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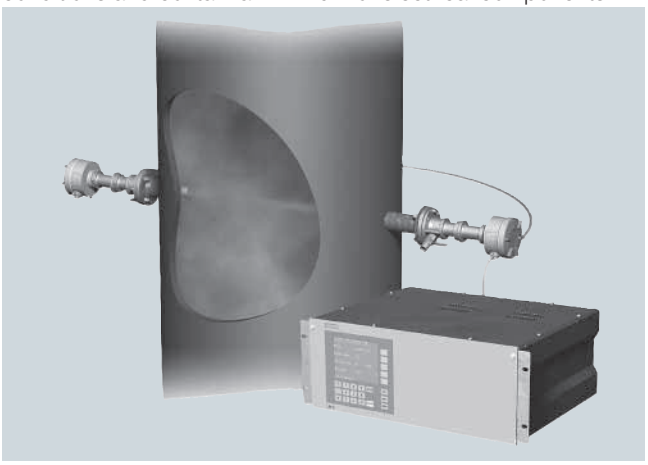
General

Overview

LDS 6 is a diode laser gas analyzer with a measuring principle based on the specific light absorption of different gas components. LDS 6 is suitable for fast and non-contact measurement of gas concentrations or temperatures in process or flue gases. One or two signals from up to three measuring points are processed simultaneously by one central analyzer unit. The in-situ cross-duct sensors at each measuring point can be separated up to 700 m from the central unit by using fiber-optic cables. The sensors are designed for operation under harsh environmental conditions and contain a minimum of electrical components.



LDS 6, typical installation with transmitted-light sensors

Benefits

The in-situ gas analyzer LDS 6 is characterized by a high availability and unique analytical selectivity, and by a broad scope of suitable applications. LDS 6 enables the measurement of one or two gas components or – if desired – the gas temperature directly in the process:

- With high levels of dust load
- In hot, humid, corrosive, explosive, or toxic gases
- In applications showing strong varying gas compositions
- Under harsh environmental conditions at the measuring point
- Highly selective, i.e. mostly without cross-sensitivities

LDS 6 properties:

- Little installation effort
- Minimum maintenance requirements
- Extremely rugged design
- High long-term stability through built-in, maintenance-free reference gas cell, field calibration is unnecessary
- Real-time measurements

Moreover, the instrument provides warning and failure messages upon:

- Need for maintenance
  - Erroneous reference function
  - Bad signal quality
- Violation of a lower or upper alarm level for the measured variable
- Transmitted amount of light violating an upper or lower limit

Application

Applications

- Process optimization
- Continuous emission monitoring for all kinds of fuels (oil, gas, coal, and others)
- Process measurements in power utilities and any kind of incinerator
- Process control
- Explosion protection
- Measurements in corrosive and toxic gases
- Quality control
- Environmental protection
- Plant and operator safety

Sectors

- Power plants
- Steel works
- Cement industry
- Chemical and petrochemical plants
- Automotive industry
- Waste incinerators
- Glass and ceramics production
- Research and development

Special applications

In addition to the standard applications, special applications are available upon request.

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General

Design

The gas analyzer LDS 6 consists of a central unit and up to three in-situ sensors. The connection between the central unit and the sensors is established by a so-called hybrid cable, which contains optical fibers and copper wires. An additional cable connects the transmitter and receiver parts of the cross-duct sensor.

Central unit

The central unit is housed in a 19" rack with 4 holders for mounting

- in a hinged frame
- in racks with or without telescopic rails

Display and control panel

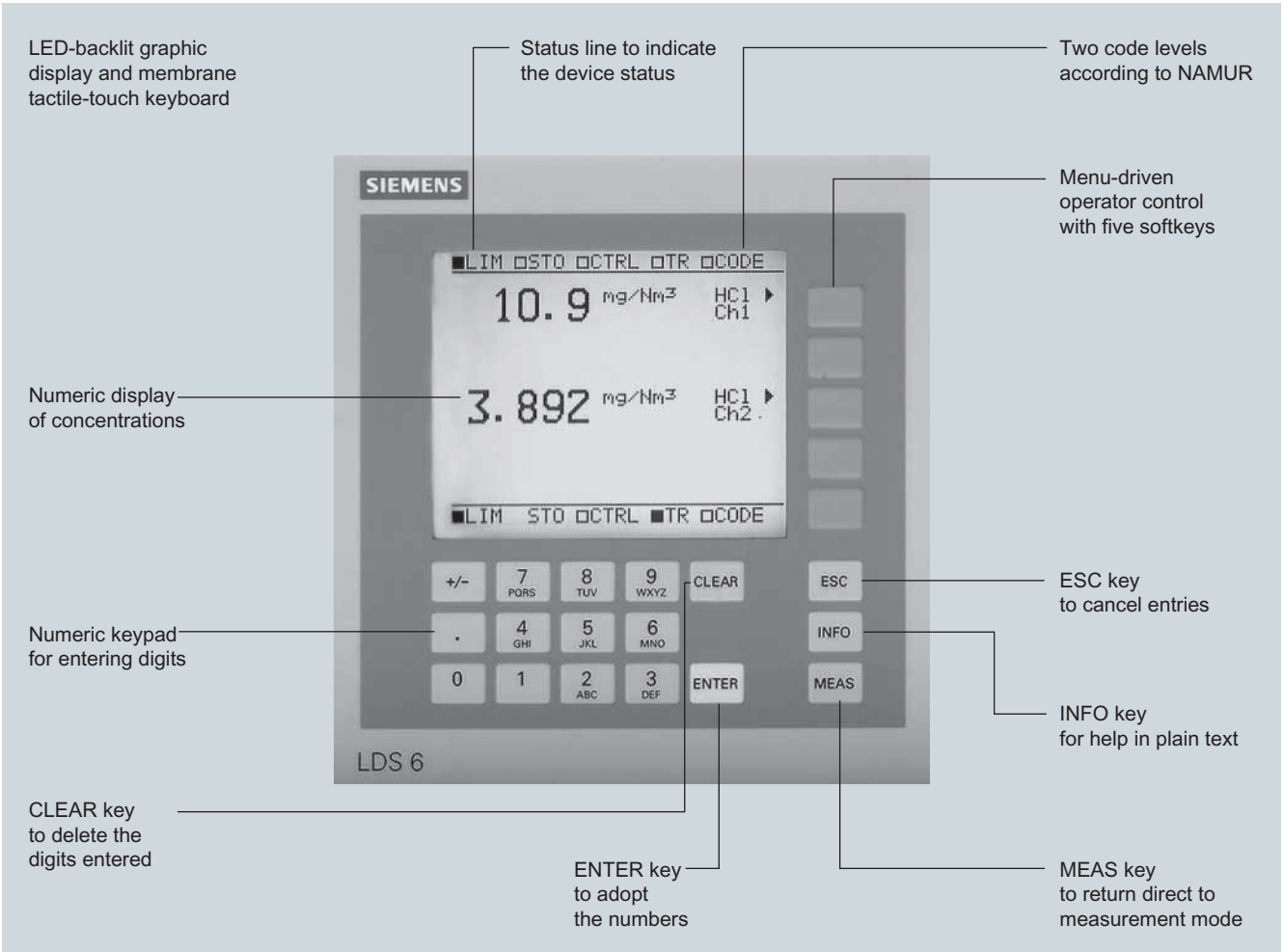
- Large LCD field for simultaneous display of measurement result and device status
- Contrast of the LCD field is adjustable via the menu
- LED background illumination of the display with energy-saving function
- Easy-to-clean membrane touch pad with softkeys
- Menu-driven operation for parameterization and diagnostics
- Operation support in plain text

Input and outputs

- One to three measurement channels with hybrid connections for the sensors at the measuring points
- 2 analog inputs per channel for process gas temperature and pressure
- 2 analog outputs per channel for gas concentration(s) or for gas temperature and concentration For selected versions, the transmission can be read out as an alternative.
- 6 freely configurable binary inputs per channel for signaling faults or maintenance requests from external temperature or pressure transducers or sensor purging failure.
- 6 freely configurable binary outputs per channel (signaling of fault, maintenance requirements, function control, transmission limit alarm, concentration limit alarm, store analog output)

Communication

Network connection: Ethernet (T-Base-10) for remote diagnostics and maintenance.



LDS 6 central unit, membrane keyboard and graphic display

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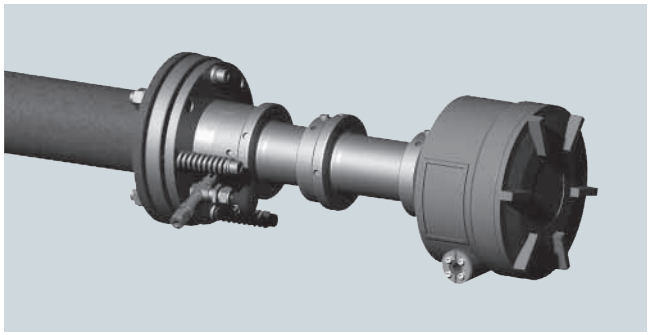
Cross-duct sensors



Sensor CD 6, transmitter or receiver unit

- In-situ cross-duct sensors, configured as transmitter and receiver unit, connected via sensor cable
- Connection to the LDS 6 central unit by a so-called hybrid cable, max. length 700 m
- Stainless steel, partially painted
- IP65 degree of protection for sensor
- Adjustable flanges with flange connection
- DN 65/PN 6, ANSI 4"/150 lbs
- Optional flameproof window flanges with dimensions: DN 65/PN 6, DN 80/PN 16, ANSI 4"/150 lbs, other process interfaces available on request
- Purging facilities on the process and the sensor sides, configurable application with purging gas connections for:
  - Instrument air
  - Purging air blower
  - Steam
  - Nitrogen
  - Process gases to which the pressure equipment directive cat. 2 does not apply
- In combination with high-pressure window flanges, purging with instrument air or nitrogen is possible
- Fast connectors for cleaning the measurement openings and the sensor window
- Optional: Ex-protected version according to ATEX II 1GD T135 °C EEx ia IIC T4, Cert. No. DEMKO 06 ATEX 139648X. Certificates according to IEC and TIIS are also available
- Sensor types CD6 and CD6C are compliant with the pressure equipment directive

Parts in contact with the process gases

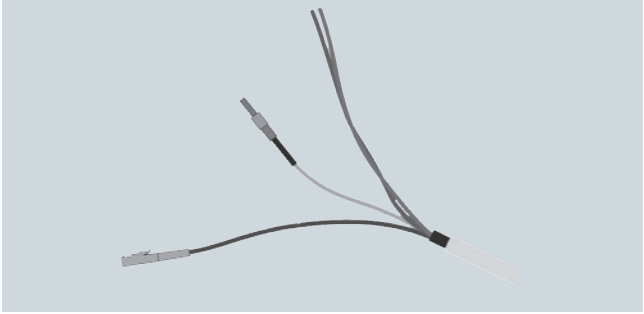
The sensors normally do not come into contact with the process gas, since purging with a gaseous media is applied at the process side. Stainless steel purging gas tubes in front of the sensor windows immerse slightly into the process gas and thus limit the purging volume. Special materials such as Hastelloy, plastics (PP) and ceramics are available on request.

Hybrid and sensor cables

A combination of fiber-optic cables and twisted copper wires connects the sensors to the central unit. The hybrid cable connects the central unit with the transmitter unit of the sensor, the sensor cable connects the transmitter and receiver units of the sensor.

For installation in EEx-protected environments, the legislative regulations have to be complied with, such as the spatial separation of intrinsically-safe from non-intrinsically-safe cables.

- Max. 700 m between central unit and measuring point
- Hybrid and sensor cables
  - Multimode fiber-optic cable, provided with SMA connections for transmission of the measured signal
  - Two-wire copper cable, in twisted pair version, for +24 V supply of the detector electronics (+12 V in the case of EEx-suitable instruments)
- Additionally for the hybrid cable:
  - Single-mode fiber-optic cable, configured double-sided with E2000 connectors for transmission of laser light
- Rugged cable sheath for mounting in open cable ducts or ductworks
- Sheath material: oil-resistant polyurethane



Connections of the hybrid cable

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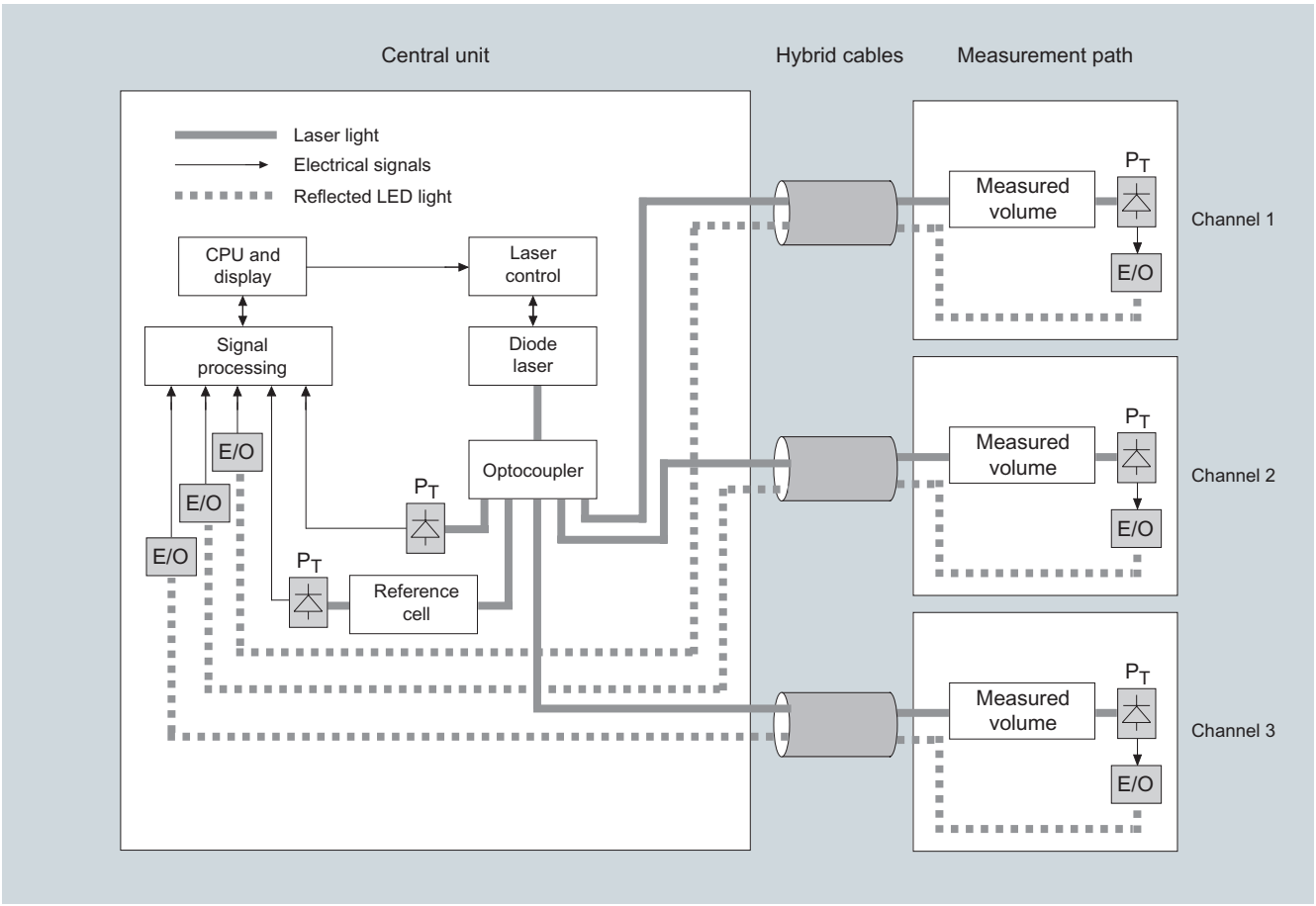
General

Function

Operating principle

LDS 6 is a gas analyzer employing single-line molecular absorption spectroscopy. A diode laser emits a beam of near-infrared light, which passes through the process gas and is detected by a receiver unit. The wavelength of the laser diode output is tuned to a gas-specific absorption line. The laser continuously scans this single absorption line with a very high spectral resolution.

The result is a fully resolved single molecular line which is analyzed in terms of absorption strength and line shape. The influence of cross-sensitivities on the measurement is negligible, since the quasi-monochromatic laser light is absorbed very selectively by only one specific molecular line in the scanned spectral range.

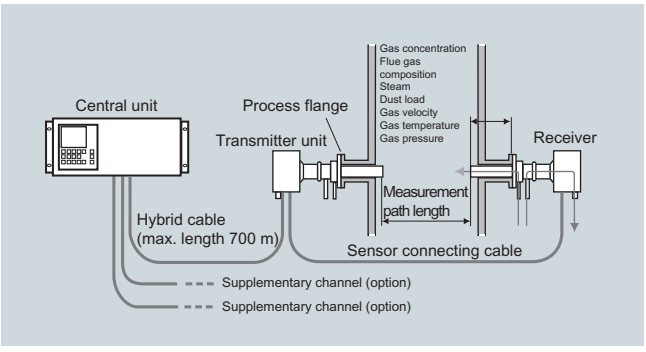


Basic design of the LDS 6

Configuration examples:

A feature of the in-situ analytical procedure is that the physical measurement takes place directly in the stream of process gas, and usually also 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 LDS 6 and must therefore be systematically investigated for each new application.

A feature of the standard applications defined in the ordering data of the LDS 6 is that the typical process conditions are well-known and documented, and that the guaranteed measuring properties can be proven by reference installations. 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 LDS 6. You can find an application questionnaire on the LDS product sites on the Internet.



Typical transmitted light setup of LDS 6, in-situ

To avoid contamination of sensor openings on the process side, clean gaseous purging media are used such as instrument air, N2 or steam. Purging air tubes on the sensor heads, which slightly penetrate into the process gas stream, define the effective measuring path length.

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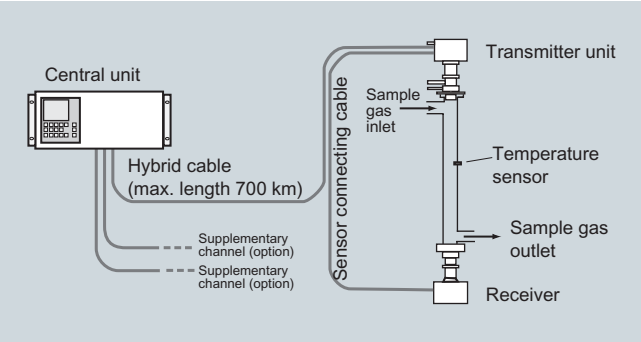
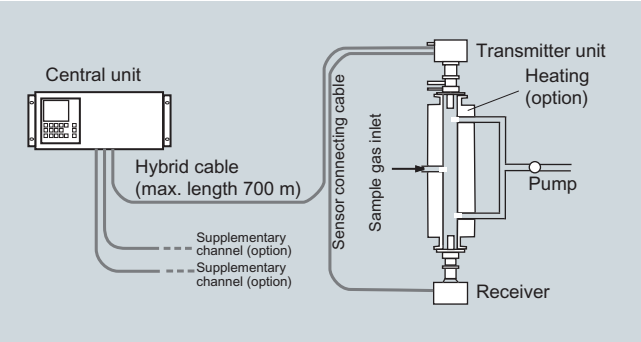
The LDS 6 can measure in both the transverse and longitudinal directions of the process gas flow. In certain cases, the process conditions make it necessary to condition the sample gas stream in a bypass line with respect to process temperature, pressure and/or optical path length. Further treatment of the process gas, such as drying or dust precipitation, is usually unnecessary.



Typical transmitted light setup of LDS 6, in bypass

A flow cell is optionally available for the LDS 6 which has been specially optimized for use with the LDS 6 and its transmitted-light sensors with respect to handling and measuring performance. It is designed to reduce surface effects, and is therefore also highly suitable for polar gases like ammonia. This flow cell is available in heated and non-heated versions. Wheel mounted and wall mounted versions are available.



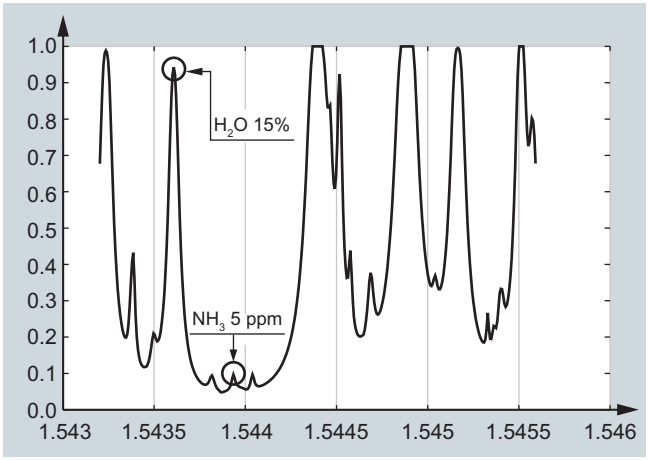
Measuring configuration of LDS 6 with heated flow cell

General

LDS 6 is connected to the measuring points by fiber optics. The laser light is guided by a single-mode fiber from the central unit to the transmitter unit of the in-situ sensor. The sensor consists of a transmitter and a receiver; the distance between them defines the measurement path. In the receiver box, the light is focused onto a suitable detector. The detector signal is then converted into an optical signal and transmitted via a second optical fiber to the central unit, where the concentration of the gas component is determined from the detected absorption signal.

LDS 6 usually measures a single gas component by means of the absorption capacity of a single fully resolved molecular absorption line. The absorption results from conversion of the radiation energy of the laser light into the internal energy of the molecule. In the working range of the LDS 6, both rotation-vibration transitions and electronic transitions – such as with O_2 – can be triggered.

In some specific cases, two components can be measured simultaneously if their absorption lines are so close to each other that they can be detected within the laser spectrum by one single scan (for example water (H_2O) and ammonia (NH_3)).



Absorption spectra of water and ammonia

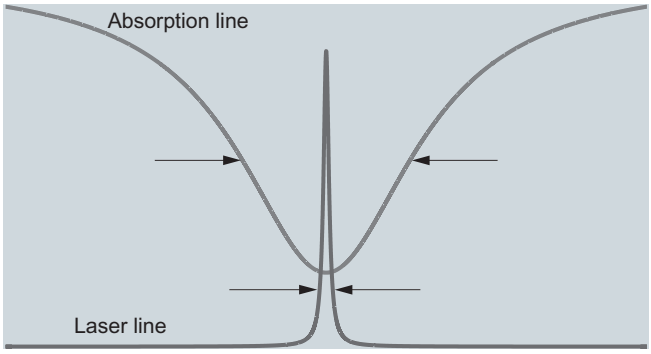
Moreover, in some applications it is possible to determine the gas temperature as a measured value. In this case, the ratio of the absorbance of two characteristic lines of the same molecule measured at the same time in the same volume gives the actual temperature in the process gas.

Typical measurable gases for LDS 6 are:

- Oxygen (O_2) for low and high pressure
- Oxygen + temperature
- Hydrogen fluoride (HF) + water
- Hydrogen chloride (HCl) + water
- Ammonia (NH_3) + water
- Water vapor (H_2O)
- Carbon monoxide (CO)
- Carbon dioxide (CO_2)
- CO + CO_2

By using an internal reference cell normally filled with the gas measured, the stability of the spectrometer is permanently checked in a reference channel.

By doing so, the continuous validity of the calibration is ensured without the need to carry out external recalibration using bottled test gases or reference gas cells.



Typical spectral bandwidth of an absorption line compared to the bandwidth of the laser light.

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General

Influences on the measurement

Dust load

As long as the laser beam is able to generate a suitable detector signal, the dust load of the process gases does not influence the analytical result. By applying a dynamic background correction, measurements can be carried out without any negative impact. Under good conditions, particle densities up to 100 g/Nm^3 can be handled by the LDS 6. Varying dust loads are compensated by scanning the laser over the gas absorption line and the current background. At a scan position next to the absorption line, the instrument can "see" only absorption caused by the dust load where at the line center the signal is composed of the molecular absorption and the continuous, unspecific background absorption. With the wavelength modulation technique, the actual measured transmission is always compared with the baseline. After signal processing, phase-sensitive application delivers a signal only from the molecular line free of background.
The influence of a high dust load is complex and depends on the path length and particle size. The optical damping increases at longer path lengths. Smaller particles also have a large influence on the optical damping. With a combination of high dust load, long path length and small particle size, the technical support at Siemens should be consulted.

Temperature

The temperature influence on the absorption line strength is compensated by a correction factor determined during calibration. A temperature signal can be fed into the instrument from an external temperature sensor. This signal is then used to correct the influence of the temperature on the observed line strength. If the temperature of the sample gas remains constant, it is alternatively possible to carry out a static correction using a preset value.
At high temperatures there may be noticeable broadband IR radiation of gas and dust, or flames may occasionally occur in the measurement path. In this case the detector is protected by an optical bandpass filter to prevent saturation by the strong background radiation.

Pressure

The gas pressure can affect the line shape of the molecular absorption line. LDS 6 uses a special algorithm to adapt the line shape. Additionally, an external pressure signal can be fed to the instrument to provide complete compensation for the pressure influence including the density effect.

Cross-interferences

Since LDS 6 derives its signal from a single fully resolved molecular absorption line, cross-interferences with other gases are quite unlikely. LDS 6 is therefore able to measure the desired gas components very selectively. In special cases, the composition of the process gas might have an influence on the shape of the absorption line features. This influence is compensated by analyzing the full shape of the detected signal curve applying specific algorithms.

Optical path length

The absorption values analyzed by the LDS 6 are typically small. As a result of Beer-Lambert's law, the absorption of laser light depends on the optical path length within the gas. Therefore, the precision in determining the effective optical path length in the process might limit the overall precision of the measurement. As the sensor openings toward the process normally need to be purged to keep them clean over a long period of time, the thickness of the mixing zone between the purging medium and the process gas and its concentration distribution need to be considered. In a typical in-situ installation with some meters of path, the influence of the purging gas on the effective path length can be neglected.
Path length and dust load are mutually influencing: the higher the dust load in the process, the shorter the max. possible path length.

Maintenance and fault messages

LDS 6 outputs different warnings via relays:

- Need for maintenance (measured value is not influenced)
- Operating error (measured value might be influenced)

Note

Individual requirements for the measuring point can make the utilization of special sensor equipment necessary. The possibilities for adapting the sensors are:

- Different purging media, such as instrument air, ambient air, nitrogen or steam
- Different purging modes on process and sensor sides
- Special materials of purging tubes and/or sensor flanges
- Cooling or heating of the sensors
- EEx-proof sensor configurations

Essential characteristics

- Integrated calibration adjustment with an internal reference cell
- Negligible long-term drifts of zero and span
- Dynamic background correction for varying dust loads
- Isolated signal outputs, 4 to 20 mA
- User-friendly, menu-driven operation
- Selectable time constants (response time)
- Two user levels with individual access codes for prevention of unwanted and unauthorized operations
- Operation according to NAMUR recommendations
- Monitoring of overall optical transmission
- Remote preventive maintenance and servicing via Ethernet/modem
- Straightforward replacement of the central unit, since connections can easily be removed
- Sensor and central unit housing free of wear and corrosion
- Easy operation with a numerical keypad and menu prompting

Certified versions for emission monitoring

The LDS 6 is available as certified instrument for emission monitoring of NH_3, NH_3/H_2O, H_2O, HCl, HCl/H_2O. The certificates are issued by TÜV for Germany and MCERTS for the United Kingdom. For conducting regular calibration and linearity checks, test kits for ammonia, water and HCl should be used. These kits can be ordered separately as instrument accessories. For new analyzer orders, the NH_3, NH_3/H_2O and H_2O kits named "Version 2" must be ordered. For already installed analyzers, please contact Siemens for spotting the correct kit version, or consult the instrument manual.

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Technical specifications

Analytical performance	
Measuring range	Internally adjustable
Minimum detectable quantity (20 °C, 1000 hPa, 1 m path length)	Depending on gas: HF: 0.1 ppm HCl: 0.6/0.2 ppm NH_3: 0.5 ppm H_2O (top measuring range): 1 000 ppm O_2 (stand. pressure): 1 000 ppm O_2 (high pressure): 1 000 ppm CO (one component): 300 ppm CO_2 (one component): 300 ppm CO/CO_2: 600/1 500 ppm
Smallest recommended measuring range (20 °C, 1000 hPa, 1 m path length)	HF: 0 ... 5 ppm HCl: 0 ... 10 ppm NH_3: 0 ... 10 ppm H_2O (top measuring range): 0 ... 5% O_2 (standard pressure): 0 ... 5% O_2 (high pressure): 0 ... 5% CO (one component): 0 ... 1.5% CO_2 (one component): 0 ... 1.5% CO/CO_2: 0 ... 3 / 0 ... 7.5%

The maximum applicable measuring ranges can be found in the table of standard combinations (pages 3/12 and 3/13). These can only be applied if the individual process conditions allow it. Please contact the Technical Support from Siemens for checking the applicability.

Accuracy	• 2% of the measured value or minimum detection limit (whichever is largest) for: - NH_3 (all versions) - O_2 (not with combination with temperature) - CO (all versions) - CO_2 (all versions) • 5% of the measured value or minimum detection limit (whichever is largest) due to calibration gas uncertainties: - HF (all versions) - HCl (all versions) - H_2O - O_2 (combination with temperature)
Linearity	Better than 1%
Precision	2% of the measured value or minimum detection limit (whichever is largest) For Code FT, water: 10% of the measured value or minimum detection limit (whichever is largest)
Zero point drift	Negligible
Measured-value drift	Negligible
Calibration interval	No recalibration required due to internal reference cell
General	
Concentration units	ppmv, vol%, mg/Nm^3
Display	Digital concentration display (5 digits with floating decimal point)
Laser protection class	Class 1, safe to the eye
Certificates	CE marking, TÜV, MCERTS

Design, enclosure	
Degree of protection	IP20 according to EN 60529
Dimensions	177 x 440 x 380 mm
Weight	Approx. 13 kg
Mounting	Horizontal
Electrical characteristics	
Power supply	100 ... 240 V AC 50 ... 60 Hz, automatically adapted by the system; with a 3-channel central unit, an additional external power supply +24 V DC, 50 VA is included in the scope of delivery
Power consumption	50 W
EMC	According to EN 61326 and standard classification of NAMUR NE21
Electrical safety	According to EN 61010-1, overvoltage classification II
Fuse specifications	100 ... 240 V: T2.5L250V
Dynamic response	
Warm-up time at 20 °C ambient temperature	Approx. 15 min
Response time	Better than 3 sec, application-dependent
Integration time	1 ... 100 sec, selectable
Influencing variables	
Ambient temperature of measured value	< 0.5%/10 K
Atmospheric pressure	Negligible
Gas pressure compensation	Recommended for all gases except O_2/low pressure
Pressure compensation	Oxygen, high pressure: 1 ... 5 bar CO/CO_2: 0,95 ... 1.4 bar All other gases except O_2/low pressure: 0.95 ... 1.05 bar
Power supply changes	< 1%/30 V
Tilting	< 1% for non-horizontal mounting of the central unit < 15°
Electrical inputs and outputs	
Number of measurement channels	1 … 3, optional
Analog output	2 per channel, 4 ... 20 mA, floating, ohmic resistance max. 750 Ω
Analog inputs	2 per channel, designed for 4 ... 20 mA
Binary outputs	6 per channel, with changeover contacts, configurable, 24 V AC/DC/1 A, floating
Binary inputs	6 per channel, designed for 24 V, floating, configurable
Communication interface	Ethernet 10BaseT (RJ-45)
Climatic conditions	
Temperature range	5 ... 45 °C during operation, -40 ... +70 °C during transportation and storage
Atmospheric pressure	800 to 1 100 hPa
Humidity	< 85% RH, above dew point

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19" central unit

Selection and ordering data — Order No.

LDS 6 in-situ gas analyzer — **7MB6121-** ■■■ **0 0 - 0** ■■■
19" rack unit for installation in cabinets

Ex protection			
Without, not suitable for connection to EEx sensors			**0**
Without, suitable for connection to EEx sensors acc. to ATEX II 1 GD T135° C			**1**
Measured component	Possible with application number		
O_2	11 ... 14; 20		**A**
O_2 / temp	12		**B**
NH_3	11; 15 ... 17; 22		**C**
NH_3 / H_2O	11; 15 ... 17; 22		**D**
HCl	11; 18; 22		**E**
HCl / H_2O	11; 18; 22		**F**
HF	11; 18	G)	**G**
HF / H_2O	11; 18	G)	**H**
CO	12 ... 14		**J**
CO / CO_2	14		**K**
CO_2	11		**L**
H_2O	11; 22		**M**
Application for channel 1	Application number		
Emission monitoring, non-certified	11		**A**
Combustion optimization	12		**B**
Safety-relevant areas	13		**C**
Process monitoring	14		**D**
SNCR-DeNOx	15		**E**
SCR-DeNOx	16		**F**
SCR-DeNOx/automotive	17		**G**
Filter optimization	18		**H**
Process monitoring (high pressure)	20		**P**
Emission monitoring, certified according to 17. BimschV and Mcerts, in combination with components C, D, E, F, M	22		**T**
Application for channel 2	Application number		
Channel 2 not used			**X**
Emission monitoring	11		**A**
Combustion optimization	12		**B**
Safety-relevant areas	13		**C**
Process monitoring	14		**D**
SNCR-DeNOx	15		**E**
SCR-DeNOx	16		**F**
SCR-DeNOx/automotive	17		**G**
Filter optimization	18		**H**
Process monitoring (high pressure)	20		**P**
Emission monitoring, certified according to 17. BimschV and Mcerts, in combination with components C, D, E, F, M	22		**T**

G) Subject to AL export regulations: 2B351A, ECCN: 2B351

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Selection and ordering data

		Order No.
LDS 6 in-situ gas analyzer 19" rack unit for installation in cabinets		**7MB6121-** ■■■ **0 0 - 0** ■■■
Application for channel 3 External 24 V DC power supply included in scope of delivery	Application number	
Channel 3 not used		**X**
Emission monitoring	11	**A**
Combustion optimization	12	**B**
Safety-relevant areas	13	**C**
Process monitoring	14	**D**
SNCR-DeNOx	15	**E**
SCR-DeNOx	16	**F**
SCR-DeNOx/automotive	17	**G**
Filter optimization	18	**H**
Process monitoring (high pressure)	20	**P**
Emission monitoring, certified according to 17. BimschV and Mcerts, in combination with components C, D, E, F, M	22	**T**
Language (supplied documentation, software)		
German		**0**
English		**1**
French		**2**
Spanish		**3**
Italian		**4**

Selection and ordering data

Further Versions		Kurzangabe
Add "-Z" to Order No. and specify Order code		
Telescopic rails (2 units)		**A31**
Set of Torx screwdrivers		**A32**
TAG label (customized inscription)		**Y30**
Additional units		Bestell-Nr.
External power supply, only for hybrid cable length > 500 m		**A5E00854188**
LDS Com communication software		**A5E00822928**
LAN modem incl. cable	E)	**A5E00834946**
Calibration verification kit for NH_3 (version 2)	D)	**A5E01075594**
TÜV/MCERT calibration kit NH_3 (version 2), 2 cells	D)	**A5E00823339013**
TÜV/MCERT calibration kit NH_3/H_2O (version 2), 3 cells	D)	**A5E00823339014**
TÜV/MCERT calibration kit H_2O (version 2), 2 cells	D)	**A5E00823339015**
Calibration verification kit for NH_3 (version 1)	D)	**A5E00534675**
TÜV/MCERT calibration kit NH_3 (version 1), 2 cells	D)	**A5E00823339003**
TÜV/MCERT calibration kit NH_3/H_2O (version 1), 3 cells	D)	**A5E00823339004**
TÜV/MCERT calibration kit H_2O (version 1), 2 cells	D)	**A5E00823339005**
TÜV/MCERT calibration kit HCl, 2 cells		**A5E00823339008**
TÜV/MCERT calibration kit HCl/H_2O, 3 cells		**A5E00823339009**

D) Subject to AL export regulations: 9I999, ECCN: N

E) Subject to AL export regulations: 9I999, ECCN: EAR99

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19" central unit

The following table lists typical measuring conditions for standard applications. The values for resolution are only approximate. The exact resolution at the measuring point is determined by the sum of all influencing parameters and can be determined individually by Siemens. Please note that the approximate resolution and maximum applicable range listed refer to a path length 1 m. Longer path lengths will improve the resolution, but not linearly due to limiting effects such as dust load. The maximum applicable measuring ranges can only be used if permitted by the process conditions such as dust load.

				Standard application	Typical values	Maximum applicable range	Approximate resolution	Typical values	Maximum applicable range	Approximate resolution
Gas 1	**Gas 2**	**Gas code**	**Appl. Code**	**Remarks**	**for range gas 1**		**at 1 m**	**for range gas 2**		**at 1 m**
O_2		A	A	Emission monitoring	0 … 21 vol%	0 ... 100%	0.1 vol%	—	—	—
NH_3		C		Flue gas, high accuracy	0 … 25 ppm	0 ... 500 ppm	0.5 ppm	—	—	—
NH_3	H_2O	D			0 … 25 ppm	0 ... 100 ppm	0.5 ppm	0 … 30 vol%	0 … 30 %	0.1%
HCl		E			0 … 10 ppm	0 ... 6 000 ppm	0.6 ppm	—	—	—
HCl	H_2O	F			0 … 10 ppm	0 ... 100 ppm	0.6 ppm	0 … 30 vol%	0 … 30 %	0.1%
HF		G			0 … 5 ppm	0 ... 1 500 ppm	0.1 ppm	—	—	—
HF	H_2O	H			0 … 5 ppm	0 ... 20 ppm	0.1 ppm	0 … 30 vol%	0 … 30 %	0.1%
CO_2		L			0 … 30 vol%	0 ... 100%	0.1 vol%	—	—	—
H_2O		M			0 … 30 vol%	0 ... 30%	0.1 vol%	—	—	—
NH_3		C	T	Emission monitoring certified	0 ... 30 ppm	0 ... 500 ppm	0.5 ppm	—	—	—
NH_3	H_2O	D			0 ... 30 ppm	0 ... 500 ppm	0.5 ppm	0 ... 15 vol%	0 ... 30%	0.1%
HCl		E			0 ... 10 ppm	0 ... 6 000 ppm	0.2 ppm	—	—	—
HCl	H_2O	F			0 ... 10 ppm	0 ... 6 000 ppm	0.2 ppm	0 ... 30 vol%	0 ... 30%	0.5%[2]
H_2O		M			0 ... 30 ppm	0 ... 30%	0.1%	—	—	—
O_2		A	B	Combustion optimization	0 … 21 vol%	0 ... 100%	0.1 vol%	—	—	—
O_2	Temp.	B		High temperature calibration	0 … 21 vol%	0 ... 100%	0.1 vol%	650 … 1 200 °C	600 … 1 200 °C	± 30K
CO		J			0 … 5 vol%	0 ... 100%	0.1 vol%	—	—	—
O_2		A	C	Safety-relevant areas	0 … 10 vol%	0 ... 100%	0.1 vol%	—	—	—
CO		J		Short response time	0 … 10 vol%	0 ... 100%	0.1 vol%	—	—	—
O_2		A	D	Process monitoring	0 … 21 vol%	0 ... 100%	0.1 vol%	—	—	—
CO		J		Customized algorithm	0 … 60 vol%	0 ... 100%	0.1 vol%	—	—	—
CO	CO_2	K			0 … 100%	0 ... 100%	0.3 vol%	0 … 100%	0 … 100%	0.5%
O_2		A	P	Process monitoring High pressure	0 … 90%	0 ... 100%	0.1 vol%	—	—	—
NH_3		C	E	SNCR-DeNOx	0 … 50 ppm	0 ... 500 ppm	1 ppm	—	—	
NH_3	H_2O	D		High dynamics (e.g. municipal waste incinerator)	0 … 50 ppm	0 ... 100 ppm	1 ppm	0 … 30 vol%	0 … 30%	0.1%
NH_3		C	F	SCR-DeNOx	0 … 10 ppm	0 ... 500 ppm	0.5 ppm	—	—	—
NH_3	H_2O	D		Power plants, highest accuracy	0 … 10 ppm	0 ... 100 ppm	0.5 ppm	0 … 30 vol%	0 … 30%	0.1%
NH_3		C	G	SCR-DeNOx / automotive	0 … 100 ppm	0 ... 500 ppm	1 ... 2 ppm[1]	—	—	—
NH_3	H_2O	D		Engine test stands	0 … 100 ppm	0 ... 100 ppm	1 ... 2 ppm[1]	0 … 30 vol%	0 … 30%	0.1%
HCl		E	H	Filter optimization	0 … 2 000 ppm	0 ... 6 000 ppm	2 ppm	—	—	
HCl	H_2O	F		High dynamics (e.g. municipal waste incinerator)	0 … 2 000 ppm	0 ... 2 000 ppm[1]	[1]	0 … 30 vol%	0 … 30%	[1]
HF		G			0 … 2 000 ppm	0 ... 2 000 ppm	2 ppm	—	—	
HF	H_2O	H			0 … 2 000 ppm	0 ... 2 000 ppm[1]	[1]	0 … 30 vol%	0 … 30%	[1]

Reference table: standard combinations

1) Dependent on existing concentrations. For details, please contact Siemens.

2) At gas temperature 200 °C

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				Typical values for		Typical values for		Typical	Purging mode		Purging medium
Gas 1	Gas 2	Code	Code	Temperature	Pressure	Path length	Dust load[3]	Integration time	Standard	Optional	
O_2		A	A	< 600 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	D	B	N_2
NH_3		C		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
NH_3	H_2O	D		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
HCl		E		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
HCl	H_2O	F		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
HF		G		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
HF	H_2O	H		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
CO_2[1]		L		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
H_2O[1]		M		< 150 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	30 s	C	G	Air
NH_3		C	T	< 150 °C	1 000 hPa	1.3 ... 6 m	< 100 mg/Nm^3	30 s	C	G	Air
NH_3	H_2O	D		< 150 °C	1 000 hPa	1.3 ... 6 m	< 100 mg/Nm^3	30 s	C	G	Air
HCl		E		120 ... 210 °C	1 000 hPa	2 ... 6 m	< 100 mg/Nm^3	30 s	C	G	Air
HCl	H_2O	F		120 ... 210 °C	1 000 hPa	2 ... 6 m	< 100 mg/Nm^3	30 s	C	G	Air
H_2O		M		< 150 °C	1 000 hPa	1.3 ... 6 m	< 100 mg/Nm^3	30 s	C	G	Air
O_2		A	B	600 … 1 200 °C	1 000 hPa	2 … 6 m	< 20 g/Nm^3	10 s	E , F	G, H	Steam + air, N_2
O_2	Temp.	B		600 … 1 200 °C	1 000 hPa	2 … 6 m	< 20 g/Nm^3	10 s	F	H	Steam + N_2
CO		J		< 600 °C	1 000 hPa	1 … 6 m	< 20 g/Nm^3	10 s	E	G	Air
O_2		A	C	< 600 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	2 s	D	B	N_2
CO		J		< 150 °C	1 000 hPa	1 … 4 m	< 20 g/Nm^3	2 s	E	G	Air or N_2
O_2		A	D	< 600 °C	1 000 hPa	1 … 6 m	< 100 mg/Nm^3	10 s	D	B	N_2
CO		J		< 600 °C	1 000 hPa	1 … 4 m	< 20 g/Nm^3	2 s	E	G	Air or N_2
CO	CO_2	K		< 400 °C	800 ... 1 400 hPa	1 … 6 m	< 20 g/Nm^3	3 s	C	G	Air
O_2		A	P	< 200 °C	1 ... 5 bar	1 … 6 m	< 100 mg/Nm^3	2 s	D	B	N_2
NH_3		C	E	250 … 350 °C	1 000 hPa	2 … 6 m	< 20 g/Nm^3	30 s	E	G	Air
NH_3	H_2O	D		250 … 350 °C	1 000 hPa	2 … 6 m	< 20 g/Nm^3	30 s	E	G	Air
NH_3		C	F	300 … 400 °C	1 000 hPa	4 … 8 m	< 20 g/Nm^3	30 s	E	G	Air
NH_3	H_2O	D		300 … 400 °C	1 000 hPa	4 … 8 m	< 20 g/Nm^3	30 s	E	G	Air
NH_3		C	G	20 … 650 °C	1 000 hPa	1 m	< 2 g/Nm^3	2 s	C	A	Air
NH_3	H_2O	D		20 … 650 °C[1]	1 000 hPa	1 m	< 2 g/Nm^3	2 s	C	A	Air
HCl		E	H	150 … 250 °C	1 000 hPa	1 ... 6 m	< 20 g/Nm^3	10 s	E	G	Air
HCl	H_2O	F		150 … 250 °C	1 000 hPa	1 … 6 m	< 20 g/Nm^3	10 s	E	G	Air
HF		G		150 … 250 °C	1 000 hPa	1 … 6 m	< 20 g/Nm^3	10 s	E	G	Air
HF	H_2O	H		150 … 250 °C	1 000 hPa	1 … 2 m	< 20 g/Nm^3	10 s	E	G	Air

Reference table: standard combinations (continued). The specified pressures are absolute pressures.

[1] For temperatures above 400 °C, please contact Siemens.

[2] The influence of dust is very complex and depends on the path length and particle size. The optical damping increases exponentially at longer path lengths. Smaller particles also have a 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.

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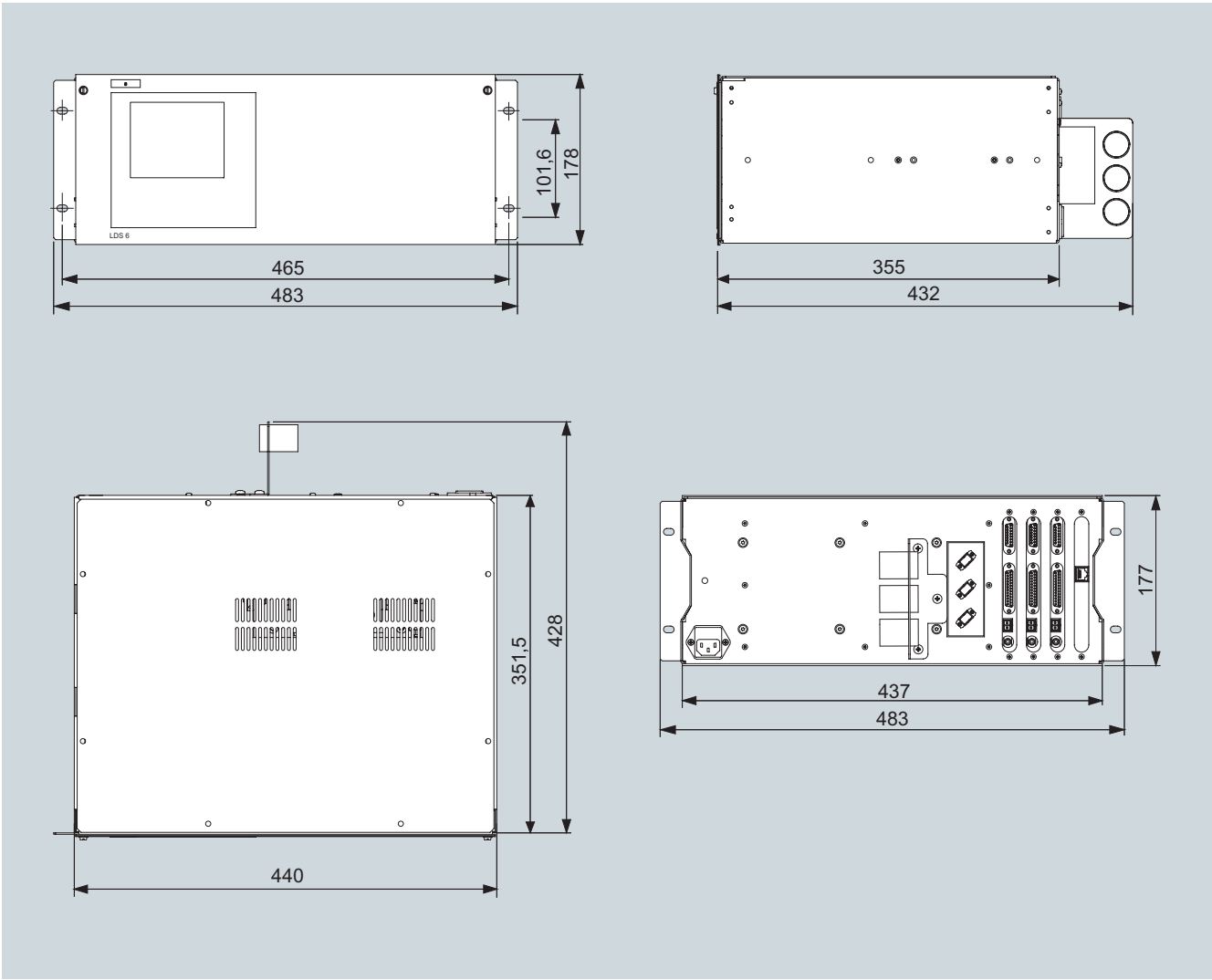
19" central unit

Dimensional drawings



LDS 6, 19" central unit, dimensions in mm

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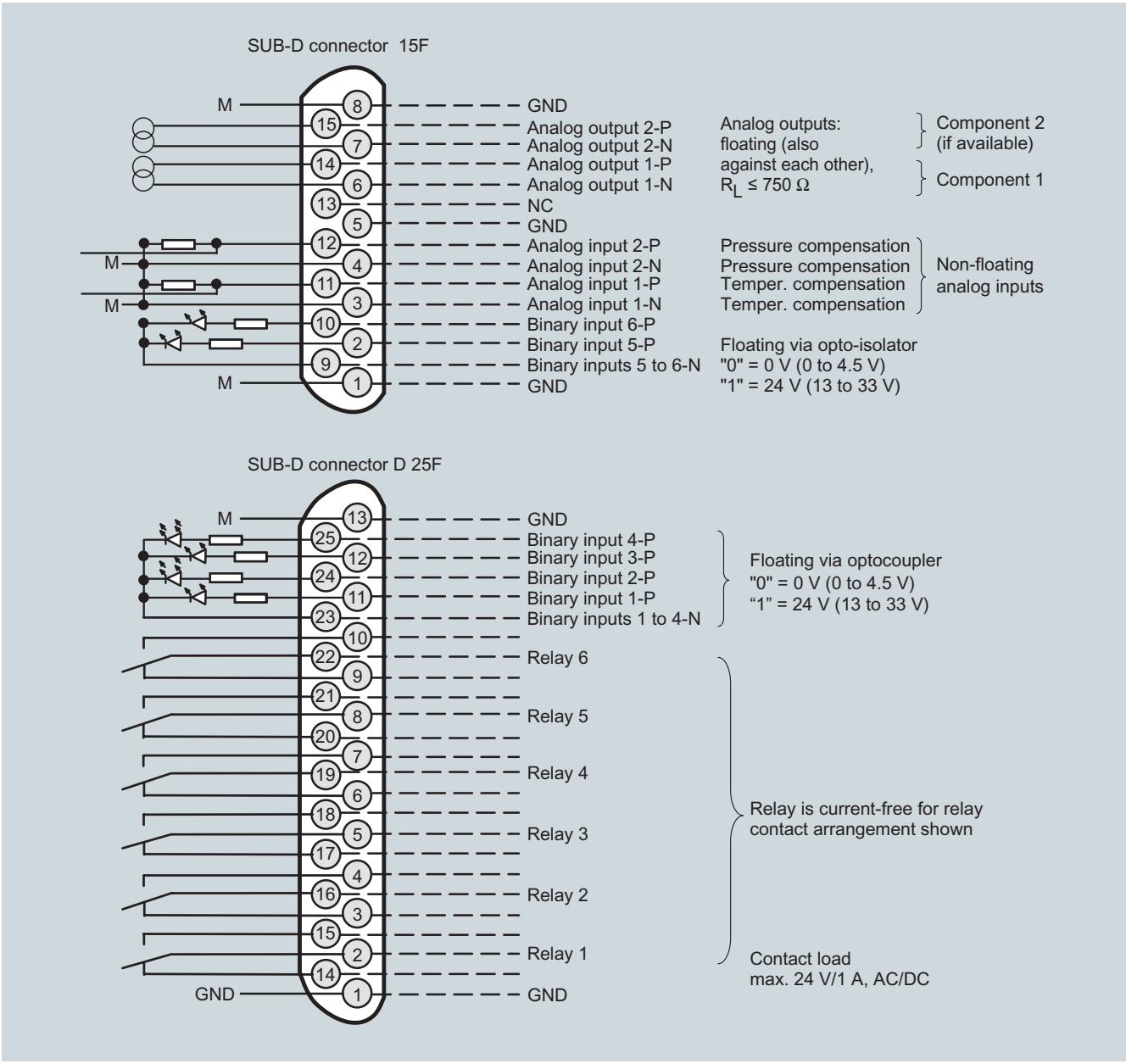
Schematics

Pin assignments



LDS 6, 19" central unit, pin assignments

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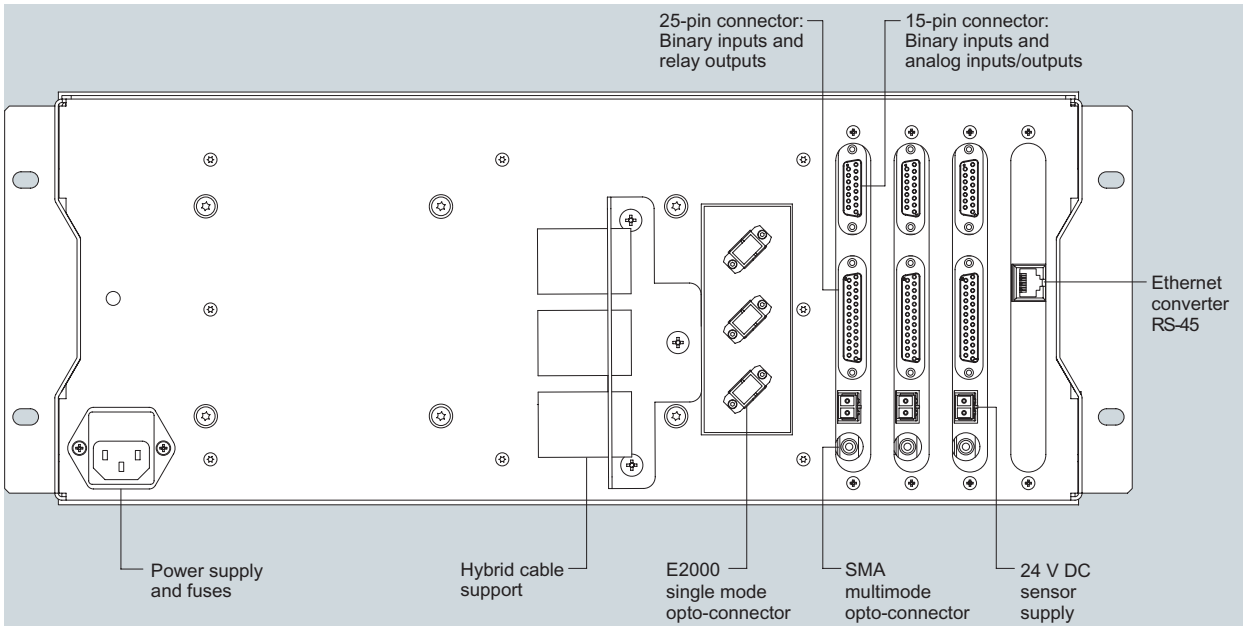
19" central unit

Optical and electrical connections



LDS 6, three-channel 19" central unit, optical and electrical connections

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Overview

Cross-duct sensors CD 6 and cables for non-Ex applications

The standard cross-duct sensor consists of a transmitter unit and a receiver unit with the same dimensions. The transmitter unit provides a connector for the fiber-optic cable. The laser light is transmitted through this cable. The receiver unit contains a photodetector and an electronics PCB, and is connected to the transmitter unit by a sensor cable. The sensors are mounted onto flanges. The easiest way to avoid condensation and dust deposits on the sensor windows is to purge them, e.g. with instrument air. Purging must be selected depending on the application. The cross-duct sensors can therefore be configured for the respective situation. The application reference table provides recommendations for suitable purging with standard applications.

If a component is to be measured which is also present in measurable quantities in the purging medium - such as oxygen or moisture - it is necessary to use purging gases such as nitrogen, superheated process steam or similar. In such cases it is usually also necessary to purge the sensor heads, since the ambient air must also be displaced here out of the laser beam path. A differentiation is therefore made between purging on the process side and purging on the sensor side.

Note: For measurement of O_2 at gas temperatures above 600 °C, it may also be possible to tolerate air as the purging medium since its influence on the measurement can be compensated. In contrast to this, the combination O_2/temperature always requires O_2-free purging.

Applications with oxygen (high-pressure)

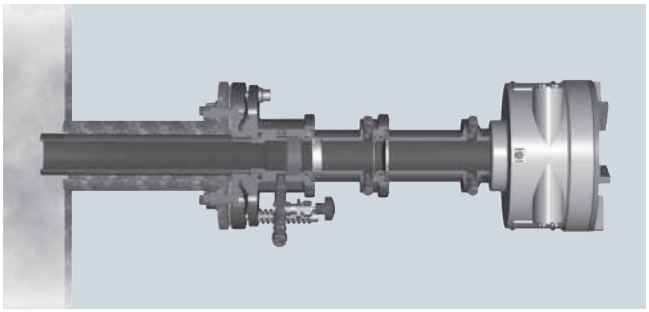
For oxygen measurements with a higher process gas pressure (1 to 5 bar), the sensor CD 6 can be used together with a suitable window flange as process connection. This window flange is also available in the standard sizes DN 65/PN 6, DN 80/PN 16 or ANSI 4"/150 lbs. The optical surface to the process is made of borosilicate glass. Flanges can be equipped with window purging, but without purging tubes. Possible purge modes for the window flanges are "A-C" (no purging or moderate purging on the process side). Window flanges are tested for leakage before delivery using overpressure, and show leakage rates of less than 10^{-5} mbar·l/s.

For ordering this application, the MLFB code of the central unit with the application code "P" must be selected. The process interface suitable for the sensors can be chosen by selection of the corresponding code in the 6th configurable position of the MLFB number.

The most important sensor purging configurations are presented below:

Purging with moderate flow:

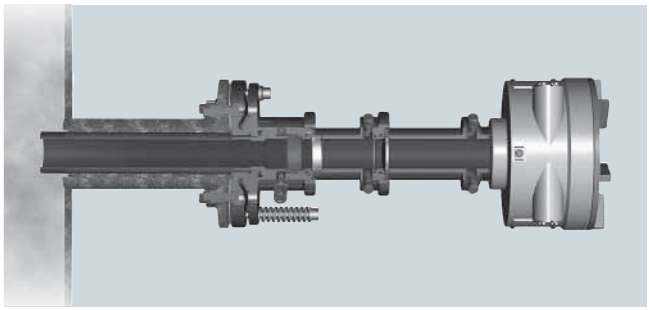
Is selected for pure gas applications, such as emission monitoring, inerting monitoring, ... The purging gas flow can be adjusted between 0 and approx. 120 l/min at each sensor head using a needle valve (included in delivery).



Moderate purging on process side

Purging with increased flow:

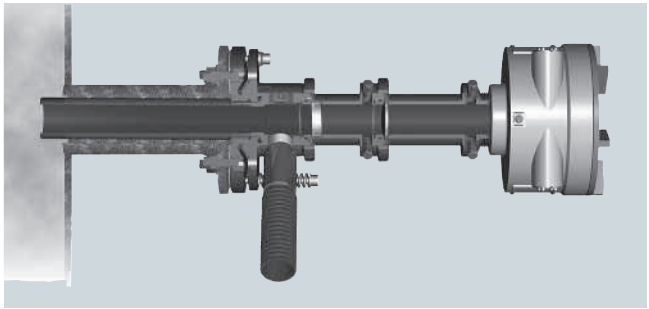
Through omission of needle valve. This type of purging is selected in crude gas applications with higher concentrations of particles and/or condensation such as in non-purified flue gases in combustion plants, ... The purging gas flow is typically set between 200 and 500 l/min on each sensor head depending on the input pressure of the purging medium.



Increased purging on process side

Purging with high flow:

Through use of air blower or dry process steam. Connectors with hose adapters are included in the delivery. An additional Swagelok adapter must be ordered if a high flow of steam or instrument air purging is required (option A27). This type of purging is selected in crude gas applications with very high concentrations of particles and/or condensation such as in the furnaces of combustion plants. If instrument air is not available, an air blower is also an alternative for purging in applications with lower demands. On the process side, dry steam can be used as the inert purging gas instead of nitrogen. The purging gas flow is automatically set between 500 and <1 000 l/min on each sensor head depending on the purging air blower or the steam pressure.



Increased purging on process side, with hose connection adapter

Purging on sensor side:

Can be combined with any purging mode on the process side, and is always selected if the ambient air must never have an influence on the measurement. The volumes within the sensor head are then continuously purged with an O_2-free gas. Allowed purging gases are nitrogen or carbon dioxide. The flow of purging gas required in this case is approx. 1 – 6 l/min and is set using a needle valve (included in delivery). The combination shown here of purging with superheated process steam on the process side and with nitrogen from a compressed gas bottle on the sensor side may satisfy the necessity for O_2-free purging e.g. also in combustion plants with boilers without own nitrogen network.

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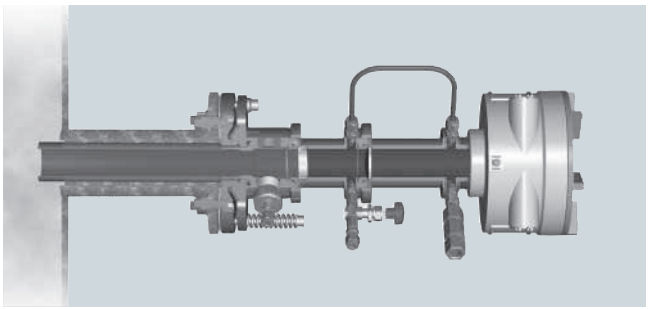
Cross-duct sensor CD 6



Sensor configuration with high purging on process side, with 6 mm joint for use with steam, and with N_2 purging on the sensor side

The purging media used on the process side flow through purging gas tubes into the process gas stream. The tubes extend a few centimeters into the process area, and usually provide a flow from the side. This results in a wedge being generated in the inlet zone of the purging gas. The effective measuring path in the process gas is therefore well-defined as the distance between the ends of the two purging gas inlet tubes.

Cross-duct sensor CD 6: Options and accessories:

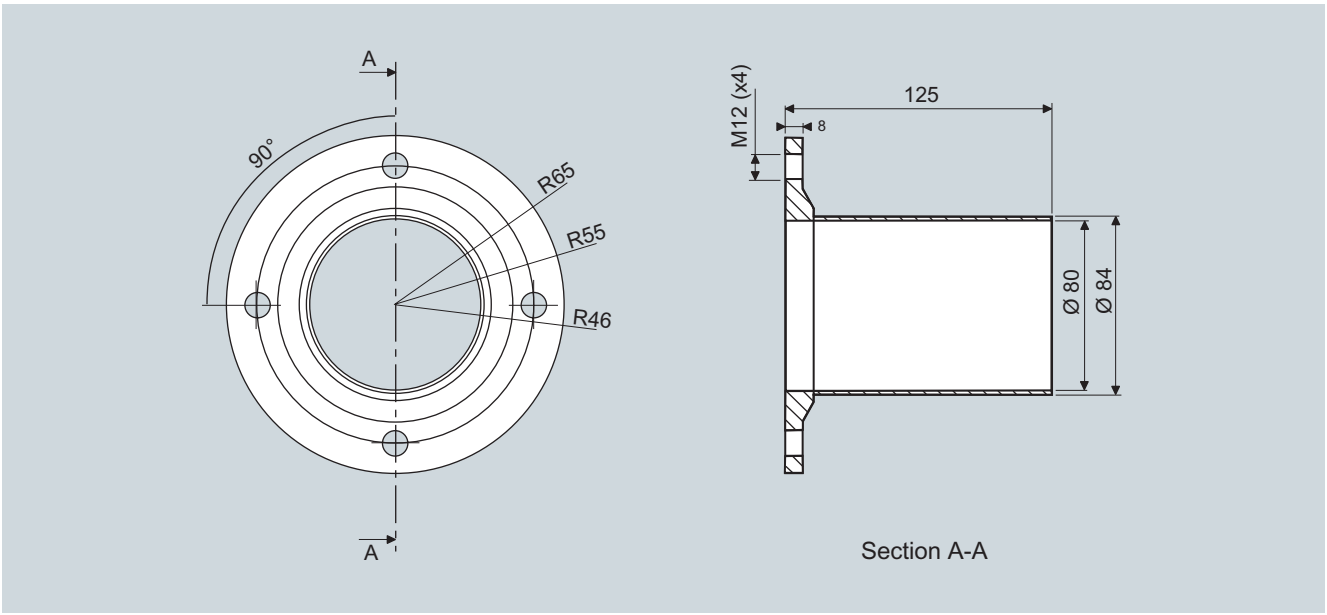
Sensor alignment kit

Includes a battery-operated visible light source, a centering aid with crosshair, and two hook spanners for opening the optics tube of the sensors.

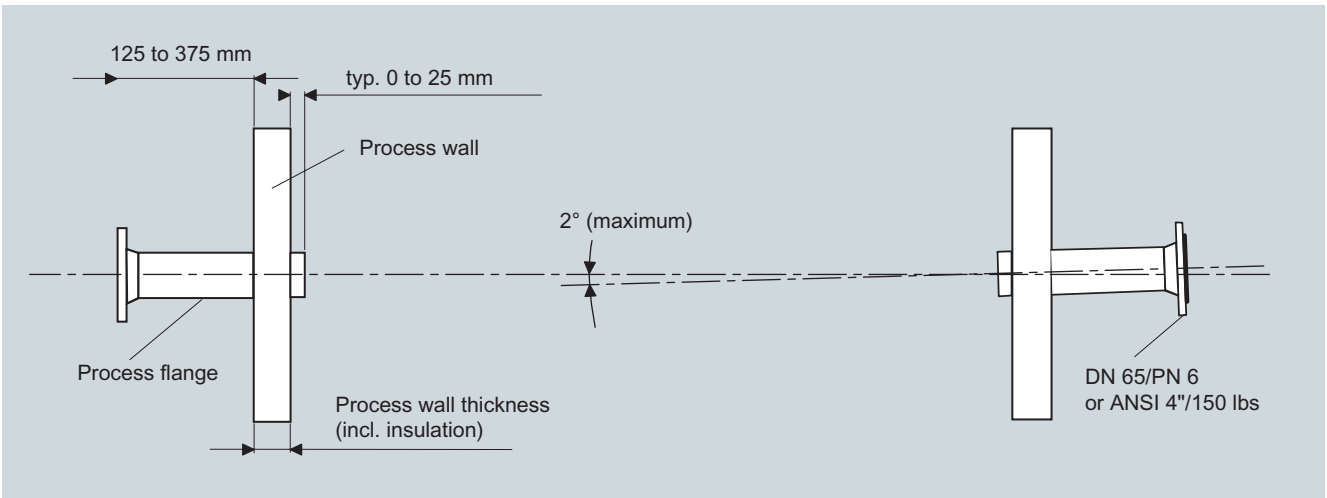
Please note: the sensor alignment kit is not EEx-protected.

Welding flanges

2 special flanges made of stainless steel with DN 65 circle of holes for use as mounting flange on process side. Particularly suitable together with the sensor configurations for the SCR-DeNOx/automotive application.



Weld-on flange, sensor option, dimensions in mm



Installation requirements for the cross-duct sensors CD 6, dimensions in mm

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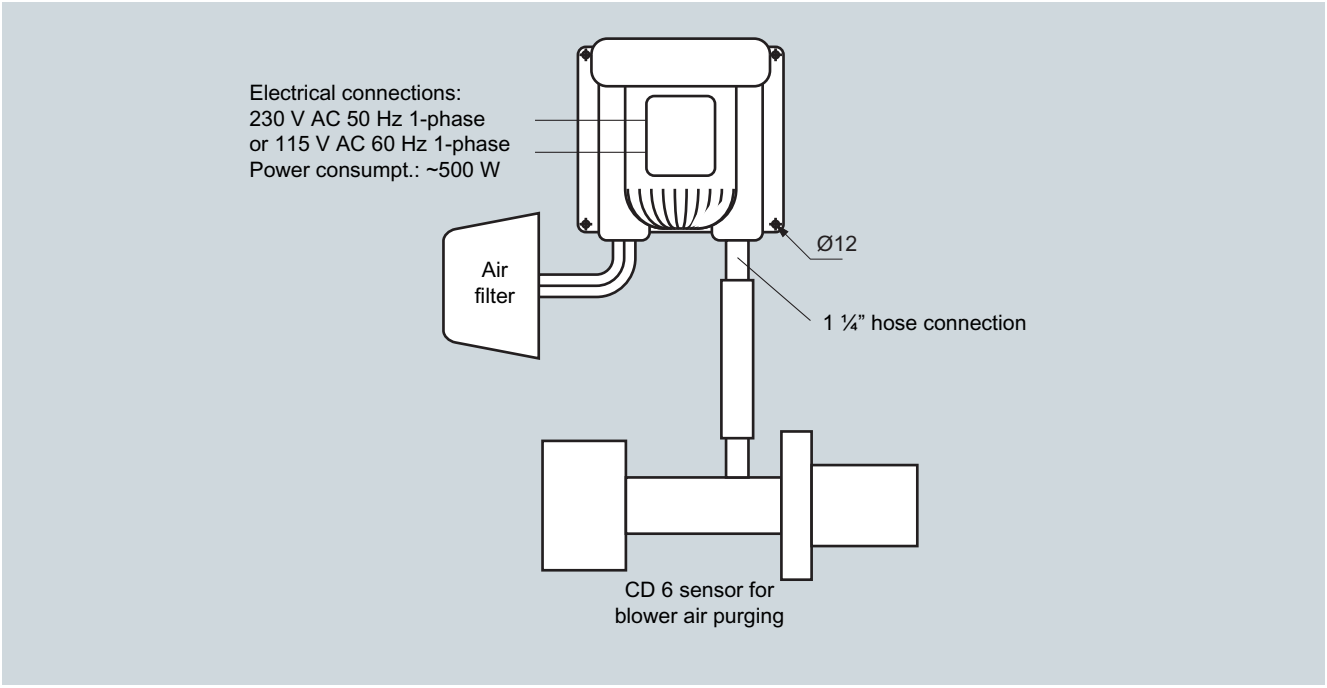
Purging air blower

Two purging air blowers are required to purge the sensor heads.
Both 230 V AC and 115 V AC versions can be ordered.



Sensor configuration with purging air blower

Flow cell

For implementation of measuring configurations with bypass mode. The cell consists of a stainless steel tube whose internal surfaces are coated with PTFE to minimize surface effects. With an effective measuring path of 1 m, the inner volume is only 1.2 l, and fast gas displacement times can therefore be achieved. The flow of sample gas can be from the ends or from the center of the tube, since appropriate 6 mm joints are present here. The flow cell can be ordered in four configurations:

- Unheated, including assembly for wall mounting
- Unheated, including assembly for wall mounting and a 19" housing with an air jet pump with a delivery rate of max. 30 l/min
- As above, but can be heated up to approx. 200 °C
- As above, but can be heated up to approx 200 °C and mounted on a rack with wheels and integrated 19" frame

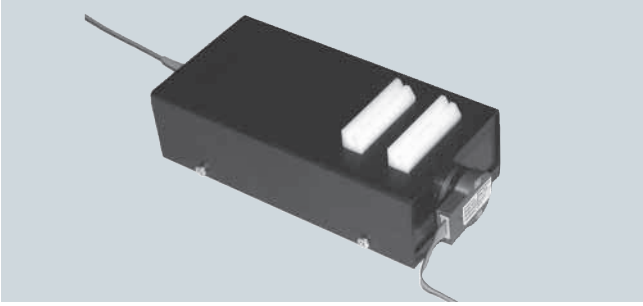
Optical bandpass filter

Serves to protect the light-sensitive detector in the receiver unit of the sensor from saturation by IR background radiation. Is used with measurements in very hot process gases (T > 1 000 °C) or with unavoidable appearances of flames in the measurement path.

Verification of calibration

Assembly with certified, maintenance-free calibration gas cell with connections for laser fiber-optic conductors and detector module of cross-duct sensor. Serves to rapidly verify the factory calibration in the field without compressed gas bottles and flow cell.

The calibration verification kit is available for applications in which ammonia is the sample gas.



Assembly for verification of calibration

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Cross-duct sensor CD 6

Technical specifications

Cross-duct sensor CD 6

General	
Design	Transmitter and receiver units, connected by a sensor cable
Materials	Stainless steel
Installation	Horizontally to the optical axis, perpendicular or parallel to the gas flow
Laser protection class	Class 1, safe to the eye
Explosion protection	Option, in accordance with ATEX II 1 GD T 135 °C EEx ia IIC T4 A defined leak rate can only be guaranteed when using high-pressure window flanges. Otherwise it may be necessary for the owner to carry out an evaluation in accordance with ATEX (DEMKO 06 ATEX 139648X [17]).
Design, enclosure	
Degree of protection	IP65
Dimensions	Diameter: 163, L: 395 mm
Purging gas tube in mm	400 (370 net) x 44 x 40 800 (770 net) x 44 x 40 1 200 (1 170 net) x 44 x 40
Weight	2 x approx. 11 kg
Mounting	DN 65/PN 6 or ANSI 4"/150

Please note:

- For purging tubes with a length of 800 and 1200 mm, the wall thickness must not exceed 200 mm with DN65/PN6 connections. To carry out measurements with thicker walls, please contact Siemens.
- The optimum adjustment of the flanges can change with high differences in temperature depending on the type of assembly.

Electrical characteristics	
Power supply	24 V DC, supply from central unit via hybrid cable
Power consumption	< 2 W during operation
Climatic conditions	
Ambient temperature	-30 ... +70 °C during operation, -40 ... +70 °C during storage and transportation
Humidity	< 95% RH, above dew point
Pressure	800 ... 1 200 hPa
Measuring response	
Measurement path	0.3 m ... 12 m (other lengths on request)
Gas temperatures	0 ... 1 500 °C, application-dependent
Gas pressure	General: 1 013 ± 50 hPa High pressure O_2: 800 ... 5 000 hPa
Dust load	The influence of dust is very complex and depends on the path length and particle size. The optical damping increases exponentially at longer path lengths. Smaller particles also have a 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.

Accessories

Purging

Nitrogen is permissible as the purging gas for the sensor side. Nitrogen, steam, air and gases which are not subject to the pressure equipment directive Cat. 2 are permissible as purging gases for the process side.

Purging with instrument air, N_2	
• Pressure at purging inlet	2 000 ... 8 000 hPa
• Max. overpressure in the sensor	< 500 hPa
• Quality	
- Instrument air	Free of oil and water
- Nitrogen	Purity better than 99.7%. For oxygen measurements, an O_2 content < 0.01% is recommended in the purging gas (optical path length ≥ 1 m, min. 5% oxygen in the process gas)
• Maximum flow rate	500 l/min
• Dew point	Benchmark: < -10 °C, condensation on the optics must be avoided
Blower purging	
• Maximum counter pressure	40 hPa
• Maximum flow rate	850 l/min
• Power consumption	370 W
• Degree of protection (fan)	IP54
Steam purging	
• Steam conditioning	Overheated
• Maximum temperature	240 °C
• Minimum pressure	> 4 000 hPa
• Maximum pressure	16 000 hPa, refers to a volume flow of approx. 1 100 l/min

Hybrid and sensor cables

General	
Configuration hybrid cable	Two optical fibers and two twisted copper wires in one cable for 24 V DC. Single-mode optical fiber configured at both ends with E2000 angle connectors. Multimode optical fiber configured at both ends with SMA connectors.
Cable sheath	Oil-resistant polyurethane
Dimensions	Diameter: < 8 mm, length: up to 700 m • For > 500 m, an external power supply must be additionally ordered • For installation in EEx zones, non-intrinsically-safe cables have to be spatially separated from intrinsically-safe lines
Impact resistance	200 N/cm
Maximum tensile strength	500 N
Minimum bending radius	10 cm
Climatic conditions	
Ambient temperature	-40 ... +80 °C during operation
Humidity	< 95% rel. humidity, above dew point

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Selection and ordering data		Order No.
LDS 6 in-situ gas analyzer Pair of sensors (cross-duct sensor)		**7MB6122-** ■■■■■ - ■■■■
Explosion protection Without Acc. to ATEX II 1 GD	**Degree of protection** n.a. EEx ia	**0** **1**
Sensor type Standard cross-duct sensor	**Measured component** O_2 All gases except O_2	**A** **W**
Purging, process side Without purging	**Sensor side** Without purging Air or N_2, 1 to 2 l/min; incl. needle valve, 6 mm Swagelok	**A** **B**
Instrument air or N_2 Reduced flow: 0 ... 120 l/min incl. needle valve, 6 mm Swagelok	Without purging Air or N_2, 1 to 2 l/min; incl. needle valve, 6 mm Swagelok	**C** **D**
Air or N_2 Increased flow: 200 ... 500 l/min incl. 6 mm Swagelok	Without purging Air or N_2, 1 to 2 l/min; incl. needle valve, 6 mm Swagelok	**E** **F**
Air, fan or steam; high flow: > 500 l/min incl. 1¼" hose adapter	Without purging Air or N_2, 1 to 2 l/min; incl. needle valve, 6 mm Swagelok	**G** **H**
Purging tubes, material		
No purging tubes		**0**
Stainless steel, EN 4432/316L		**1**
Purging tubes, length		
No purging tubes		**0**
400 mm		**1**
800 mm		**2**
1 200 mm		**3**
Engine test rig		**4**
Special length		**9**
Process connection		
Stainless steel flange (EN 1.4404/316L), dimensions acc. to DN 65/PN 6		**0**
Stainless steel flange (EN 1.4404/316L), dimensions acc. to ANSI 4"/150 lbs		**1**
Stainless steel flange (EN 1.4404/316L) for engine test rig		**2**
Pressure-resistant window flange (EN 1.4404/316L, borosilicate glass), DN 65/PN 6		**3**
Pressure-resistant window flange (EN 1.4404/316L, borosilicate glass), DN 80/PN 16		**4**
Pressure-res. window flange (EN 1.4404/316L, borosilicate glass), ANSI 4"/150 lbs		**5**
Hybrid cable No hybrid cable Standard length	**Length [m]** 5 10 25 40 50	 **X** **A** **B** **E** **G** **H**
Customized length	Only > 50	**Z**

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Cross-duct sensor CD 6

Selection and ordering data		Order No.
LDS 6 in-situ gas analyzer Pair of sensors (cross-duct sensor)		**7MB6122-** ■■■■■ - ■■■■
Sensor connecting cable	**Length [m]**	
No sensor connecting cable		X
Standard length	5	A
	10	B
	25	E
Customized length	Only > 25	Z
Language (supplied documentation)		
German		0
English		1
French		2
Spanish		3
Italian		4

3

Selection and ordering data		
Further versions		Order code
Add "-Z" to Order No. and specify Order code		
6 mm Swagelok for steam, purging types G and H	D)	**A27**
Purging tube, special length		**M1Y**
Hybrid cable, customized length		**P1Y**
Sensor cable, customized length		**Q1Y**
TAG label, customized inscription	D)	**Y30**
Additional units		Order No.
LDS 6, 230 V purging air blower	D)	**A5E00829151**
LDS 6, 115 V purging air blower		**A5E00829150**
CD 6, sensor alignment kit		**A5E00253142**

D) Subject to AL export regulations: 9I999, ECCN: N

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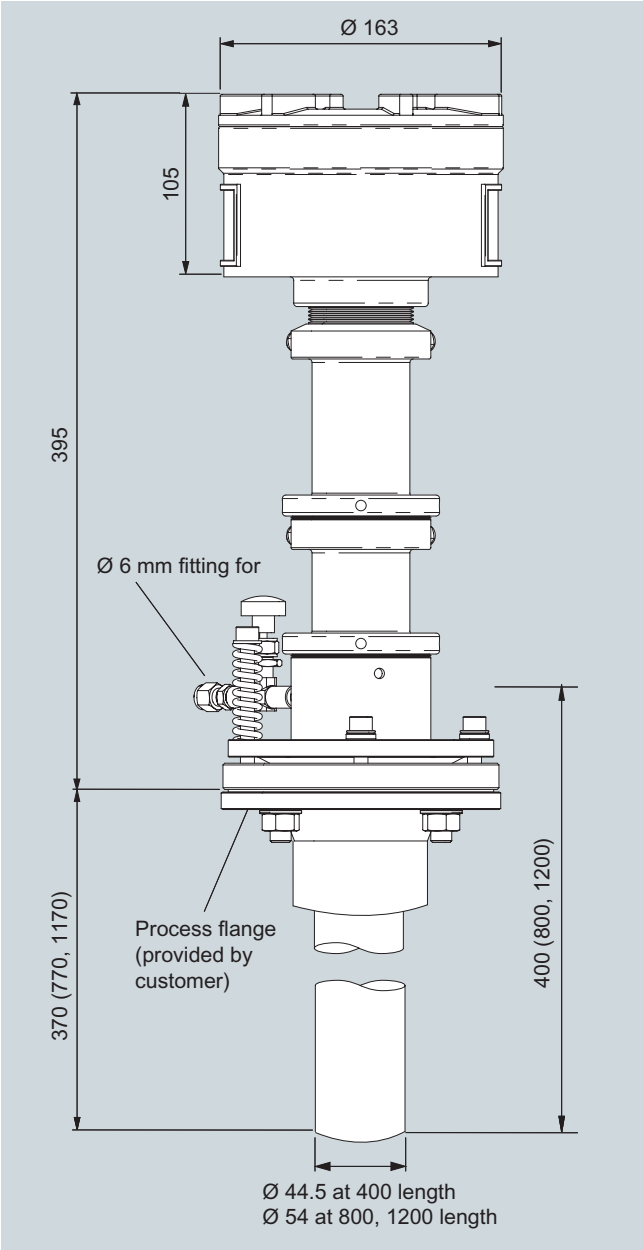
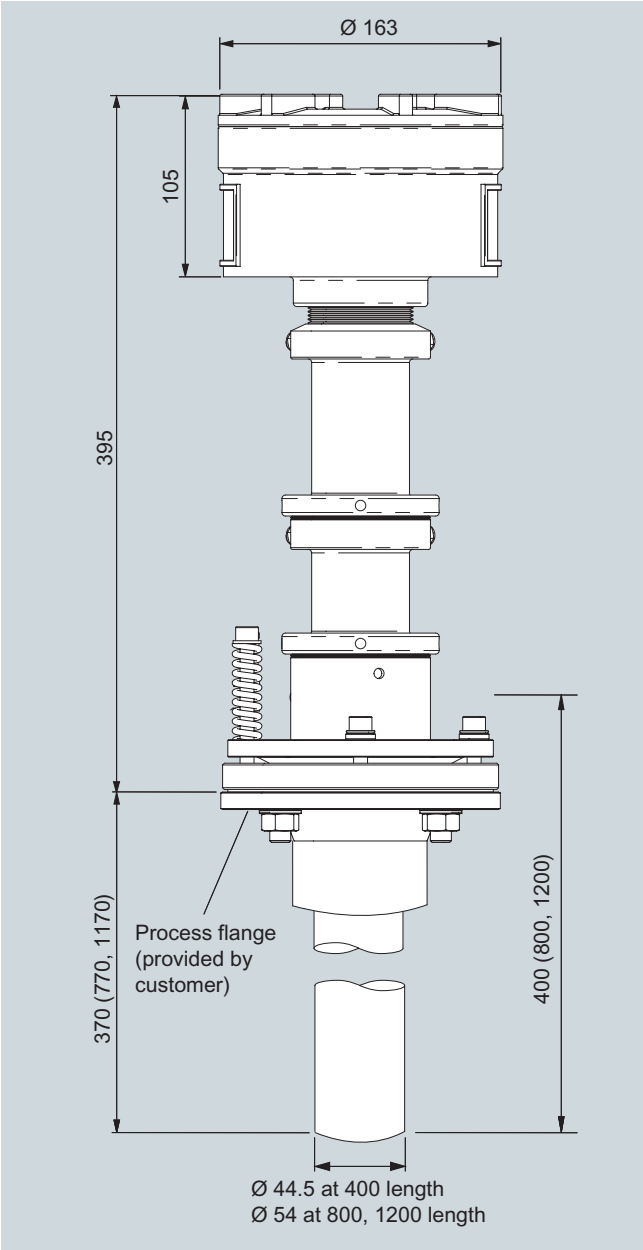
Dimensional drawings



Cross-duct sensor CD 6, moderate purging (instrument air), version according to Order No. 7MB6122-**C1*-0***, dimensions in mm



Cross-duct sensor CD 6, increased purging (instrument air), version according to Order No. 7MB6122-**E1*-0***, dimensions in mm

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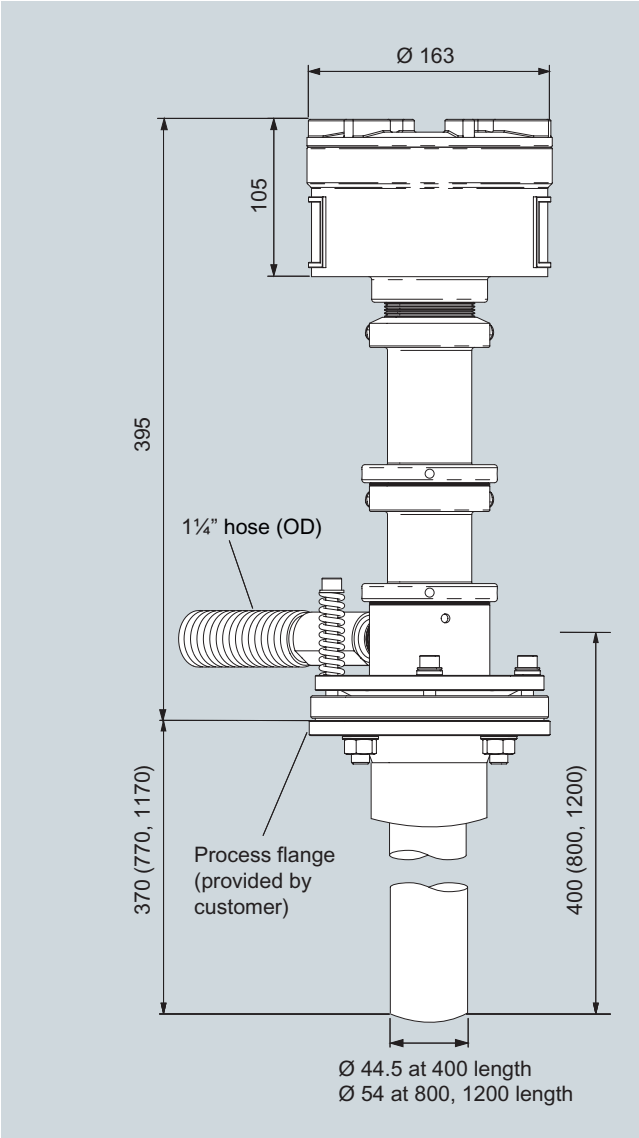
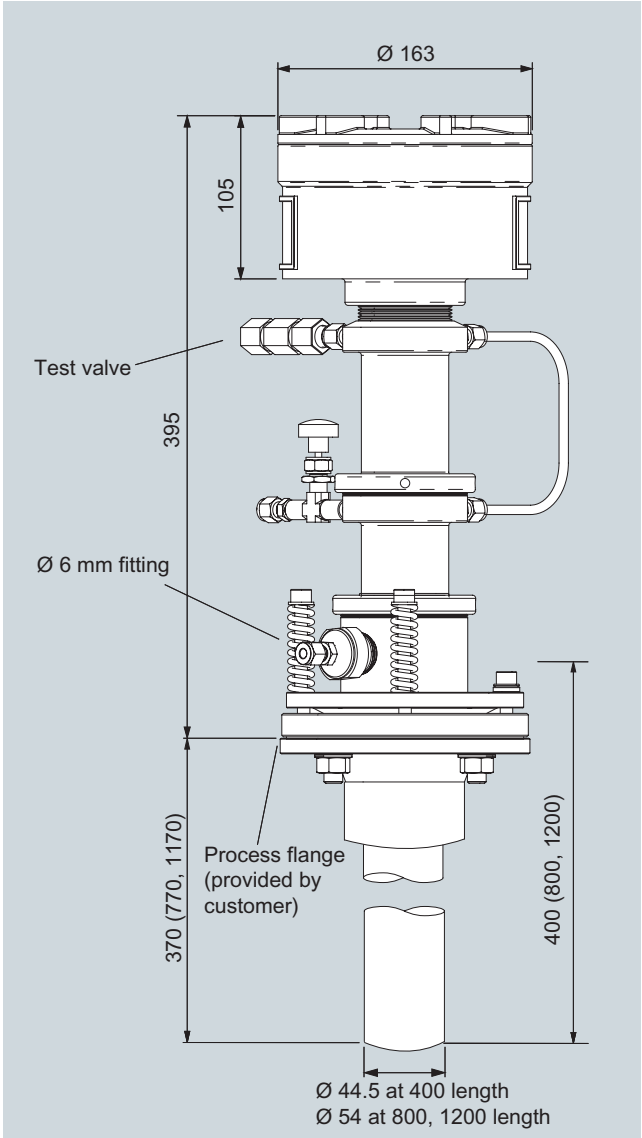
Cross-duct sensor CD 6



Cross-duct sensor CD 6, blower purging, version according to Order No. 7MB6122-**G1*-0***, dimensions in mm



Cross-duct sensor CD 6, sensor and process side purging, version according to Order No. 7MB6122-**H1*-0***, dimensions in mm

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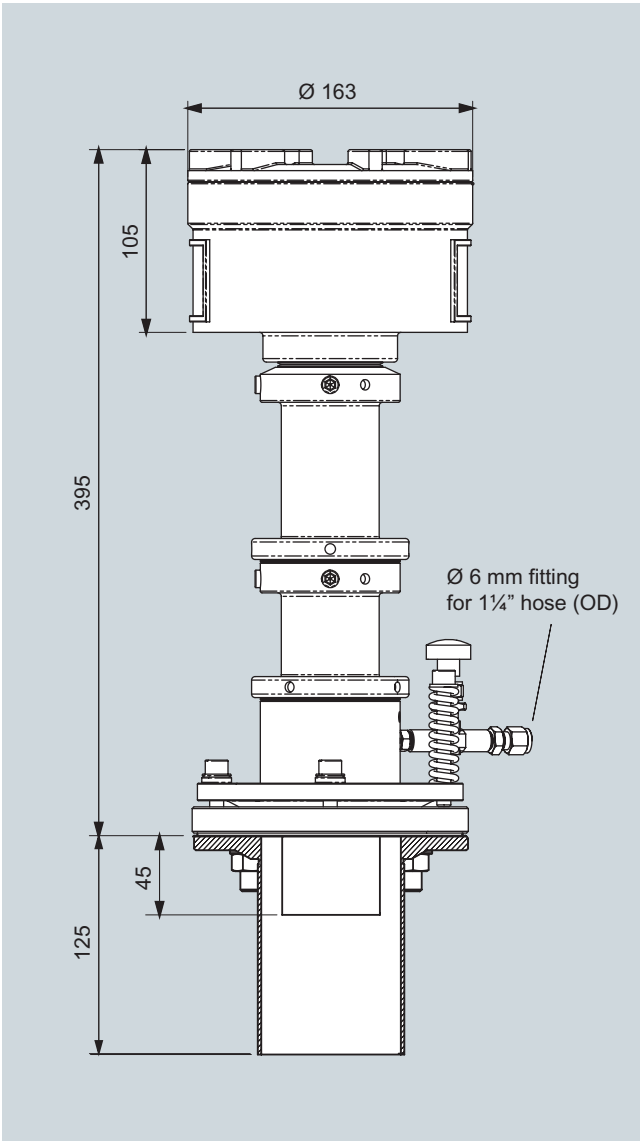
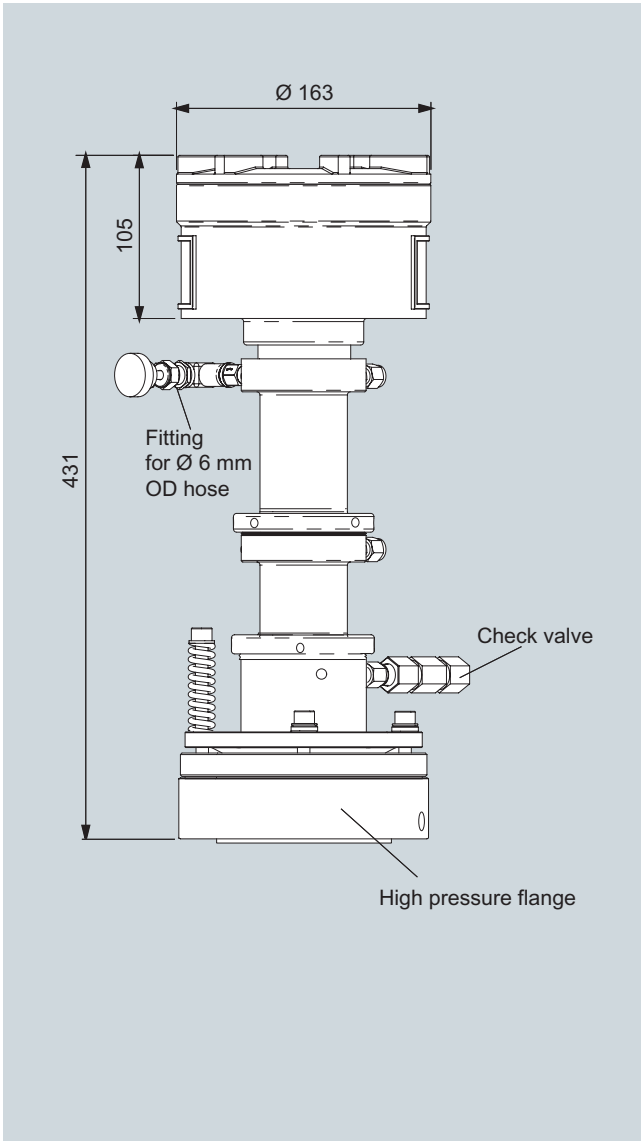


Cross-duct sensor CD 6, purged version for application SCR_DeNOx/ automotive, version according to Order No. 7MB6122-*WC14-2***, dimensions in mm



CD 6 high-pressure sensor for oxygen, dimensions in mm

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Documentation

Selection and ordering data

Manual	Order No.
LDS 6 manual	
• German	**A5E00295893**
• English	**A5E00295894**
• French	**A5E00295895**
• Italian	**A5E00295896**
• Spanish	**A5E00362720**

Suggestions for spare parts

Selection and ordering data

LDS 6 does not contain parts subject to wear, but some parts within the sensors might be stressed. For this reason it is recommended for demanding applications to keep window modules and detector electronics on stock (quantities stated per measuring point, i.e. per sensor pair).

Description	Quantity for 2 years	Quantity for 5 years		Order No.
CD 6, window module, quartz	1	2		**A5E00338487**
CD 6, window module, engine test bay, no purging	1	2		**A5E00338490**
CD 6, high-pressure window for SS 2343 DN 65/PN 6	1	2		**A5E00534662**
CD 6, high-pressure window for SS 2343 DN 80/PN 16	1	2		**A5E00534663**
CD 6, high-pressure window for SS 2343 ANSI 4"	1	2		**A5E00534664**
CD 6, Roctex gasket for sensor	1	2	D)	**A5E00853911**
CD 6C, high-pressure window DN 80/PN 16	1	2		**A5E00534671**
CD 6, sensor electronics FO InGaAs (version 2)	1	1		**A5E01090409**
CD 6, sensor electronics FO Ge, only HCl (version 2)	1	1		**A5E01090413**
CD 6, sensor electronics SW, only O_2	1	1		**A5E00338533**
CD 6C and FT 6, sensor electronics Ippm H_2O (version 2)	1	1		**A5E01090420**
CD 6, sensor electronics ATEX SW, only O_2	1	1		**A5E00338563**
CD 6, sensor electronics ATEX HCl	1	1		**A5E00853896**
CD 6, sensor electronics ATEX HF	1	1		**A5E00853905**
CD 6, sensor electronics ATEX NH_3, CO, CO_2	1	1		**A5E00338572**
CD 6C and FT 6, sensor electronics Ippm H_2O ATEX	1	1		**A5E00924868**

D) Subject to AL export regulations: 9I999, ECCN: N

For the suitability of different parts (version 1 or version 2) please consult the instrument manual or contact Siemens directly. In general, all new analyzers are compatible with spare parts of version 2.