

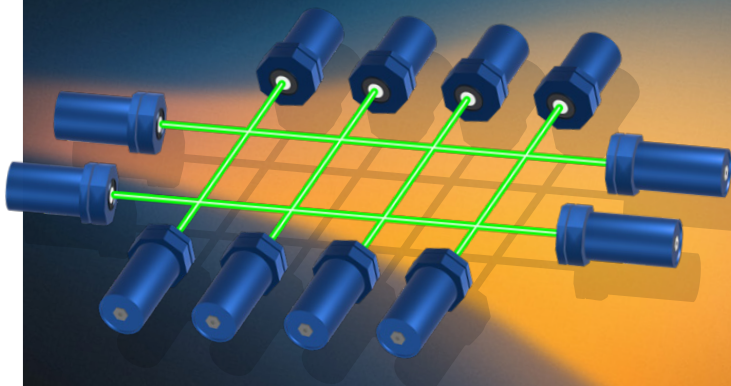
Real-Time, In-Situ Combustion Monitoring for Industrial Furnaces

Unlock Efficiency. Improve Reliability. Reduce Emissions.

ZoloSCAN2 is an advanced combustion monitoring system built for the world's most demanding industrial heaters and furnaces.

Using Tunable Diode Laser Absorption Spectroscopy (TDLAS), it provides real-time, multi-zone in-situ measurements of combustion gases — without sampling filters, or routine calibration.

Designed for high-temperature, high-dust environments, **ZoloSCAN2** enables plant teams to reduce fuel use, cut emissions, and improve product quality and production — while simplifying operations.



— What It Does

ZoloSCAN2 simultaneously measures key combustion parameters, directly in the firebox including:

- Gas temperature
- O₂ (oxygen)
- CO (carbon monoxide)
- H₂O (water vapor)
- CH₄ (methane)
- CO₂ (carbon dioxide)

It supports multiple species and up to 14 laser paths per system, delivering high-resolution, zone-by-zone visibility in real time.

With update rates of 1–10 Hz, **ZoloSCAN2** enables automated control and fast response to dynamic conditions.



—Key Technical Capabilities

In-Situ, Multi-Path Sensing

- Measurements taken directly across the combustion zone — not from sample lines. One system supports up to 14 paths, each 1–25 meters long.

No Local Electronics at Furnace

- All sensitive hardware is mounted remotely; only optics are near the firebox.

SensAlign™ Auto-Alignment

- Self-aligning optics maintain signal strength under thermal expansion, vibration, or wall movement.

Multi-Species, High-Speed Monitoring

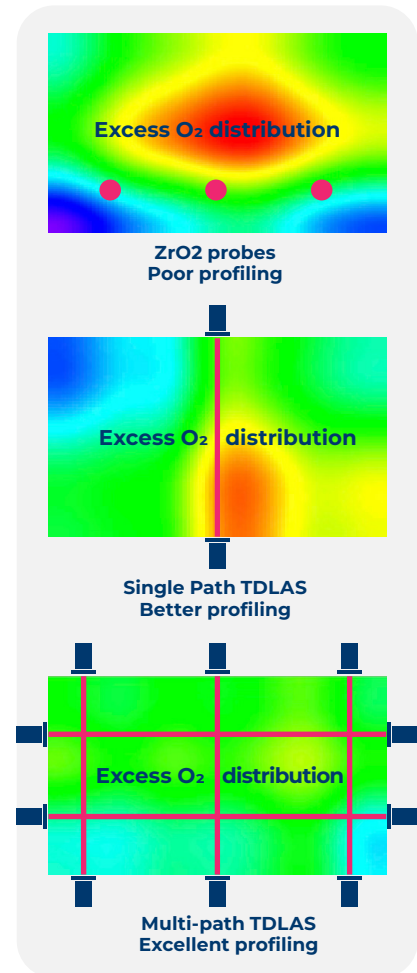
- Multiple species measured simultaneously. Data is updated every 1–10 seconds per path. A typical species configuration for a furnace or heater includes: Temperature, O₂, CO, H₂O and CH₄ all measured via one system.

Plug-and-Play Integration

- Connects easily to DCS/PLC systems. Typically via OPC UA/DA or Modbus TCP/IP.

Remote Access Enabled

- For diagnostics, configuration, and firmware updates.



Monitoring Options



—Proven Performance Benefits

Fuel Savings (2–5%)

- Control excess oxygen in real time to lower fuel use and energy costs.

Emissions Reduction

- Lower CO, NO_x, and unburned hydrocarbons via more precise air–fuel ratio tuning.

Improved Product Quality

- Eliminate hot spots and thermal gradients to improve temperature uniformity and yield.

Reduced Downtime

- Detect combustion instability, steam leaks, and flame issues before they escalate.

Minimal Maintenance

- No filters, no calibration gases, no consumables — just clean optics and diagnostics.

Fast ROI

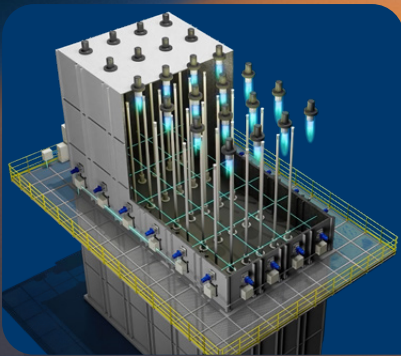
- Payback achieved within 12–24 months in most applications through fuel savings and process improvements.

Comparison to Traditional Technologies

Feature	ZoloSCAN2	Extractive Gas Analyzer	Zirconia Oxygen Probes
Measurement Type	In-situ, laser-based	Extractive, delayed	In-situ, single-point
Gases Measured	O ₂ , CO, CH ₄ , CO ₂ , H ₂ O, Temp	Typically 1–2 gases	O ₂ only
Measurement Speed	Seconds	Minutes	Seconds
Installation Downtime	Usually not required	Often required	Typically required
Maintenance Needs	Low (no consumables)	High (filters, lines)	Medium (probe drift, delays)
Zone Coverage	Multi-zone (up to 14)	Single point	Single point
Calibration	Not required	Depends	Periodic

* Full measurement specs and installation guidance available in the ZoloSCAN2 Technical Datasheet.

Why ZoloSCAN2 Outperforms



True In-Situ Measurements

- Eliminates delays, drift, and errors caused by sample conditioning

Multi-Species, Multi-Zone Coverage

- Replace multiple analyzers with a single platform — faster, simpler, smarter.

High Frequency, High Fidelity

- Real-time visibility enables control systems to respond in seconds, not minutes.

SensAlign™ for Reliable Uptime

- Maintains beam alignment during startup and shutdown of units — no signal loss, no maintenance stops.

Low Lifecycle Cost

- No calibration, no filters, and fewer devices to maintain.

Built to Last

- Industrial-grade components with field-proven performance across steel, refining, pulp & paper, and power.

—Typical Applications

Steel Reheat Furnaces

- Optimize zone balance, reduce scale formation, and lower natural gas consumption.

Steel Melting – EAFs and BOFs

- Provided real-time off-gas combustion feedback for melt control and refinement.

Steam Methane Reformers (SMRs)

- Stabilize air–fuel ratios under variable hydrogen and process gas conditions.

Recovery Boilers (Pulp & Paper)

- Improve combustion uniformity and detect leaks before they cause shutdowns.

Glass & Biomass Furnaces

- Control combustion in highly variable fuel conditions with real-time feedback.

Power Generation Steam Boilers

- Improve heat rate, reduce excess O₂ and CO emissions, and enhance steam generation efficiency across large multi-burner boilers.



Field-Proven. Globally Installed. Ready for Your Furnace.

With over 100 installations worldwide, ZoloSCAN2 is trusted by industry leaders across combustion-intensive sectors.

Whether you're upgrading aging analyzers or deploying a new digital combustion strategy, ZoloSCAN2 gives you the data you need to drive real results.



See ZoloSCAN2 in Action

Watch how our system performs in real industrial settings:

Each video illustrates how ZoloSCAN2 adapts to diverse industrial challenges—fuel efficiency, reliability, and emissions compliance.

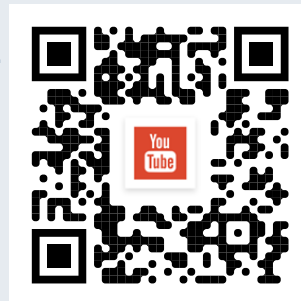
STEEL REHEAT FURNACE

Precision combustion
across the length of
the furnace



PETROCHEMICAL REFORMER

Stable air-fuel ratios
and improved furnace
thermal efficiency



See What Your Combustion Has Been Hiding

Gain control, boost efficiency, and avoid surprises. Let's talk about how **ZoloSCAN2** can make your combustion visible.



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MEASUREMENT SPECIFICATIONS

Measurement Species	Choose up to 3 species sets per system: O ₂ , CO, CO & CH ₄ , CO ₂ , Temperature & H ₂ O
Measurement System	Multiplexed Tunable Diode Laser Absorption Spectroscopy (TDLAS)
Available Paths per System	1 to 14

Constituent	Full Scale Range	Accuracy	Precision	Temperature Range
Temperature	Standard: 260 to 1700° C Enhanced: 0 to 1700° C	± 1.0% fs	± 0.5% fs	N/A
O ₂ %	0 to 30%	± 0.25% abs	± 0.125% abs	260 to 1700° C
CO - High Resolution	0 to 10,000 ppm	± 100 ppm	±50 ppm	500 to 1700° C
CO - High Concentration	0 to 20%	0.2%	± 0.1%	500 to 1700° C
CH ₄ %	0 to 10%	± 0.5% abs	± 0.25% abs	25 to 500° C
H ₂ O %	0 to 30%	± 1.0% abs	± 0.50% abs	260 to 1700° C
CO ₂ %	0 to 50%	± 1.0% abs	± 0.50% abs	260 to 1700° C

* fs = full scale abs = absolute Specifications based on nominal installation, actual results will vary based on installation specific criteria.

Pressure Range	0.8 to 1.1 atm	
Optical Path Length	1 to 25 meters (3 to 82 feet)	
Applicable Fired Gases	Natural Gas, LPG, Waste Gas, Naphtha, Hydrogen, Coal, Biomass and others	
Dust Sensitivity	Negligible for typical firing conditions	
Path Measurement Time	10 seconds	Typical per path duration
Complete Furnace Profile	Total path count X 10 sec	Typical cycle duration (e.g. 12 paths = 2 minutes)
On-site Calibration	Not required	Self-calibrated every 24 hours

SENSALIGN HEADS

Features

Active Heads	Automatic Alignment	± 2.5 deg range
	Local Indicator Light	Green (measuring), Yellow (open), Red (error)
	Weight	11 kg (24 lbs)
	Dimensions	285 mm D x 215 mm W x 225 mm H (11.3 in. D x 8.7 in. W x 8.9 in. H)
Passive Heads	Hardened Reflecting Mirror	Head alignment not required
	Weight	9 kg (20 lbs)
	Dimensions	110 mm D x 175 mm W x 200 mm H (4.4 in. D x 7.0 in. W x 8.0 in. H)
Measurement Path	Low Maintenance	Configurable but not required
	Purge Air/N ₂	Recommendation available based on fired gas
	Cooling Air	Not required
	Alerts / Health Checks	Signal Strength, Temperature, Open Head

Installation Conditions

Operating Temperature	-20 to 85 °C R.H. 0-100%, (-4 to +185 F)
Ingress Protection	IP66
Sight Tube Installation	75mm Ø (3") cutout in refractory and furnace for tube penetration
Sight Port Installation	Outage not typically required for sight port replacement, multiple sight port sizes available
Hazardous Classifications Available	Class I Division 2 / Zone 2, (NEC / ATEX / IECEx / KCs)
Conduit (Active Head to J-Box)	Hi-temp flex conduit - electrical and fiber optics
Conduit (J-Box to Rack)	38mm (1.5 in) O.D. typical - electrical and fiber optics
Electrical	48V CAN bus supplied by Control Rack, no local power required

ZOLOSCAN2 CONTROL CABINET

Features

Data Output	OPC UA/DA via Ethernet TCP/IP, Additional protocols available via converter
User Interface	ZoloSCAN BalanceApp for combustion visualization
Species Measurements	Path and zone data for all measured species
Alert / Health Checks	Laser status, temperature, comm errors
Lock-out Tag-out Available	Yes, main power disconnect
Remote Access Available	Yes, for remote monitoring and support

Installation Conditions

Ambient Temperature	-20 to 55 °C R.H. 0-100%, (-4 to +131 F)
Ingress Protection	IP66 Powder Coated Steel or Optional Stainless Steel
Weight	353kg (780 lbs)
Hazardous Classifications Available	Class I Division 2 / Zone 2, (NEC / ATEX / IECEx / KCs)
Electrical Requirements	230/240 Vac, Single Phase, 50/60Hz, 25A
Dimensions	1220 mm W x 1525 mm H x 560 mm D (60"W x 60"H x 18"D)