



OpreX™ Analyzers

TDLS8000

Tunable Diode Laser Spectrometer

The best just got better

Yokogawa's new TDLS8000 houses all of the industry's leading features in one robust device.

- SIL2 TruePeak combined with smart laser technology
- Intuitive touchscreen HMI
- HART and Modbus TCP communications standard
- 8-stage auto-gain adapts to difficult applications
- Fully field repairable with 50 days of data and spectra storage
- Compact design for one-man installation without sacrificing ruggedness
- Area classification Zone2/Div2 or Zone1/Div1
- Conforms to Marine certification and QAL1



Fired Heater Combustion, Safety, and Lifecycle Management

Yokogawa TDLS8000 O₂ and CO + CH₄ measurements provide reliable information to achieve;

- Combustion Efficiency Improvement
- Safety Improvement
- Longer Life time of the coils and coil hangers
- Higher throughput of the process heating



Limiting O₂ Concentration for safety and process monitoring & control

Yokogawa TDLS8000 O₂ analyzer achieves;

- No Sampling system Operation
- Fast Response Analysis
- No Interference Analysis
- Less Maintenance Operation

System Configuration

- **Standard System configuration**
 - HART communication available

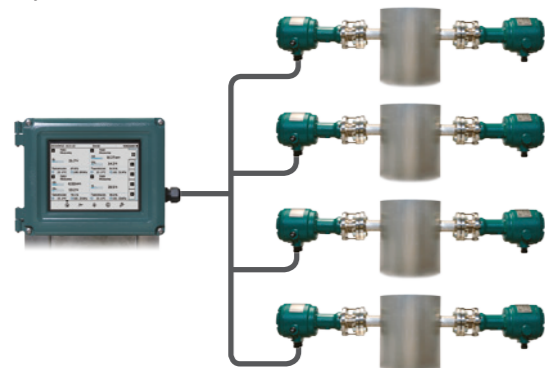


- **System configuration with HMI**



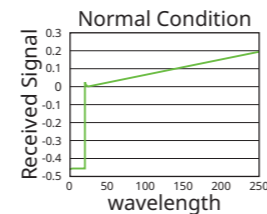
- **Multi Analyzer configuration with Remote HMI**

- Up to 4 units connection available

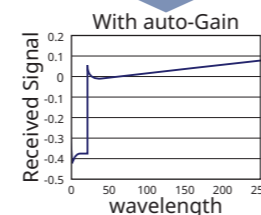
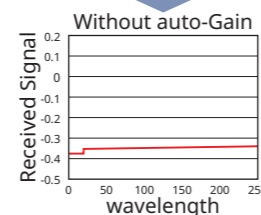


High Reliability

- **Reference Cell**
 - Internal reference cell in the laser module ensures peak locking during trace measurement.
- **Auto gain**
 - Auto-gain enables wide signal ranges against dynamic variation of transmission.

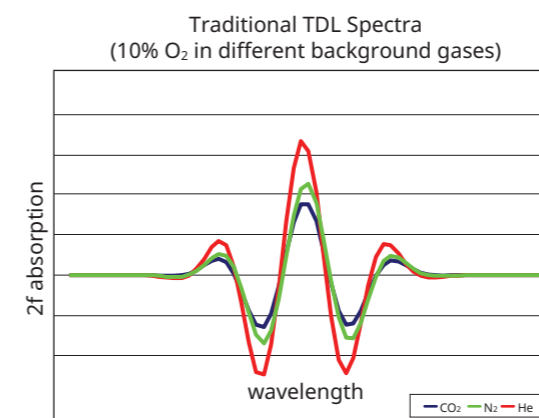
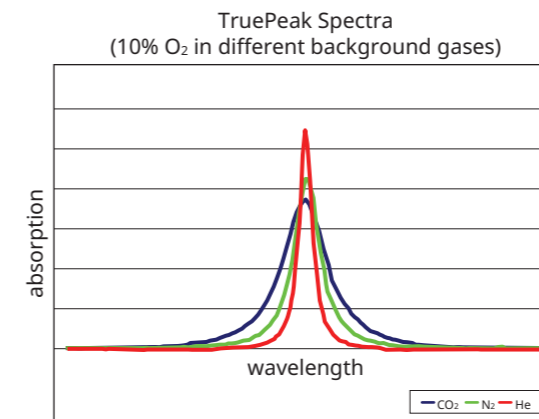


Transmission is lowered by dust, moisture, or vapor



- **Validation**
 - Validation can be initiated manually, remotely, or automatically on a daily, weekly or monthly basis defined by the user.
- **SIL2 certified**
 - IEC61508 SIL designed & approved, SIL2 capability for single analyzer use, SIL3 capability for dual analyzer use.
- **Marine certification: DNV Type Approval**
 - Certificate No: TAA000030E
- **Obtained QAL1 certification**
 - Compliance with European Emission Directives EN 14181 and EN 15267-3 (QAL1)

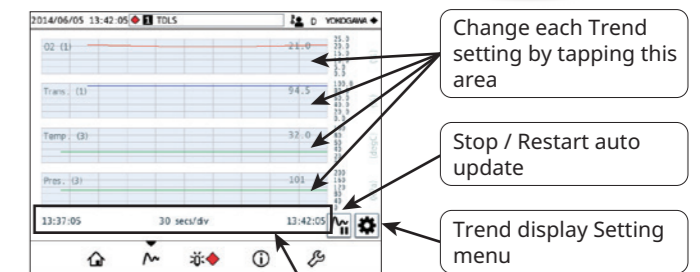
TruePeak



The TruePeak we can measure the area of the absorbance peak. This eliminates effects from changing background gases, allowing for simple pressure and temperature compensation.

Intuitive touchscreen HMI

- **Touchscreen 7.5 inch color LCD on HMI**
 - Makes it simple to operate.
 - Gives all the information including trend graph and eliminate PC to maintenance.
 - Can be remotely installed.



Change each Trend setting by tapping this area

Stop / Restart auto update

Trend display Setting menu

Change Time scale by tapping this area

Trend Graph

- **Mini Display**
 - Optical transmission at both the ends for easy alignment.



Sensor Control unit



Laser unit

Specifications

TDL8000

STANDARD SPECIFICATIONS

Measurement object	O ₂ , CO, CO or CH ₄ , CO ₂ , CO + CO ₂ , H ₂ O, NH ₃ , H ₂ S, HCl concentration in combustion exhaust gas and process gas		
Measurement system	Tunable diode laser spectroscopy		
Measured components and ranges	Measured component		Min. range
	O ₂		0-1%
	CO (ppm)		0-200 ppm
	CO or CH ₄	CO	0-200 ppm
		CH ₄	0-10,000 ppm
	NH ₃		0-30 ppm
	H ₂ O (ppm) in non HC		0-30 ppm
	H ₂ O (ppm) in HC		0-30 ppm
	CO (%)		0-20%
	CO (%) + CO ₂ (%)		0-30%
	NH ₃ + H ₂ O	NH ₃	0-30 ppm
		H ₂ O	0-5,000 ppm
	H ₂ S		0-5%
	CO ₂ (%) High Range		0-5%
	CO ₂ (%) Extend. Range		0-30%
	H ₂ O (%)		0-10%
	HCl		0-50 ppm
	HCl + H ₂ O	HCl	0-30 ppm
		H ₂ O	0-100 ppm
HF		0-10 ppm	
Optical path length	Optical distance between the laser unit and the sensor control unit Standard; 0.5 to 6 m, Max; 30 m (With LAO)		
Analog output	2 points, 4 to 20 mA DC Output types; Gas concentration, Transmission, Process gas temperature, Process gas pressure Output range; 3.0 to 21.6 mA DC		
Digital communication	HART, Ethernet		
Digital output	2 points, contact rating 24 V DC, 1 A DO; Function: Activate during Warning / Calibration / Validation / Warm up / Maintenance conditions Fault; Function: Activate during Fault condition or when the system power is off		
Valve control output	2 points Function; Activate calibration or validation solenoid valves for zero, span or validation gas Output signal; 24 V DC, 500 mA Max. per terminal		
Digital input	2 points Function; External alarm/Calibration start/Validation start/Stream switch Contact specification; Zero voltage contact input Input signal; Open signal; 100 kΩ or more, Close signal; 200 Ω or less		
Analog input	2 points, 4 to 20 mA DC Input types; Process gas temperature, Process gas pressure		
Self-diagnostics	Laser Unit temperature, Sensor Control Unit temperature, Laser temperature, Detector signal level, Memory read/write function, Peak locking condition		
Calibration	Calibration method; Zero/Span calibration Calibration mode; Manual, Auto (Time initiate, Remote initiate (DI/Modbus)), Semi-Auto (YH8000/HART)		
Validation	Validation method; Up to 2 points Validation mode; Manual, Auto (Time initiate, Remote initiate (DI/Modbus)), Semi-Auto (YH8000/HART)		
Power supply	24 V DC ± 10%		
Warm-up time	5 min.		

Protection degree	IP66, NEMA Type 4X
Hazardous area classifications	Division 1, Zone 1; Explosion-proof/ Flame-proof type; IECEx, ATEX, FM (US, Canada), Korea Ex, EAC, INMETRO, Japan Ex Division 2, Zone 2; Non-Incendive/Type n; IECEx, ATEX, FM (US, Canada), Korea Ex, NEPSI, EAC, INMETRO, Japan Ex
Process gas condition	Process gas temperature; Max. 1500 °C Process gas pressure; Max. 1 MPa abs., Min. 90 kPa abs. Dust in process gas; 20 g/m ³ or less
Installation condition	Ambient operating temperature; -20 to 55 °C Storage temperature; -30 to 70 °C Humidity; 0 to 95%RH at 40 °C (Non-condensing) Mounting flange type; ASME B 16.5, DIN, JIS Gas connections; 1/4 NPT or Rc1/4

PERFORMANCE

Measured gas	Repeatability	Linearity
O ₂	+/- 1% reading or +/- 0.01% O ₂ , whichever is greater	+/- 1% F.S.
CO (ppm)	+/- 2% reading or +/- 1 ppm CO, whichever is greater	+/- 1% F.S.
CO or CH ₄	CO	+/- 2% reading or +/- 1 ppm CO, whichever is greater
	CH ₄	+/- 4% reading or +/- 0.02% CH ₄ , whichever is greater
NH ₃	+/- 2% reading or +/- 1 ppm NH ₃ , whichever is greater	+/- 2% F.S.
H ₂ O (ppm) in non HC	+/- 2% reading or +/- 0.1 ppm H ₂ O, whichever is greater	+/- 1% F.S.
H ₂ O (ppm) in HC	+/- 2% reading or +/- 0.1 ppm H ₂ O, whichever is greater	+/- 1% F.S.
CO (%)	+/- 1% reading or +/- 0.01% CO, whichever is greater	+/- 1% F.S.
CO (%) + CO ₂ (%)	CO	+/- 1% reading or +/- 0.1% CO, whichever is greater
	CO ₂	+/- 1% reading or +/- 0.1% CO ₂ , whichever is greater
NH ₃ + H ₂ O	NH ₃	+/- 2% reading or +/- 1 ppm NH ₃ , whichever is greater
	H ₂ O	+/- 4% reading or +/- 0.05% H ₂ O, whichever is greater
H ₂ S	+/- 1% reading or +/- 0.005% H ₂ S, whichever is greater	+/- 1% F.S.
CO ₂ (%) High Range	+/- 1% reading or +/- 0.005% CO ₂ , whichever is greater	+/- 1% F.S.
CO ₂ (%) Extend. Range	+/- 1% reading or +/- 0.02% CO ₂ , whichever is greater	+/- 1% F.S.
H ₂ O (%)	+/- 1% reading or +/- 0.004% H ₂ O, whichever is greater	+/- 1% F.S.
HCl	+/- 1% reading or +/- 2.5 ppm HCl, whichever is greater	+/- 2% F.S.
HCl + H ₂ O	HCl	+/- 2% reading or +/- 2.5 ppm HCl, whichever is greater
	H ₂ O	+/- 4% reading or +/- 0.05% H ₂ O, whichever is greater
HF	+/- 2% reading or +/- 0.2 ppm HF, whichever is greater	+/- 2% F.S.

YH8000

Display	Touchscreen 7.5 inch TFT color LCD panel, 640 x 480 (VGA)
Communication	Ethernet; RJ-45 connector, Communication speed; 100 Mbps
Protection degree of enclosure	IP65, NEMA Type 4X
Weight	Approx. 4 kg
Mounting	Analyzer mount (Front, left-side, right-side) with tilt function, Pipe mount or Panel mount
Cable Entries	1/2NPT or M20 x 1.5 mm, two holes
Installation conditions	Ambient operating temperature; -20 to 55 °C Storage temperature; -30 to 70 °C Humidity; 10 to 90%RH at 40 °C (Non-condensing)
Power Supply	24 V DC ±10%
Hazardous area classifications	Division 2, Zone2: Non-Incendive/Type n; IECEx, ATEX, FM (US, Canada), Korea Ex, EAC, INMETRO, Japan Ex

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