

# The Process TDLS Solution



## TDLS 200

Tunable Diode Laser Spectroscopy (TDLS) Analyzer

Bulletin 11Y01B01-E-A

[www.yokogawa.com/an/index.html](http://www.yokogawa.com/an/index.html)

# The **first** Tunable Diode Laser analyzer, designed **specifically** for process analysis

## INNOVATIVE

Our TruePeak Process Laser Analyzer uses a tunable diode laser and measures across an infrared absorbance region. This means you can make measurements in the most demanding applications (high dust, corrosive, aggressive) typically **without sample conditioning**.

## ACCURATE

The TruePeak measurement integrates the area of the absorbance rather than measuring peak height or peak width value alone. This means you get a true **interference free** analysis.

## DEPENDABLE

TruePeak measurement ensures accuracy even during simultaneous sample pressure, temperature, and background gas changes.

## PROCESS HARDENED

Flexible installation options, materials of construction, and validation methods makes the Yokogawa TDL a perfect solution for the most aggressive process applications. A unique alignment method allows adjustment without compromising the process seal.

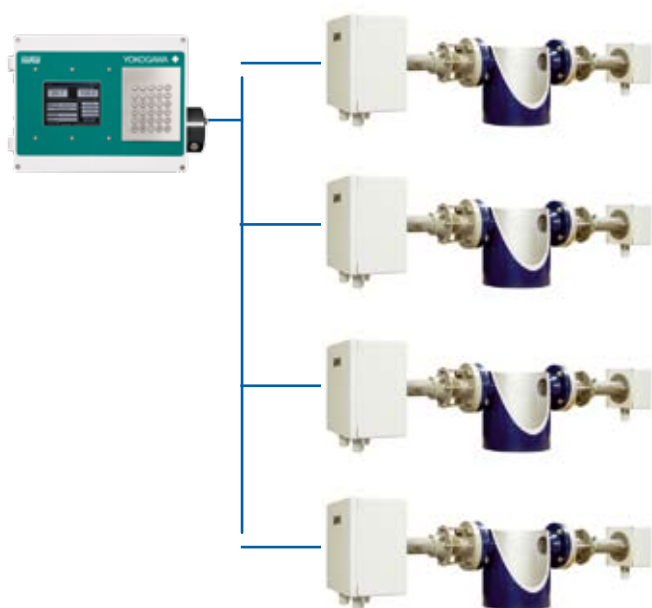
## USER INTERFACE

### ▶ **STAND ALONE**

- Mini Display (integral or remote), 4x20 VFD with scrolling information
- 7" Color Screen with Keypad

### ▶ **REMOTE INTERFACE UNIT (RIU)**

- Interface only, not required for analyzer operation
- 7" Color Screen with Keypad
- Connects 1 to 4 analyzers with central display/keypad (For more than 4 contact factory.)



## RELIABILITY

### ▶ **ENHANCED DIAGNOSTICS**

Built In diagnostics with on board CPU, data storage, and retrieval. No PC required to record data, spectra, and critical diagnostics.

- Data transfer via ethernet or memory stick
- Spectra capture (timed, manual capture, event-based)

### ▶ **MAINTENANCE**

- All components field repairable
- Remote diagnostics and analyzer control



# The Process TDLS Solution

- ▶ In situ analysis
- ▶ Interference free
- ▶ TruePeak measurement
- ▶ Rapid measurement (as fast as 2 seconds)
- ▶ Process pressure up to 20 bar
- ▶ Process temperature up to 1500° Celsius
- ▶ Optical measurement - no sensor contact with process
- ▶ Flexible installation options
- ▶ Aggressive applications - high particulate, corrosives, and more

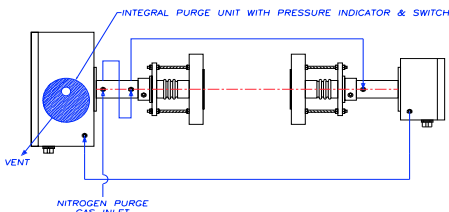


## HAZARDOUS AREA

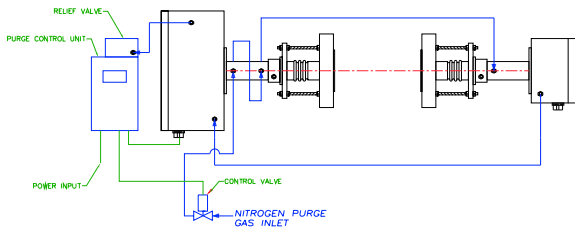
### ▶ NEC CLASS 1, DIV 2 GROUP

#### **B,C,D WHEN PURGED**

- Suitable for Division 1 or 2 Installations with Purge System
- CSA/CSAu Special Acceptance Available



Analyzer for Division 2 Configuration



Analyzer for Division 1 Configuration

## COMMUNICATIONS

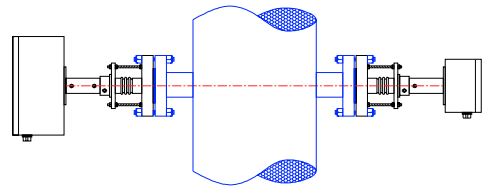
### ▶ WIRED

- Analog Outputs (3, 4-20mA)
- Digital Outputs (Warning/Fault Relays + 3x Valve Control)
- Ethernet (standard)
- USB Data Transfer (standard)
- Other Options Available

## PROCESS INTERFACE

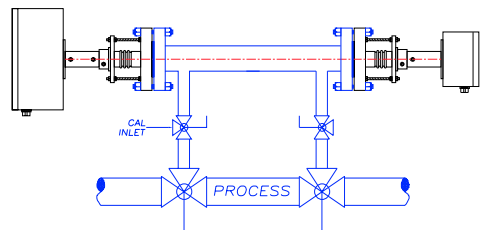
### ▶ IN SITU

Measurement across the process (stack or pipe)



### ▶ BYPASS

Process is diverted through a bypass line where analyzer is installed. Allows isolation of analyzer for verification, calibration, and maintenance.



Bypass/Close Coupled Extractive

### ▶ CLOSE COUPLED EXTRACTIVE

Process is extracted to a flow cell where analyzer is installed. Allows isolation of analyzer for verification, clarification, and maintenance.

### ▶ TRUE PROCESS INTERFACE

Alignment without affecting the process seal is achieved by the use of a flexible bellows.



## COMBUSTION CONTROL

Ever increasing energy prices and the need to minimise harmful emissions require now more than ever that the combustion process needs to be fully optimised by controlling the air fuel ratio to ensure minimum energy use for maximum reward.

Measurement of excess oxygen and carbon monoxide on a precise and continuous basis is the recognised methodology. Tuneable diode lasers (TDLS) together with zirconia based  $O_2$  analyzers enable a range of fast and accurate measurements of waste combustion gas for point or space average. Additionally, CO can for the first time be accurately measured on a continuous basis at low ppm levels using TDLS such that air fuel ratios can be precisely and continually optimised.



## REFINERY

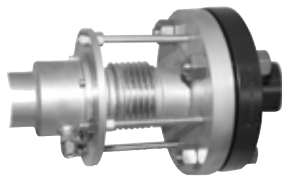
In addition to straightforward combustion control (where TDLS can monitor in combustion chambers across multiple burners), laser based analyzers can now be offered (patent applied for) which monitor  $CO$ ,  $CH_4$  and  $O_2$  to enable burner flame out and process tube leaks to be identified.

Additionally,  $O_2$  on flare lines, Alkylation Units and Gas plant as well as  $CO$  and  $O_2$  on FCCU's for safety and catalyst regeneration and low ppm  $H_2O$  in hydrocarbons in catalytic reforming are among many applications of these fast non contacting devices.

## PROCESS INTERFACE

### ► OPTIONS

Windows, O-rings and wetted metal parts available for corrosive/lethal service  
Insertion tubes to reduce path length for high particulate applications.  
Window purge protection for flow cell and in-situ applications available.



### ► LAYERS OF PROTECTION

Optional second window set provides seal, chamber behind process window, purge-able (can be monitored for breakthrough).

## VALIDATION

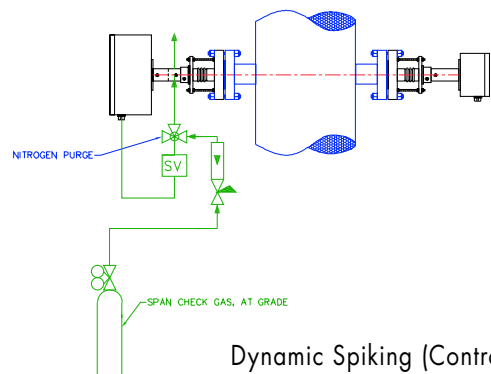
### ► VALIDATION

Validation can be initiated manually, remotely, or automatically on a daily, weekly, bi-weekly, or monthly basis with time defined by the user.

### ► AUTOMATED DYNAMIC SPIKING

With integral bump cell and analyzer driven valve control, on line validation can be performed using dynamic spiking. Gas standard and Nitrogen are alternately sent to the bump cell which is in series with the process gas being measured.

## VALIDATION

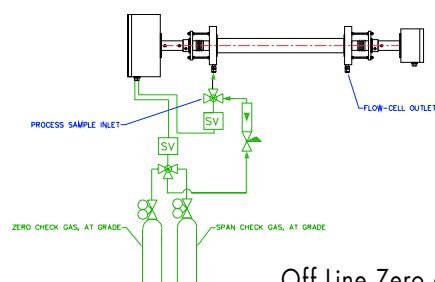


Dynamic Spiking (Controlled and Recorded by Analyzer)

### ► OFF LINE

For cross stack/pipe installations, analyzer can be mounted on a calibration cell to check or calibrate zero and span.

For bypass or close coupled extractive installations, analyzer can be isolated from the process to check or calibrate zero and span. This process can be automatically controlled by the analyzer.



Off Line Zero and Span (Controlled and Recorded by Analyzer)

# TECHNICAL SPECIFICATIONS

<b>Path Length</b>	0.5-30 meters
<b>Response Time</b>	2-20 seconds
<b>Accuracy</b>	Application Dependent
<b>Linearity</b>	R2=0.9999
<b>Ambient Temperature</b>	Continuous operation - 10°C to 50°C, start up temperature 0°C to 50°C. Extended temperature installation options are available please contact Yokogawa.
<b>Analog I/O (optional)</b>	<b>Outputs:</b> Concentration/Transmission (3@0/4-20mA isolated) Sub 4mA for warnings/faults <b>Inputs:</b> Pressure/Temperature Feed for Compensation (2@4-20mA isolated, powered or loop power)
<b>Digital I/O</b>	<b>Outputs:</b> •Warning/Fault/Concentration Limit Relays (3 Form C Relay SPDT rated 1A@24VDC) •Valve Control (3@24VDC, Max 10W per valve), zero/span/dynamic spiking <b>Inputs:</b> Remote Validation (3 voltage free floating contacts) for zero/span/dynamic spiking
<b>Window Purge (if required)</b>	Application Dependent (Contact Yokogawa)
<b>Area Classification</b>	Zone/Div 1/2 with purge
<b>Communications</b>	Ethernet, IEEE 802.3, 10/100 Mbps, RJ45 Automatic USB data transfer (upload/download settings and data)
<b>Calibration</b>	Recommended Calibration Check Interval 3-6 Months

# GASES MEASURED

<b>O<sub>2</sub></b>	0.01% detection limit, Min Range 0-1%		<p>* Consult Yokogawa for ranges, other gas measurements possible. All detection limits for 1 meter path, 25°C, 1 bar.</p> <p>Consult representative for detection limits at other conditions</p>
<b>H<sub>2</sub>O (low range)</b>	0.2 ppm, Min Range 0-20ppm		
<b>H<sub>2</sub>O (high range)</b>	ppm to % levels	contact Yokogawa	
<b>CO (low range)</b>	low ppm range	contact Yokogawa	
<b>CO (high range)</b>	high-ppm to % levels	contact Yokogawa	
<b>CO<sub>2</sub></b>	low ppm range	contact Yokogawa	
<b>CO<sub>2</sub></b>	high-ppm to % levels	contact Yokogawa	
<b>CO + CO<sub>2</sub></b>	dual gas, % concentrations	contact Yokogawa	
<b>NH<sub>3</sub></b>	Minimum Range 0-30 ppm	contact Yokogawa	
<b>H<sub>2</sub>S</b>	High ppm to % level	contact Yokogawa	
<b>Detection Limits, accuracy, etc. are application dependant.</b>			<b>Contact Yokogawa for more details</b>

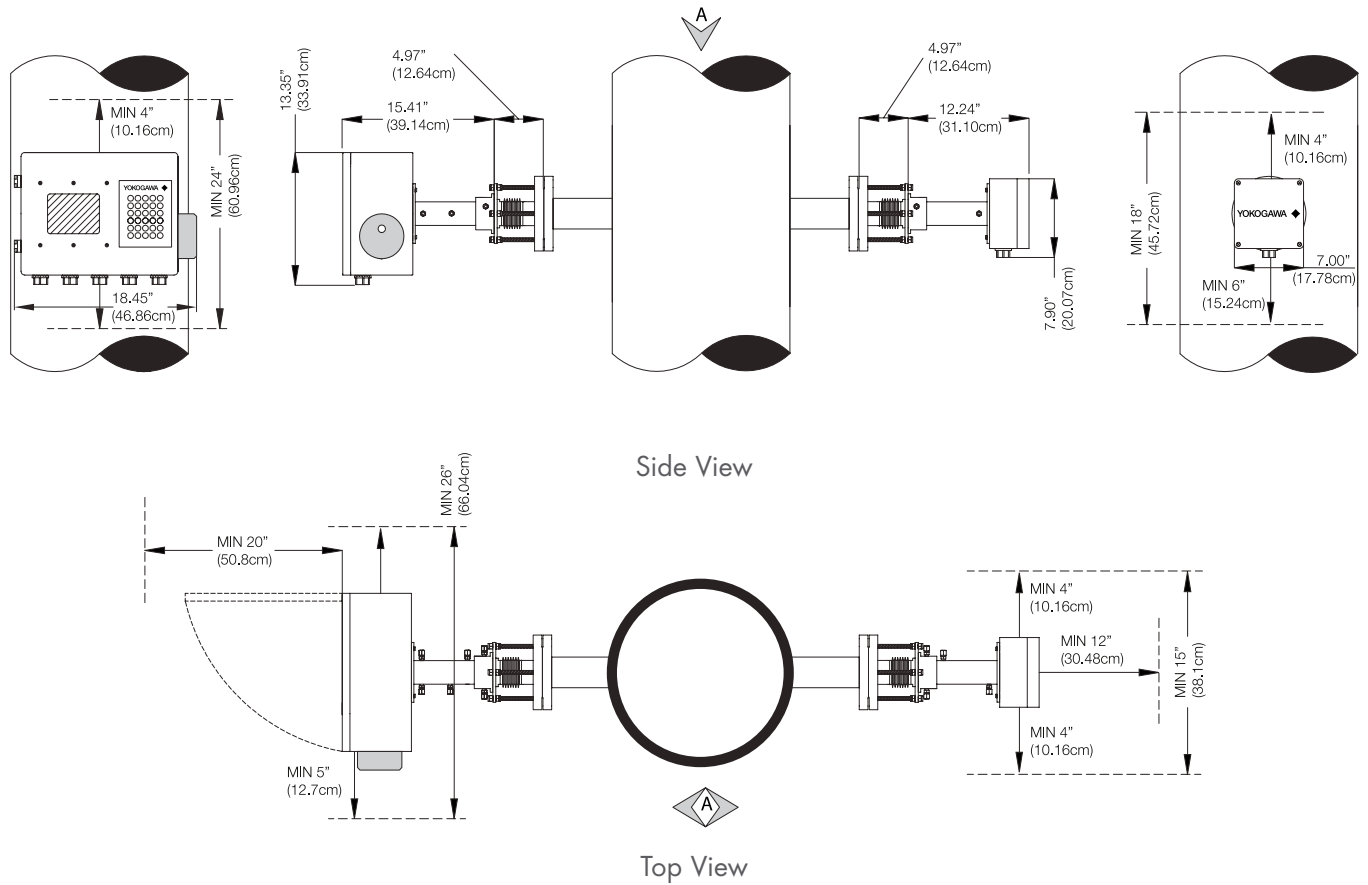
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CLEARLY

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IN ADVANCE

**ACT**  
WITH AGILITY



# Dimensions



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The clear path to operational excellence

VigilantPlant is Yokogawa's automation concept for safe, reliable, and profitable plant operations. VigilantPlant aims to enable an ongoing state of Operational Excellence where plant personnel are watchful and attentive, well-informed, and ready to take actions that optimize plant and business performance.

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