

# General Specifications

## TDLS5500 High Sensitivity Laser Spectrometer

GS 11Y01B04-01EN

### ■ General

TDLS5500 is a computerized device that measures the amount of gas contained in the process in real time. Gases are measured in parts per million (ppm by volume) or in milligrams per normal cubic meter ( $\text{mg}/\text{Nm}^3$ ) in the sample. The sampling of the gas is continuously performed by being pumped. In this manner, the sampled gas is continuously analyzed. The sampling is done continuously by pumping through a calibrated hole called sonic nozzle. Once the nozzle is passed, the gas is expanded to reach a pressure well below atmospheric pressure. This is Low Pressure Sampling (LPS). The sampled gas is guided to a low volume measuring tank: cell for analysis. The analysis is performed by infrared laser spectroscopy, OFCEAS (Optical Feedback Cavity Enhanced Absorption Spectroscopy).



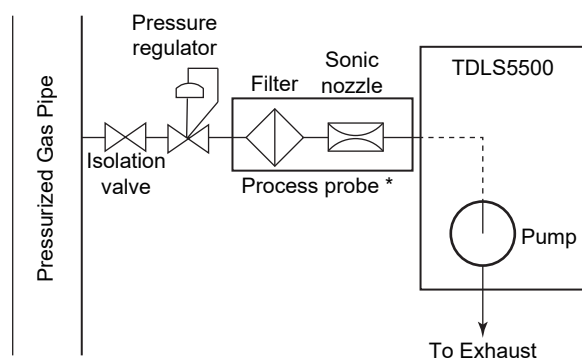
### ■ Applications

- Acetylene in ethylene
- Hydrogen sulfide in Natural gas
- Moisture in Natural gas

### ■ Features

- **The optical resonator structure makes the effective path length long (up to 30 km) and realizes ultra-high sensitivity.**
- **Low pressure sampling**
  - The interactions within the gas are reduced. This has a direct effect on the shape of the absorption peaks. It is thus easier to distinguish the different peaks and allow a very good selectivity. This eliminates the effects of cross-sensitivity and false positives.

### ■ System configuration



\*: The process probe is part of the product.

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## ■ Standard Specifications

Measurement object:

C<sub>2</sub>H<sub>2</sub> concentration in Ethylene,  
H<sub>2</sub>S concentration in Natural gas, or  
H<sub>2</sub>O concentration in Natural gas

If other gas measurements are required, consult with Yokogawa.

### Measurement performance

Measured components and ranges:

Measured component	Min. range	Max. range
C <sub>2</sub> H <sub>2</sub> in Ethylene	0-5 ppm	0-100 ppm
H <sub>2</sub> S in Natural gas	0-5 ppm	0-1000 ppm
H <sub>2</sub> O in Natural gas	0-5 ppm	0-500 ppm

Please consult with Yokogawa if the measuring range for your sample gas is outside of the above ranges.

Measured gas	Repeatability	Linearity	Response time (T10-T90)
C <sub>2</sub> H <sub>2</sub> in Ethylene	±2% of reading or ±50 ppb, whichever is greater	R <sup>2</sup> >0.99	within. 20 sec.
H <sub>2</sub> S in Natural gas	±2 % of reading or ±100 ppb, whichever is greater	R <sup>2</sup> >0.99	within. 10 sec.
H <sub>2</sub> O in Natural gas	0-100 ppm ±2% of reading or ±100 ppb whichever is greater 0-500 ppm ±2% of reading or ±500 ppb whichever is greater	R <sup>2</sup> >0.99	within. 30 sec.

Response time depends on the gas and the configuration, particularly from the length of the transfer line.

### Environment

Ambient operating temperature: 10 to 40°C  
Storage temperature: -10 to 60°C  
Relative humidity range: 10 to 90% non-condensing  
Pressure: 700 mbar to 1,300 mbar absolute.  
Installation requirements: Vibration-free

### Power supply

Power supply rating: 115V±10%, 48-62Hz  
230V±10%, 48-62Hz  
Power consumption: 500 W (max)

### Signal Output

Analog output: 4-20 mA  
Load resistance 600 Ω (max)  
Dry contact output: 5 points  
Contact rating 24 VDC, 1A  
Contact Specification: C-contact  
(COM/NO or COM/NC)

Modbus TCP/IP, RS232

### Mechanical and others

Protection degree: IP54  
Mounting: Indoor wall mount  
Case material: Stainless steel  
Display: 5.7" diagonal color screen  
Weight: 40 kg

### Sampling gas condition

Sampling pressure: 1 to 5 bar gauge  
Sampling flow rate: 60 L/h (max)  
Sampling Gas Temperature:  
80°C (max) non-condensation or non-freezing  
Exhaust: 0.2 bar gauge (max)  
Dust: Basically dust free

### Pressurization gas connections (ATEX)

Inlet pressure: 5 to 7 bar gauge  
Pursing flow rate: 5 Nm<sup>3</sup>/h (min)  
Purging time: 11 minutes (min)  
Dust: dust free  
Overpressure: 6 to 10 mbar  
Leakage flow rate: 2 Nm<sup>3</sup>/h (max)  
Note: The certification is valid for air pressurization only.

### Containment system

Inlet pressure: 5 bar gauge (max)  
Flow rate: 60 L/h (max)

### Regulatory

Safety conformity standards:  
EN61010-1, EN IEC 61010-2-030,  
EN 61010-2-010

Installation altitude: 2000 m or less  
Installation category: II  
Pollution degree: 2

Note: Installation category, called overvoltage category, specifies impulse withstand voltage. Pollution degree indicates the degree of existence of solid, liquid, gas or other inclusions which may reduce dielectric strength.

EMC conformity standards:

EN 55011 Class A Group 1  
EN 61326-1 Class A Table 2,  
EN 61326-2-3,  
EN 61000-3-2, EN 61000-3-3

\* For Class A equipment

RoHS conformity standards: EN IEC 63000  
REACH conformity standard:  
Regulation EC 1907/2006

Laser classification:

EN60825-1, Class 1 laser product

\* If you need to open the optical box, laser input can be up to 3B class. Safety optical laser glasses MUST be worn.

### Hazardous area classifications

ATEX Type of protection:  
II 2G Ex pxb IIC T3 Gb

Enclosure rating:  
IP4X (In accordance with EN 60529)

Applicable standards:  
ATEX Directive 2014/34/UE, Standards  
EN 60079-0 :2018  
EN 60079-2 :2014

## MODEL AND CODES

Model	Suffix Code	Option Code	Description
<b>TDLS5500</b>	.....	.....	High Sensitivity Laser Spectrometer
Type	<b>-S1</b>	.....	ATEX Pressurized enclosure "px" *
Gas Parameter	<b>-T1</b> <b>-S1</b> <b>-S2</b> <b>-H1</b>	..... ..... ..... .....	C <sub>2</sub> H <sub>2</sub> in Ethylene: 0-5 ppm / 0-100 ppm H <sub>2</sub> S in Natural Gas: 0-5 ppm / 0-100 ppm H <sub>2</sub> S in Natural Gas: 0-1000 ppm H <sub>2</sub> O in Natural Gas: 0-5 ppm / 0-500 ppm
Process Probe	<b>-P1</b>	.....	(for C <sub>2</sub> H <sub>2</sub> and H <sub>2</sub> S) OD1/4 inch, 100 µm nozzle + 2 µm Filter (for H <sub>2</sub> O) OD1/4 inch, 150 µm nozzle + 2 µm Filter
Power Supply	<b>-01</b> <b>-02</b>	..... .....	115 VAC, 50/60 Hz 230 VAC, 50/60 Hz
—	<b>-NN</b>	.....	Always -NN
—	<b>-NN</b>	.....	Always -NN

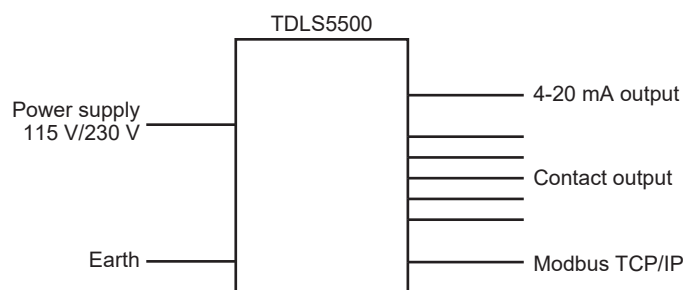
\*: This model is available for UKCA.

### Standard Accessories

Parts Name	Qty	Description
Pump maintenance kit	1	2x membranes viton, 4x clapets viton, 4x joints (o-rings)
Process Probe	2*	OD1/4 inch, 100 µm nozzle + 2 µm filter, or OD1/4 inch, 150 µm nozzle + 2 µm filter
SS Nut Fitting OD 1/4	4	SS Nut 1/4 for tube fitting
Ferrules set OD1/4	4	SS Set of rings for 1/4 tube fitting (Front ferrule and back ferrule)
Mounting bracket	4	For wall mount
Key of enclosure	1	used to open the door

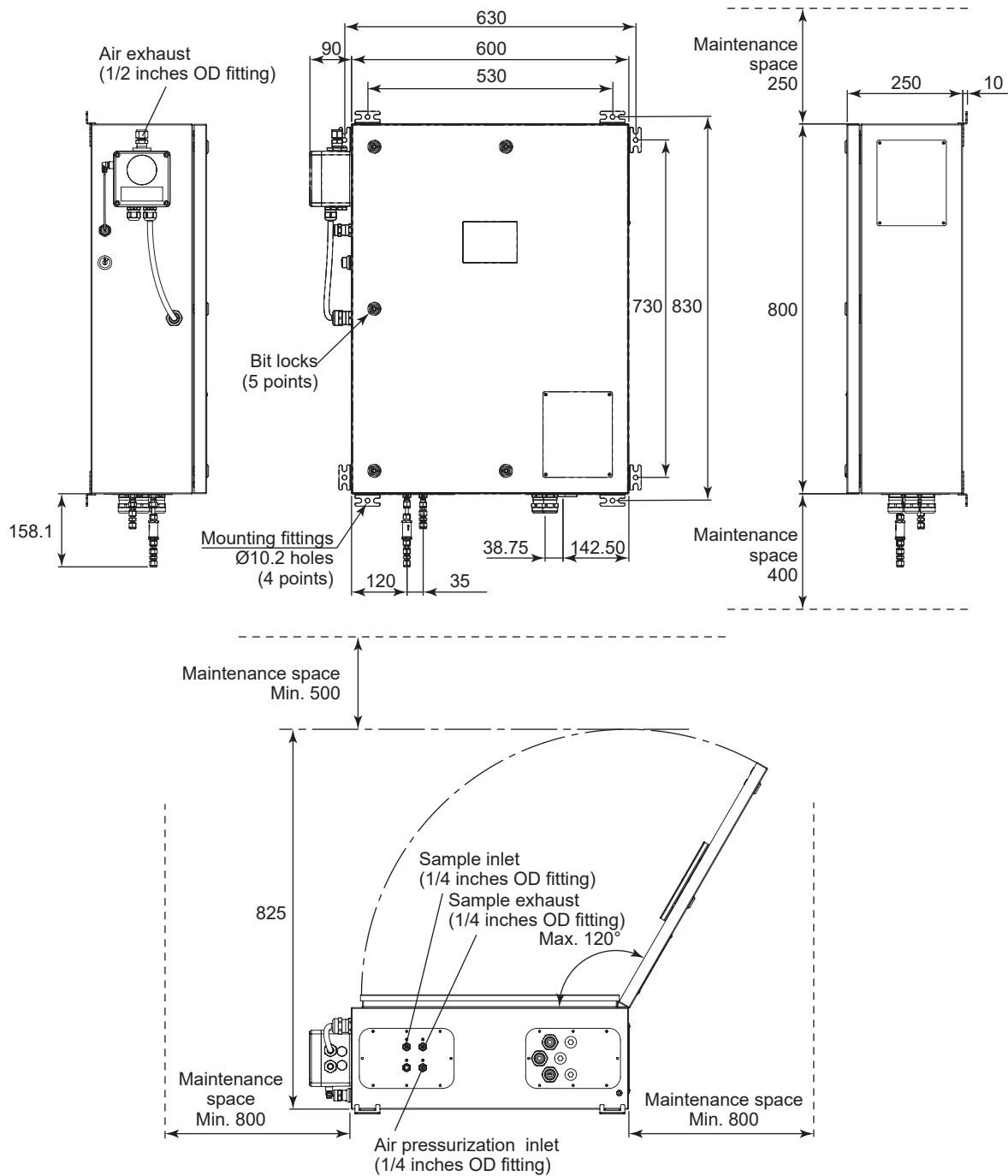
\*: 2 sets including one spare part

## WIRING



EXTERNAL DIMENSIONS

Unit: mm



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- **Process probe**

The process probe is part of the product and consists of a sonic nozzle and a filter. It must be connected to the cabinet sample inlet fitting A.

– the sonic nozzle is a 1/4" outer diameter, with a small pinhole of 100  $\mu\text{m}$  or 150  $\mu\text{m}$ .

– the filter is generally a 2  $\mu\text{m}$  sintered stainless steel in-line filter.

Material: 316L Stainless Steel

