
POWER TECHNOLOGIES™
Power Transformer Oil
Intelligent DGA Monitoring
POWER TECHNOLOGIES
PTDGA5
iDGA
Laser Photo-Acoustic Spectroscopy

Power Transformers are critical, high-value assets. Unexpected failures can occur at any time, making real-time online monitoring essential for grid security and operational reliability.

Power transformers are the single most valuable assets within a substation, often accounting for up to 60% of total capital investment. Their dependable performance is fundamental to maintaining a stable, secure, and uninterrupted power supply across the grid.

Despite their critical role, transformers are also among the most vulnerable pieces of power equipment. When failures occur, the consequences can be severe—leading to unexpected outages, safety risks, extensive asset damage, and widespread service disruption. Protecting these essential assets is therefore not just an operational priority, but a strategic imperative for every utility.

Fortunately, most transformer failures can be anticipated and mitigated through continuous real-time monitoring.

Online monitoring technologies—particularly online dissolved gas analysis (DGA)—enable early detection of developing faults before they escalate into costly failures.

DGA is widely recognised as the cornerstone of effective transformer asset management, providing critical insight into internal fault activity. The type, concentration, and trend of dissolved gases reveal emerging fault mechanisms and their severity.

The Power Technologies laser photoacoustic spectroscopy (PAS) online DGA solution delivers real-time, highly reliable, and maintenance-free diagnostics, transforming complex gas data into actionable insights that support confident, proactive decision-making.

High - Precision and Intelligent DGA solutions based on Laser Photo-Acoustic Spectroscopy.

- Prevent Transformer Failures
- Implement Condition-Based Maintenance
- Extend Transformer Service Life
- Optimize O&M Expenditures
- AI-Driven DGA Trend Evaluation and risk assessment

Product Overview

The iDGA PTDGA laser PAS transformer oil Online DGA monitor is a transformer Online monitoring product based on laser photo-acoustic spectroscopy (PAS) technology. The device can continuously detect the characteristic gas and water content of H_2, CO, CO_2, CH_4, C_2H_2, C_2H_4, C_2H_6 dissolved in the transformer oil accord-ing to the preset period. Users can acti-vate the optional O_2 measurement functionality.

This product is suitable for the Online monitoring of dissolved gas in oil of oil-immersed transformer, reactor and other electrical equipment. In addition to the use for power generation, power grid system substation, it can also be used in railway, petroleum, petrochemical, mining, steel, coal and other power industry clients.

Maintenance-Free; Consumable-Zero

15-year consumable-free operation. it operates without replacement of consumables or components.

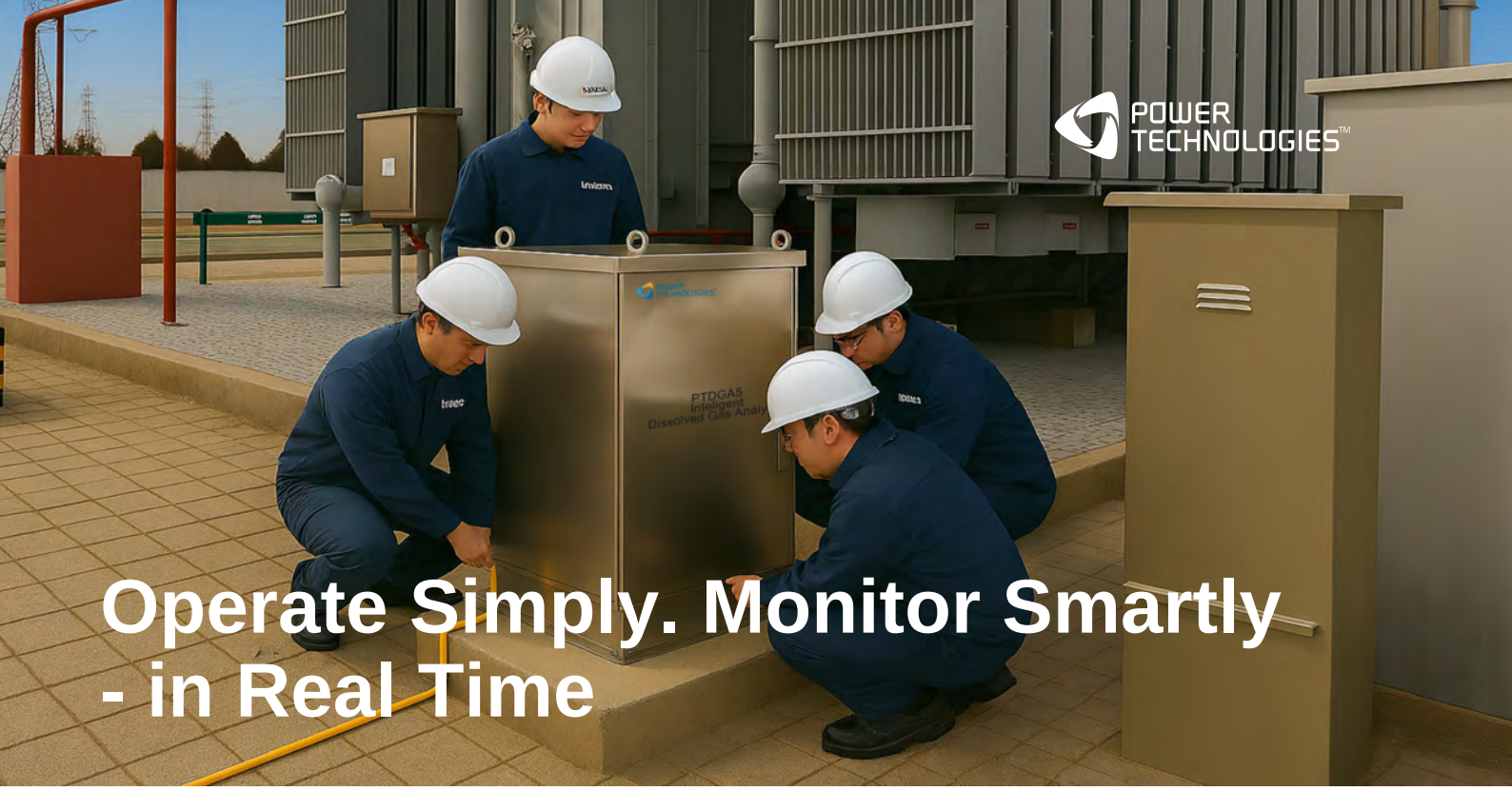
Leveraging Near-Infrared Laser Photo-Acoustic Spectroscopy Technology, the design incorporates minimal stationary parts, eliminating mechanical wear and replacements for enhanced simplicity, reliability, and durability.

The solution eliminates carrier gases, calibration gases, chromatographic columns, optical filters, moving mechanical parts, or other consumables required by conventional alternatives.

High-Precision ; High-Reliability

Using highly sensitive gas detection technology, novel photo-acoustic spectral filtering algorithms, and auto-compensation calibration, overcomes challenges such as low measurement sensitivity, cross interference between different gases. The minimum detection concentration of acetylene reaches 0.1 μL/L.

Led by PT expert Ph.D. team in optical sensing, it adopts pure physical optical detection method. Featuring a compact design, streamlined workflows, and self-adaptive degassing, this engineering excellence ensures unmatched operational stability and reliability.



Operate Simply. Monitor Smartly - in Real Time

Quick Installation & Seamless Upgrades

One-Click Installation with Automatic Deployed Software and Power-Off Resilient Configuration. Modular Design Enables Seamless Upgrades.

Self-Adaptive Degassing & Auto-Calibrating System

Self-Adaptive Degassing Volume: Post measurement clean oil is returned to the transformer. Automatic Compensation Calibration ensures consistently reliable DGA results.

Automatic Monitoring & Intelligent Diagnosis

All detection analyses of gases is completed at one time within a one-hour cycle. Centralized remote management with customiz-able policies ensures continuous awareness of transformer health indices.

Concise and Intuitive User Interface

Secure, comprehensive and intuitive user interface. Real-time access gas measurement data, transformer health indices and trends in graphical and numerical formats, with customizable alarms.

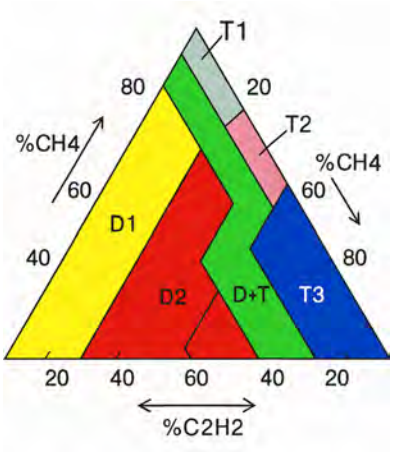
Holistic Engineering; AI-Driven Intelligence; Ruggedized Construction

Certified by SGS, ILAC-MRA, CNAS, CMA among others,the system operates reliably in harsh environments under strong electromagnetic interference, delivering intelligent real-time monitoring with trend recording, advanced intelligence analytics, and transformer fault correlation alerts.

Featuring hermetically sealed optical sensors, temperature-controlled enclosures, stainless-steel tubing, and statically sealed vacuum oil-gas separation modules, the design ensures exceptional performance and durability without consumable replacements. Its operational range extends from Arctic to Tropical zones (-40°C to +70°C).

PTDGA3 iDGA

Next Gen AI Driven Intelligent DGA



Operating Specifications

Description	Specification	Description	Specification
Power Supply	220VAC±10%, 50/60Hz	**Power Consumption**	≤1000w
Weight	<180kg	**Dimensions**	650mm(H)*750mm(W)*580mm(D)
Ambient Temp / RH	-40℃ ~ +55℃ / 10 ~ 95% RH	**Sampling Period**	Minimum 2hrs, Maximum 24hrs
Control Method	Auto, Menu set, Manual	**Overvoltage Category**	IV
Communication Protocol	IEC61850, TCP/IP	**Communication Method**	RJ45 / Fiber Optic
IP Rating	IP55 / IP65	**Altitude**	≤5000m
Expected Environmental Pollution Level	No pollution	**Insulation Rating of External Circuits**	100MΩ

Standard Eigth - Gases Measurement Error Limits

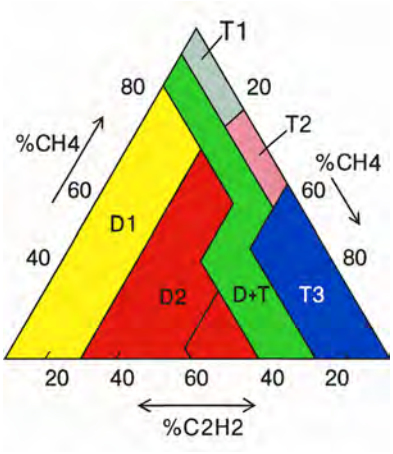
Detection Parameter	Detection Range(μL/L)	Measurement error limits(Grade B)
Hydrogen H_2	5 to 20	±5μL/L or ±30%
	20 to 2000	±35%
Acetylene C_2H_2	0.5 to 5	±1μL/L or ±30%
	5 to 10	±35%
	10 to 200	±30%
Methane CH_4,Ethane C_2H_6, Ethylene C_2H_4	0.5 to 10	±1μL/L or ±30%
	10 to 600	±35%
Carbon Monoxide CO	25 to 100	±30μL/L
	100 to 3000	±35%
Carbon Dioxide CO_2	25 to 100	±30μL/L
	100 to 15000	±35%
Total Hydrocarbons	2 to 10	±3μL/L
	10 to 150	±35%
	150 to 2000	±30%

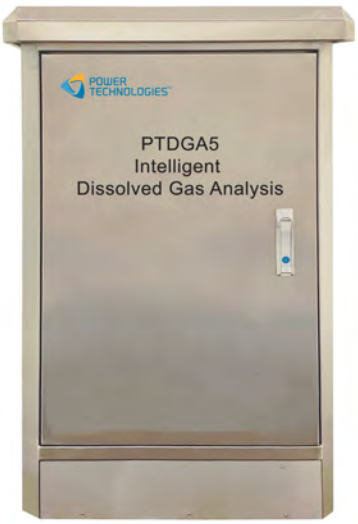
Optional Nitrogen & Oxygen Measurement

Detection	Specification
Nitrogen N_2, Oxygen O_2	2000 to 50000ppm

PTDGA5 iDGA

Next Gen AI Driven Intelligent DGA





Operating Specifications

Description	Specification	Description	Specification
Power Supply	220VAC±10%, 50/60Hz	**Power Consumption**	≤1000w
Weight	<100kg	**Dimensions**	1154mm(H)*650mm(W)*646mm(D)
Ambient Temp / RH	-40℃ ~ +70℃ / 10 ~ 95%	**Sampling Period**	Minimum 1 hrs, Maximum 24 hrs
Control Method	Auto, Menu Set, Manual	**Overvoltage Category**	IV
Communication Protocol	IEC61850, MODBUS, TCP/IP,optional PRP	**Communication Method**	RS485 / RJ45 / Fiber Optic / 4G wireless
IP Rating	IP55 / IP65	**Altitude**	≤5000m
Expected Environmental Pollution Level	No pollution	**Insulation Rating of External Circuits**	≥100MΩ

Standard Eight - Gases Measurement Error Limits

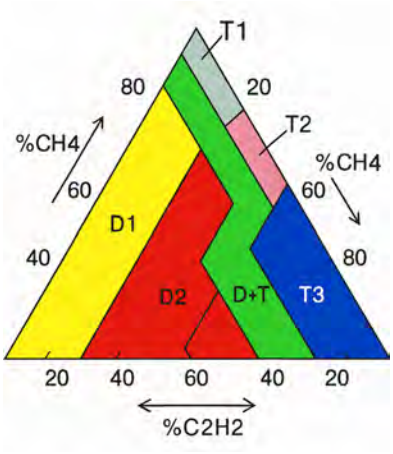
Detection Parameter	Detection Range(μL/L)	Measurement error limits(Grade B)
Hydrogen H_2	5 to 20	±3μL/L or ±30%
	20 to 2000	±35%
Acetylene C_2H_2	0.2 to 5	±0,2μL/L or ±30%
	5 to 10	±30%
	10 to 50	±20%
Methane CH_4,Ethane C_2H_6, Ethylene C_2H_4	0.5 to 10	±0.5μL/L or ±30%
	10 to 150	±30%
Carbon Monoxide CO	25 to 100	±25μL/L or ±30%
	100 to 1500	±30%
Carbon Dioxide CO_2	25 to 100	±25μL/L or ±30%
	100 to 7500	±30%
Total Hydrocarbons	2 to 10	±2μL/L or ±30%
	10 to 150	±30%
	150 to 500	±20%

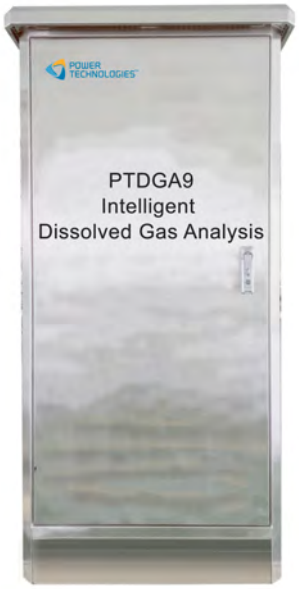
Optional Nitrogen & Oxygen Measurement

Detection	Specification
Nitrogen N_2, Oxygen O_2	0~50000ppm

PTDGA9 iDGA

Next Gen AI Driven Intelligent DGA





Operating Specifications

Description	Specification	Description	Specification
Power Supply	220VAC±10%, 50/60Hz	**Power Consumption**	≤1200w
Weight	<180kg	**Dimensions**	1550mm(H)*650mm(W)*646mm(D)
Ambient Temp / RH	-40℃ ~ +70℃ / 10 ~ 95%	**Ambient Humidity**	Regular Mode: Min. 1 hrs, Max 24 hrs; Fast Mode: Min. 0.5 hrs, Max 24 hrs.
Control Method	Auto, Menu set, Manual	**Overvoltage Category**	IV
Communication Protocol	IEC61850, MODBUS, TCP/IP,optional PRP	**Communication Method**	RS485 / RJ45 / Fiber Optic / 4G wireless
IP Rating	IP55 / IP65	**Altitude**	≤5000m
Expected Environmental Pollution Level	No pollution	**Insulation Rating of External Circuits**	≥100MΩ

Standard Eight - Component Measurement Error Limits

Detection Parameter	Detection Range(μL/L)	Measurement error limits(Grade B)
Hydrogen H_2	5 to 20	±5μL/L or ±30%
	20 to 1000	±30%
Acetylene C_2H_2	0.2 to 5	±0.2μL/L or ±30%
	5 to 10	±30%
	10 to 50	±20%
Methane CH_4,Ethane C_2H_6, Ethylene C_2H_4	0.5 to 10	±0.5μL/L or ±30%
	10 to 150	±30%
Carbon Monoxide CO	25 to 100	±25μL/L or ±30%
	100 to 1500	±30%
Carbon Dioxide CO_2	25 to 100	±50μL/L or ±30%
	200 to 7500	±30%
Total Hydrocarbons	2 to 10	±2μL/L or ±30%
	10 to 150	±30%
	150 to 500	±20%

Optional Nitrogen & Oxygen Measurement

Detection	Specification
Nitrogen N_2, Oxygen O_2	0~50000ppm

RELIABILITY ENHANCE™

PT endeavours to ensure the completeness and accuracy of the information, however, information in this information are subject to change without prior notice, PT assumes no responsibility.

If you want to have more detailed product information, please email **info@powertechnologies.com.sg**

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