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Detect, Measure, Analyze.

Thank You for Attending Today's Webinar:

Oxygen Measurement in Safety Critical Applications

Your Host

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Today's Agenda:

- Measuring oxygen in critical applications
- In-situ vs grab-sampling technologies
- Maintenance requirements in safety applications
- Application considerations
- Using laser diode spectroscopy for fast response
- Ask the Expert: Your questions answered

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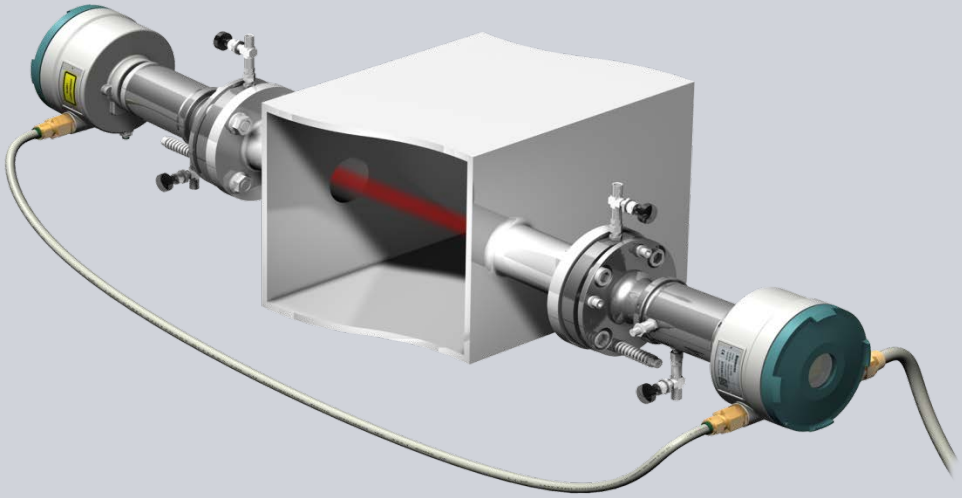
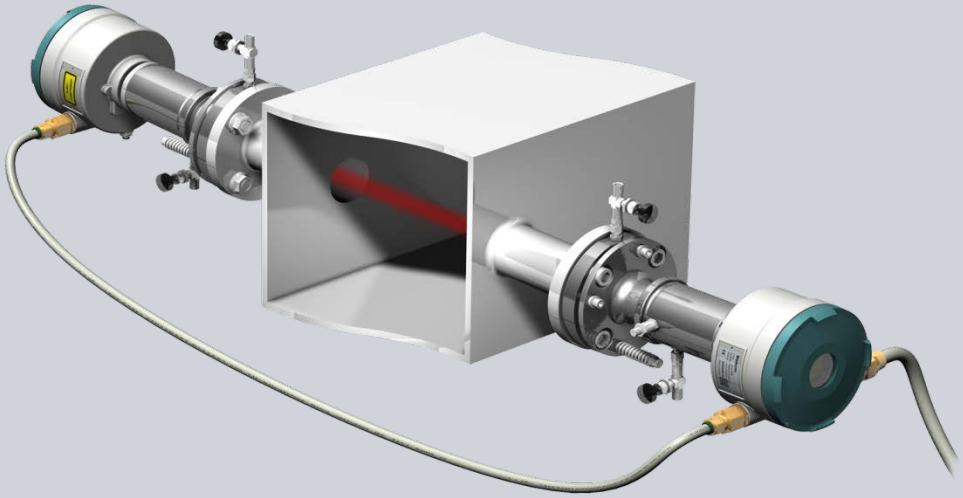
Sitrans SL Tunable Diode Laser for

O2 Measurement



What is SITRANS SL?

Introduction



- SITRANS SL is an all-in-one transmitter-like laser gas analyzer for oxygen measurement
- SITRANS SL is a non fiber optic-based system
- SITRANS SL has a similar same sensor look as the LDS 6,
  but requires no central unit

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Market Positioning and Target Applications

Introduction

- **Chemical Applications**:
  - Safety monitoring
  - Process control
- **Combustion control for boilers**
- **Combustion control for MWIs**
- **Steel plants**
  - Converters
  - Coke gas

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Technology

System overview

Transmitter

Transmitter Housing Unit

Transmitter Tube Unit

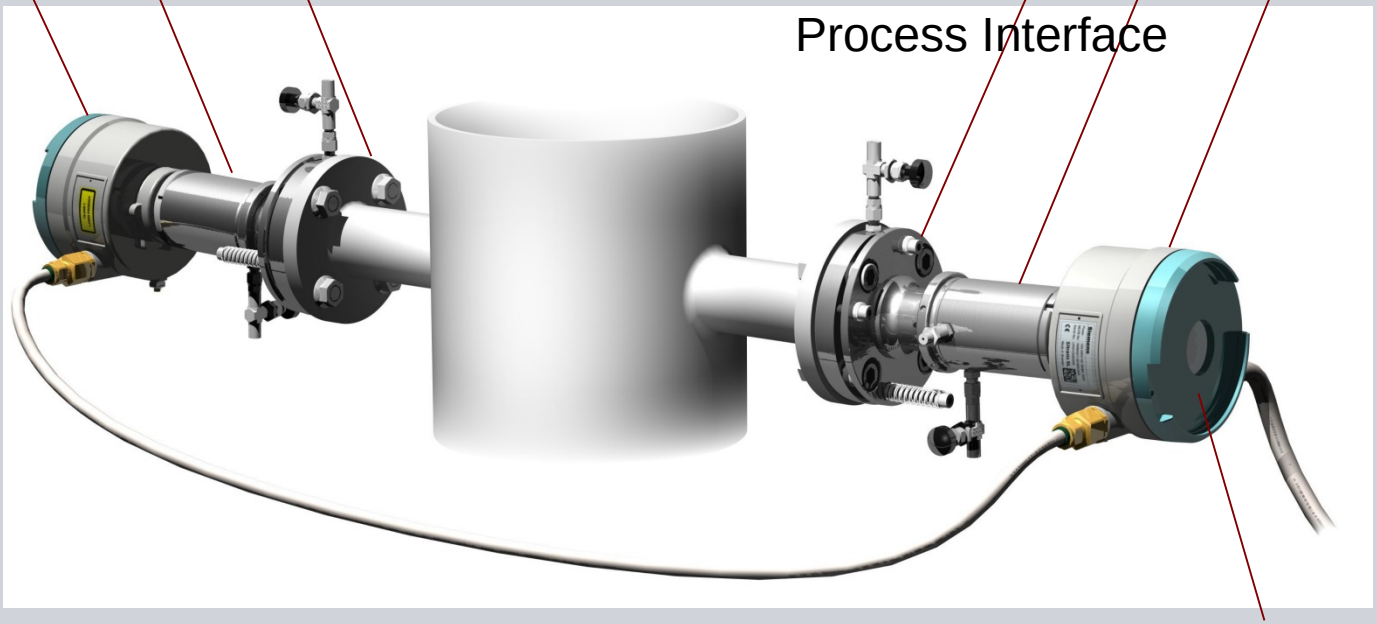
Process Interface

Receiver

Receiver Housing Unit

Receiver Tube Unit

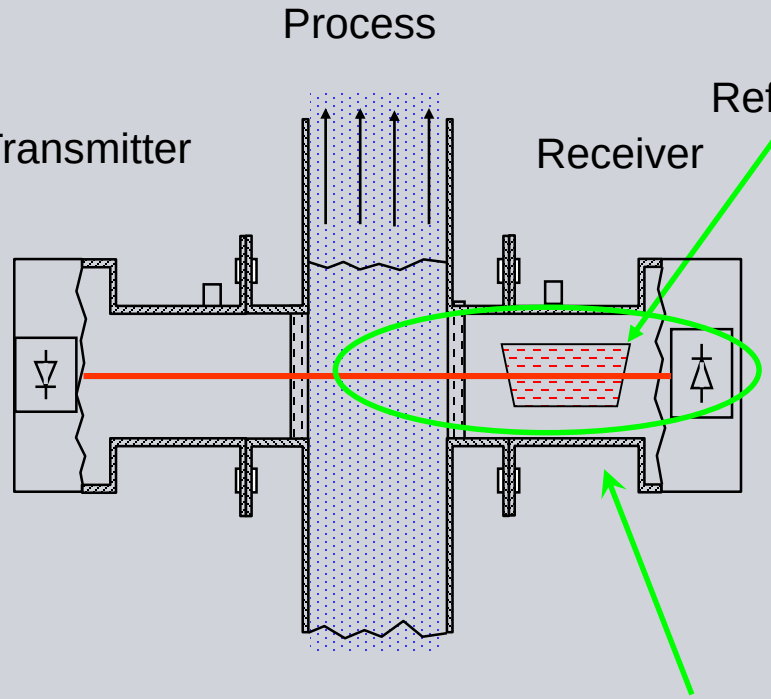
Process Interface

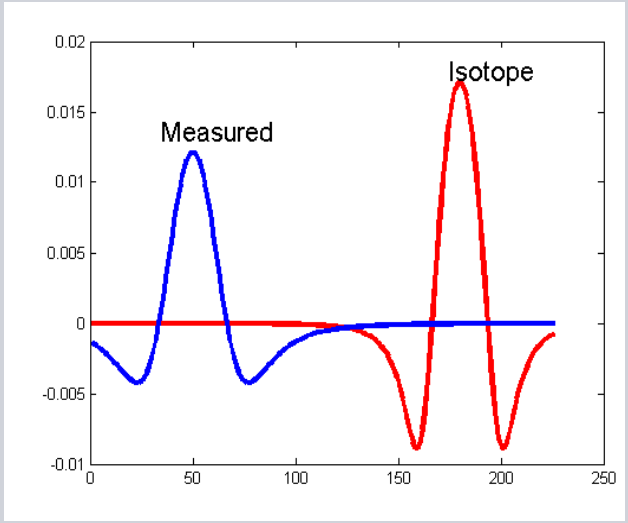


Local User Interface

SITRANS SL: Reference cell

Technology





- **Built-in Reference Cell, filled with oxygen isotope $^{18}O_2$**
- **No interferences with oxygen of process gas ($^{16}O_2$)**
- **Locking signal is always available**
- **Higher Accuracy and long-term stability**

SITRANS SL: EEx-d design (explosion protection by encapsulation)

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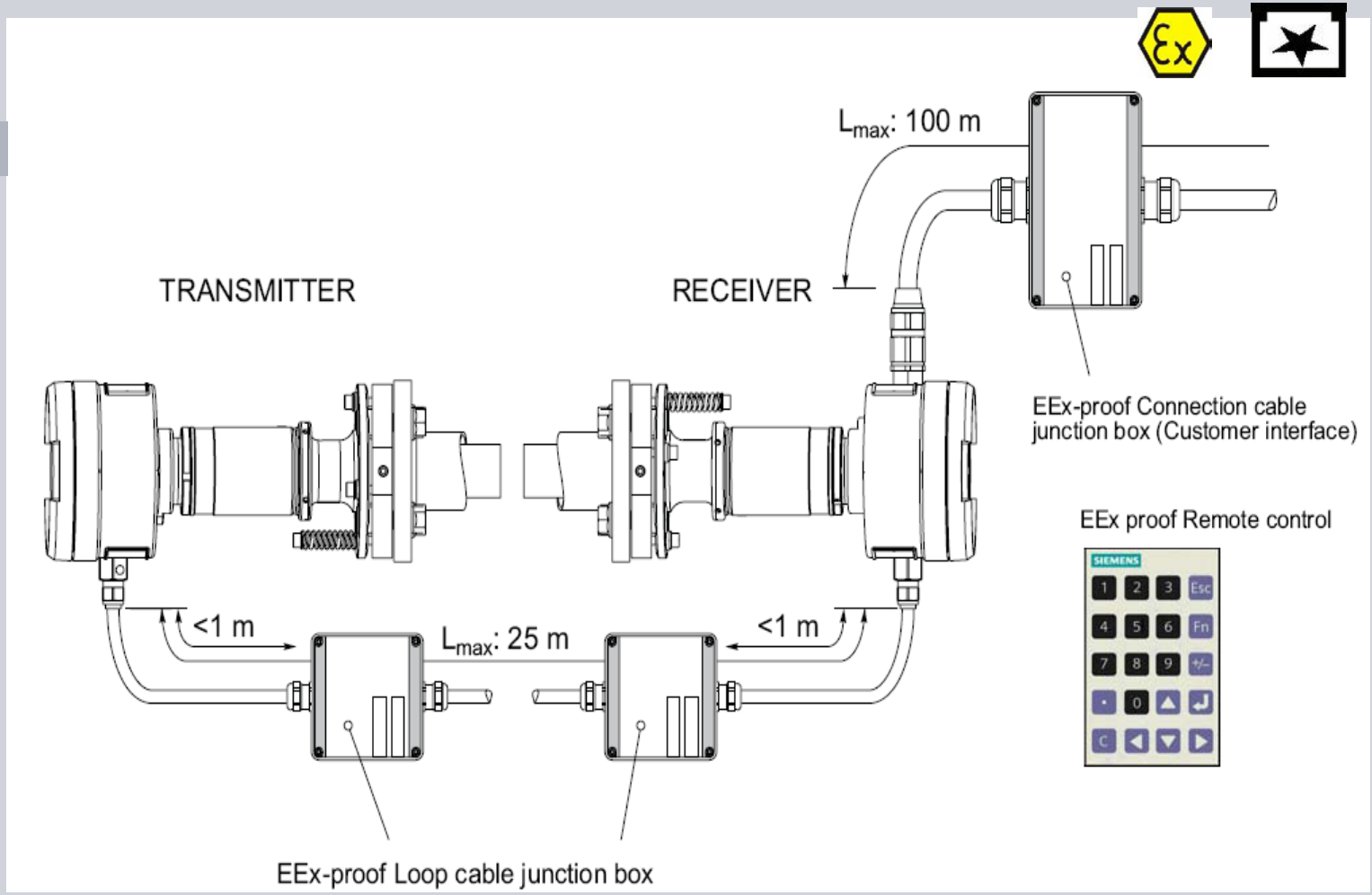
Technology



COST OF OWNERSHIP COMPARISON

	IN SITU	EXTRACTIV
Instrument cost	assuming slightly equal	
Installation work	2 flanges	1 flange
	cabling	cabling
	pneumatic or fan	pneumatic
	Field device	shelter
Start up	easy and with no specific parts needed, no calibration in the field	long, specific parts, calibration
Utilities	Instrument air + low power	Instrument air + high power
Consumable parts	No	significant
Service	None or almost none	significant

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Comparison of in-situ CGA Technologies – Customer Benefits

Technology	Conventional in-situ		In-situ with laser
	IR, UV-VIS, ZrO_2		**Tuneable diode laser**
	Sensitive to dust and/or alignment	→	Insensitive to dust. Alignment needs to be within +/- 1 degree!
	Cross interference very likely:		No cross interferences!
	→ H_2O, CO_2, SO_2, CO, HC		
	Limited lifetime of light source, probe	→	Life time of diode laser (> 6 y)!
	Off-line calibration by test gases	→	Self calibration by build-in ref. cell!
	Delay due to signal treatment	→	Real-time measurement!
	ZrO_2-Probe: point like measurement		Line-of-sight measurement!

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Applications

Gas, (gas code)	**O_2,** (A)	**O_2,** (A)	**O_2,** (A)
Standard application (application code)	Combustion Control, (B)	Safety Monitoring (C)	Process control, (D)
Typical measurement range (depends on path length)	0 – 100 Vol%	0 – 8 Vol%	0 – 30 Vol%
Optical path length	< 8 m	<8 m	< 8 m
Precision (@ 1013 mbar, RT, 1m path length)	0.02 Vol%	0.02 Vol%	0.02 Vol%
Temperature range	0 … 600 °C	0 … 200 °C	0 … 200 °C
Pressure range	900 ... 1100 hPa	700 … 5000 hPa	700 … 5000 hPa
Dust load (@1m path length)	<20g/m^3	<10g/m^3	<10g/m^3
Response time	Approx. 1 s	Approx. 1 s	Approx. 1 s
Integration time	10 s	10 s	2 s
Purging gas, sensor side	N_2	N_2	N_2
Purging gas, process side	N_2	- / N_2	- / N_2

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Summary

SITRANS SL – Setting a new TDLS Technology Benchmark

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Summary

- **O18 reference cell**
  - ⇨ non-interfering reference gas
  - ⇨ Less demand for re-calibration (minimum for 1 year!)
  - ⇨ Stability and Availability
- **EEx-d version as standard, without need of additional EEx-p pressure control units**
- **Wireless parameterization in EEx-zones**
- **Profibus DP communication as an option**
- **Unparalleled cost / performance ratio for single-point measurements**
- **Low maintenance**
- **Easy to align and service**

Thank you very much

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Upcoming Webinar:

Gas Detection

Thursday, September 15 1pm CST

Featured Speaker

Werner Haag

Environmental Applications Chemist,
Ion Science USA

Webinar invitation e-mail coming soon...