [14.3 lbs.]	8.2 kg [18.1 lbs.]	6.7 kg [14.8 lbs.]

* Maximum values in technical data must be rated in consideration of total cooling capacity at 25 °C [77 °F] ambient temperature and an outlet dew point of 5 °C [41 °F].

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

Heat Exchanger Options

Gas Cooler Series ECP®	ECP1000C / ECP2000C				
Heat exchanger type	ECM-2 / ECP(1/2)000C / ECC-1 G, WT	ECM-2 / ECP(1/2)000C / ECC-1 PV, WT	ECM-2 / ECP(1/2)000C / ECC-1 SS, WT	ECM-2 / ECP(1/2)000C / ECC-1 SS / NPT, WT	ECM-2 / ECP(1/2)000C / ECC-1 G / GL14, WT
Part No.	97K0100	97K0110	97K0115	97K0115NN	97K0101
Material of heat exchanger	DURAN® glass	PVDF	SS 316Ti	SS 316Ti	DURAN® glass
Admissible gas pressure	Max. 3 bar abs.[1] (2 bar abs.[2])	Max. 3 bar abs. (2 bar abs.[2])	Max. 10 bar abs. (2 bar abs.[2])	Max. 10 bar abs. (2 bar abs.[2])	Max. 3 bar abs.[1] (2 bar abs.[2])
Sample gas connection	GL 18 for tube Ø 6 mm OD	Tube Ø 6 mm	Tube Ø 6 mm	1/4" tube	GL 18 for tube Ø 6 mm OD; GL 14 for sensor
Condensate connection	GL 25 for tube Ø 12 mm, Ø 8 mm* or Ø 10 mm*	G 3/8" i	G 3/8" i	3/8" NPT	GL 25 for tube Ø 12 mm, Ø 8 mm* or Ø 10 mm*

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Heat Exchanger Options

Gas Cooler Series ECP®	ECP3000C			
Heat exchanger type	**ECM-1 / ECP3000(C) / ECC-1 G, WT**	**ECM-1 / ECP3000(C) / ECC-1 PV, WT**	**ECM-1 / ECP3000(C) / ECC-1 SS, WT**	**ECM-1 / ECP3000(C) / ECC-1 SS / NPT, WT**
Part No.	93K0140	93K0170	93K0160	93K0160N
Material of heat exchanger	DURAN® glass	PVDF	SS 316Ti	SS 316Ti
Admissible gas pressure	Max. 3 bar abs.[1] (2 bar abs.[2])	Max. 3 bar abs. (2 bar abs.[2])	Max. 10 bar abs. (2 bar abs.[2])	Max. 10 bar abs. (2 bar abs.[2])
Sample gas connection	GL 18 for tube Ø 6 mm OD	G 1/4" i	G 1/4" i	1/4" NPT
Condensate connection	GL 25 for tube Ø 12 mm, Ø 8 mm* or Ø 10 mm*	G 3/8" i	G 3/8" i	3/8" NPT

* Optional

[1] With GL adapter

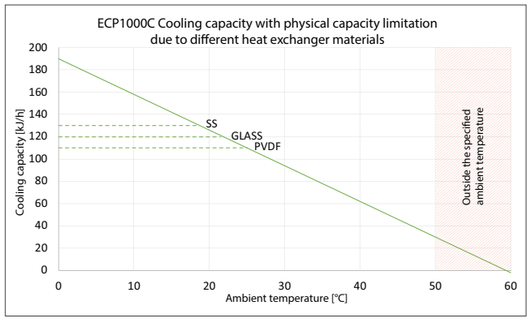
[2] With peristaltic pump SR25.2-W

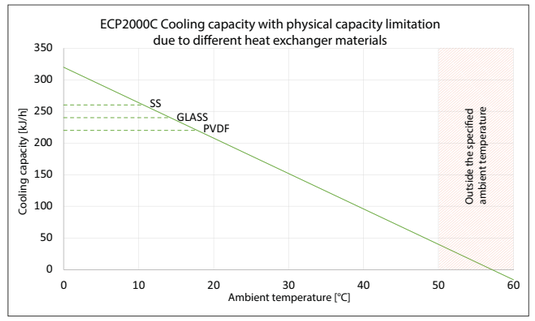
GL adapter and tube fittings for the connection of different tube diameters at the heat exchanger, see data sheets "Fittings for GL Glass Connections" and "Flexible and rigid tube fittings, plugs and connectors with barbed fitting".

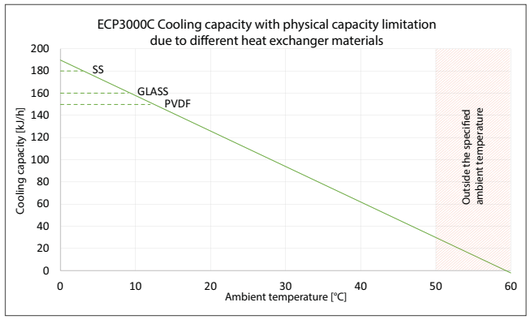
More Options

Options für ECPX000C	
Part No. 01K9200	1 x mA output incl. plug and socket, mounting and calibration (per channel)
Part No. 01K9250	1 x thermocouple incl. plug, socket, signal converter and mounting incl. special heat exchanger with three gas connections (ECP1000C only)
Part No. 03E1001	LA1S: Liquid alarm sensor with cable break detection Note: Evaluation is carried out as standard in the ECPX000C, LA1S for M&C universal filters with D connection
Part No. 03E1000	Type LA1: Liquid alarm sensor without cable break detection Note: Evaluation is carried out as standard in the ECPX000C, LA1 for M&C universal filters with D connection
Part No. 01P1307	Peristaltic pump SR25.2-W, 0.3 Nl/h, 115/230 V AC with PVDF tube connection fitting DN 4/6 mm
Part No. 01P9160X	SR25.2-W Connection set without peristaltic pump (PVDF screw connections for SS 316Ti, PVDF and glass HE, 0.5 m Novoprene hose and fixing screws)

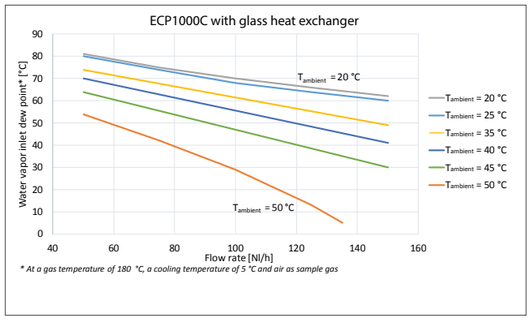
Cooling Capacity

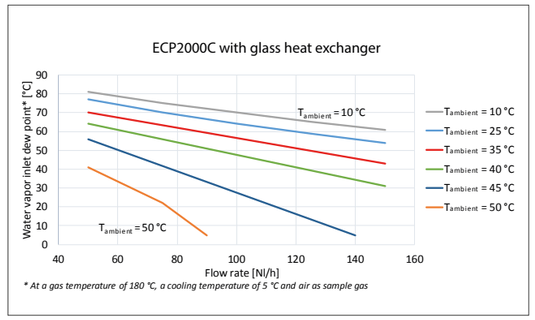




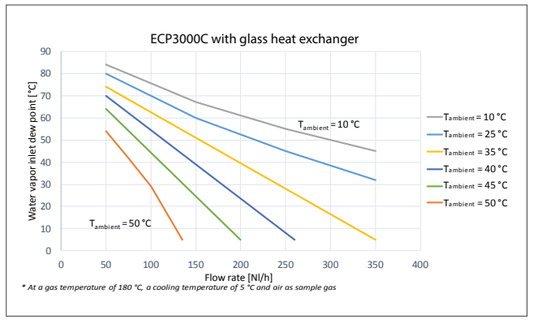


Maximum Inlet Dew Point



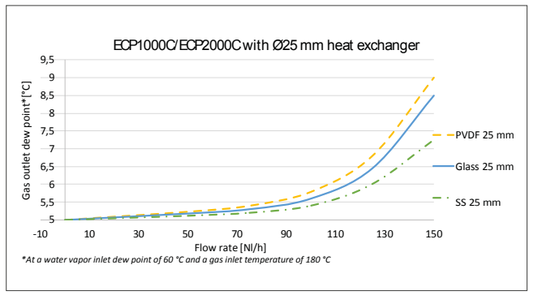


Maximum Inlet Dew Point

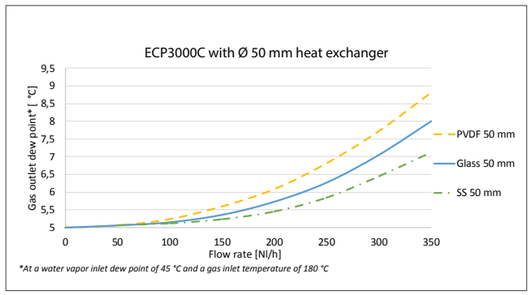


** At a gas temperature of 180 °C, a cooling temperature of 5 °C and air as sample gas*

Gas Outlet Dew Point



**At a water vapor inlet dew point of 60 °C and a gas inlet temperature of 180 °C*



**At a water vapor inlet dew point of 45 °C and a gas inlet temperature of 180 °C*

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Multigas Analyzer GenTwo® V2.4

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

Multigas-Analyzer GenTwo® V2.4

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 H_2S sensor
  - Thermal conductivity detector (TCD)
  - NDIR/NDUV/UVRAS photometers
- Measured value storage over one year in the analyzer
- Pressure compensation 0.8 to1.2 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 builtin 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.

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Sensors

Paramagnetic oxygen sensor PMA2
The M&C oxygen transmitter uses the paramagnetic properties of oxygen. The compact design of the transmitter 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 CO_2-resistant.

Electrochemical H_2S sensor
This compact sensor is available for different hydrogen sulfide concentrations from 0 to 10 000 ppm.

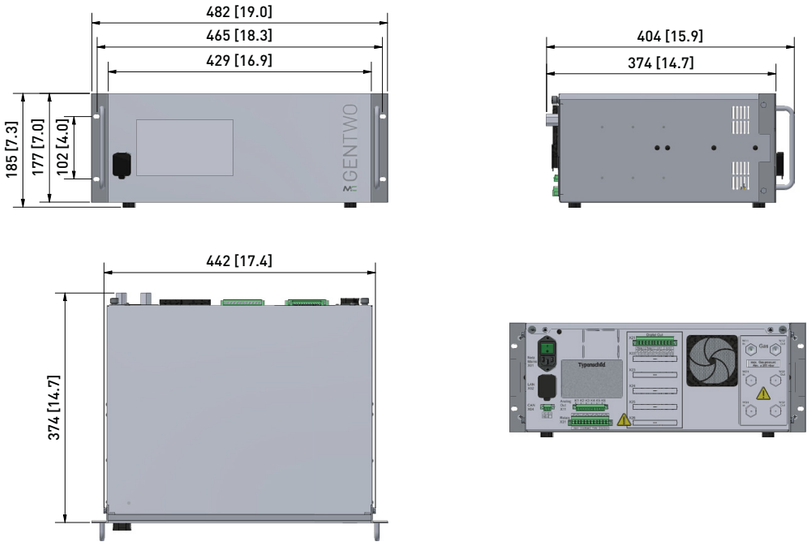
Thermal conductivity detector (TCD)
This type of sensor uses the thermal properties of gases. In the design implemented here, the thermal conductivity of hydrogen in a binary gas mixture is used to determine the H_2 concentration.

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 in mm [Inches]

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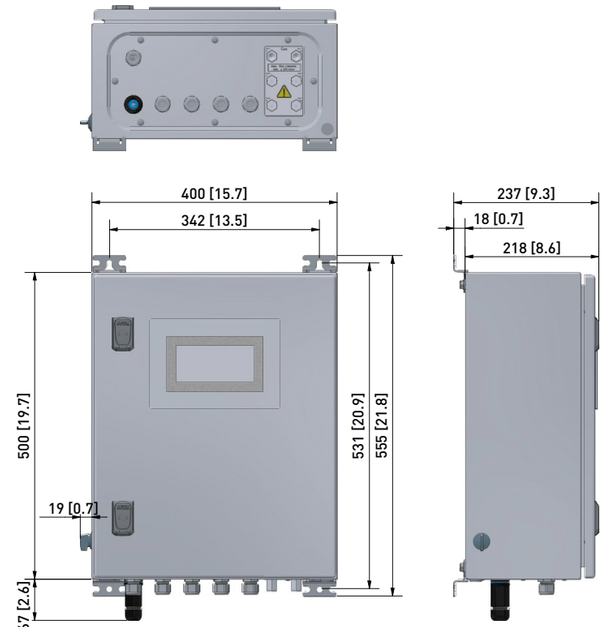
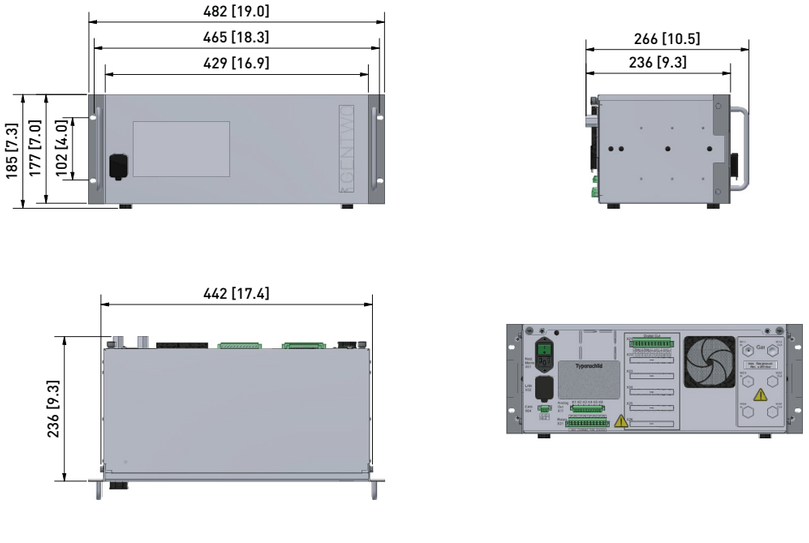
Analyzer – Multigas Analyzer GenTwo® V2.4

Dimensions wall-mount housing



Dimensions 19"-rack housing (short housing)



Dimensions in mm [Inches]

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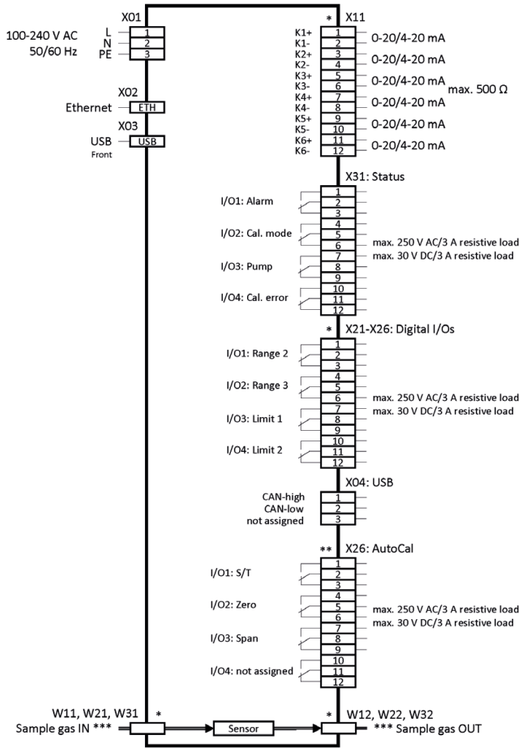
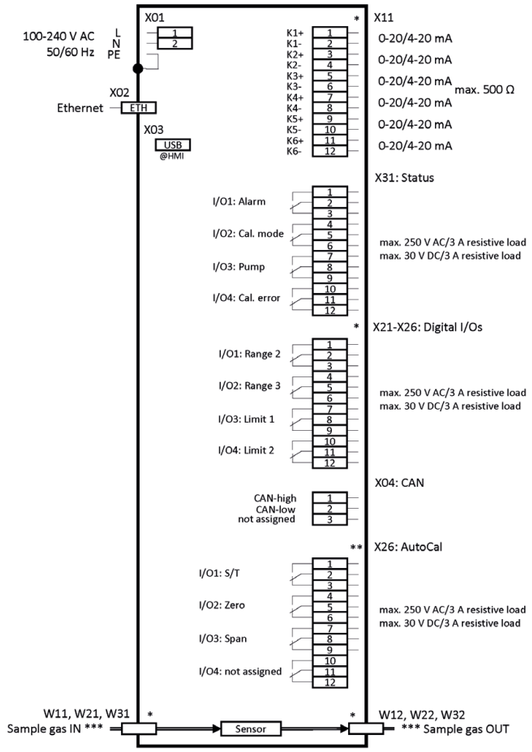
Interfaces diagrams

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.

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Technical specifications in general

Multigas Analyzers of the GenTwo® Series	GenTwo V2.4
Basic device w/o sensors, short housing: Part No.	08A2240
Basic device w/o sensors, long housing: Part No.	08A2230
Basic device w/o sensors, wall-mount housing: Part No.	08A2220
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 Nl/h, depending on sensor used
Sample gas inlet pressure	800 to 1200 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], avoid condensation
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 mm2 wires (customer provided), rack-housing: power cord (3 x 1.5 mm2 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	With Viton® (standard) gas path: G1/4" female thread, with stainless steel gas path: 1/8" NPT female thread
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	2000 m [≈ 6561.7 ft]
Pollution degree of the intended environment	PD 2
Long housing: dimensions (W x H x D)	482 x 185 x 404 mm [≈ 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 10.4"], 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 [≈ 15.7" x 19.7" plus approx. 2.4" gas connection fitting x 8.6"]
Long housing: weight	Approx.13 kg [≈ 29 lbs] (depending on sensor configuration)
Short housing: weight	Approx.11 kg [≈ 24 lbs] (depending on sensor configuration)
Wall-mount housing: weight	Approx.18 kg [≈ 39.7 lbs] (depending on sensor configuration)

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

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Technical specifications in general (see instruction manual for complete list)

Options	
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. Contains O-rings made of FKM.
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: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.
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Technical specifications sensors

Electrochemical oxygen sensor

	GenX Sensor O_2 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 Nl/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_3H_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.

Analyzer – Multigas Analyzer GenTwo® V2.4

Technical specifications sensors

Paramagnetic oxygen sensor PMA2

	GenX Sensor O_2 PMA2 and sensor environments
PMA2 HL, thermostatted to 55 °C incl. preheating loop	10A4010
GenX Sensor O_2 PMA2 HL-F01, thermostatisiert auf 55 °C mit Vorwärmeschleife, Drift- und Noise-Test nach EN 50399 Anhang E.2, nur für Anschluss mit Viton®	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 Nl/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 Nl/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

* 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 H_2S sensor

	GenX sensor H_2S 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_2S
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 Nl/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 H_2 WLD MK-F200	08A2845
GenX sensor environm. WLD MK-F VI/PT for gas paths in Viton® or PTFE tubing	08A2850
GenX sensor environm. WLD 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 Nl/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 0.01 vol%
Ambient temperature	10–40 °C [50 to 104 °F]
Zero drift	< 2 % of full scale value per week
Sample gas flow rate	25–60 Nl/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.

Analyzer – Multigas Analyzer GenTwo® V2.4

Technical specifications sensors

Available measuring ranges: oxygen sensors, electrochemical H_2S sensor and TCD

Measuring ranges	O_2 PMA2	O_2 electrochemical	H_2S 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
0–1000 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 H_2O 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).

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.

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Technical specifications sensors

Available gases and standard measuring ranges: NDIR photometers

Measuring ranges	CO_2	CO	CH_4	C_nH_m	N_2O	SF_6	CF_4	NO	H_2O
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
0–5000 ppm	x	x	x	x	-	x	*	x	x
0–2000 ppm	x	x	x	x	x	x	*	x	-
0–1000 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	-	-	-
0–10 ppm	-	-	-	-	-	-	-	-	-

Available gases and standard measuring ranges: NDUV photometers

Measuring ranges	H_2S	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%	*	*	-	*	-
0–5000 ppm	x	x	x	*	-
0–2000 ppm	x	x	x	*	x
0–1000 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%	-
0–5000 ppm	x
0–2000 ppm	x
0–1000 ppm	x
0–500 ppm	x
0–300 ppm	x
0–100 ppm	-
0–50 ppm	-
0–10 ppm	-

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.
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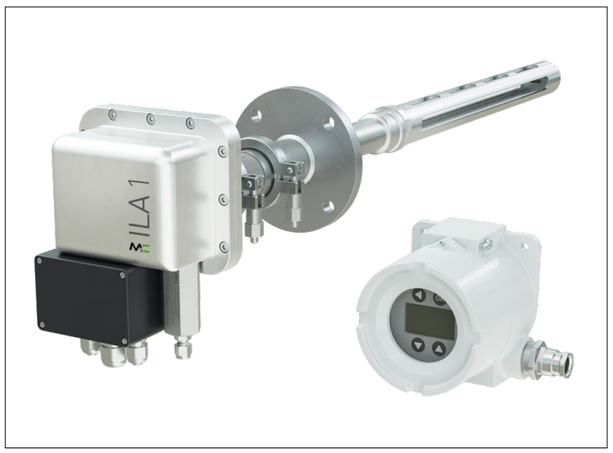
Laser Analyzer ILA1-A000-EX

Optical Oxygen Measurement Version ILA1-A000-EX



ILA1-A000-EX-PXX80 with HMI

Special Features

- O_2 measuring ranges from 0 to 100 vol%
- Maximum process temperature 900 °C [1652 °F]
- Max. process pressure 7 bar abs.
- ATEX version approval
- Laser Class 1 – eye-safe
- Analog signal outputs 2 x 4–20 mA
- IP65 for installations in harsh environments
- Digital interfaces: CAN, RS485 and Modbus TCP/IP
- Access to all parameters via HMI (Human Machine Interface)

Application

The In-situ Laser Analyzer ILA1-A000-EX is a high-performance oxygen analyzer for industrial and process control applications.

Description

The In-situ Laser Analyzer ILA1-A000-EX consists of a probe with a measuring section, probe flange and sensor head with a separate HMI unit. The transmitter and receiver are located in the sensor head while the beam reflector is placed inside the tip of the probe lance in the measuring section. The active measuring path is the result of the laser installed in the sensor head emitting an infrared laser beam that passes through the process gas to the retroreflector and from there is reflected back to the receiver in the sensor head.

An integrated system for continuous N_2 purge prevents dust and other contaminates from coating the retroreflector and sensor head window.

The external HMI or a PC with access to the web interface can be used to operate, configure and perform diagnostics on the ILA1-A000-EX.

Example applications are real-time oxygen measurements for combustion control, safety monitoring and process control.

Industries that can benefit from this measurement technology are chemical and petrochemical plants, power plants, waste incinerators and the steel industry.

The analyzer is particularly suitable for controlling combustion processes, process optimization and control, ensuring facility and workplace safety, explosion protection, quality control and measurement in corrosive and toxic gases.

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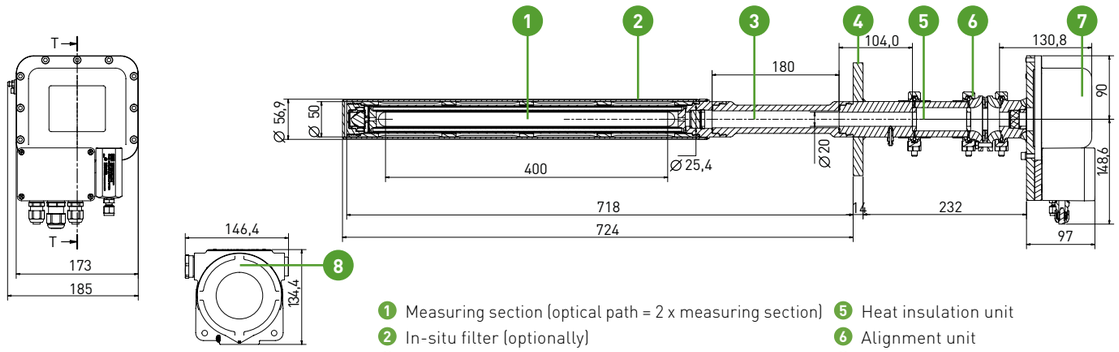
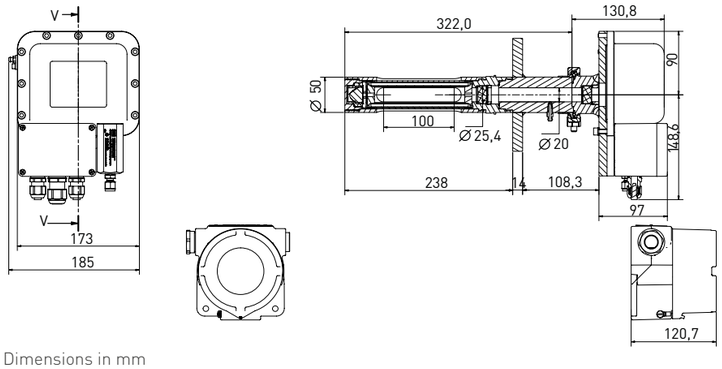
ILA1-A000-EX-PXX80 with HMI and options



1 Measuring section (optical path = 2 x measuring section)
2 In-situ filter (optionally)
3 Probe extension
4 Probe flange
5 Heat insulation unit
6 Alignment unit
7 Sensor head
8 HMI (optionally)

ILA1-A000-EX-PXX20 with HMI



Dimensions in mm

Dimensions and Weights (example probes)

In-situ Laser Analyzer	20 cm path length	40 cm path length	80 cm path length
Probe (sensor head, probe flange and measuring section): dimensions (W x H x L)	185 x 238.6 x 460 mm [≈ 7.3" x 9.4" x 18"]	185 x 238.6 x 560 mm [≈ 7.3" x 9.4" x 22"]	185 x 238.6 x 760 mm [≈ 7.3" x 9.4" x 30"]
Probe (sensor head, probe flange and measuring section): weight	Approx. 10.6 kg [≈ 23.4 lbs]	Approx. 14.9 kg [≈ 32.8 lbs]	Approx. 16 kg [≈ 35.3 lbs]
HMI Ex version: dimensions (W x H x L)	146.4 x 134.4 x 120.7 mm [≈ 5.8" x 5.3" x 4.8"]		
HMI Ex version: weight	Approx. 2.1 kg [≈ 4.6 lbs]		
Sensor head: housing material	Aluminum		
Probe flange: material	Stainless steel 316		
Probe flange: dimensions	ANSI-flanges: 2" Class 150, 2.5" or 3" Class 150 or higher; DN 80 PN 40, DN 65 PN 6		

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Technical Data of the Overall System

In-situ Laser Analyzer	ILA1-A000-EX
Gas measured	O_2
Measuring range	0 to 100 vol%
Limit of detection* (depending on optical path length)	ILA1-A000-EX-PXX20: 500 ppm ILA1-A000-EX-PXX40: 250 ppm ILA1-A000-EX-PXX60: 170 ppm ILA1-A000-EX-PXX80: 125 ppm
Max. process gas temperature	Depends on the selected thermal package and the material of process flange, probe extension and measuring section. The max. process gas temperature is determined by the component with the lowest permitted temperature
Max. process gas pressure	7 bar abs.
Length of optical path (optical path = 2 x measuring section)	Measuring sections with 200 [≈ 7.9"], 400 [≈ 15.7"], 600 [≈ 23.6"] and 800 mm [≈ 31.5"] optical path length available
Repeatability deviation (depending on optical path length)	ILA1-A000-EX-PXX20: ±1 % of measured value or ±500 ppm O_2, whichever is higher ILA1-A000-EX-PXX40: ±1 % of measured value or ±250 ppm O_2, whichever is higher ILA1-A000-EX-PXX60: ±1 % of measured value or ±170 ppm O_2, whichever is higher ILA1-A000-EX-PXX80: ±1 % of measured value or ±125 ppm O_2, whichever is higher
Linearity error	< 1 %
Drift	< 2 % of measuring range every 12 months
Measuring repetition rate	1 second
Purging of windows	Nitrogen (N_2)
Recommended purging gas flow	0–10 Nl/min, depending on the application
Purging gas flow for housing	Only slight overpressure of 20 mbar needed; flow approx. 5 ml/min
Wetted material	Depends on the selected material of the process flange, probe extension and measuring section
Process windows	Sapphire, leak tested and certified in accordance to EN1779:1999 norm
Retroreflector	UVFS (UV Fused Silica)
Power supply	24 V DC ±10 % 6 W fused with max. 20 A (short-circuit current)
Power consumption	< 6 VA
Process gas speed	1 m/s, recommended: over 5 m/s
EMC immunity standard	In accordance with EN 61326-1
Warm-up time	It takes approximately 3 minutes for the system to be fully operational
Alignment unit	To align measuring section and sensor head, weight: 1 kg [≈ 2.2 lbs]

* The limit of detection (LOD) was measured under constant ambient conditions in the compensated temperature and pressure range (±0.015 %/mbar) and with a measurement time of 10 seconds and a moving average of 10 points. Additionally, the limit of detection is depending on sample gas and the selected measuring range.

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

Interfaces for ILA1-A000-EX

In-situ Laser Analyzer	Sensor Head
Analog outputs	2 x 4–20 mA, active (for concentration and transmission)
Analog inputs	2 x 4–20 mA (for pressure and temperature), active or passive
Relay output	Error status 60 V AC/60 V DC, max. 500 mA, NO (normally open)
Relay input	Maintenance status min. 6 V DC, max. 60 V DC, NO (normally open)
Digital interfaces	CAN (connection to HMI), RS485, Modbus TCP/IP WebServer-based software for real-time logging of the gas concentration and optical transmission

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Material selection: Thermal package (heat insulation unit and set of gaskets)

Thermal package	Material: heat insulation unit	Material: gaskets	Max. process gas temperature
TP NG065	-	Gylon® Style 3522	65 °C
TP DG250	Durobest DB250R	Gylon® Style 3522	250 °C
TP ZT900	ZrO_2	ThermA-Pur® Style 4122	900 °C*

*Temperature due to heat conduction to the sensor head GYLON® is a registered trademark for a high-performance PTFE material by Garlock Sealing Technologies LLC, USA.
THERMa-PUR®Style 4122 is a registered trademark for non-metallic gaskets for use in extreme temperature applications by Garlock Sealing Technologies LLC, USA.

Material selection of wetted parts: process flange, probe extension and measuring section

Material: process flange, probe extension and measuring section	Max. process gas temperature	Corrosion resistance
Stainless steel 316Ti (standard)	500 °C	corrosion-resistant
Stainless steel F51	250 °C	Increased corrosion resistance
Stainless steel 904L	400 °C	Increased corrosion resistance
Stainless steel 321H (temperature range increased)	600 °C	Reduced corrosion resistance
Nickel-based alloy, e.g. Hastelloy® (high temperature)	900 °C	High corrosion resistance

Hastelloy® is a registered trademark for a nickel-chromium-molybdenum alloy by Haynes International, USA.

Laser Safety

In-situ Laser Analyzer	ILA1-A000-EX
Laser class for laser in probe	Class 1 according to IEC 60825-1, eye-safe
Laser class during maintenance	Class 3B according to IEC 60825-1, avoid exposure to beam

Ex Safety

In-situ Laser Analyzer	ILA1-A000-EX	
Marking	$T_{Umgebung}$ -40 °C to +59 °C EX II (1)2 G Ex db eb [op is Ga] IIC T6 Gb EX II (1)2 D Ex tb [op is Da] IIIC T85 °C Db	$T_{Umgebung}$ -40 °C to +65 °C EX II (1)2 G Ex db eb [op is Ga] IIC T5 Gb EX II (1)2 D Ex tb [op is Da] IIIC T92 °C Db
EU Directives	IEC 60079-0:2017 Ed. 7 IEC 60079-7:2015/A1:2017 Ed. 5.1 IEC 60079-28:2015 Ed. 2 EN 60079-0:2018/AC:2020 EN 60079-7:2015/AC:2017 EN 60079-28:2015	IEC 60079-1:2014 Ed. 7 IEC 60079-14:2014 Ed. 6 IEC 60079-31:Ed. 3 EN 60079-1:2014/AC:2018 EN 60079-14:2014/AC:2016 EN 60079-31:2014

Ambient Conditions

In-situ Laser Analyzer	ILA1-A000-EX
Ambient pressure	700 to 1200 hPa
Ambient humidity	RH < 99 %, non-condensing
Anbient temperature	-40 to +59 °C [-40 to +138.2 °F] for T6 -40 to +65 °C [-40 to +149 °F] for T5
Storage temperature	-40 to +70 °C [-40 to +158 °F]
Degree of protection	In accordance with IP65

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Oxygen Laser Analyzer ILA1-A000-EX

Type designation: ILA1-A000-EX-P ...

Probe extension XX	
00	No extension
20	20 cm
45	45 cm

Path length XX	
20	20 cm
40	40 cm
60	60 cm
80	80 cm

Flange version -XXX	
-A01	2" Class 150
-A02	2.5" Class 150
-A03	2.5" Class 300
-A04	3" Class 150
-A05	3.5" Class 150
-D01	DN 65 PN 6
-D02	DN 80 PN 40

Material -X	
-S	1.4571 (standard)
-R	1.4462 (corrosion resistant)
-V	1.4539 (very corrosion resistant)
-T	1.4878 (temperature range increased)
-H	Nickel-based alloy (high temperature)

Temperature package X	
N	Gylon gaskets, No insulation unit
D	Gylon gaskets, Durobest insulation unit
Z	ThermA-Pur gaskets, ZrO_2 insulation unit

Options

In-situ Laser Analyzer	ILA1-A000-EX
ILA HMI DCU10 EX	HMI to operate, configure or perform diagnostics on the ILA1-A000-EX In-situ Laser Analyzer. - LCD display: 128 x 64 pixel - Analog outputs: 4 x 4–20 mA, programmable, active - Analog inputs: 2 x 4–20 mA, programmable, active/passive - Relay outputs: 2 x relay outputs programmable: 60 V AC/60 V DC, max. 120 mA, NO (normally open) - Relay inputs: 2 x relay inputs programmable: min. 16 V DC, max. 60 V DC, NO (normally open) - Digital interfaces: CAN (connection to sensor head)
SU EL10	Supply unit with 24 V DC including: 2 x cable glands (5–14 mm) for connecting laser head and HMI, 5 x cable glands (4–11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU EP10	Supply unit incl. 24 V DC power supply unit with 50 W for supply voltage 100–240 V AC including: 2 x cable glands (5–14 mm) for connecting laser head and HMI, 5 x cable glands (4–11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU EP10 EX	EX supply unit incl. 24 V DC power supply unit with 50 W for supply voltage 100–240 V AC including: 2 x cable glands (5–14 mm) for connecting laser head and HMI, 5 x cable glands (4–11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU G10	Supply unit for purge gas including: 1 x purge gas IN (pressure: 3–8 bar) for nitrogen (N_2), 1 x gas path with flow meter to purge measuring section (gas flow: 0–13 Nl/min), 1 x gas path with pressure regulator (0–0.7 bar) for pressurized sensor head enclosure (0.1 bar above ambient pressure), 1 x gas path with pressure regulator (0–6.8 bar) for pressurized buffer zone enclosure (1 bar above process pressure); protection class: IP65
SU G10 EX	EX supply unit for purge gas including: 1 x purge gas IN for nitrogen (pressure: 3–8 bar), 1 x gas path with flow meter to purge measuring section (gas flow: 0–13 Nl/min), 1 x gas path with pressure regulator (0–0.7 bar) for pressurized sensor head enclosure (0.1 bar above ambient pressure), 1 x gas path with pressure regulator (0–6.8 bar) for pressurized buffer zone enclosure (1 bar above process pressure); protection class: IP65
ILA cable, 10 m, 10 x 2 x 0.25 mm	Pre-assembled ILA cable 10 x 2 x 0.25 mm, length: 10 m, for connecting laser head and electrical supply unit
ILA HMI, cable, 10 m, 12 x 2 x 0.25 mm	Pre-assembled ILA cable, 12 x 2 x 0.25 mm, length: 10 m, for connecting HMI and electrical supply unit
EX ILA power supply	ILA power supply TR TSPC050-124 24VDC EX
ILA cellular VPN router RO1520-4L	The cellular router enables remote access to the ILA laser analyzer. A SIM card for operating the router must be provided by the customer
PS KE10-80R EX	EX piezoresistive pressure transmitter, 0–10 bar abs., pressure connection: G 1/2", complete temp. range: -10 to +80 °C [-40 to 1112 °F]
PS KE10-80R	Piezoresistive pressure transmitter, 0–10 bar abs., pressure connection: G 1/2", complete temp.range: -10 to +80 °C [-40 to 1112 °F]
TS JU600-400A EX	EX screw-in resistance thermometer with end-to-end protection tube, -40 to +600 °C, connect.: G 1/2" threaded
TS JU600-400A	Screw-in resistance thermometer with end-to-end protection tube, -40 to +600 °C, connection: G 1/2" threaded
Probe extension	Various lengths up to 500 mm available
In-situ filter	Filter to protect the measuring section against high dust concentrations

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Technical specifications and illustrations are without obligation, subject to modifications.
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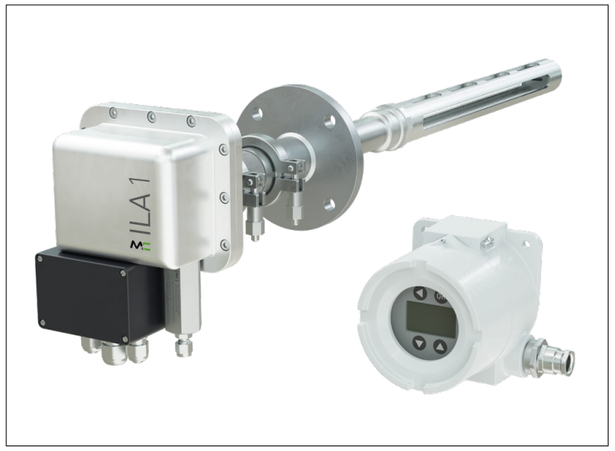
Laser Analyzer ILA1-B000-EX

Optical Sulfur Oxide Measurement Version ILA1-B000-EX



ILA1-B000-EX-PXX80 with HMI

Special Features

- SO_2 measuring ranges from 0–0.5 vol% to 0–2 vol%
- Maximum process temperature 900 °C [1652 °F]
- Maximum process pressure 7 bar abs.
- ATEX version approval
- Laser class 1 – eye-safe
- Analog signal outputs 2 x 4–20 mA
- IP65 for installations in harsh environments
- Digital interfaces: CAN, RS485 and Modbus TCP/IP
- Access to all parameters via HMI (Human Machine Interface)

Application

The In-situ Laser Analyzer ILA1-B000-EX is a high-performance sulfur oxide analyzer for industrial and process control applications.

Description

The In-situ Laser Analyzer ILA1-B000-EX consists of a probe with a measuring section, probe flange and sensor head with a separate HMI unit. The transmitter and receiver are located in the sensor head while the beam reflector is placed inside the tip of the probe lance in the measuring section. The active measuring path is the result of the laser installed in the sensor head emitting an infrared laser beam that passes through the process gas to the retroreflector and from there is reflected back to the receiver in the sensor head.

An integrated system for continuous N_2 or instrument air purge prevents dust and other contaminates from coating the retroreflector and sensor head window.

The external HMI or a PC with access to the web interface can be used to operate, configure and perform diagnostics on the ILA1-B000-EX.

Application examples include process monitoring at sulphur recovery plants, combustion optimization and control in cement plants and in sulphuric acid production as well as monitoring SO2 scrubbers at stationary combustion plants and on ships.

Industries that can benefit from this measurement technology are chemical and petrochemical plants, power plants, waste incinerators and the steel industry.

The analyzer is particularly suitable for controlling combustion processes, process optimization and control, ensuring facility and workplace safety, explosion protection, quality control and measurement in corrosive and toxic gases.

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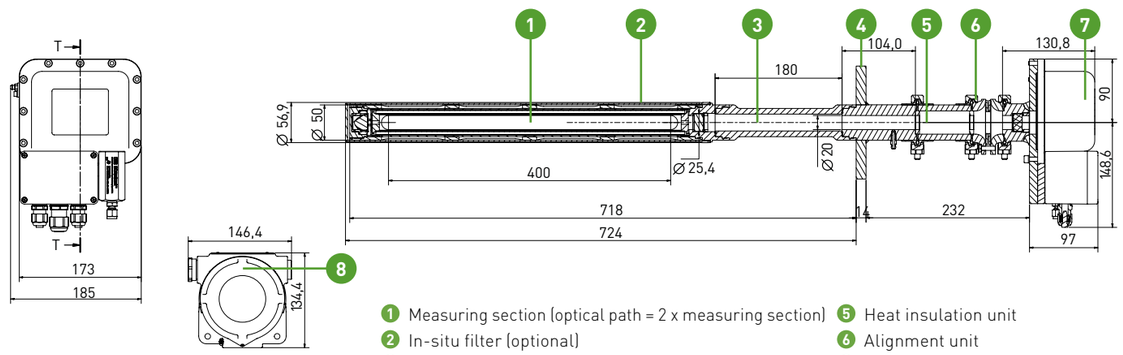
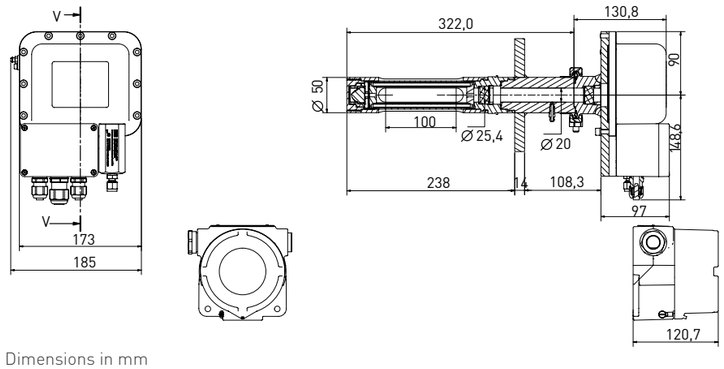
ILA1-B000-EX-PXX80 with HMI and options



1. Measuring section (optical path = 2 x measuring section)
2. In-situ filter (optional)
3. Probe extension
4. Probe flange
5. Heat insulation unit
6. Alignment unit
7. Sensor head
8. HMI (optional)

ILA1-B000-EX-PXX20 with HMI



Dimensions in mm

Dimensions and Weights (example probes)

In-situ Laser Analyzer	20 cm path length	40 cm path length	80 cm path length
Probe (sensor head, probe flange and measuring section): dimensions (W x H x L)	185 x 238.6 x 460 mm [≈ 7.3" x 9.4" x 18"]	185 x 238.6 x 560 mm [≈ 7.3" x 9.4" x 22"]	185 x 238.6 x 760 mm [≈ 7.3" x 9.4" x 30"]
Probe (sensor head, probe flange and measuring section): weight	Approx. 10.6 kg [≈ 23.4 lbs]	Approx. 14.9 kg [≈ 32.8 lbs]	Approx. 16 kg [≈ 35.3 lbs]
HMI Ex version: dimensions (W x H x L)	146.4 x 134.4 x 120.7 mm [≈ 5.8" x 5.3" x 4.8"]		
HMI Ex version: weight	Approx. 2.1 kg [≈ 4.6 lbs]		
Sensor head: housing material	Aluminum		
Probe flange: material	Stainless steel 316		
Probe flange: dimensions	ANSI-flanges: 2" Class 150, 2.5" or 3" Class 150 or higher; DN 80 PN 40, DN 65 PN 6		

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Technical specifications and illustrations are without obligation, subject to modifications.
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Technical Data of the Overall System

In-situ Laser Analyzer	ILA1-B000-EX
Gas measured	SO_2
Measuring range (depending on optical path length)	ILA1-B000-EX-PXX20: 0 to 2 vol% ILA1-B000-EX-PXX40: 0 to 1 vol% ILA1-B000-EX-PXX60: 0 to 0.7 vol% ILA1-B000-EX-PXX80: 0 to 0.5 vol%
Detection limit* (depending on optical path length)	ILA1-B000-EX-PXX20: 100 ppm ILA1-B000-EX-PXX40: 50 ppm ILA1-B000-EX-PXX60: 33 ppm ILA1-B000-EX-PXX80: 25 ppm
Max. process gas temperature	Depends on the selected thermal package and the material of process flange, probe extension and measuring section. The max. process gas temperature is determined by the component with the lowest permitted temperature
Max. process gas pressure	7 bar abs.
Length of optical path (optical path = 2 x measuring section)	Measuring sections with 200 [≈ 7.9"], 400 [≈ 15.7"], 600 [≈ 23.6"] and 800 mm [≈ 31.5"] optical path length available
Repeatability deviation (depending on optical path length)	ILA1-B000-EX-PXX20: ±1 % of measured value or ±100 ppm SO_2, whichever is higher ILA1-B000-EX-PXX40: ±1 % of measured value or ±50 ppm SO_2, whichever is higher ILA1-B000-EX-PXX60: ±1 % of measured value or ±33 ppm SO_2, whichever is higher ILA1-B000-EX-PXX80: ±1 % of measured value or ±25 ppm SO_2, whichever is higher
Linearity error	< 1 %
Drift	< 2 % of measuring range every 12 months
Measuring repetition rate	1 second
Purging of windows	Nitrogen (N_2) or instrument air
Recommended purging gas flow	0–10 Nl/min, depending on the application
Purging gas flow for housing	Only slight overpressure of 20 mbar needed; flow approx. 5 ml/min
Wetted material	Depends on the selected material of the process flange, probe extension and measuring section
Process windows	Sapphire, leak tested and certified in accordance to EN1779:1999 norm
Retroreflector	Crystalline material similar to Sapphire
Power supply	24 V DC ±10 % 6 W fused with max. 20 A (short-circuit current)
Power consumption	< 6 VA
Process gas speed	1 m/s, recommended: over 5 m/s
EMC immunity standard	In accordance with EN 61326-1
Warm-up time	It takes approximately 3 minutes for the system to be fully operational
Alignment unit	To align measuring section and sensor head, weight: 1 kg [≈ 2.2 lbs]

* The limit of detection (LOD) was measured under constant ambient conditions in the compensated temperature and pressure range (±0.015 %/mbar) and with a measurement time of 10 seconds and a moving average of 10 points. Additionally, the limit of detection is depending on sample gas and the selected measuring range.

Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar.

Interfaces for ILA1-B000-EX

In-situ Laser Analyzer	Sensor Head
Analog outputs	2 x 4–20 mA, active (for concentration and transmission)
Analog inputs	2 x 4–20 mA (for pressure and temperature), active or passive
Relay output	Error status 60 V AC/60 V DC, max. 500 mA, NO (normally open)
Relay input	Maintenance status min. 6 V DC, max. 60 V DC, NO (normally open)
Digital interfaces	CAN (connection to HMI), RS485, Modbus TCP/IP WebServer-based software for real-time logging of the gas concentration and optical transmission

Sulfur Oxide Laser Analyzer ILA1-B000-EX

Material selection: Thermal package (heat insulation unit and set of gaskets)

Thermal package	Material: heat insulation unit	Material: gaskets	Max. process gas temperature
TP NG065	-	Gylon® Style 3522	65 °C
TP DG250	Durobest DB250R	Gylon® Style 3522	250 °C
TP ZT900	ZrO_2	ThermA-Pur® Style 4122	900 °C*

*Temperature due to heat conduction to the sensor head GYLON® is a registered trademark for a high-performance PTFE material by Garlock Sealing Technologies LLC, USA.
THERMa-PUR®Style 4122 is a registered trademark for non-metallic gaskets for use in extreme temperature applications by Garlock Sealing Technologies LLC, USA.

Material selection of wetted parts: process flange, probe extension and measuring section

Material: process flange, probe extension and measuring section	Max. process gas temperature	Corrosion resistance
Stainless steel 316Ti (standard)	500 °C	corrosion-resistant
Stainless steel F51	250 °C	Increased corrosion resistance
Stainless steel 904L	400 °C	Increased corrosion resistance
Stainless steel 321H (temperature range increased)	600 °C	Reduced corrosion resistance
Nickel-based alloy, e.g. Hastelloy® (high temperature)	900 °C	High corrosion resistance

Hastelloy® is a registered trademark for a nickel-chromium-molybdenum alloy by Haynes International, USA.

Laser Safety

In-situ Laser Analyzer	ILA1-B000-EX
Laser class for laser in probe	Class 1 according to IEC 60825-1, eye-safe
Laser class during maintenance	Laser class 1M according to IEC 60825-1, do not view laser radiation directly with optical instruments

Ex Safety

In-situ Laser Analyzer	ILA1-B000-EX	
Marking	$T_{ambient}$ -40 °C to +59 °C EX II (1)2 G Ex db eb [op is Ga] IIC T6 Gb EX II (1)2 D Ex tb [op is Da] IIIC T85 °C Db	$T_{ambient}$ -40 °C to +65 °C EX II (1)2 G Ex db eb [op is Ga] IIC T5 Gb EX II (1)2 D Ex tb [op is Da] IIIC T92 °C Db
EU Directives	IEC 60079-0:2017 Ed. 7 IEC 60079-7:2015/A1:2017 Ed. 5.1 IEC 60079-28:2015 Ed. 2 EN 60079-0:2018/AC:2020 EN 60079-7:2015/AC:2017 EN 60079-28:2015	IEC 60079-1:2014 Ed. 7 IEC 60079-14:2014 Ed. 6 IEC 60079-31:Ed. 3 EN 60079-1:2014/AC:2018 EN 60079-14:2014/AC:2016 EN 60079-31:2014

Ambient Conditions

In-situ Laser Analyzer	ILA1-B000-EX
Ambient pressure	700 to 1200 hPa
Ambient humidity	RH < 99 %, non-condensing
Anbient temperature	-40 to +59 °C [-40 to +138.2 °F] for T6, -40 to +65 °C [-40 to +149 °F] for T5
Storage temperature	-40 to +70 °C [-40 to +158 °F]
Degree of protection	In accordance with IP65

Type designation: ILA1-B000-EX-P ...

Probe extension XX	
00	No extension
20	20 cm
45	45 cm

Path length XX	
20	20 cm
40	40 cm
60	60 cm
80	80 cm

Flange version -XXX	
-A01	2" Class 150
-A02	2.5" Class 150
-A03	2.5" Class 300
-A04	3" Class 150
-A05	3.5" Class 150
-D01	DN 65 PN 6
-D02	DN 80 PN 40

Material -X	
-S	1.4571 (standard)
-R	1.4462 (corrosion resistant)
-V	1.4539 (very corrosion resistant)
-T	1.4878 (temperature range increased)
-H	Nickel-based alloy (high temperature)

Temperature package X	
N	Gylon gaskets, No insulation unit
D	Gylon gaskets, Durobest insulation unit
Z	ThermA-Pur gaskets, ZrO_2 insulation unit

Options

In-situ Laser Analyzer	ILA1-B000-EX
ILA HMI DCU10 EX	HMI to operate, configure or perform diagnostics on the ILA1-A000-EX In-situ Laser Analyzer. - LCD display: 128 x 64 pixel - Analog outputs: 4 x 4–20 mA, programmable, active - Analog inputs: 2 x 4–20 mA, programmable, active/passive - Relay outputs: 2 x relay outputs programmable: 60 V AC/60 V DC, max. 120 mA, NO (normally open) - Relay inputs: 2 x relay inputs programmable: min. 16 V DC, max. 60 V DC, NO (normally open) - Digital interfaces: CAN (connection to sensor head)
SU EL10	Supply unit with 24 V DC including: 2 x cable glands (5–14 mm) for connecting laser head and HMI, 5 x cable glands (4–11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU EP10	Supply unit incl. 24 V DC power supply unit with 50 W for supply voltage 100–240 V AC including: 2 x cable glands (5–14 mm) for connecting laser head and HMI, 5 x cable glands (4–11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU EP10 EX	EX supply unit incl. 24 V DC power supply unit with 50 W for supply voltage 100–240 V AC including: 2 x cable glands (5–14 mm) for connecting laser head and HMI, 5 x cable glands (4–11 mm) for power supply, analog signals and status signals; interfaces: RJ45 for Modbus TCP/IP; operating elements: mains switch and maintenance switch; protection class: IP65
SU G10	Supply unit for purge gas including: 1 x purge gas IN (pressure: 3–8 bar) for nitrogen (N_2), 1 x gas path with flow meter to purge measuring section (gas flow: 0–13 Nl/min), 1 x gas path with pressure regulator (0–0.7 bar) for pressurized sensor head enclosure (0.1 bar above ambient pressure), 1 x gas path with pressure regulator (0–6.8 bar) for pressurized buffer zone enclosure (1 bar above process pressure); protection class: IP65
SU G10 EX	EX supply unit for purge gas including: 1 x purge gas IN for nitrogen (pressure: 3–8 bar), 1 x gas path with flow meter to purge measuring section (gas flow: 0–13 Nl/min), 1 x gas path with pressure regulator (0–0.7 bar) for pressurized sensor head enclosure (0.1 bar above ambient pressure), 1 x gas path with pressure regulator (0–6.8 bar) for pressurized buffer zone enclosure (1 bar above process pressure); protection class: IP65
ILA cable, 10 m, 10 x 2 x 0.25 mm	Pre-assembled ILA cable 10 x 2 x 0.25 mm, length: 10 m, for connecting laser head and electrical supply unit
ILA HMI, cable, 10 m, 12 x 2 x 0.25 mm	Pre-assembled ILA cable, 12 x 2 x 0.25 mm, length: 10 m, for connecting HMI and electrical supply unit
EX ILA power supply	ILA power supply TR TSPC050-124 24VDC EX
ILA cellular VPN router RO1520-4L	The cellular router enables remote access to the ILA laser analyzer. A SIM card for operating the router must be provided by the customer
PS KE10-80R EX	EX piezoresistive pressure transmitter, 0–10 bar abs., pressure connection: G 1/2", complete temp. range: -10 to +80 °C [-40 to 1112 °F]
PS KE10-80R	Piezoresistive pressure transmitter, 0–10 bar abs., pressure connection: G 1/2", complete temp.range: -10 to +80 °C [-40 to 1112 °F]
TS JU600-400A EX	EX screw-in resistance thermometer with end-to-end protection tube, -40 to +600 °C, connect.: G 1/2" threaded
TS JU600-400A	Screw-in resistance thermometer with end-to-end protection tube, -40 to +600 °C, connection: G 1/2" threaded
Probe extension	Various lengths up to 500 mm available
In-situ filter	Filter to protect the measuring section against high dust concentrations

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Portable Gas Conditioning Unit
Series PSS®

PSS5C, PSS5C/2 and PSS5C/3

PSS5C

Special Features

- Protection class IP42 according to EN 60529
- Optional measurement of the gas temperature in the outlet of the heat exchanger, 4–20 mA
- Optional control of cooler temperature (inside the cooling block), 4–20 mA
- Equipped with high-performance ECP1000C gas cooler as standard
- Low maintenance
- Gas outlet dew point adjustable from +2 to +15 °C [35.6 to 59 °F]
- Dew point stability < ± 0.1 °C [± 0.18 °F]
- Ready for use in less than 3 minutes
- Compact construction, light weight
- Impact-resistant case with integrated trolley system
- Maximum operational safety
- Jet-Stream heat exchangers in various materials available
- Can be supplied with a wide range of equipment
- Optional shoulder strap

Application

The gas conditioning system PSS5C is suitable for variable discontinuous use as well as for continuous operation.

The PSS5C complies with protection class IP42 as required by the EN 15267-4:2017 standard and includes standard-compliant gas temperature monitoring and a temperature display visible from the outside.

The entire gas conditioning system is housed in a compact and impact-resistant plastic case equipped with an integrated trolley with pull-out handle. This allows fast, low-maintenance and reliable gas analyses to be carried out at various locations with little effort. A robust shoulder strap for mounting on the case is also available as an option.

Description

The PSS5C gas conditioning system is equipped with a high-performance Peltier gas cooler of the new series as standard.

The cooler is equipped with a Jet-Stream heat exchanger, which cools the sample gas constantly to +5 °C [41 °F], independent of the ambient temperature. As soon as the operating temperature < +8 °C [46 °F] is reached after commissioning, the sample gas pump N KPE is automatically switched on by the gas cooler status contact. The peristaltic pump SR 25.2-W ensures continuous condensate removal. This also allows to easily accomplish long-term measurements with the gas conditioning system. The corresponding particle filtration is carried out by the FP-2T ultrafine filter.

For easy handling of the PSS5C, the display and function of the cooler are visible from the outside. The case needs to be opened only for maintenance.

The portable PSS5C gas conditioning system is a complete conditioning system for most gas analysis devices.

The components installed in the PSS5C are intended for "continuous use".

For special measuring tasks, additional or other components from our extensive product range can also be used.

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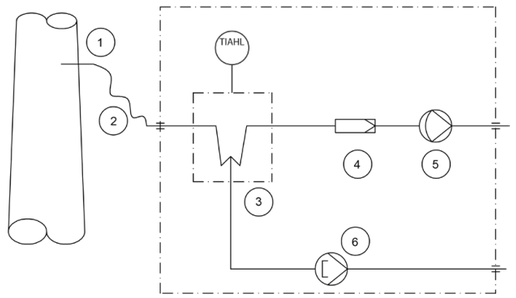
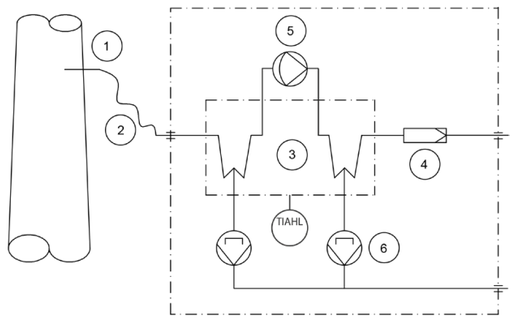
Gas flow diagram PSS5C

1 Gas sample probe
2 Sample line, 3 m PVC hose
3 Peltier gas cooler with temperature alarm (TIAHL)
4 Fine filter FP-2T, filter porosity 2 µm
5 Sample gas pump
6 Peristaltic pump SR25.2-W

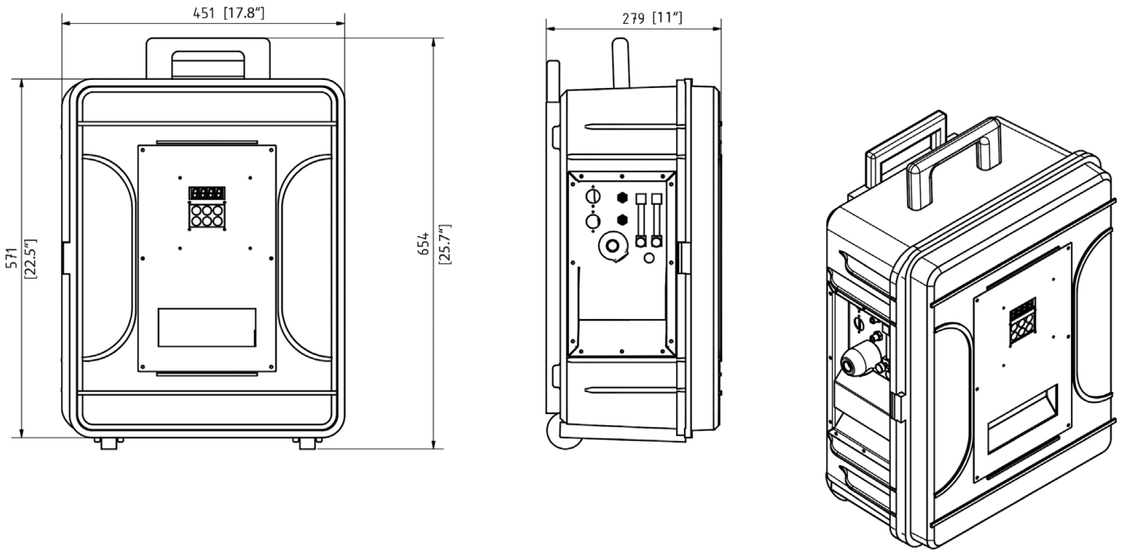


Gas flow diagram PSS5C/2

1 Gas sample probe
2 Sample line, 3 m PVC hose
3 Peltier gas cooler with temperature alarm (TIAHL)
4 Fine filter FP-2T, filter porosity 2 µm
5 Sample gas pump
6 Peristaltic pumps 2 x SR25.2-W



Dimensions



Dimensions in mm [inches]

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Gas Conditioning – Portable Gas Conditioning Unit Series PSS

Technical Data

Gas Conditioning Unit Series PSS®	Version PSS5C	Version PSS5C/2	Version PSS5C/3
Part No.	01G4000(a)**	01G4250	01G4500(a)**
Sample outlet dew point	Range of adjustment: +2 to +15 °C [35 to 59 °F], factory setting: +5 °C [41 °F]		
Dew point stability sample outlet	At constant conditions < ±0.1 °C [±0.18 °F]		
Sample inlet temperature	*Max. 80 °C [176 °F] optional: *max.180 °C [356 °F] with stainless steel bulkhead union		
Sample inlet water vapour saturation	*Max. 80 °C [176 °F]		
Gas flow rate heat exchanger	*Max. 150 Nl/h	*Max. 150 Nl/h per heat exchanger	*Max. 350 Nl/h
Ambient temperature	*+5 to +40 °C [41 to 104 °F]		
Storage temperature	-25 to +65 °C [-13 to 149 °F]		
Pressure	0.7 bar up to 1.4 bar abs.		
Total cooling capacity	*Max. 80 kJ/h		
Number of gas inlets	1		
Number of gas outlets	1, optional: max. 2		
Medium connections	Tube connections 4/6 mm, material: PVDF		
Material of sample contacting parts	SS316Ti, glass, PVDF, PTFE, Novoprene		
Ready for operation	Approx. 3 min.		
Power supply	230 V AC ±10 %, 50/60 Hz or Part No. with (a)**: 115 V AC ±10 %, 60 Hz		
Power consumption	Max. 240 VA; with option temperature controller and heated sample line 230 V: max. 1620 VA, 115 V: max. 920 VA		
Fuse protection	4 A t, 5 x 20 mm, with option temperature controller: 10 A t		
Electrical connection	2 m [≈ 6.6 ft] long cable		
Case protection	IP42 EN 60529		
Housing	Impact-resistant case with integrated trolley system and pull-out handle		
Housing color	Black		
Housing dimensions (W x H x D)	451 x 654 x 279 mm [≈ 17.8" x 25.7" x 11"] with casters and handle		
Electrical equipment standard	EN 61010		
Weight w/o options	Approx. 18.5 kg [≈ 40.8 lbs]	Approx. 19.2 kg [≈ 42.3 lbs]	Approx. 18.9 kg [≈ 41.7 lbs]

* Maximum values in technical data must be rated in consideration of total cooling capacity at 25 °C [77 °F] ambient temperature and 5 °C [41 °F] outlet dew point.
** (a) is an addition to the Part No. for 115 V versions.
PTFE = Polytetrafluoroethylene (Teflon®), PVDF = Polyvinylidenfluoride.
Teflon® is a registered trademark used by DuPont Performance Elastomers, USA. Please note: Nl/h and Nl/min refer to the German standard DIN 1343 and are based on these standard conditions: 0 °C [32 °F], 1013 mbar. Other versions on request.

Option: Shoulder strap for mounting on the PSS5C case

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Options

Options	Type	Part No.
Sample gas pump N5KPE, replacement	Extra charge for replacing the standard N3KPE by the N5KPE	01G9090
Sample gas pump N9KPE, replacement	Extra charge for replacing the standard N3KPE by the N9KPE	01G9095
Flow meter including sample gas outlet, max. 2 pieces	FM40 7–70 Nl/h air FM40 15–150 Nl/h air FM40 25–250 Nl/h air FM40 50–500 Nl/h air	01G9072 01G9077 01G9082 01G9087
Further sample gas outlet w/o flow meter	Parallel sample gas outlet, tubing via T-piece on lateral PVDF bulkhead fitting, DN 4/6, max. 1 piece	01G9065
Sample tube	Sample tube out of Kanthal® ø 6 mm, length: 1 m, sampling temperature: max. 1300 °C [2372 °F]	01G9030
3-way ball valve	3L/PV-1 for switching over from test gas to sample gas in the inlet of the sample gas conditioning unit, mounted with mounting brackets, fitting PVDF	01G9046
5-way ball valve	5L/PV-1 for switching over from test gas to sample gas in the inlet of the sample gas conditioning unit, mounted with mounting brackets, fitting PVDF	01G9045
Needle valve	Needle valve in the bypass of the sample gas pump type N3/N5/N9 for pressureless control, with PVDF screw connections, angle bracket and assembly	01G9050
Electronic temperature controller for max. 12 m [≈ 39.4 ft] (230 V) or max. 6 m [≈ 19.7 ft] (115 V) heated sample line 100 W/m for PT100	701 control range: 0 to 200 °C [32 to 392 °F], input PT100, power: 230 V 50/60 Hz (Part No. 01G9055) or 115 V 50/60 Hz (Part No. 01G9055a), contact capacity: 250 V AC max. 10 A, completely mounted incl. 7-pin plug 10 A	01G9055(a)
Electronic temperature controller for max. 12 m [≈ 39.4 ft] (230 V) or max. 6 m [≈ 19.7 ft] (115 V) heated sample line 100 W/m for thermocouple Ni-CrNi	701 control range: 0 to 200 °C [32 to 392 °F], input thermocouple Ni-CrNi, power: 230 V 50/60 Hz (Part No. 01B8245) or 115 V 50/60 Hz (Part No. 01B8245a), contact capacity: 250 V AC max. 10 A, completely mounted incl. 7-pin plug 10 A	01B8245(a)
Connecting adapter DN 4/6 for heated sample line	PSS5C connecting adapter with anti-kink protection for rigid mounting of heated sample line with replaceable PTFE tube DN 4/6, consisting of special Swagelok fitting with 4 mm cartridge, material: SS316Ti	01G9060
Connecting adapter DN 6/8 for heated sample line	PSS5C connecting adapter with anti-kink protection for rigid mounting of heated sample line with replaceable PTFE tube DN 6/8, consisting of special Swagelok fitting with 6 mm support sleeve, material: SS316Ti	01G9061
Analog output	Analog output of the sample gas cooler temperature at the PSS5C case with connection socket, mA output for PSS5C 0/4 to 20 mA, galvanically isolated, load: 500 Ohm	01G9010
mA output	Thermocouple type K for temperature measurement in the heat exchanger with 4–20 mA output for -10 to 50 °C [14 to 122 °F], load 180 Ohm	01K9250
Liquid alarm detection	Liquid alarm detection inside the PSS5C case incl. switch-off function for the sample gas pump, liquid alarm sensor type LA1S, for conductive media, completely wired, evaluation via front display	01G9015
Sample gas inlet made of stainless steel	Extra charge for gas conditioning unit series PSS® with stainless steel fittings in the sample gas inlet for 6 mm tube, material: SS316Ti	C40002
Built-in aerosol filter CLF-5	Extra charge for gas conditioning unit series PSS® with built-in aerosol filter CLF-5, fittings and mounting included	C40003
Sample gas outlet made of stainless steel	Extra charge for gas conditioning unit series PSS® with stainless steel fittings in the sample gas outlet for 6 mm tube, material: SS316Ti	C40005
Shoulder strap for mounting on the PSS5C case	Padded and adjustable shoulder strap made of robust polyester material for mounting on the PSS5C case.	90G0270

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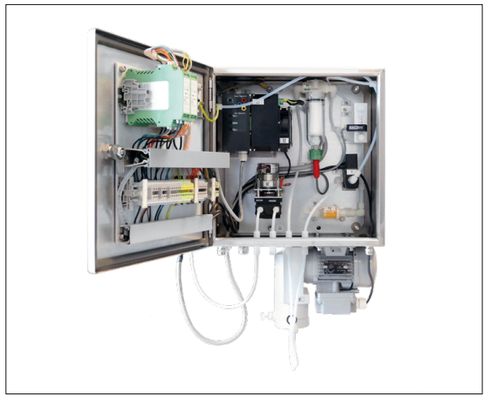
Gas Conditioning Unit
Series SS-M05

Version SS-M05 Marine for Marine Application



SS-M05 Marine

Special Features

- Type examination approval according to DNVGL-CG-0339
- Stainless steel Jet-Stream heat exchanger
- Ambient temperature up to +45 °C (113 °F)
- Outlet dew point adjustable from +2 °C (35.6 °F) to +15 °C (59 °F)
- Dew point stability < ± 0.1 °C (± 0.18 °F)
- Status alarm contact
- Compact design
- Self-controlling
- Possibility of test gas feeding through a solenoid valve

Application

The SS-M05 Marine gas conditioning system is suitable for variable discontinuous use as well as for continuous operations in the maritime sector.

The components used in the SS-M05 Marine gas conditioning system have been specially designed and tested for marine applications.

Description

All components of the gas conditioning system are either housed in a compact stainless steel housing or attached to it. The sample gas line is connected directly to the heat exchanger of the sample gas cooler.

The sample gas cooler cools the sample gas down to 5 °C (41 °F).

The heat exchanger is placed inside a heat-insulated cooling block.

The cooling block is cooled to a constant temperature of +5 °C (41 °F) by an electronically controlled (analog technology) Peltier element. A PT100 sensor is used to measure the temperature.

The thermal energy generated by the cooling system is dissipated via a fan-cooled heat sink.

The cooler is equipped with a temperature alarm contact that switches off the sample gas pump in case of a temperature deviation of ±3 °C (±5.4 °F) from the factory set point (+ 5 °C (41 °F)).

The peristaltic pump removes the accumulated condensate.

Downstream the cooler, there is a microfilter with a 0.1 µ filter element and integrated liquid alarm sensor LA. In case of liquid leaking, the liquid alarm sensor also switches off the sample gas pump automatically.

A PTFE bellows pump is mounted onto the outside of the housing. This pump draws the sample gas from the sampling point via the sample probe SP180H/MA. The sample probe is sold separately. The gas is drawn through the heated sample gas line (optional) into the cooler and further through the micro-filter.

In the outlet of the sample gas pump a flow meter FM40 with flow monitoring FA1bi is integrated. The flow rate controller FA1bi reports the failure of the sample gas flow. The now filtered and dried sample gas is passed on to the analyzers.

To calibrate the system, there is a switchover for test gas feeding through a solenoid valve. The switchover is implemented in the system.

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Technical Data

Gas Conditioning System Series SS®	SS-M05 Marine			
Part-No.:	03 G 6000			
DNV Type Examination Certificate	TAA000018R			
Location classes	Temperature Humidity Vibration	A B A	EMC Enclosure	A B
Sample outlet dew point	Range of adjustment: +2 °C up to +15 °C (35.6 °F up to 59 °F) , factory setting: +5 °C (41 °F)			
Sample outlet dew point stability	< ±0,1 °C (±0,18 °F) at constant conditions			
Sample inlet temperature**	Max. 70 °C (158 °F)			
Sample inlet water vapour saturation**	Max. 70 °C (158 °F)			
Gas flow rate/heat exchanger**	Max. 100 l/h			
Number of heat exchangers	1			
heat exchanger material	Stainless steel 316Ti			
Ambient temperature**	+5 up to +45 °C (41 °F up to 113 °F)			
Storage temperature	-20 up to +60 °C (--4 °F up to 140 °F)			
Pressure	Max. 1 bar overpressure			
Total cooling power at 25 °C ambient temperature	80 KJ/h			
Sample gas connection Inlet	Tubing 6 mm Ø*			
Sample gas connection Outlet	Tube connections 4/6 mm			
Condensate connection	Tube connections 4/6 mm			
Condensate removal	Peristaltic pump SR25.2			
Sample gas pump	MP-F 05			
Ready for operation	10 min			
Power consumption	250 VA (up to 1600 VA for sample gas line)			
Power supply	230 V ±10%, 50 Hz or 115 V ±10%, 60 Hz			
Electrical connections	Clamps 2.5 mm², cable glands 2 x M20			
Status alarm: gas flow rate	1 change-over contact			
Switching power: status alarm	250 V, 2 A, 500 VA, 50 W			
Case protection	IP54, EN 60529			
Electrical equipment standard	EN 61010			
Housing color	RAL 9005			
Type of installation	Wall-mount			
Dimensions (W x H x D)	600 x 780 x 600 mm (23.62" x 30.71" x 23.62") with opened door			
Weight	Approx. 30 kg (approx. 66.14 lbs)			

* Standard, others on request.

** Maximum values in technical data must be rated in consideration of total cooling capacity at 25 °C (77 °F) ambient temperature and an outlet dew point of 5 °C (41 °F).

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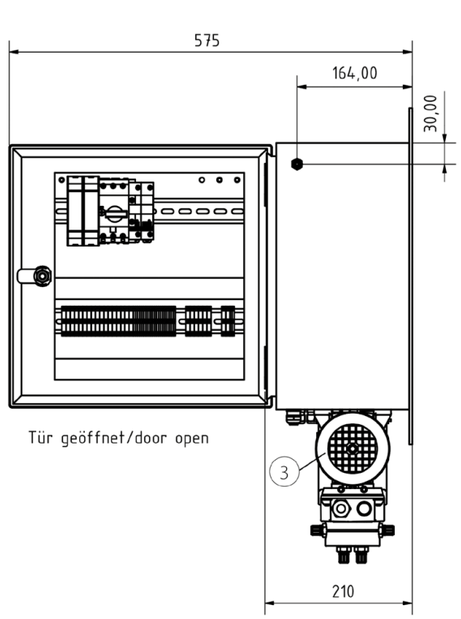
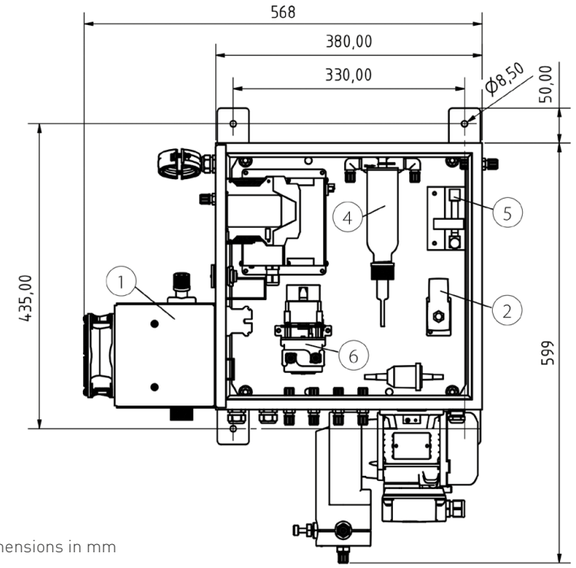
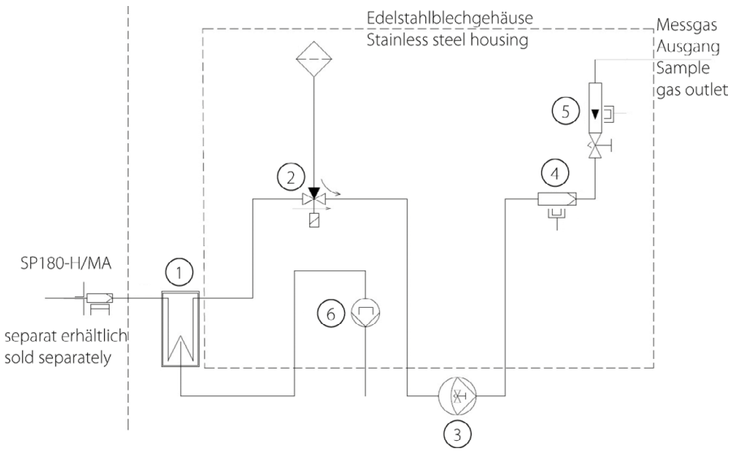
Dimensions





Dimensions in mm

SS-M05 Marine design



1 Gas cooler
2 Solenoid valve for test gas feeding
3 Sample gas pump MP-F 05
4 Filter FP-0.1 GF-D filter porosity 2 µ with integrated liquid alarm sensor LA
5 Flow meter FM40 with flow monitoring FA1bi
6 Peristaltic pump SR25.2 for continuous automatic condensate drainage

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