AIEQS
Arka Behbood Farayand (LLC)
Process Devlopment

TDLAS GAS ANALYZER

GA9282

Specialized for high-precision O_2 measurement using TDLAS Technology.

Wall Mount

Highlights:

- Designed based on TDLAS (Tunable Diode Laser Absorption Spectroscopy) technology for high-precision oxygen (O_2) measurement
- Narrow-linewidth semiconductor diode laser for selective O_2 detection
- Highly accurate and selective oxygen measurement without cross-gas interference
- Laser frequency tuning via drive current control aligned with the O_2 absorption line
- Lock-in amplifier for enhanced signal-to-noise ratio
- High-accuracy and long-term stable O_2 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_2 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_2) TDLAS (Tunable Diode Laser Absorption Spectroscopy)
- لیزر دیودی نیمه‌هادی با پهنای طیفی باریک برای آشکارسازی اختصاصی O_2
- اندازه‌گیری دقیق و انتخابی غلظت اکسیژن بدون تداخل گازهای دیگر
- تنظیم فرکانس لیزر از طریق کنترل جریان برای تطبیق با خط جذب O_2
- استفاده از تقویت‌کننده 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)
- جبران‌سازی خودکار دما و فشار برای حفظ دقت اندازه‌گیری
- پایش پیوسته و برخط اکسیژن در فرآیندهای احتراقی
- بهینه‌سازی احتراق و کاهش مصرف انرژی
- جلوگیری از اتلاف حرارتی با تنظیم صحیح نسبت هوا به سوخت
- افزایش ایمنی و کاهش خطر انفجار هنگام راه‌اندازی
- کاهش انتشار آلاینده‌های زیست‌محیطی

Product Details:

Gas	min. range	max. range	Type of Sensor
O2	0-1000ppm	0–5%Vol	TDLAS[1]
		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.

کاربردها :

- نصب در سیستم های آنالایزر برخط گاز در صنایع سیمان و فولاد
- نصب در سیستم‌های آنالایزر برخط گاز در صنایع سیمان فولاد و متالورژی برای پایش O_2
- پایش O_2 در دهانه کوره دوار و کلساینر جهت کنترل احتراق و کاهش مصرف انرژی
- پایش O_2 در ناحیه پیش‌گرم‌کن و ESP برای کاهش خطر انفجار
- کنترل فرآیند در کارخانجات احیا مستقیم آهن (DRI) با مانیتورینگ O_2 در گازهای فرآیندی
- اندازه‌گیری O_2 در کوره‌های عملیات حرارتی و نورد برای حفظ کیفیت محصول فولادی

Applications:

- Suitable to install in gas analyzer system of Cement, Steel plants
- Online O_2 gas monitoring in cement, steel and metallurgical plants
- Kiln inlet and calciner O_2 control for combustion optimization and energy savings
- O_2 monitoring in preheater and ESP areas to reduce explosion risk
- Process control in DRI plants via O_2 measurement in process gases
- O_2 measurement in heat treatment and reheating furnaces for steel quality control

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Technical Information for GA9282

1 Technical Data of TDLAS sensor

measuring principle	Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Range	Customizable
Resolution	0.1ppm/0.01%
accuracy	±1%F.S.
response time	≤30 s
Flow Rate	0.5–3 L/min
Working / Operating Temp.	-10~50°C
Humidity	0–98%RH
Voltage / Power	12V±10%, 24V DC
Constant Temp.	50°C ±0.5°C
Linearity Error	≤±1%F.S
Repeatability	≤1%
Span drift	≤±1%F.S.
Zero drift	≤±1%F.S.
Maintenance cycle	≤2 times/year
warm-up time	20 s quick start < 10 min full specification
Output / Interface	RS-485 / RS-232/4-20mA
Storage Conditions	-40~85°C; 0–98%RH

2 Technical Data of Other Sensors

Cubic

Tunable diode laser absorption spectroscopy (TDLAS), Customized for measuring O_2

Manufacturer
Cubic Instruments (Wuhan) Ltd.

Zetian

Tunable diode laser absorption spectroscopy (TDLAS) Customized for measuring O_2

Manufacturer
Zetian Process and Environmental

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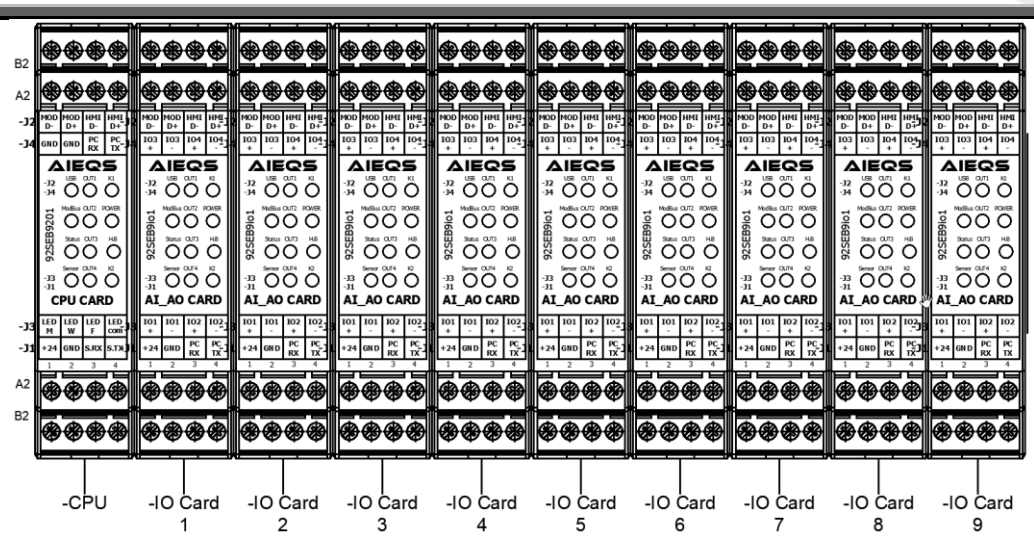
3 Power & I/O card Details



Standard IO Block configuration:
CPU Card
Depends on the gas measuring add
-IO Card 1: 1st, 4...20 mA output
-IO Card 2: 2nd, 4...20 mA output

Maximum IO Block configuration (as order):

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

2nd, 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)

2nd, 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)

2nd, Opto-coupler output Card
4 Opto-coupler input
Switching range: 14 … 42 V
Highest allowable voltage: ±50 V DC

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Gas connection
Swagelok 6 mm
Swagelok ¼"

Purge Gas connection
Swagelok 8 mm

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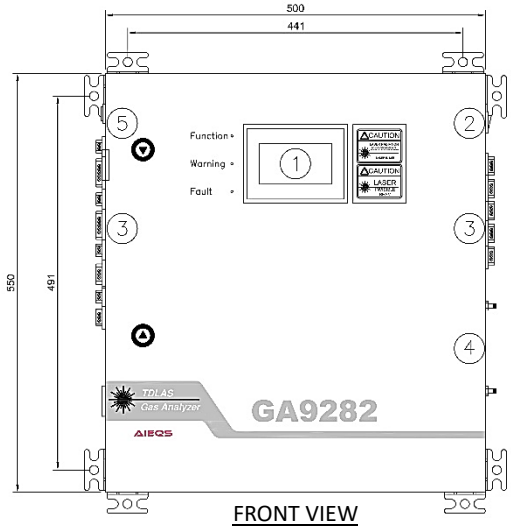
4…20 mA input
4 channels mA input 4 … 20 mA
Potential-free (electrically isolated)
Highest allowable input signal 30 mA
Overload protection ±1000 mA
Input load 50 Ω

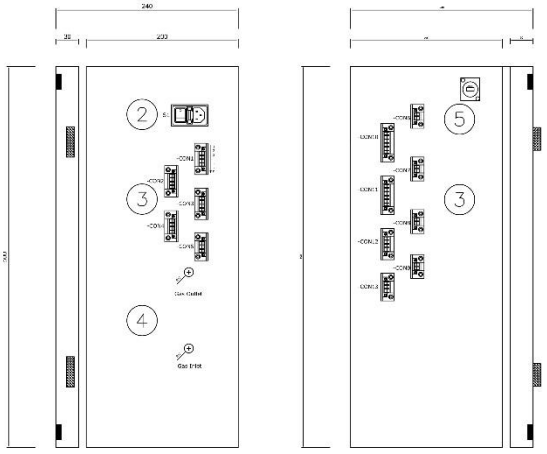
Wall mount enclosure Dimension
500x 500 x 240 mm

Wall mount enclosure weight
30-40 Kg

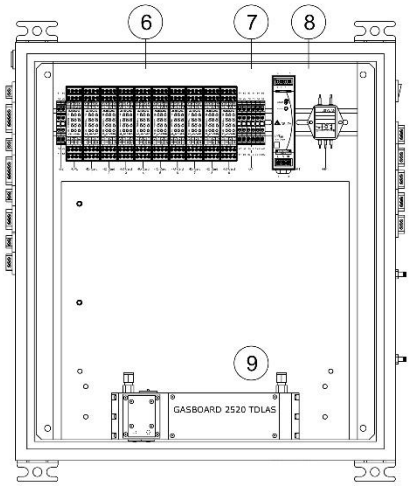
4 Dimensions



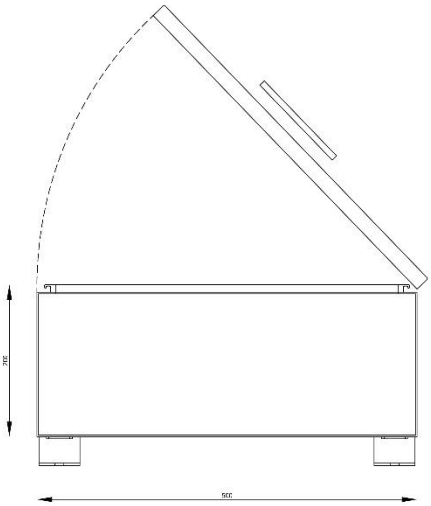
FRONT VIEW



SIDE VIEW



INSIDE VIEW



TOP VIEW

1. Touch screen Display and LEDs for Status
2. Power Cable & Fuse
3. Signal sockets
4. Gas inlet / outlet connections
5. USB connection
6. CPU & I/O cards Blocks
7. Terminals
8. Power Supply
9. TDLAS Sensor