

# TDLAS GAS ANALYZER

## GA9272\_O<sub>2</sub>



Specialized for high-precision O<sub>2</sub> measurement using TDLAS Technology.

### 19" Rack Mount

#### Highlights:

- Designed based on TDLAS (Tunable Diode Laser Absorption Spectroscopy) technology for high-precision oxygen (O<sub>2</sub>) measurement
- Narrow-linewidth semiconductor diode laser for selective O<sub>2</sub> detection
- Highly accurate and selective oxygen measurement without cross-gas interference
- Laser frequency tuning via drive current control aligned with the O<sub>2</sub> absorption line
- Lock-in amplifier for enhanced signal-to-noise ratio
- High-accuracy and long-term stable O<sub>2</sub> concentration calculation
- Single-Line TDLAS technology with no moving parts
- High mechanical stability with fast response time
- Minimal maintenance due to solid-state design
- Automatic temperature and pressure compensation for measurement stability
- Continuous, real-time monitoring of O<sub>2</sub> in combustion processes
- Improved combustion efficiency and reduced energy consumption
- Prevention of furnace heat losses through optimized air-to-fuel ratio
- Enhanced operational safety by preventing unsafe oxygen conditions during startup
- Reduced environmental emissions through precise oxygen control in combustion processes

#### ویژگیها :

- طراحی شده بر پایه فناوری ویژه اندازه گیری گاز اکسیژن (O<sub>2</sub>) TDLAS (Tunable Diode Laser Absorption Spectroscopy)
- لیزر دیودی نیمههادی با پهنای طیفی باریک برای آشکارسازی اختصاصی O<sub>2</sub>
- اندازه گیری دقیق و انتخابی غلظت اکسیژن بدون تداخل گازهای دیگر
- تنظیم فرکانس لیزر از طریق کنترل جریان برای تطبیق با خط جذب O<sub>2</sub>
- استفاده از تقویت کننده Lock-in برای افزایش نسبت سیگنال به نویز
- محاسبه دقیق و پایدار غلظت اکسیژن
- فناوری Single-Line TDLAS بدون قطعات متحرک
- پایداری مکانیکی بالا و پاسخدهی سریع
- نیاز حداقلی به سرویس و نگهداری (ساختار Solid-State)
- جبران سازی خودکار دما و فشار برای حفظ دقت اندازه گیری
- پایش پیوسته و برخط اکسیژن در فرآیندهای احتراقی
- بهینه سازی احتراق و کاهش مصرف انرژی
- جلوگیری از اتلاف حرارتی با تنظیم صحیح نسبت هوا به سوخت
- افزایش ایمنی و کاهش خطر انفجار هنگام راه اندازی
- کاهش انتشار آلاینده های زیست محیطی

#### Product Details:

Gas	min. range	max. range	Type of Sensor
O <sub>2</sub>	0-1000ppm	0-5%Vol	TDLAS <sup>1</sup>
		0-25%Vol	
		0-100%Vol	

#### Notes:

1. Tunable Diode Laser Absorption Spectroscopy
2. The 0-100% range can be fully customized according to the application requirements.
3. The measurement of other gases is also customizable.

#### Applications:

- Suitable to install in gas analyzer system of Cement, Steel plants
- Online O<sub>2</sub> gas monitoring in cement, steel and metallurgical plants
- Kiln inlet and calciner O<sub>2</sub> control for combustion optimization and energy savings

#### کاربردها :

- نصب در سیستم های آنالایزر برخط گاز در صنایع سیمان و فولاد
- نصب در سیستم های آنالایزر برخط گاز در صنایع سیمان فولاد و متالورژی برای پایش O<sub>2</sub>
- پایش O<sub>2</sub> در دهانه کوره دوار و کلساینر جهت کنترل احتراق و کاهش مصرف انرژی
- پایش O<sub>2</sub> در ناحیه پیش گرم کن و ESP برای کاهش خطر انفجار
- کنترل فرآیند در کارخانجات احیا مستقیم آهن (DRI) با مانیتورینگ O<sub>2</sub> در گازهای فرآیندی
- اندازه گیری O<sub>2</sub> در کوره های عملیات حرارتی و نورد برای حفظ کیفیت محصول فولادی
- O<sub>2</sub> monitoring in preheater and ESP areas to reduce explosion risk
- Process control in DRI plants via O<sub>2</sub> measurement in process gases
- O<sub>2</sub> measurement in heat treatment and reheating furnaces for steel quality control





## Technical Information for GA9272

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Technical Data of TDLAS sensor

<b>measuring principle</b>	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
<b>Range</b>	Customizable
<b>Resolution</b>	0.1ppm/0.01%
<b>accuracy</b>	±1%F.S.
<b>response time</b>	≤30 s
<b>Flow Rate</b>	0.5–3 L/min
<b>Working / Operating Temp.</b>	-10~50°C
<b>Humidity</b>	0–98%RH
<b>Voltage / Power</b>	12V±10%, 24V DC

<b>Constant Temp.</b>	50°C ±0.5°C
<b>Linearity Error</b>	≤±1% F.S.
<b>Repeatability</b>	≤1%
<b>Span drift</b>	≤±1%F.S.
<b>Zero drift</b>	≤±1%F.S.
<b>Maintenance cycle</b>	≤2 times/year
<b>warm-up time</b>	20 s quick start < 10 min full specification
<b>Output / Interface</b>	RS-485 / RS-232/4-20mA
<b>Storage Conditions</b>	-40~85°C; 0–98%RH

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Technical Data of Other Sensors



Cubic

**Tunable diode laser absorption spectroscopy (TDLAS), Customized for measuring O<sub>2</sub>**

**Manufacturer**  
Cubic Instruments (Wuhan) Ltd.



Zetian

**Tunable diode laser absorption spectroscopy (TDLAS) Customized for measuring O<sub>2</sub>**

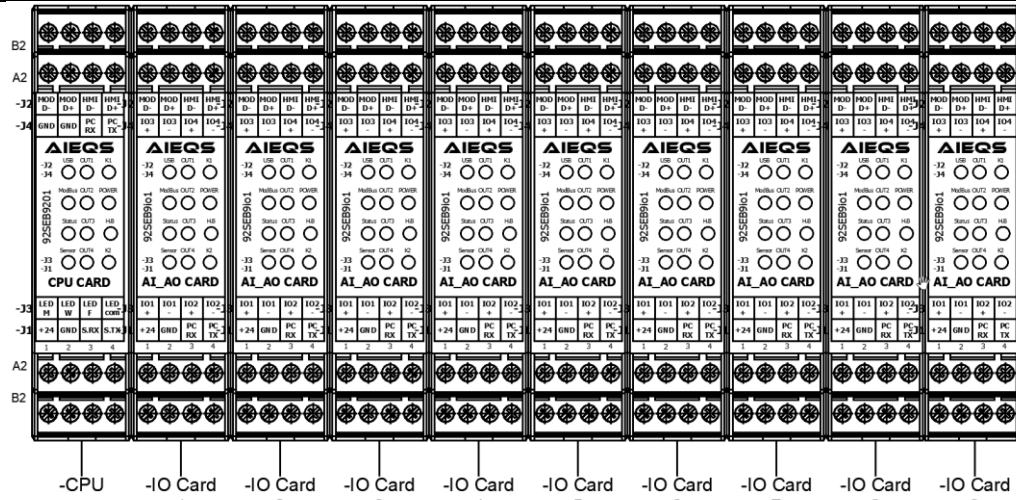
**Manufacturer**  
Zetian Process and Environmental





### 3

### Power & I/O card Details



#### Standard IO Block configuration:

- CPU Card1
- CPU Card2
- CPU Card3

Depends on the gas measuring add

- IO Card 1: 1<sup>st</sup>, 4...20 mA output
- IO Card 2: 2<sup>nd</sup>, 4...20 mA output

#### Maximum IO Block configuration (as order):

##### CPU Card

- IO Card 1: 1<sup>st</sup>, 4...20 mA output
- IO Card 2: 2<sup>nd</sup>, 4...20 mA output
- IO Card 3: 1<sup>st</sup>, Relay Card
- IO Card 4: 2<sup>nd</sup>, Relay Card
- IO Card 5: 1<sup>st</sup>, Opto-coupler output
- IO Card 6: 2<sup>nd</sup>, Opto-coupler output
- IO Card 7: 1<sup>st</sup>, Opto-coupler input
- IO Card 8: 2<sup>nd</sup>, Opto-coupler input
- IO Card 9: 1<sup>st</sup>, 4...20 mA input

#### Analyzer Supply Voltage

90 to 260 VAC (+10 %, -15 %),  
switchable, 48 ... 62 Hz

#### Ambient temperature

+5 ... +45 °C

#### Storage temperature

-20 ... +70 °C

#### interface

RS-485 for Modbus  
USB

#### CPU Card

Power Supply: 24 VDC  
Serial Port 1: RS232 / 485 to sensor  
Serial Port 2: 485 to HMI  
Serial Port 3: USB to Laptop  
LED indicators

#### 2<sup>nd</sup>, 4...20 mA output Card

4 channels mA output 4 ... 20 mA, 500 Ω  
Potential-free (electrically isolated)  
Signal range: 0 ... 24 mA  
Resolution/precision: 0.1 % (20 µA)

#### 2<sup>nd</sup>, Relay output Card

4 relay outputs: 30 V AC/48 V DC  
0,5 A; 1-pole changeover switch  
3 connections  
Max. switching current: 30 W (at 48 V DC/500 mA)

#### 2<sup>nd</sup>, Opto-coupler output Card

4 Opto-coupler input  
Switching range: 14 ... 42 V  
Highest allowable voltage: ±50 V DC  
2<sup>nd</sup>, Opto-coupler input  
4 Opto-coupler input  
Switching range: 14 ... 42 V  
Highest allowable voltage: ±50 V DC

#### Gas connection

Swagelok 6 mm  
Swagelok ¼"

#### Purge Gas connection

Swagelok 8 mm

#### 1<sup>st</sup>, 4...20 mA output Card

4 channels mA output 4 ... 20 mA, 500 Ω  
Live Zero 0/2/4 mA Configurable  
Potential-free (electrically isolated)  
Signal range: 0 ... 24 mA  
Resolution/precision: 0.1 % (20 µA)

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4 Opto-coupler input  
Switching range: 14 ... 42 V  
Highest allowable voltage: ±50 V DC

#### 4...20 mA input

4 channels mA input 4 ... 20 mA  
Potential-free (electrically isolated)  
Highest allowable input signal 30 mA  
Overload protection ±1000 mA  
Input load 50 Ω

19" Rack mount enclosure Dimension  
420x 420 x 170 mm, 4 unit of rack

19" Rack mount enclosure weight  
15-25 Kg



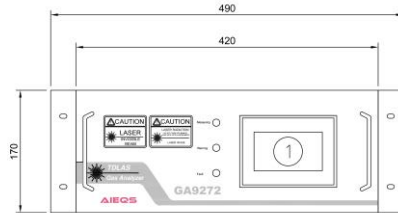


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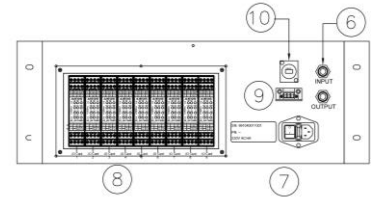
Arka Behbood Farayand (LLC)  
Process Development

## 4

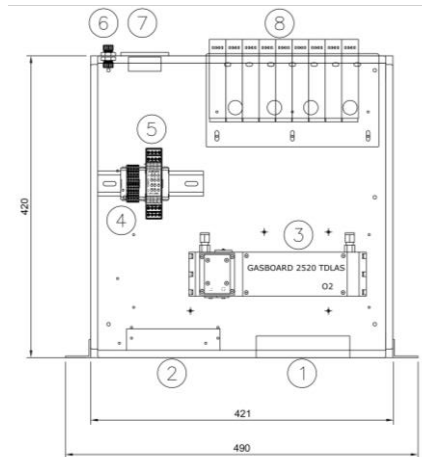
### Dimensions



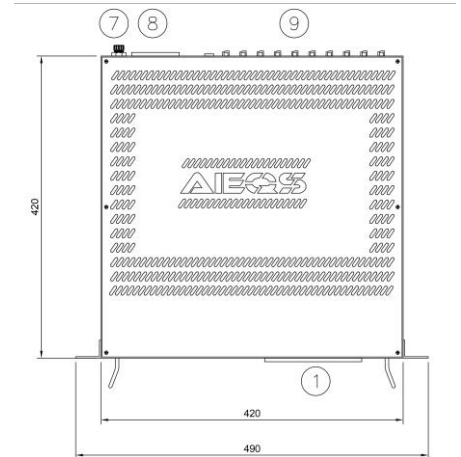
FRONT VIEW



BACK VIEW



INSIDE VIEW



TOP VIEW

- 1** Touch screen Display and LEDs for Status
- 2** Power Supply
- 3** TDLAS Sensors
- 4** Terminals
- 5** CPU Cards
- 6** Gas inlet / outlet connections
- 7** Power Cable & Fuse
- 8** I/O cards Block
- 9** Signal socket
- 10** USB connection

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