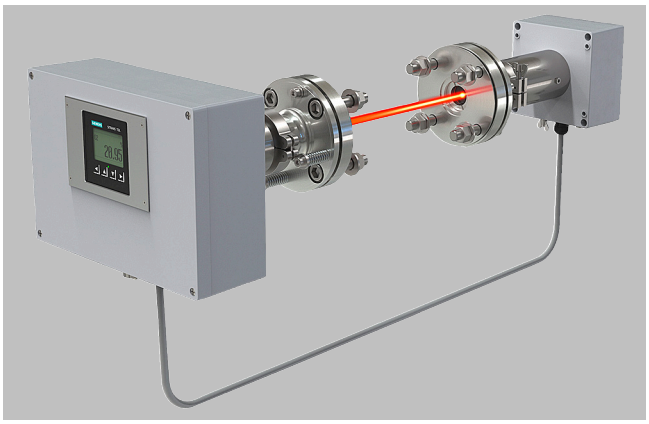
Overview



The in-situ gas analyzer SITRANS TDL consists of a pair of cross-duct sensor units which are directly installed at the measuring point in the plant. The operating principle of the SITRANS TDL is based on TDLS (Tunable Diode Laser Spectroscopy). This makes the SITRANS TDL the ideal solution for fast and non-contact measurement of gas concentrations. The analyzer can be intuitively monitored and controlled locally via its human machine interface (HMI). In addition, the integrated Ethernet interface allows complete configuration with the help of a standard web browser. A large variety of communications interfaces enables the seamless integration into digital control systems.

The SITRANS TDL gas analyzer can be used to measure the concentration of a wide range of gases, e.g. CO, CO_2, CH_4, H_2, HCHO, HCN, HCl, HF, H_2O, H_2S, NH_3, NO, NO_2, O_2, SO_2, SO_3.

Standardized device variants enable simplified selection and ordering for typical applications. In addition, customer-specific device variants are possible.

Application

Applications

- Control of combustion processes

The measurement of the oxygen concentration is possible as standard at temperatures up to 1100 °C. Higher temperatures are possible on request. Even oxygen-containing purging gases can be used.

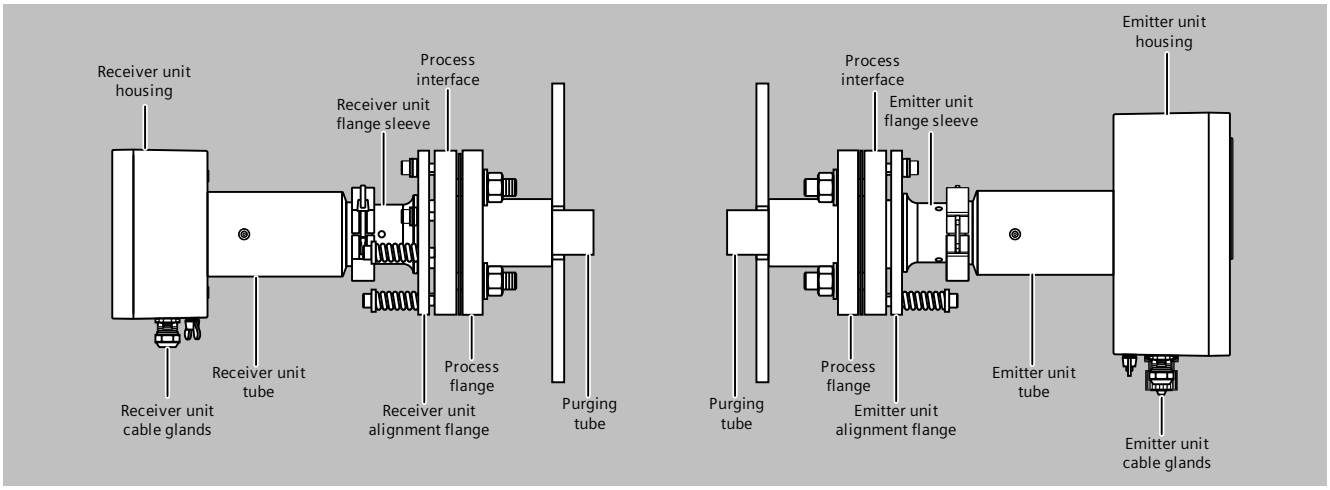
- Process optimization
- Plant security and safety at the workplace
- Process measurements in all types of power and combustion plants
- Process control
- Explosion protection
- Measurements in corrosive and toxic gases
- Quality control

Sectors

- Chemical and petrochemical plants
- Power plants
- Waste incinerators
- Steel industry
- Semiconductor industry

Design

The complete analyzer is integrated into two cross-duct sensor units which are installed on opposite sides of the customer process: The emitter unit enclosure contains a laser diode whose light is transmitted through the measurement path to the detector unit. There it can be detected using a photodetector. The detector unit enclosure is connected to the emitter unit by means of a sensor cable. The emitter unit enclosure contains a human machine interface (HMI) with an LC display and pushbuttons. In addition to the HMI (HMI), the SITRANS TDL can be monitored and configured via an Ethernet connection and a standard web browser.



Emitter and detector unit enclosures

- Powder-coated aluminum; stainless steel
- Degree of protection: IP66
- Adjustable process connection plates
- Supported flange sizes (provided by customer): DN50/PN16, DN65/PN6, ANSI 2"/150 lbs
- Purging gas connections (see "Purging")

Display and operating interfaces

HMI in emitter unit enclosure:

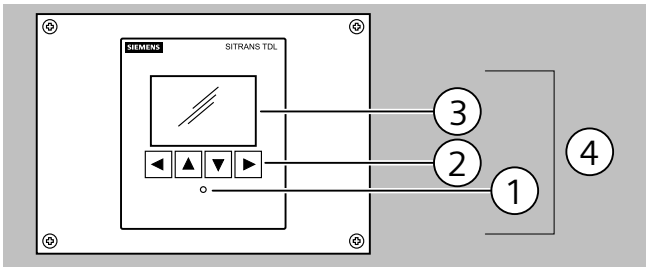
- Display for simultaneous output of measurement result and device status
- LED backlighting of display
- Menu-driven operation for parameterization and diagnostics

Web interface:

- Monitoring of parameters
- Complete configuration of the analyzer
- Available via Ethernet connection
- Access to device via standard web browser, no proprietary software required

SIMATIC PDM:

- Access to maintenance and servicing information

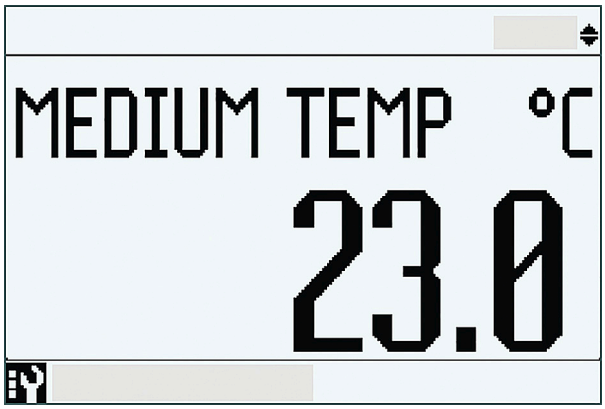


SITRANS TDL, display and operating interfaces

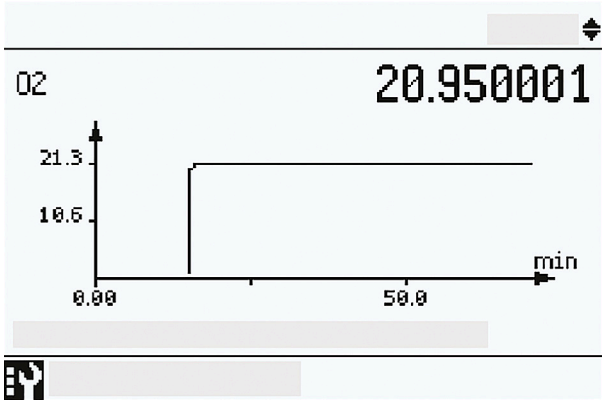
1	LED light
2	Local buttons
3	Graphical display
4	Local operation (HMI)

Design (continued)

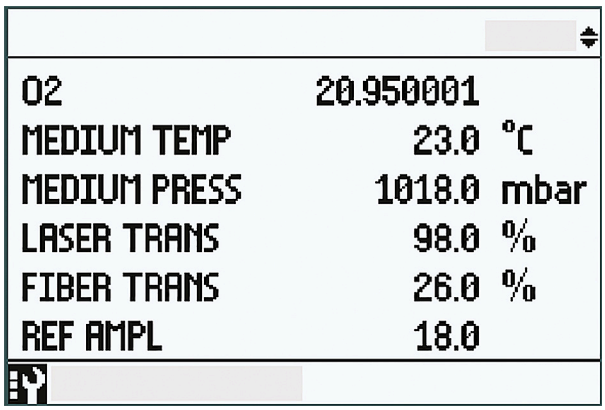
Available views on HMI



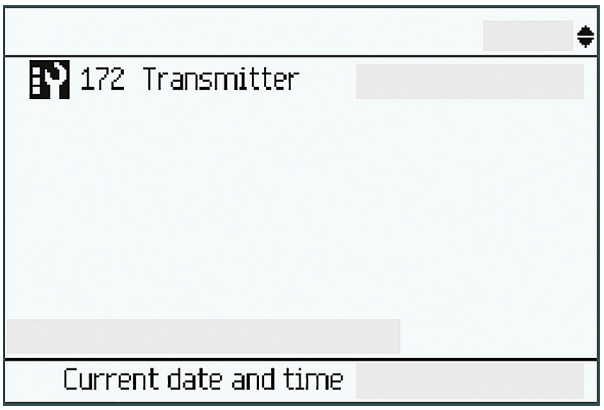
View on HMI of the SITRANS TDL (1 value)



View on HMI of the SITRANS TDL (1 value and diagram)



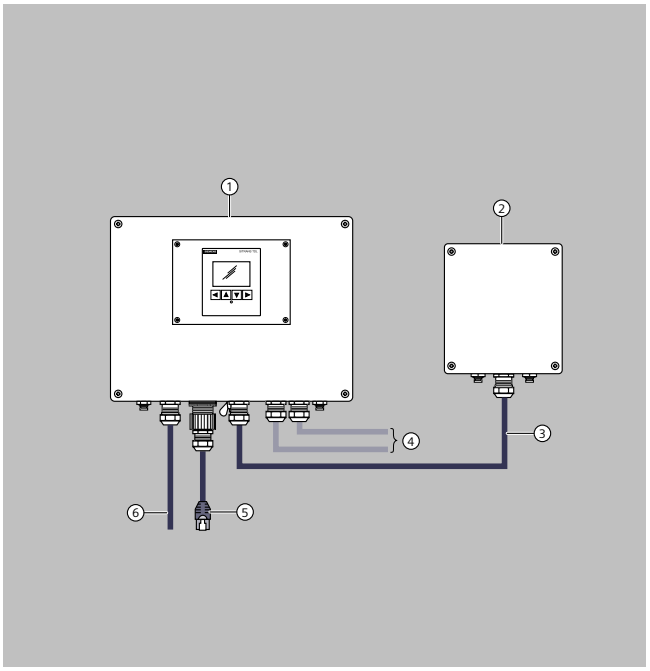
View on HMI of the SITRANS TDL (6 values)



View on HMI of the SITRANS TDL (alarm view)

Connection cables

The sensor cable connects the enclosures of the emitter and detector unit. It is offered in standard lengths of 5, 10, 25 or 50 m and in custom lengths. Further terminal and connection cables are available as accessories. This includes cables for power supply, permanent Ethernet connection and industrial communications interfaces.



SITRANS TDL, connection cables

1	Emitter unit with transmitter
2	Detector unit
3	Sensor cable
4	Cables for industrial protocols provided by customer
5	Ethernet cable
6	Customer cable

Inputs/outputs

Standard interfaces:

Design (continued)

- 4 configurable analog inputs (4 to 20 mA, active and passive mode)
- 4 configurable analog outputs (4 to 20 mA, active and passive mode, isolated)
- 4 configurable digital outputs (isolated)
- 1 Ethernet interface

Optional interfaces:

- Modbus RTU interface
- Modbus TCP interface
- Profibus DP interface

Function

Operating principle

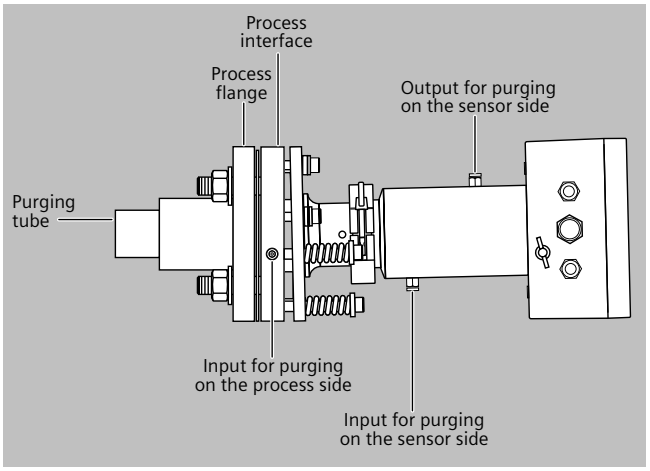
The operating principle of the SITRANS TDL is based on tunable diode laser spectroscopy (TDLS). The wavelength of the laser light is selected such that it matches a specific absorption line of the gas species of interest. This absorption line is scanned by the SITRANS TDL with very high spectral resolution. The degree of absorption and the line shape are used for the determination of the gas concentration. The gas concentration determination takes the measurement path length between both cross-duct sensors into account which is typically measured once during installation of the analyzer.

Lifetime calibration

It is key to ensure a reliable analyzer performance over long periods, even under changing ambient conditions. Therefore, the SITRANS TDL measures a comparison gas spectrum in addition to the gas species of interest and automatically stabilizes its laser wavelength. Additionally, internal self-calibration procedures continuously monitor the analyzer performance. Thanks to these measures, the SITRANS TDL is designed to be lifetime calibrated. Nevertheless, we recommend a validation of the analyzer every 2 years with the optional offline validation sets.

Purging

The easiest way to avoid condensation and dust deposits on the sensor windows or excessively high thermal stress of the analyzer components is to purge the SITRANS TDL with a purging gas. Purging gas types and purging modes must be selected depending on the measurement application. For selected oxygen measuring applications, even purging with oxygen-containing purging gases is possible. The application reference table provides recommendations for suitable purging gases and lists the achievable detection limits. The cross-duct sensors can therefore be configured for the respective situation. Different connector types are available for the purging gas connectors: Clamping ring connections (6 mm and ¼"), plug-in connectors (6 mm and ¼") and ¾" connector for process purging with air blowers.



Purging on the process side

For purging on the process side, the purging gas flow must be adjusted between 5 and approx. 50 l/min at each sensor head using a needle valve (not included). The purging gas is injected into the process interface and enters the process via the purging tube (optional).

Purging on sensor side

On both sensor enclosures, dedicated inlet and outlet ports are available for the sensor purging gas. The sensor purging gas flow must be adjusted between 0.2 and 7 l/min. Particularly when (re)starting the SITRANS TDL, a sufficiently high flow of sensor purging gas must be provided for several minutes to ensure that residues of oxygen are removed (not required in case of air purging). The flow of sensor purging gas can subsequently be set to a lower value using a needle valve.

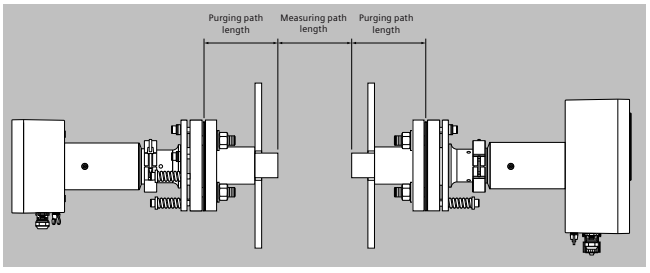
Note

No process gas may flow back into the purging gas line!

With purging on the process side, it may be necessary to use non-return valves to ensure no process gas can enter the purging gas line in the event of failure of the purging gas supply. This applies especially in the case of cascaded sensor and process purging where there is otherwise a danger that corrosive process gases could enter the sensor enclosure. In case of the installation of the SITRANS TDL in hazardous areas, the process purging must be implemented in compliance with the safety concept of the plant.

Purging tubes

The purging gas used on the process side flows through purging tubes into the process gas stream. The pipes extend into the process area by a few centimeters, usually perpendicular to the process gas stream. This means that an exactly defined optical path length is defined through the sample gas. The effective measuring path in the process gas is therefore defined as the distance between the ends of the two purging tubes. Purging tubes are offered in two lengths (400 mm and 800 mm) and two materials (1.4404/316L stainless steel and 2.4602/Hastelloy® C-22).



Influences on the measurement

Temperature

The influence of the process gas temperature on the absorption line is compensated by the SITRANS TDL. A temperature signal can be fed into the device from an external temperature sensor or the

Function (continued)

DCS of the plant. The SITRANS TDL supports Pt100 and Pt1000 temperature sensors natively and accepts signals via 4-20 mA analog input and via digital communication protocols (optional). The temperature signal is then used for mathematical correction of the influence of the temperature on the absorption signal. If the process gas temperature remains constant, a static correction can be carried out as an alternative, although in most cases the use of an external temperature signal is recommended.

Pressure

In addition to the temperature signal, an external pressure signal can be fed to the device to provide complete mathematical compensation for the pressure influence including the density effect. An external pressure signal is recommended in most cases.

Effective optical path length

As a result of Beer-Lambert's law, the absorption of laser light depends on the optical path length within the sample gas. Therefore, the precision of the effective optical path length measurement can influence the precision of the total measurement. Since the sensor optics on the process side are normally purged to keep them clean for a longer period, the expansion of the mixed zone between the purging medium and the process gas as well as the latter's concentration distribution must be considered. In a typical in-situ installation with an optical path length of several meters, the influence of the purging gas on the effective path length can be ignored. The maximum possible path length and dust load mutually affect each other: the higher the dust load in the process, the shorter the max. possible path length.

Dust load

As long as the laser beam is able to generate a suitable detector signal, the dust load in the process gas does not influence the analytical result. By applying a dynamic background compensation, measurements can be carried out without any negative effects even when the dust load fluctuates. The influence of a high dust load is complex, and depends on the optical path length and particle size. The optical damping increases exponentially at longer path lengths. Smaller particles also have a very large influence on the optical damping. With high dust load, long path length and small particle size, the technical support at Siemens should be consulted.

Adjustment of the sensor enclosures

Both emitter and receiver housings must be aligned such that the laser beam generated by the emitter unit reaches the detector in the detector unit. The alignment flanges of the process interfaces allow both sensor units to be tilted in horizontal and vertical direction. The alignment of both sensor units can be checked by monitoring the transmission parameters on the local HMI and on the website. A dedicated alignment kit is available as accessory part to simplify the alignment procedure.

Configuration

A feature of the in-situ analytical procedure is that the physical measurement takes place directly in the process gas stream and directly in the actual process gas line. All process parameters such as gas matrix, pressure, temperature, moisture, dust load, flow velocity and mounting orientation can influence the measuring properties of the SITRANS TDL and must therefore be investigated for each new application.

The listed TDL standard applications are distinguished in that the typical process conditions are adequately well-known and documented. If you cannot find your application among the standard applications, please contact Siemens. We will be pleased to check your possible individual application of the SITRANS TDL. You can find an application questionnaire on the SITRANS TDL product page on the internet:

http://www.siemens.com/insituquestionnaire

Measurement conditions for standard applications

The following table lists the measuring conditions for standard applications. The listed values for the measuring range and detection limit (DL) are only approximate values. The exact values at the respective measuring point depend on the totality of all influencing parameters and can be determined by Siemens for the specific case. Note that the values for the detection limit and the maximum measuring range are based on a path length of 1 m. Longer path lengths will improve the detection limit, but typically not linearly. This is due to potentially restrictive effects such as dust load. The maximum applicable measuring ranges can only be used if permitted by the process conditions (e.g. dust load).

Standard application				Process gas temperature T_{min} ... T_{max}	Process gas pressure p_{min} ... p_{max}	Path length L_{min} ... L_{max}	Max. measuring range	Detection limit x path length	Max. measuring range	Detection limit x path length
Gas 1	Gas 2	Gas code	App. code				Gas 1	Gas 1	Gas 2	Gas 2
O2		A	A	0 ... 200 °C	700 ... 2000 mbar abs.	0 ... 25 m	0 ... 25%	100 ppmv·m [1)]		
O2		B	B	500 ... 1100 °C	700 ... 1500 mbar abs.	0 ... 30 m	0 ... 25%	700 ppmv·m for N2 purging at 800 °C, 5000 ppmv·m for instrument air purging at 800 °C		
O2		B	C	500 ... 1100 °C	950 ... 1050 mbar abs.	0 ... 30 m	0 ... 100%	450 ppmv m with instrument air or N2 purging at 800 °C		
NH3		C	A	0 ... 150 °C	800 ... 1200 mbar abs.	0 ... 25 m	0 ... 500 ppm	0.2 ppmv·m [1)]		
NH3	H2O	D	A	0 ... 450 °C	800 ... 1200 mbar abs.	0 ... 25 m	0 ... 100 ppm	0.2 ppmv·m [1)]	0 ... 40%	100 ppmv·m [1)]
CO		J	A	0 ... 400 °C	700 ... 1500 mbar abs.	0 ... 30 m	0 ... 000 ppm	0.2 ppmv·m [1)]		

Function (continued)

Standard application				Process gas temperature T_{min} ... T_{max}	Process gas pressure p_{min} ... p_{max}	Path length L_{min} ... L_{max}	Max. measuring range	Detection limit x path length	Max. measuring range	Detection limit x path length
Gas 1	Gas 2	Gas code	App. code				Gas 1	Gas 1	Gas 2	Gas 2
CO		K	A	0 ... 1100 °C	700 ... 1500 mbar abs.	0 ... 30 m	0 ... 1000 ppm	1 ppmv·m [1]		
CO		K	B	0 ... 1100 °C	700 ... 1500 mbar abs.	0 ... 10 m	0 ... 5000 ppm	1 ppmv·m [1]		
CO	CH4	K	C	0 ... 1100 °C	800 ... 1200 mbar abs.	0 ... 30 m	0 ... 1000 ppm	1 ppmv·m [1]	0 ... 1000 ppm	2 ppmv·m [1]
CO	CH4	K	D	500 ... 1100 °C	800 ... 1200 mbar abs.	0 ... 10 m	0 ... 1%	10 ppmv m with instrument air or N2 purging at 800 °C		10 ppmv m with instrument air or N2 purging at 800 °C

1) All technical specifications apply to an optical path distance of 1 m in a nitrogen atmosphere under standard conditions 25 °C and 1013 hPa. The effective detection limit, the measuring range and the accuracy can be influenced by process parameters such as pressure, temperature and gas composition. Not all combinations of maximum pressure and temperature can be realized with the minimum measuring ranges. If the process conditions deviate from the specifications of the standard applications, special applications are also possible on request. Please complete the application questionnaire which can be found on the internet at http://www.siemens.com/insituquestionnaire.

Selection and ordering data

SITRANS TDL	Article No. 7MB6431-	●	●	●	●	●	-	●	●	●	●
Click on the Article No. for online configuration in the PIA Life Cycle Portal. **Unavailable combinations are shown in PIA Life Cycle Portal as "not permitted".**											
Type of Ex protection											
Without Ex protection / for use in non-hazardous areas only		0									
For use in hazardous areas in accordance with ATEX II 1/2G Ex op is pxb IIC T6 Ga/Gb and II 1/2D Ex op is pxb IIIC T85°C Da/Db. Requires purging unit **A5E54213449**		1									
For use within hazardous areas in accordance with IECEx Ex op is pzc IIC T6 Gc and Ex op is pzc IIIC T85°C Dc. Requires purging unit **A5E54213481**		2									
App. code											
Oxygen (O_2); 0 ... 200 °C; 700 ... 2000 mbar abs.; 0 ... 25%; 0 ... 25 meters			A	A							
Oxygen (O_2): customer-specific application			A	Y							
Oxygen (O_2); 500 ... 1100 °C; 700 ... 1500 hPa abs.; 0 ... 25%, 0 ... 30 m, 700 ppm*m at 800 °C with nitrogen purging/5000 ppm*m at 800 °C with air purging			B	B							
Oxygen (O_2); 500 ... 1100 °C; 950 ... 1050 mPa abs.; 0 ... 100%, 0 ... 30 m, 450 ppm*m, with air or nitrogen purging at 800 °C			B	C							
Oxygen (high temperature) (O_2): customer-specific application			B	Y							
Ammonia (NH_3): 0 ... 150 °C; 800 ... 1200 mbar abs.; 0 ... 500 ppm; 0 ... 25 m			C	A							
Ammonia (NH_3): customer-specific application			C	Y							
Ammonia and water (NH_3, H_2O): 0 ... 450 °C; 800 ... 1200 mbar abs.; 0 ... 25 m • NH_3: 0 ... 100 ppm • H_2O: 0 ... 40%			D	A							
Ammonia and water (NH_3, H_2O): customer-specific application			D	Y							
Hydrogen chloride (HCl); customized request			E	Y							
Hydrogen chloride (HCl): customer-specific application			F	Y							
Hydrogen (H_2): customer-specific application			H	Y							
Carbon monoxide (CO): 0 ... 400 °C; 700 ... 1500 mbar abs.; 0 ... 1000 ppm; 0 ... 30 m			J	A							
Carbon monoxide (CO): customer-specific application			J	Y							
Carbon monoxide (CO): 0 ... 1100 °C; 700 ... 1500 mbar abs.; 0 ... 1000 ppm; 0 ... 30 m			K	A							
Carbon monoxide (CO): 0 ... 1100 °C; 700 ... 1500 mbar abs.; 0 ... 5000 ppm; 0 ... 10 m			K	B							
Carbon monoxide and methane (CO, CH_4): 0 ... 1100 °C; 800 ... 1200 mbar abs.; 0 ... 30 m • CO: 0 ... 1000 ppm • CH_4: 0 ... 1000 ppm			K	C							
Carbon monoxide and methane (CO, CH_4): 500 ... 1100°C; 800 ... 1200 mbar abs.; 0 ... 10 meters • CO: 0 ... 1000 ppm • CH_4: 0 ... 1000 ppm			K	D							
Carbon monoxide and methane (CO, CH_4): customer-specific application			K	Y							
Carbon dioxide (O_2): customer-specific application			L	Y							
Water ($_2O$): customer-specific application			M	Y							
Trace moisture (H_2O): customer-specific application			N	Y							
Hydrogen fluoride (HF): customer-specific application			P	Y							
Hydrogen fluoride and water (HF, H_2O): customer-specific application			Q	Y							
Customer-specific measured components			Y	Y							
Purging tube (clamp-on such as SITRANS SL)											
without purging tube					0						
400 mm made of stainless steel (1.4404/316L)					1						
800 mm made of stainless steel (1.4404/316L)					2						
400 mm made of Hastelloy (2.4602/Hastelloy C22)					3						
800 mm made of Hastelloy (2.4602/Hastelloy C22)					4						
Customized request					9						
Process connection											
Without process connection (just for retrofitting)						0					
DN 50/PN 16 (1.4404/316L), with window, MAWP (PS) at 20 °C: 1.6 Mpa; 3°, with graphite gasket						2					
DN 65/PN6 (1.4404/316L), incl. window module, no hermetic sealing, with graphite gasket, easy to clean, max. purge pressure 5 bar						4					
ANSI 2"/150 lbs (1.4404/316L), with window, MAWP (PS) at 20 °C: 150 lbs, with graphite gasket						5					
Customized request						9					

Selection and ordering data (continued)

SITRANS TDL		Article No. 7MB6431-	●	●	●	●	●	-	●	●	●	●
Purging mode: Process purging	**Purging mode: Sensor purging**											
Without purging mode with blanking plug / Purging retrofittable	Without purging mode with blanking plug / Purging retrofittable								0			
Clamping ring connection 6 mm Swagelok adapter (stainless steel 316) for instrument air or nitrogen, 5 ... 50 l/min	Clamping ring connection 6 mm Swagelok adapter (stainless steel 316) for instrument air or nitrogen, 0.2 ... 7 l/min								1			
Clamping ring connection ¼" Swagelok adapter (stainless steel 316) for instrument air or nitrogen, 5 ... 50 l/min	Clamping ring connection ¼" Swagelok adapter (stainless steel 316) for instrument air or nitrogen, 0.2 ... 7 l/min								2			
Plug-in connection for 6 mm pipe (stainless steel 316 / PTFE) for instrument air or nitrogen, 5 ... 50 l/min	Plug-in connection for 6 mm pipe (stainless steel 316 / PTFE) for instrument air or nitrogen, 0.2 ... 7 l/min								3			
Plug-in connection for ¼" pipe (stainless steel 316 / PTFE) for instrument air or nitrogen, 5 ... 50 l/min	Plug-in connection for ¼" pipe (stainless steel 316 / PTFE) for instrument air or nitrogen, 0.2 ... 7 l/min								4			
¾" connection for blower	Without purging mode with blanking plug / Purging retrofittable								5			
¾" connection for blower	Clamping ring connection 6 mm Swagelok adapter (stainless steel 316) for instrument air or nitrogen, 0.2 ... 7 l/min								6			
¾" connection for blower	Clamping ring connection ¼" Swagelok adapter (stainless steel 316) for instrument air or nitrogen, 0.2 ... 7 l/min								7			
Customized request									9			
Communication												
4 × AO (4 ... 20 mA – active/passive), 4 × AI (4 ... 20 mA – active/passive), 4 × DO										A		
4 × AO (4 ... 20 mA – active/passive), 4 × AI (4 ... 20 mA – active/passive), 4 × DO and Modbus RTU										B		
4 × AO (4 ... 20 mA – active/passive), 4 × AI (4 ... 20 mA – active/passive), 4 × DO and Modbus TCP										C		
4 × AO (4 ... 20 mA – active/passive), 4 × AI (4 ... 20 mA – active/passive), 4 × DO and Profibus DP										E		
4 × AO (4 ... 20 mA – active/passive), 4 × AI (4 ... 20 mA – active/passive), 4 × DO and Modbus RTU as well as Modbus TCP										F		
4 × AO (4 ... 20 mA – active/passive), 4 × AI (4 ... 20 mA – active/passive), 4 × DO and Modbus RTU as well as Profibus DP										H		
Customized request										Z		
Sensor cable length												
5 m											A	
10 m											B	
25 m											C	
50 m											D	
Customized request											Z	
Cable glands												
Nickel-plated												1
Stainless steel												2
Customized request												9

Options	Order code
Add "-**Z**" to Article No. and then add order code.	
Settings	
Inspection certificate 3.1 (EN 10204) – Material certificate of pressure-containing and wetted parts	**C12**
Inspection certificate 3.1 (EN 10204) – Leak test certificate of pressure-containing and wetted parts	**C15**
Customized measured component; please clarify with Technical Support and specify in plain text	**Y01**
Customized measuring range; please clarify with Technical Support and specify in plain text	**Y02**
Gas matrix; please clarify with Technical Support and specify in plain text	**Y03**
Temperature range; please clarify with Technical Support and specify in plain text	**Y04**
Pressure range; please clarify with Technical Support and specify in plain text	**Y05**

Options	Order code
Tag plate, customized description; please clarify with Technical Support and specify in plain text	**Y15**
Application number: Special calibration; please clarify with Technical Support and specify in plain text	**Y99**
Purging tube: special design; please clarify with Technical Support and specify in plain text	**L1Y**
Process connection: special design; please clarify with Technical Support and specify in plain text	**M1Y**
Purging mode: special design; please clarify with Technical Support and specify in plain text	**N1Y**
Communication: special request; please clarify with Technical Support and specify in plain text	**P1Y**
Sensor cable length: special design; please clarify with Technical Support and specify in plain text	**Q1Y**
Cable gland: special design; please clarify with Technical Support and specify in plain text	**R1Y**
Price level 1	**R01**
Price level 4	**R04**
Price level 5	**R05**
Price level 6	**R06**

Selection and ordering data (continued)

Options	Order code
Price level 7	**R07**
Price level 8	**R08**
Price level 9	**R09**
Price level 10	**R10**
Price level 11	**R11**

Accessories	Article No.
Sensor alignment kit	**A5E52636429**
Calibration verification for O_2 (static gas cell, incl. short sensor cable)	**A5E52636430**
Customer cable (voltage, AI, AO, DO), 5 m	**A5E52639213**

Accessories	Article No.
Customer cable (voltage, AI, AO, DO), 10 m	**A5E52639220**
Customer cable (voltage, AI, AO, DO), 25 m	**A5E52639229**
Customer cable (voltage, AI, AO, DO), x-m	**A5E52639235**
Ethernet cable and IP66 plug for web server access, 10 meters, with nickel-plated brass cable glands	**A5E52639239**
Process flange alignment kit (requires sensor alignment kit for flange alignment)	**A5E52639245**
Extra long flange adapter (350 mm)	**A5E52639248**
Blower for process purging 115 V / 60 Hz	**A5E52659858**
Blower for process purging 230 V / 50 Hz	**A5E52659869**
Purging unit ATEX Zones 1, 2, 21 and 22	**A5E54213449**
Purging unit for EX Zone 2	**A5E54213481**

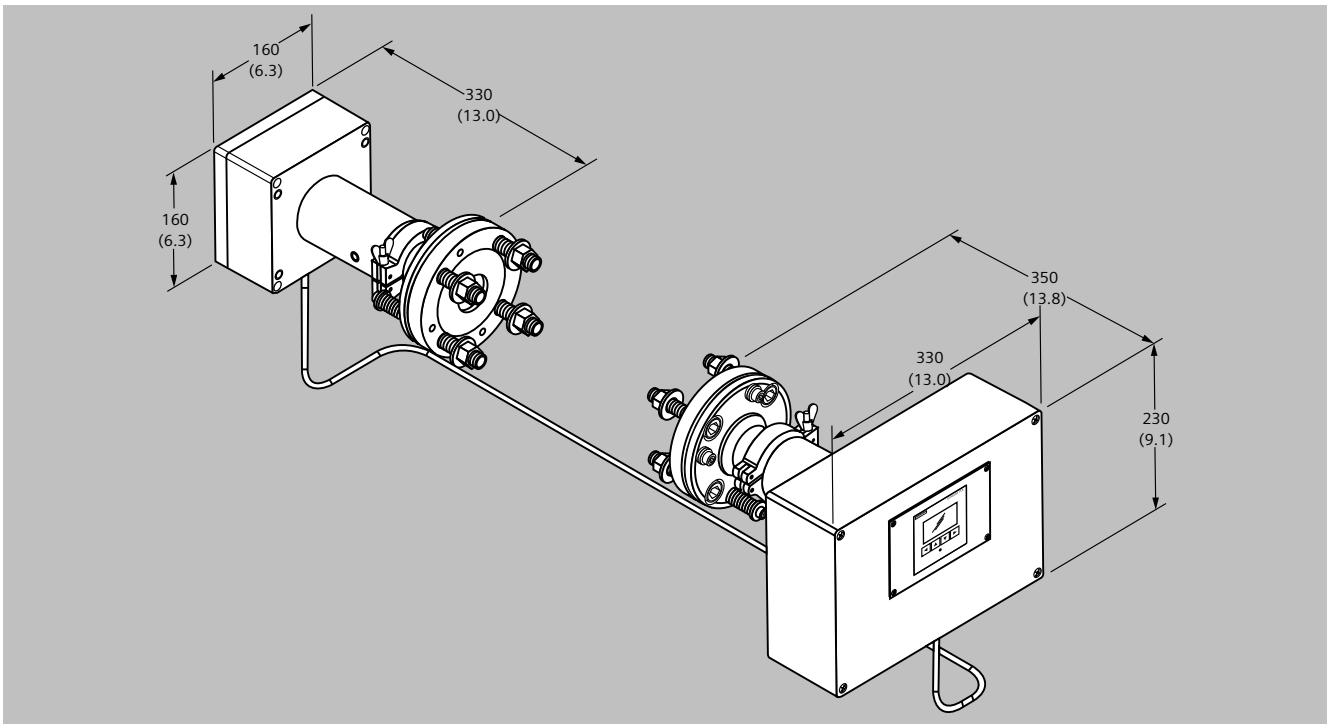
Technical specifications

SITRANS TDL	
General information	
Design	Emitter and detector units, connected by sensor cable
Material	Sensor enclosures: AlSi12 DIN230
	Process interface: Stainless steel 316L
	Flat gaskets: Graphite
Parts in contact with the process gas	Flanges, window ring, process purging: Acid-resistant stainless steel (316L)
	Window: Sapphire/Quartz
	Gasket in window: FFKM 75 ShA
	Flat gasket between customer flange and process flange: Graphite
	Purging tubes: Stainless steel (1.4404/316L) or Hastelloy (2.4602 / Hastelloy® C-22)
Installation	In-situ or bypass
Laser protection class	Class 1 in accordance with EN 60825-1:2014, safe to the eye
Design, enclosure	
Degree of protection	IP66 according to EN 60529
Dimensions	Emitter: • Height: 230 mm • Width: 330 mm • Length: 350 mm Receiver: • Height: 160 mm • Width: 160 mm • Length: 330 mm
Weights	Receiver: 13 kg Emitter: 15 kg Process interface • DN50/PN16: 5.2 kg • DN65/PN6: 6.05 kg • ANSI 2"/150 lbs: 5.2 kg
Climatic conditions	
Ambient temperature	• -20 ... +55 °C (-4 ... 131 °F) during operation (additional solar radiation not permissible) • -40 ... +70 °C (-40 ... 158 °F) during transport and storage
Relative humidity	< 99%, non-condensing
Atmospheric pressure	800 ... 1200 hPa
Purging	
Purging gas	Nitrogen or instrument air (depending on application)
Sensor purging	Max. overpressure in enclosure: 0.5 barg
Electrical characteristics	
Supply voltage	24 V DC nominal (19-30 V DC)
Power consumption, maximum	15 VA in operation, 45 VA during device startup
EMC	In accordance with EN 61326-1
Electrical safety	In accordance with 61010-1
Electrical inputs and outputs	
Analog outputs	4 outputs, 4 ... 20 mA, isolated, passive/active mode user selectable, ohmic resistance min. 50 Ω
Analog inputs	4 inputs, 4 ... 20 mA, isolated, passive mode, 50 Ω
Digital outputs	4 outputs, isolated, 30 V DC, passive mode, 0.5 A max.
Resistance temperature detectors (RTD)	Pt100 and Pt1000 temperature sensors, 2-, 3-, 4-wire connection
Service port	Ethernet (RJ-45) for web server access

Technical specifications (continued)

SITRANS TDL	
RS 485 Profibus DP (optional)	D-subminiature DE-09F
RS 485 Modbus RTU (optional)	Two-wire interface, 9600/19200 bps
Modbus TCP (optional)	Ethernet (2 x RJ-45)
Sensor cable	
Cable type	Optical fiber, PE and 2x0.22 mm² electric wires
Cross-section of electrical wires	2 x 0.5 mm² (30 AWG)
Cable jacket material	Polyurethane (TPE-U)
Dimensions	• Diameter: 8.8 mm • Length: 5 m, 10 m, 25 m, 50 m and custom length
Ethernet cable	
Cable type	UTP CAT 5 (4 twisted pairs)
Cable jacket material	PVC
Length	10 m
Customer cable (optional)	
Wires	Supply voltage, PE, analog IOs, digital IOs (14 x 0.5 mm²)
Length	5 m, 10 m, 25 m, custom length

Dimensional drawings



SITRANS TDL, dimensions in mm (inch)