

# JT33 TDLAS gas analyzer

## Reliable H<sub>2</sub>S measurements

### Offering at a glance

- For increased quality, process control, safety, and asset integrity in natural gas, NGL, LNG, biomethane, carbon capture, refining, and petrochemical gas streams
- Continuous, real-time TDLAS measurements with proven metrology to meet measurement specifications
- Robust patented differential technology which tolerates contaminants and stream changes in tough applications
- Heartbeat Technology for automatically stored historical data, spectrum logging, diagnostics, and verification reporting for custody transfer applications
- NIST-traceable calibration with superior accuracy and repeatability
- Auto-validation to confirm analyzer health in the field
- Field-serviceable components and modules for minimal downtime and maximum repair flexibility
- User-friendly interface with intuitive menu and web server software





The JT33 offers configuration flexibility with a variety of features to suit any application.

## Our know-how, your reliable measurement

Expectations for gas measuring instruments are constantly increasing to meet the highest levels of process and product quality, coupled with low maintenance and low total cost of ownership. From these market requirements, the JT33 H<sub>2</sub>S tunable diode laser absorption spectroscopy (TDLAS) gas analyzer was created. The highly developed algorithms of the TDLAS measurement, plus the sophisticated diagnostics, monitoring, and verification of Endress+Hauser's Heartbeat Technology, offer comprehensive process monitoring that cannot be found anywhere else. Fewer failures, lower operating costs, and improved reliability provide the user with a sustainable competitive advantage, ensuring continuous and reliable measurements.

### Plant safety and efficiency

For over 20 years, Endress+Hauser has provided customers with world-class TDLAS gas measurements for natural gas pipelines, biomethane, carbon capture, and gas sweetening plants. Extractive TDLAS H<sub>2</sub>S analyzer systems, powered by SpectraSensors TDLAS technology, provide continuous measurements to heighten operational safety and plant availability. They are best-in-class for meeting gas quality specifications. The JT33 TDLAS gas analyzer increases safety and asset integrity by helping to prevent pipeline corrosion, hydrate formation, and risk of explosion. It also helps to optimize gas sweetening plant processes by providing real-time contaminant measurements which maximize operational efficiency.

### Sustainability and regulatory compliance

Utilizing a patented differential technology, the JT33 H<sub>2</sub>S TDLAS analyzer produces a highly reliable measurement that tolerates contaminants and allows for stream changes. In doing so, it helps to ensure that specifications are met and documented as required in tariff and sales agreements between suppliers, carriers, and end users. By providing continuous, real-time measurements with proven metrology, the JT33 also helps to maintain gas quality control to avoid shut-in, flaring, and interrupted gas delivery incidents.

### High performance and availability

The JT33 TDLAS H<sub>2</sub>S analyzer has a high availability factor, supported by Endress+Hauser's Heartbeat Technology with advanced diagnostics and measurement algorithms. It can be used to indicate maintenance to avoid or mitigate costly premature media replacement and/or process shutdowns. This feature offers easy field serviceability for minimal downtime and maximum repair flexibility.

### Global presence

Endress+Hauser experts are strategically located worldwide, ensuring an active local presence that is always ready to offer support wherever and whenever you need it.

### Approvals and certificates

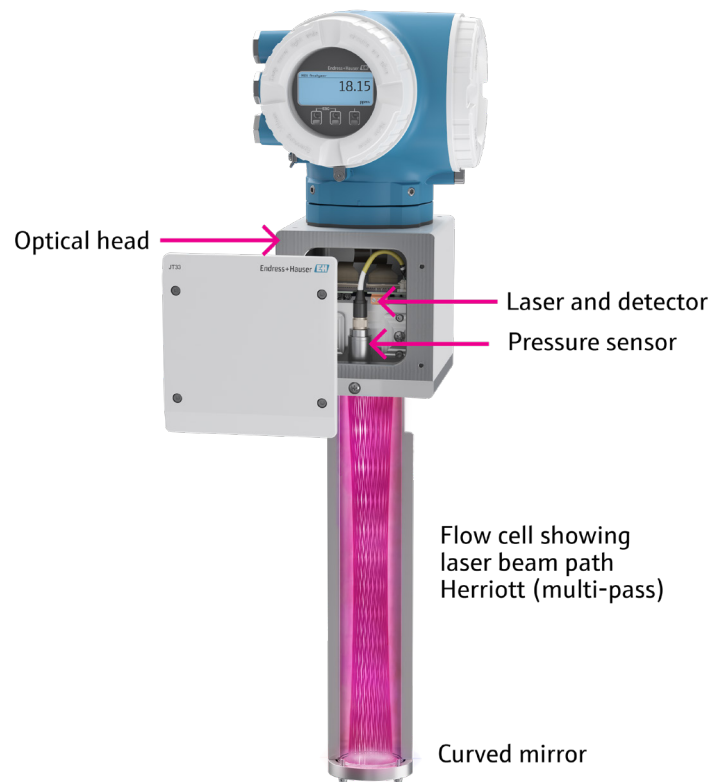


# Principle technology of the analyzer

Recognized as the leader in TDLAS technology, Endress+Hauser pioneered the use of tunable diode lasers for on-line, real-time measurements of H<sub>2</sub>S in hydrocarbon gas streams. Advanced diagnostics and superior measurement algorithms differentiate the JT33 analyzer, providing the highest analyzer availability.

The heart of the TDLAS measurement lies in the gas sample cell where the laser and signal detector are isolated from process contaminants, eliminating contamination and measurement errors.

State-of-the-art gas mixing technology is used during factory calibration for measurement confirmation. This ensures leading-edge metrology for superior measurement performance, safeguarding downstream gas transmission for uninterrupted delivery.



## Field-proven advantage

The JT33 TDLAS H<sub>2</sub>S analyzer employs a patented spectral subtraction technique that enables trace-level (sub-ppm) measurements to be made when a process gas sample contains very low levels of an analyte and background gas interferences.

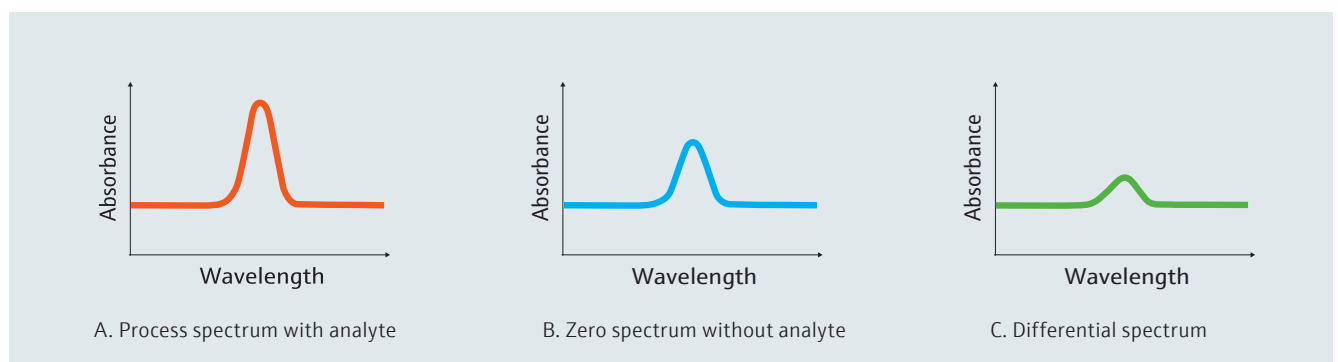
### How it works

The TDLAS analyzer performs a sequence of steps to obtain a “zero” and “process” spectrum that are used to calculate analyte concentration by spectral subtraction.

- The zero spectrum (B) is obtained by passing the process gas sample through a high-efficiency scrubber which selectively removes the H<sub>2</sub>S without altering the process gas composition and background absorbance.
- The analyzer records the resulting zero spectrum of the process gas and automatically switches the sample gas flow path to bypass the scrubber and collect the process spectrum (A) with H<sub>2</sub>S in the stream.
- Subtraction of the recorded zero spectrum from the process spectrum generates a differential spectrum (C) of the trace H<sub>2</sub>S which is free of background interferences. The analyte concentration is calculated from the differential spectrum.

### The differential advantage

Using field-proven metrology means our analyzers deliver trustworthy, real-time H<sub>2</sub>S measurements. Unlike any other H<sub>2</sub>S analyzer, the well-established patented differential technique can tolerate contaminants and allow for stream changes in light or heavy streams while still providing a reliable H<sub>2</sub>S measurement.







## Your benefits up close

Maximize high-quality throughput and ensure asset integrity, while minimizing operational costs

The JT33 TDLAS gas analyzer provides an exceptionally reliable H<sub>2</sub>S measurement. It is tailored for natural gas pipeline operators, natural gas suppliers, and biomethane and carbon capture plant owners who want to meet gas quality specifications and prevent pipeline corrosion. It is also ideal to help control and optimize gas sweetening plant processes. Real-time contaminant measurement maximizes operational efficiency and ensures that gas meets specifications for pipeline transmission.

TDLAS was introduced to the market over 20 years ago by Endress+Hauser, establishing the rugged nature of the laser-based analyzers. Endress+Hauser's JT33 analyzer uses a patented differential spectroscopy technique which enables detection and quantitation of low ppm levels of H<sub>2</sub>S. The analyzer is built with laser and detector components which are isolated and protected from the process gas and entrained contaminants. This design avoids fouling and corrosion, ensuring stable long-term operation and accurate measurements in the field. The JT33 has an exceptionally fast response to changes in H<sub>2</sub>S concentration, an important performance characteristic for monitoring the efficiency and quality of gas products.

### Benefit highlights

- Optimize gas processes and maximize operational efficiency with 24/7, real-time H<sub>2</sub>S contaminant measurements
- Rapidly respond to H<sub>2</sub>S concentration changes and reliably meet gas purity specifications
- Prevent pipeline corrosion and minimize the risk of an uncontrollable event, ensuring human safety and asset integrity
- Enable continuous gas deliveries and avoid shut-ins, flaring, and custody disputes
- Accurately measure H<sub>2</sub>S at low ppmv levels without interferences from contaminants or stream changes
- Mitigate or prevent costly premature media replacement and/or process shutdowns by employing various output options
- Maintain high plant availability with Heartbeat Technology's diagnostics, auto-validation, and verification reporting
- Minimize downtime and maximize repair flexibility with simple in-field servicing
- Reduce maintenance and OPEX costs with no cylinders, carrier and combustion gases, or lead acetate tape

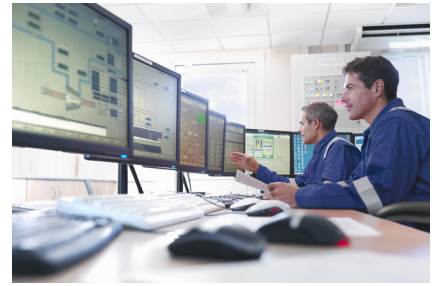
# Exceptional process monitoring and control



Safety & efficiency



Regulatory compliance



High performance & availability

## Seamless integration

The JT33 gas analyzer can be integrated seamlessly into any plant asset management system, providing reliable information for optimizing gas production measurement processes. The analyzer platform offers versatile operating options using a standardized Endress+Hauser concept. The user-friendly JT33 TDLAS gas analyzer ensures natural gas quality and enables pipeline processes to be securely controlled with confidence.



### Heartbeat Technology

- Diagnostic capabilities for reduced maintenance and quick resolution
- Permanent self-monitoring
- On-demand auto-validation and PDF verification reporting
- Alarm categories per NAMUR 107



### Superior metrology

- Excellent linearity and accuracy traceable to NIST references
- Extremely good repeatability and reproducibility
- Very low sensitivity to changes in ambient and stream conditions



### HistoROM

- Automatic data storage ensures maximum plant safety
- Simple data restoration enables quick exchange of components
- Event logbook and data logger provides for quick failure analysis



### Simple operation (HMI)

- Optimal usability with user-friendly interface
- User-specified menu structures and device access

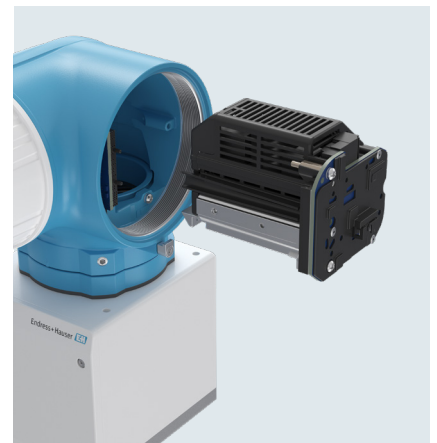


### Web server

- Time-saving local operation without additional software
- Comprehensive access to device, diagnostics, and process information
- Fast data upload/download for maintenance and service

## Ease of service for minimal downtime

The JT33 TDLAS analyzer's easy-to-replace components minimize downtime for the most efficient continuous analysis. Components are easily accessible and field serviceable, allowing for quick replacements or upgrades. The simple-to-remove gas sample cells are designed to allow convenient cleaning and servicing.



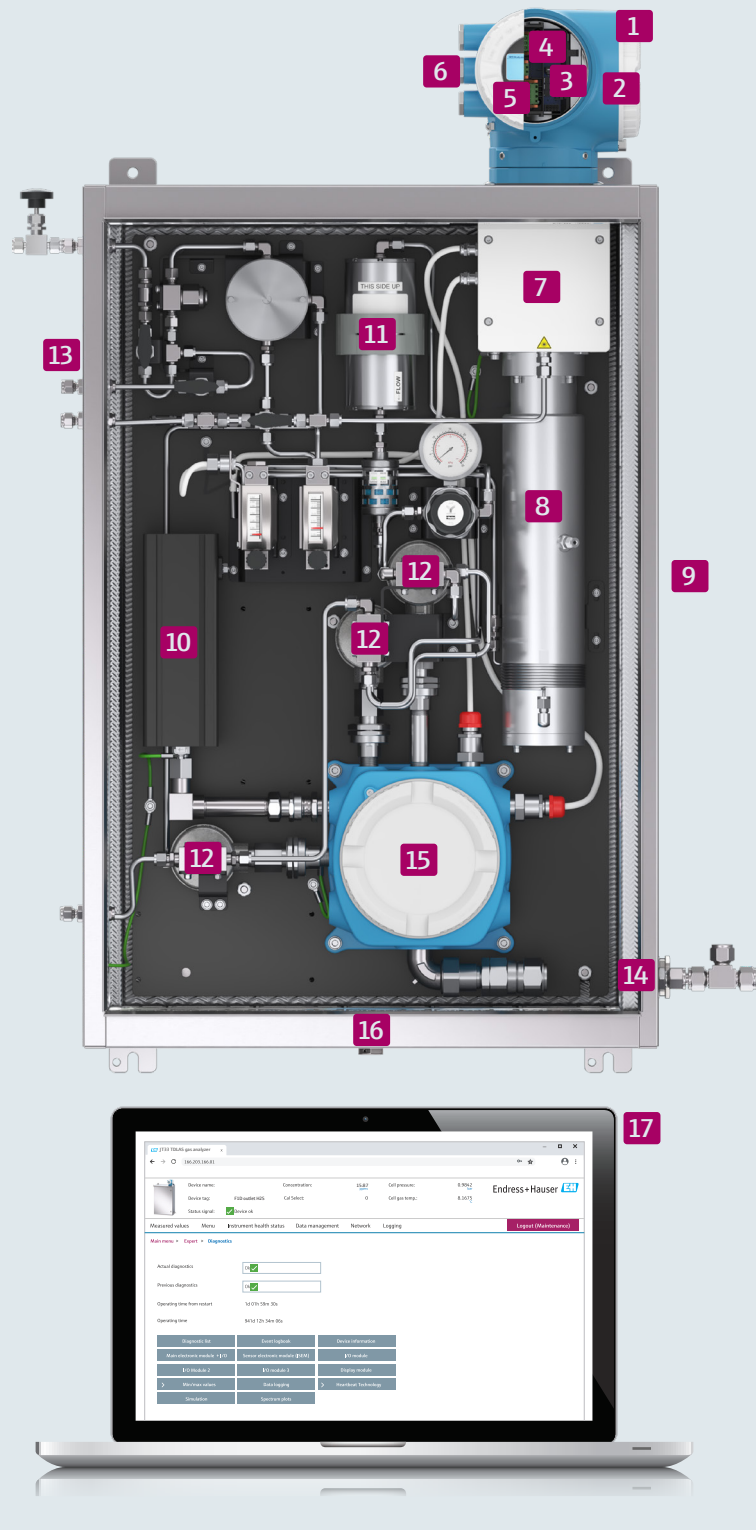


# The JT33 TDLAS analyzer system

The JT33 TDLAS gas analyzer design exceeds industry expectations and provides optimum accessibility for all user interfaces via easy access to electronics, optics, and sample conditioning components

## Features at a glance

1. Electronics housing – industry optimized using a robust housing design
2. Two-chamber housing – securely separated, modular electronics designed for quick-access serviceability
3. Web server connection – easy to connect and configure in the field using a laptop computer
4. HistoRom – memory to keep all device information; data management concept for back-up, duplication, and electronic board exchange
5. Display operation – secure HMI with intuitive menu
6. Inputs/outputs – freely configurable for optimized communications
7. Optical enclosure – the heart of the measurement using proven laser technology
8. Sample cell – continuous gas flow for real-time measurements
9. Sample conditioning system – enhanced measurement integrity with selectable components for safe optimization of incoming gas streams
10. Heater – temperature control for stable vapor phase and heightened measurement performance
11. Scrubber – removal of  $H_2S$  from the stream, used for the differential measurement
12. Solenoid valves – switching of streams for differential system and validation gases
13. Gas connections – located all on one side with optional heat-traced gas entry, safety purge, and pressure relief
14. Electrical – connection for the heater & SOVs
15. MAC - measurement accessory controller
16. Enclosure – with heater and insulation for cold weather
17. Web server interface – measured values, diagnostic information, and historical records at your fingertips



# Systems for diverse installation requirements

## Configurations to suit varying environments and gas conditions

A variety of system options allow the JT33 TDLAS gas analyzer to integrate perfectly into any number of locations. This configuration flexibility makes the JT33 the most versatile H<sub>2</sub>S analyzer available in the market.



The JT33 TDLAS gas analyzer is part of the growing family of new TDLAS analyzers offered by Endress+Hauser. The J22 (left) and JT33 (right), depicted above mounted in a shelter, are powered by field-proven SpectraSensors technology for TDLAS measurements of H<sub>2</sub>O and H<sub>2</sub>S respectively.

## Analyzer systems designed for natural gas production installations

JT33 TDLAS gas analyzer systems are available with multiple options and configurations which are suitable for various locations, including:

- 304 or 316 stainless steel enclosures for use in indoor or outdoor settings or locations with harsh environmental conditions
- Filtration with bypass and liquid knockout to remove particulates or liquids in gas streams, assuring uninterrupted measurement
- Pressure regulation with pressure relief valve to ensure a steady gas flow into the analyzer for consistent and continuous measurement
- Flowmeter choices for different area classifications, plus additional flow switch to ensure gas flow detection
- Rugged brackets for wall, rack, or pipe mount for effortless installation



# Technical specifications

## Measurement data

Target measurement	H <sub>2</sub> S (hydrogen sulfide)
Gas streams	Natural gas pipelines, natural gas processing (NGP), LNG, refining, petrochemical, biomethane, and CCUS
Principle of measurement	Tunable diode laser absorption spectroscopy (TDLAS)
Measurement ranges	0-10 ppm to 0-500 ppm; other ranges by request

## Electrical & communications

Controller display	4-line backlit display with touch control
Controller operation	Configuration via display or web servers
Controller housing materials	Coated copper-free aluminum
Outputs & communication	I/O 1: Modbus RTU over RS485 or Modbus TCP over Ethernet I/O2 and I/O3: software configurable; set as relay output, analog input (4-20 mA), analog output (4-20 mA) or digital/status output
Power supply	Controller: 24 VDC ±20% or 100-240 VAC ±10%, 50/60 Hz, 10W Sample conditioning power: AC 100 to 240 VAC ±10%, 50/60 Hz, 275W
Ingress protection	IP66, Type 4X

## Sample conditioning system

Enclosure materials	Enclosure: 304 or 316 stainless steel Window (optional): glass
Inlet pressure range	207 to 310 kPaG (30 to 45 psig)
Sample cell operating pressure range	800-1200 mbara (atmosphere) or 800-1700 mbara (flare)
Flow rate	Inlet: 0.5 to 4 slpm (1-8.5 scfh) Bypass: 0.5-1.0 slpm (1-2 scfh)
Wetted materials including sample measurement cell	316L stainless steel, FKM O-rings, glass, PCTFE/PTFE
Sample conditioning components	Includes verification port and options for heating, filtration, pressure regulation, flow meters, flow switch, and safety purge

## Certifications and marks

