NEW

HORIBA
Process & Environmental

PROCESS LASER GAS ANALYZER

# PLGA-1000


New Measurement Solutions for Carbon-Neutral Society

HORIBA's Proprietary Next-Generation Gas Measurement Technology

IRLAM Technology

# A new measurement solution to replace process gas chromatographs[*1] that contributes to improve productivity in petrochemical plant manufacturing processes[*2]

*1: This is based on our own evaluation.
*2: Limited to specific manufacturing processes


The PLGA-1000 Process Laser Gas Analyzer, by HORIBA, using proprietary IRLAM™, patented technology, quickly, continuously and reliably measures hydrocarbons and other gases in petrochemical plant process gas streams. The PLGA-1000 uses proprietary patented technology to measure low concentration impurities such as acetylene, and carbon dioxide, which exist in hydrocarbon process streams.
These continuous, high speed, high sensitivity measurements can be used as control inputs to improve plant productivity and product quality, thus lowering production costs and reducing environmental impact.

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# PLGA-1000

## Delivering New Benefits with Innovative Technology

HORIBA's proprietary IRLAM (Infrared Laser Absorption Modulation) technology realizes new solutions for specific manufacturing process that until now have been difficult to fully achieve with process gas chromatograph measurements.

### Significant Improvement of Process Control with Highly Sensitive and Stable High-Speed Continuous Gas Measurement

Continuous measurement of low concentration impurity gases in high concentration hydrocarbons with high sensitivity in a short measurement time.

▶**High-sensitivity measurement:** Low-concentration impurities in high-concentration hydrocarbons can be measured at ppb level.

▶**Fast response time:** 3 seconds (for details, see response time in specifications)

### Operational Cost Reduction

HORIBA's resilient Quantum Cascade Laser light sources and analyzer modules reduce analyzer calibration and part replacement frequencies, yielding lower operating expenses and freeing up technicians for more value-added activities.

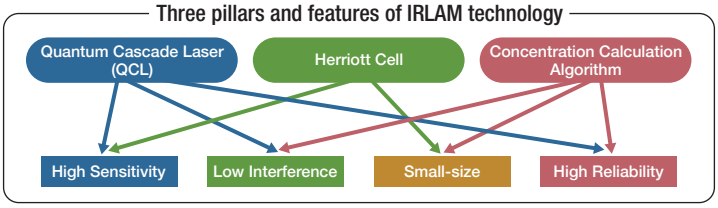
### Compact Installation Area

The use of a small gas cell (Herriot cell), etc. reduces the footprint of the analyzer and contributes to save your space.

## HORIBA Proprietary IRLAM Technology

HORIBA proprietary IRLAM technology consists of three new technologies with distinctive features.
These key components are developed and produced in-house which allows us to address to diverse customers needs.

IRLAM Technology




For further details about IRLAM Technology

### 1 Quantum Cascade Lasers (QCL)

**Mid-Infrared Laser Source Optimized for Each Gas Measurement**

Mid-infrared laser light sources (4-10 µm), optimized for each gas measurement, provide the foundation for excellent repeatability, linearity and drift characteristics, also improving environmental resistance.
(Patent applied)

Quantum Cascade Lasers

### 2 Herriot Cell (Multi-pass Cell)

**Compact, Small Volume Gas Cell Design with a Long Optical Path**

The unique, compact Herriot gas cell is designed with a 5 m optical path length, and a small 40 mL cell, optimized for speed-critical applications.
(Patented (US Patent No. 10551299))

Herriot Cell

### 3 Concentration Calculation Algorithm

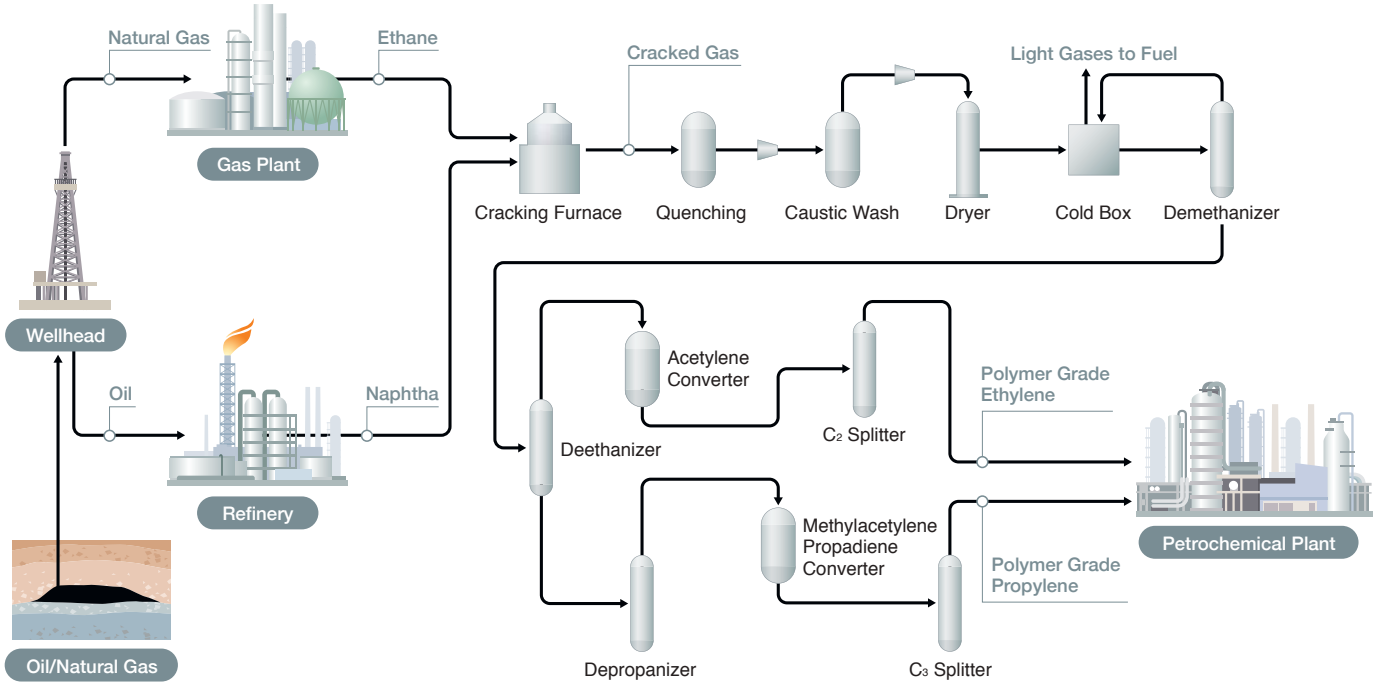
**Algorithm for Calculating Gas Concentration with Low Calculation Volume**

An algorithm quantifies gas concentrations, gas interferences and environmental temperature effects by calculating data using "feature quantities" which replaced absorption signal of the measured gases. This algorithm can calculate with less computing power without losing measurement accuracy. Therefore, even the analyzer's embedded CPU provides sufficient performance.
(Patented (Japan Patent No. 6886507, US Patent No. 11030423))

## Providing the Optimum Solution for the Site Environment

There are a number of processes in petrochemical plants. The PLGA-1000 laser gas analyzer for process use can achieve optimal measurement by combining options and sample handling according to your process gas and site environment. HORIBA's engineering division will propose the most suitable measurement solution based on our experience and know-how.

**[Example of Olefin Production Process Flow]**




### PLGA-1000 Option

Nitrogen gas generation unit for purging optical systems. This makes it possible to purge with compressed air. (Patent applied)

### Example of Sample gas Handling

Sampling unit adjusted for each process, incorporating HORIBA's past experience and know-how.

## Specifications

| | |
|---|---|
| Name | Process Laser Gas Analyzer |
| Model | PLGA-1000 |
| Measurement principle | NDIR: Non Dispersive Infrared |
| Light source | QCL: Quantum Cascade Laser |
| Laser class | Class 1 (IEC 60825-1:2014) |
| Components | Methane ($CH_4$), Ethane ($C_2H_6$),<br>Acetylene ($C_2H_2$), Carbon Dioxide ($CO_2$) |
| Range*1 | $CH_4$ : 0-2000 ppm or 0-5 vol%<br>$C_2H_6$ : 0-50 vol%<br>$C_2H_2$ : 0-50 ppm<br>$CO_2$ : 0-200 ppm |
| Repeatability | ±1.0 % full scale |
| Linearity | ±1.0 % full scale |
| Response time | $T_d + T_{90}$ : 3 sec at flow rate of 1.6L / min |
| Zero drift | ±2.0 % full scale per 1 month |
| Span drift | ±2.0 % full scale per 1 month |
| Data update cycle | 1 sec |
| Calibration interval | 1 month |
| Ambient temperature | -10˚C to 50˚C or -10˚C to 45˚C<br>(no direct sun rays, including case temperature influences due to radiant heat and heat conduction)<br>*The flow rate of the protective gas differs depending on the specification of the ambient temperature |

| | |
|---|---|
| Protection class | IP66, NEMA4X |
| Hazardous area classification | US, Canada: Class I, Division 2, Groups A, B, C, D T4<br>US: Class I, Zone 2, AEx pzc IIC T4 Gc<br>IECEx, Canada: Ex pzc IIC T4 Gc<br>ATEX, UKCA: Ex II3G Ex pzc IIC T4 Gc |
| Wetted materials | SS316, SS304, BaF2, FKM, PTFE, Au, Ni |
| Gas connector size | 1/4" NPT, 1/2" NPT (Option: $N_2$ generator) |
| Pressure error alarm output | Three channels (Main enclosure, Optical unit, Cell)<br>DC 5 V to 24 V, 1 A at each terminal |
| Communication function | Modbus®/TCP |
| Analog output | Four channels (Gas concentration)<br>4 mA to 20 mA Max. load: 550 Ω |
| Contact output | Three channels (Calibration / Main alarm / Measurement)<br>Relay contact output (isolated output)<br>DC 5 V to 24 V, 1 A at each terminal |
| Digital output | One channel (For signal barrier power control relay)<br>DC 24 V, 100 mA |
| Dimension | 664 mm (W) x 270 mm (D) x 704 mm (H) *Protrusions included |
| Weight | Standard 46 kg, Max. 50 kg *Depends on product specifications |
| Power supply | AC 100 V to 120 V, 50 Hz/60 Hz or<br>AC 200 V to 240 V, 50 Hz/60 Hz |
| Power consumption | Max. 250 VA |

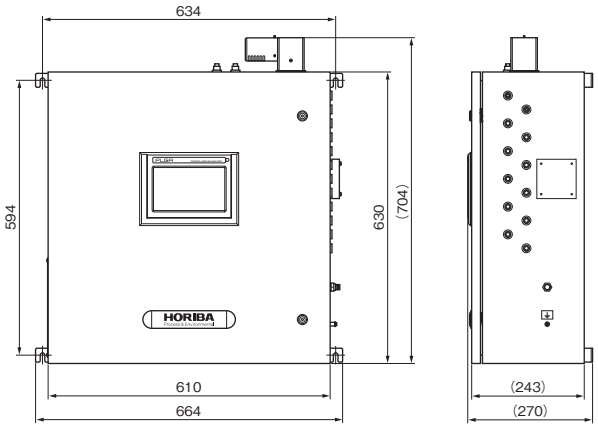
*1: Please contact us for other components

■ Modbus is a trademark of Schneider Electric USA Inc.

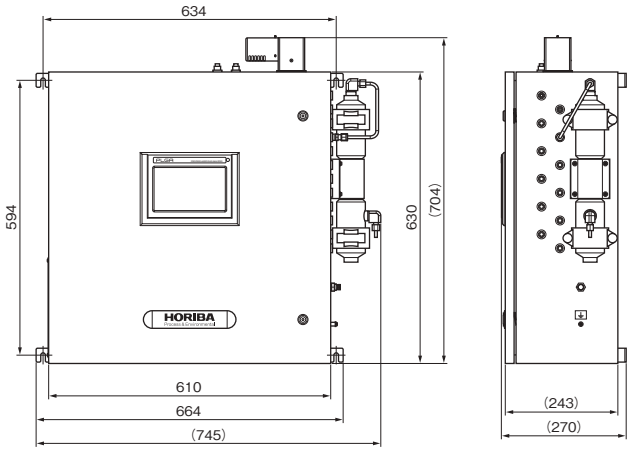
## External Dimensions

(Unit: mm)

■ PLGA-1000 Analyzer Unit




■ PLGA-1000 Analyzer Unit (Including optional parts)




**IMS**

The HORIBA Group adopts IMS (Integrated Management System) which integrates Quality Management System ISO9001, Environmental Management System ISO14001, and Occupational Health and Safety Management System ISO45001.
We have now integrated Business Continuity Management System ISO22301 in order to provide our products and services in a stable manner, even in emergencies.

**Please read the operation manual before using this product to assure safe and proper handling of the product.**

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