

Hardcore Teardown: Beijing Zetron Technology's TDLAS & Intelligent Algorithm Redefining Industrial Gas Safety

Precision Detection Solutions and Technical Specifications for Petrochemical, Pipeline Inspection, and More

CALIFORNIA, CA, UNITED STATES, August 25, 2026 /EINPresswire.com/ -- Beijing [Zetron](#) Technology Co., Ltd. (Zetron) is a Beijing-based industrial gas detection manufacturer. The company develops and markets portable gas detectors, fixed detection systems, remote laser methane detectors, and air quality monitoring stations. This teardown examines how Zetron's instruments are engineered, with emphasis on tunable diode laser absorption spectroscopy (TDLAS), intelligent signal processing, and the communication interfaces that allow gas monitors to feed data into industrial control and IoT platforms.



Beijing Zetron Technology Co.,LTD

Founded in 2010, Zetron operates a 3,500-square-meter facility and reports annual output of roughly 6,000 units. Approximately 90% of products are exported to Southeast Asia, North America, South America, and the European Union. The instruments are used in natural gas, petrochemical, municipal pipeline, confined-space, environmental, and general industrial safety applications.

Industry Context: Why Sensing Technology Is the Core of Gas Detection

The global gas detector market was valued at USD 3.16 billion in 2023 and is projected to reach

USD 4.42 billion by 2030, at a CAGR of 4.9%, according to MarketsandMarkets. Asia Pacific dominated the market in 2024, accounting for approximately 34.1% of global share. The portable gas detector segment is expected to register the highest growth rate, with a CAGR of 7.8% through 2030.

Additional market data points to rising demand for specialized gas analysis. The global flue gas analyzer market was valued at about USD 2.73 billion in 2024, with a projected CAGR of 3.64% through 2035, per Market Research Future. Photoionization detection (PID), used for high-precision VOC measurement, is growing at an estimated CAGR of 7.1%, according to DataIntel. These market trends favor suppliers that can deliver faster response, broader gas coverage, and remote connectivity rather than single-gas fixed detection alone.

Technology Teardown: Inside Zetron's Gas Detector Architecture

TDLAS: Laser-Based Methane Detection

Tunable diode laser absorption spectroscopy uses a diode laser tuned to a specific absorption wavelength of the target gas. As the laser beam passes through an air sample, the gas absorbs energy at that wavelength. The instrument measures the attenuation and converts it into a concentration reading. Because the response is based on a targeted molecular absorption line, TDLAS provides high selectivity and is not consumed by the measurement process. It also does not require atmospheric oxygen, making it usable in inert or oxygen-depleted zones where catalytic sensors would be unreliable.

Zetron applies TDLAS in the ZW-G200 and ZW-G100 portable laser gas detectors, the PTM600-Eg high-sensitivity laser gas detector, and the MIC-200-TDL open-path laser methane detector. The ZW-G200 is specified for natural gas (methane) leak detection and monitoring, with typical accuracy of $\pm 2\%$ FS, linearity of $\leq \pm 2\%$, and a T90 response time of 20 seconds or less. According to the product specification, its laser-based detection reach is 150 to 200 meters. The MIC-200-TDL, an open-path instrument, has a detection distance of 120 meters. These working distances allow inspectors to check valve groups, pipeline segments, ceilings, and open areas without climbing to every potential leak source.

Multi-Sensor Integration: Electrochemical, Catalytic Combustion, and UV/IR

While TDLAS is the most distinctive technology in Zetron's lineup, industrial gas detection typically involves several sensing principles. Electrochemical cells are widely used for toxic gases such as carbon monoxide and hydrogen sulfide. Catalytic combustion sensors are common for combustible gases and hydrocarbons. Multi-spectral UV/IR detectors are used in flame and hydrocarbon fire detection. Zetron's catalog spans these categories through multi-parameter instruments that measure several gases in a single unit.

The MS800A online air quality monitor measures CO, NH₃, O₃, SO₂, VOC, and particulate matter. The MS700-FG intelligent portable flue gas analyzer measures O₂, CO, NO, NO₂, and SO₂ in combustion exhaust, and is aimed at boiler, power plant, waste incineration, and emission monitoring. The PTM600-Oz portable ozone detector is designed for ozone disinfection, water treatment, food processing, and pharmaceutical environments. The PTM600-S portable air pollution monitor covers industrial and urban air pollution parameters, including gases and particulate matter. Together, these models give Zetron a multi-gas monitoring platform that extends beyond methane into toxic gas, ozone, combustion, and ambient air quality measurement.

Intelligent Microprocessor and Signal-Processing Algorithms

Zetron's instrument specifications document a consistent digital architecture across models. Each unit records calibration logs, maintenance logs, fault records, and sensor-life expiration reminders. Data storage capacity is stated at above 10 million records, with local viewing, deletion, and data export. Interface language is selectable in Chinese and English. On several models, users can choose a high-precision sensor option with 1% FS accuracy in addition to the standard $\pm 2\%$ FS specification.

For plant safety teams, this on-device record-keeping changes how maintenance is performed. Instead of relying on external spreadsheets, a field technician can check the calibration history directly on the instrument, identify whether a fault record was generated, and see a reminder when a sensor approaches the end of its service life. The T90 response time of ≤ 20 seconds, common across the models reviewed, is the relevant specification for alarm response.

Wireless Connectivity and IoT Architecture

Zetron's product line supports four communication paths: Type-C for local data exchange, RS485 for industrial bus integration, 4-20mA analog output for legacy control systems, and wireless modules including 4G/5G and LoRa. Portable models such as the ZW-G200, MS600-L, and PTM600-Eg include Type-C and wireless communication. Outdoor monitoring stations such as the MS800A and Th2000A-Aqi accept DC24V industrial power or solar power, and connect via RS485, 4-20mA, or wireless.

In practice, this enables a layered monitoring architecture. Handheld laser detectors are used for spot checks and leak surveys. Personal detectors worn by workers provide continuous exposure monitoring. Fixed online stations, deployed across a plant or a city district, stream data to a central system over LoRa or 4G. The alarm device, industrial control system, and gas sampling probe listed in Zetron's application scope can be integrated through the same communication backbone.

Product Matrix Highlights and Specifications

The following parameters are taken from Zetron's product documentation. Where a datasheet does not publish a value, the field is omitted.

ZW-G200 Portable Laser Gas Detector

Target gas

Natural gas (methane) leak detection and monitoring

Detection principle

High-sensitivity laser detection (TDLAS)

Detection distance 150–200 m

Accuracy $\pm 2\%$ FS

Linearity $\leq \pm 2\%$

Response time $T_{90} \leq 20$ seconds

Power supply Rechargeable lithium battery

Operating temperature -20°C to $+50^{\circ}\text{C}$

Relative humidity 10–95% RH

Communication Type-C, data export, wireless communication

Data storage Above 10 million records

Explosion-proof Ex ia IIC T4 Ga

Protection IP68

MIC-200-TDL Open-Path Laser Methane Detector

Type Open-path laser methane detector

Detection principle TDLAS

Detection distance 120 m

Target gas Methane / natural gas leak detection

MS600 Series Portable Multi-Gas Detector

The MS600 series is positioned as a portable multi-gas platform, available in six-gas configurations for simultaneous monitoring.

A representative model, the MS600-L, is a remote gas detector for methane leak monitoring with the following specifications:

Accuracy $\pm 2\%$ FS (optional high-precision remote sensor)

Linearity $\leq \pm 2\%$

Response time $T_{90} \leq 20$ seconds

Communication Wireless remote communication / Type-C

Data storage Above 10 million records

Explosion-proof Ex ia IIC T4 Ga

Protection IP68

MS104K-S Personal Portable Detector

The MS104K-S series is a personal portable detector designed to be worn or carried by a worker for continuous exposure monitoring. It belongs to Zetron's intrinsically safe portable line, rated Ex ia IIC T4 Ga, making it suitable for potentially flammable atmospheres.

PTM600-S Portable Air Pollution Monitor

Measuring range

Industrial and urban air pollution parameters, multiple gases and particulate matter

Accuracy $\pm 2\%$ FS (optional high-precision sensor)

Linearity $\leq \pm 2\%$

Response time $T_{90} \leq 20$ seconds

Power supply Rechargeable lithium battery / DC24V

Operating temperature -20°C to $+50^{\circ}\text{C}$

Relative humidity 10–95% RH

Communication Type-C, RS485, wireless communication

Explosion-proof Ex ia IIC T4 Ga

Protection IP65

Additional Models in the Portfolio

Zetron also lists the ZW-G100 portable laser gas detector and the PTM600-Eg high-sensitivity laser gas detector. Both use laser-based detection for natural gas and methane, with accuracy of $\pm 2\%$ FS, linearity of $\leq \pm 2\%$, and T_{90} response time of ≤ 20 seconds. The PTM600-Eg has an SS304 stainless main casing and an IP68 rating. The MS700-FG flue gas analyzer covers O_2 , CO, NO, NO_2 , and SO_2 . The MS800A and Th2000A-Aqi are online air quality monitoring stations with SS304 outdoor cabinets, IP65-rated housings, and optional solar power for remote deployment.

How to Read the Specifications

The common specifications in Zetron's product line are worth decoding for buyers comparing industrial gas detectors.

Accuracy of $\pm 2\%$ FS means the reading can deviate from the true concentration by up to 2% of the full-scale value. For a detector with a range of 0–100 ppm, that allows a maximum error of ± 2 ppm at any point on the scale. Some models offer an optional sensor with 1% FS accuracy.

T90 response time is the time required for the reading to reach 90% of the final value after a step change in gas concentration. A T90 of ≤ 20 seconds is a general benchmark for portable industrial gas detectors that have to alarm before a hazard develops.

Ex ia IIC T4 Ga is an intrinsic-safety designator. The “Ex” indicates explosion-protected equipment; “ia” is the highest level of intrinsic safety; IIC covers hydrogen and acetylene gas groups; T4 corresponds to a maximum surface temperature of 135°C; Ga permits use in Zone 0 explosive atmospheres. UL 913 in North America and IEC 60079-11 internationally are the associated standards for this class of equipment.

IP68 is an ingress-protection rating. The first digit (6) means total dust protection. The second digit (8) means the device can be continuously immersed in water under conditions specified by the manufacturer. IP65 units are dust-tight and protected against low-pressure water jets.

Parameter Summary by Category

Detection gases: methane/natural gas (ZW-G200, ZW-G100, PTM600-Eg, MIC-200-TDL, MS600-L); CO, NH₃, O₃, SO₂, VOC, particulate matter (MS800A); O₂, CO, NO, NO₂, SO₂ (MS700-FG); ozone (PTM600-Oz); multi-gas and particulate matter (PTM600-S)

Detection principles: TDLAS laser (ZW series, PTM600-Eg, MIC-200-TDL); multi-sensor electrochemical/catalytic/optical configurations (MS800A, MS700-FG, PTM600-Oz, PTM600-S)

Accuracy: typical $\pm 2\%$ FS; optional 1% FS high-precision sensors on selected models

Linearity: $\leq \pm 2\%$ across the models reviewed

Response time: T90 ≤ 20 seconds

Operating environment: -20°C to +50°C; 10–95% RH

Explosion-proof rating: Ex ia IIC T4 Ga (portables and intrinsically safe models); N/A (outdoor environmental stations)

Protection rating: IP68 (portable laser and multi-gas models); IP65 (outdoor stations and PTM600-Oz/PTM600-S)

Data storage: above 10 million records; calibration, maintenance, fault, and sensor-life logs

Application Value in Industrial Safety Scenarios

Zetron’s product specifications list applicable industries including natural gas, petrochemical, municipal gas pipeline, industrial safety, environmental monitoring, power plant, boiler, waste incineration, water treatment, food, pharmaceutical manufacturing, and confined-space rescue. The working-condition scope covers high and low temperature, high and low humidity, high and low pressure, and toxic environments.

In petrochemical and refining, the priority is covering wide process areas. A single operator with a ZW-G200 can scan a tank farm or a compressor deck at 150–200 meters, and the MIC-200-TDL provides continuous open-path coverage in a fixed geometry. These instruments reduce the need to send personnel close to a leak before knowing that a leak exists.

In municipal pipeline inspection, handheld laser detectors such as the ZW-G100 and PTM600-Eg support walking surveys along buried gas lines, valve pits, and service connections. Their IP68-rated housings tolerate rain, mud, and wash-down conditions, and their Type-C data export simplifies recording inspection results.

In confined-space entry, the MS600 series portable multi-gas detector and MS104K-S personal portable detector are used for pre-entry testing and continuous worker monitoring. The intrinsic-safety rating is the relevant feature where flammable atmospheres may be present.

In environmental monitoring, the MS800A, Th2000A-Aqi, PTM600-S, PTM600-Oz, and MS700-FG cover ambient air quality, ozone disinfection monitoring, and combustion emissions. Solar-power options on the outdoor stations, combined with 4G/5G/LoRa links, allow deployment at remote monitoring points without trenching cables.

Market Impact and Compliance Context

Market data supports the direction of Zetron's product mix. Portable gas detection is the fastest-growing segment, expected to expand at 7.8% CAGR through 2030. TDLAS-based remote detection addresses a specific operational problem—finding leaks quickly over long distances—that fits the broader shift toward reducing worker exposure.

On compliance, gas detectors used in hazardous locations must satisfy intrinsic-safety standards such as UL 913 in North America or IEC 60079-11 internationally. Zetron reports ATEX, CE, RoHS, and FCC certifications for its industrial gas detection products, and the portable instruments carry Ex ia IIC T4 Ga markings consistent with intrinsically safe design. The company also reports ISO 9001:2005 and SGS certification for its quality system.

Company Statement

According to Zetron, the company “develops, manufactures and markets a complete range of gas detection equipment to protect people from hazardous conditions in the industry, research and commercial applications.” It states that its product range includes portable gas detectors, fixed detection systems, landfill gas analyzers, remote laser methane gas detectors, and air quality monitoring systems.

Closing Outlook

The practical question for gas detector buyers is no longer whether to use portable or fixed detection, but how quickly a leak can be located and how cleanly the measured data can enter

preventive maintenance and safety records. Zetron's product strategy combines TDLAS-based remote detection, multi-parameter portable instruments, standard industrial interfaces, and on-device calibration and fault logging. The published specifications— $\pm 2\%$ FS accuracy, T90 ≤ 20 seconds, Ex ia IIC T4 Ga, and IP68—give procurement and engineering teams a concrete basis for comparing these instruments against site requirements.

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