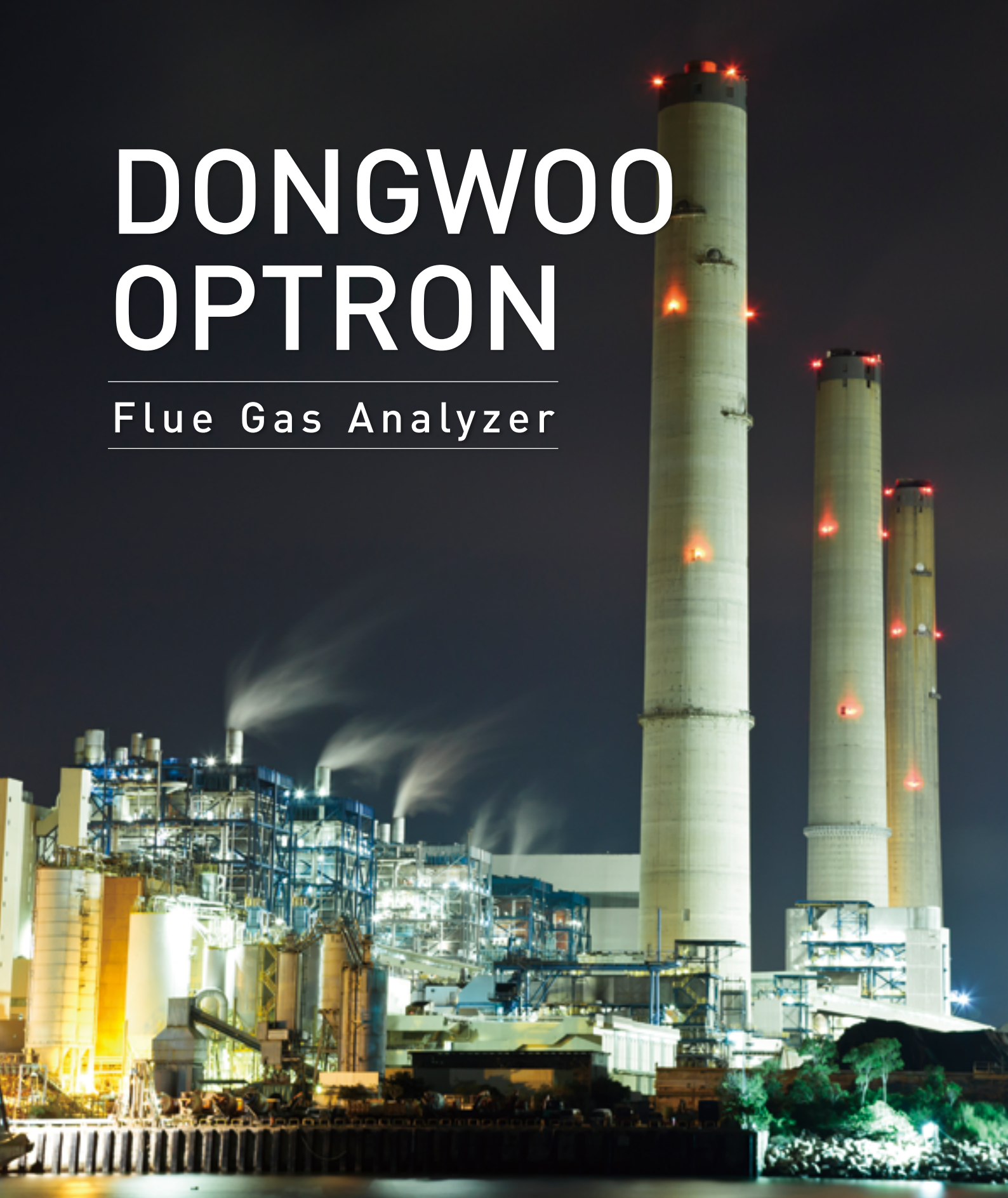


DONGWOO OPTRON

Flue Gas Analyzer



C o n t i n u o u s E m i s s i o n M o n i t o r i n g S y s t e m s

DONGWOO OPTRON Co., Ltd.

DONGWOO OPTRON

With Precision, For Environment


Established in 1989, DONGWOO OPTRON has succeeded in developing the first flue gas analyzer in Korea based on many years of experience in spectroscopy.

With continuous effort and investment to improve the quality and performance, DONGWOO OPTRON has achieved total sales of more than 1,800 units of flue gas analyzers and established itself as one of the leading flue gas analyzer manufacturers.

In pursuit of Accurate Analyzer with User-friendly System, DONGWOO OPTRON will continue strive to achieve customer satisfaction and trust in global market.

History

- 1989 Foundation of DONGWOO OPTRON
- 1998 Establishment of manufacturing facilities & R&D center
- 2001 New manufacturing facility and office building expansion
- 2006 1st Presidential Commendation for Excellence in Precision Technology
- 2007 Development of Flue Gas Analyzer
- 2009 2nd Presidential Commendation for Excellence in Precision Technology
- 2009 First sales of flue gas analyzers to 5 major state-owned power plants in Korea
- 2010 ISO 9001 certification
- 2011 Performance Certification issued by Korean government authority
- 2012 Prime Minister Commendation for contributing to National Industrial Development
- 2012 ISO 14001 Certification
- 2014 CE, CB Certification
- 2015 CPA Certification (China)
- 2016 Minister of Environment Commendation for contributing to National Environmental Industrial Development
- 2018 TUV Certification [Germany]/ CCEP Certification [China]/ EAC(Russia)
- 2019 Established South West Branch [Korea]
- 2020 Established 2nd Factory, South East Branch [Korea]
- 2021 Supply Flue Gas Analyzer more than 1,800 sets Established West Branch [Korea]
- 2022 Established Seoul HQ

A photograph of an industrial facility, likely a refinery or chemical plant, at sunset. The sky is a mix of orange, yellow, and blue. The facility is illuminated with warm lights, and a plume of white smoke or steam rises from a stack on the right. The foreground shows various industrial structures, including distillation columns and storage tanks.

With Precision, For Environment
DONGWOO OPTRON Co., Ltd.



APPLICATIONS



Power Plant

SO₂, NO_x, NH₃, CO,
O₂, Opacity, Dust,
Flowmeter, Temperature



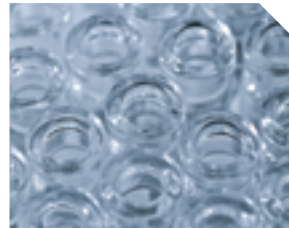
Incineration

HCl, NO_x, CO, SO₂, HF,
O₂, H₂O, Opacity, Dust,
Flowmeter, Temperature



Petrochemical, Oil and Gas

VOCS, NO_x, CO,
SO₂, O₂, H₂O,
Flowmeter



Glass, Ceramics

CO, SO₂, NO_x, O₂,
H₂O, Flowmeter,
Temperature



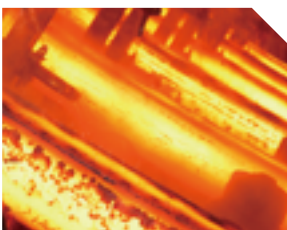
Cement

SO₂, NO_x, CO, HCl, HF,
O₂, Dust, Flowmeter,
Temperature



Paper, Pulp

SO₂, H₂S,
Flowmeter,
Temperature



Metal, Steel

CO, CO₂, SO₂, NO_x,
HCl, O₂, Flowmeter,
Temperature

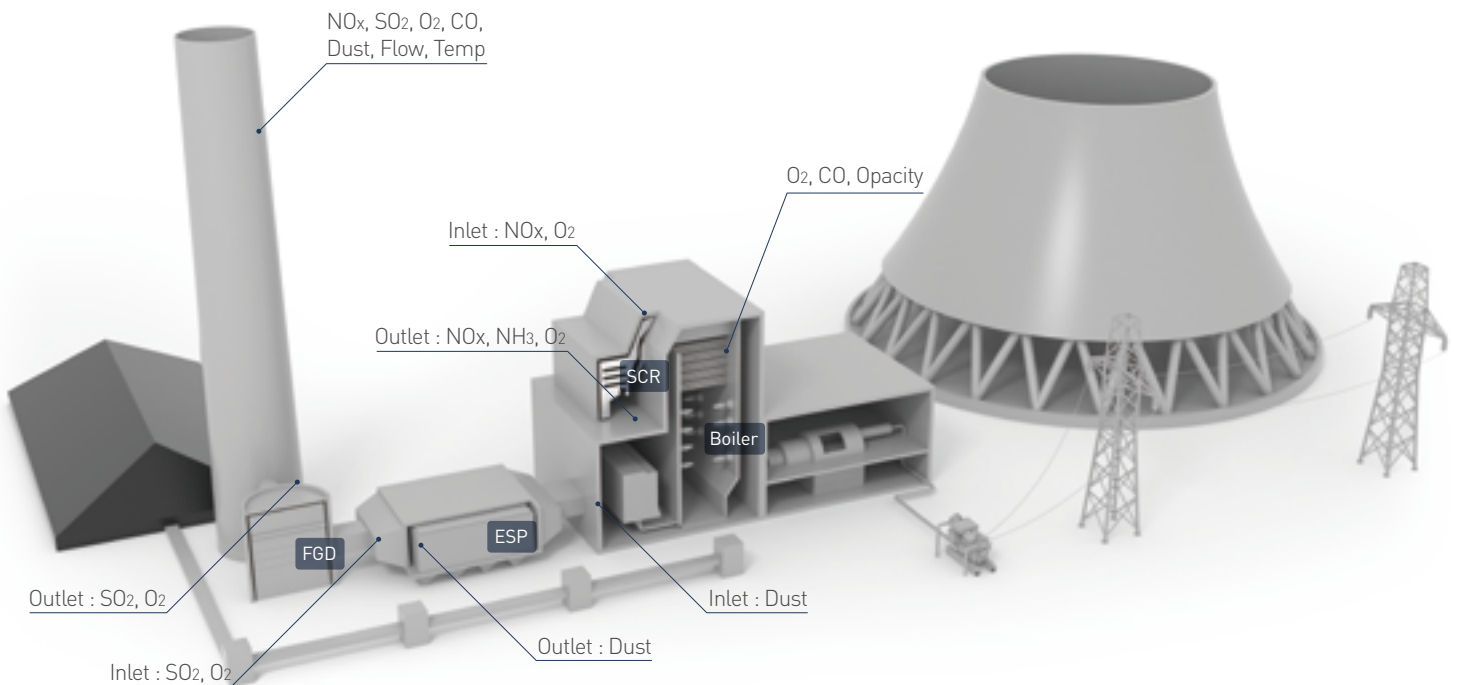


Maritime

NO_x, SO₂, CO₂,
O₂, Flowmeter,
Temperature

COAL POWER PLANT

Measured Components • NO_x, SO₂, NH₃, CO, O₂, Dust, Flow, Temp

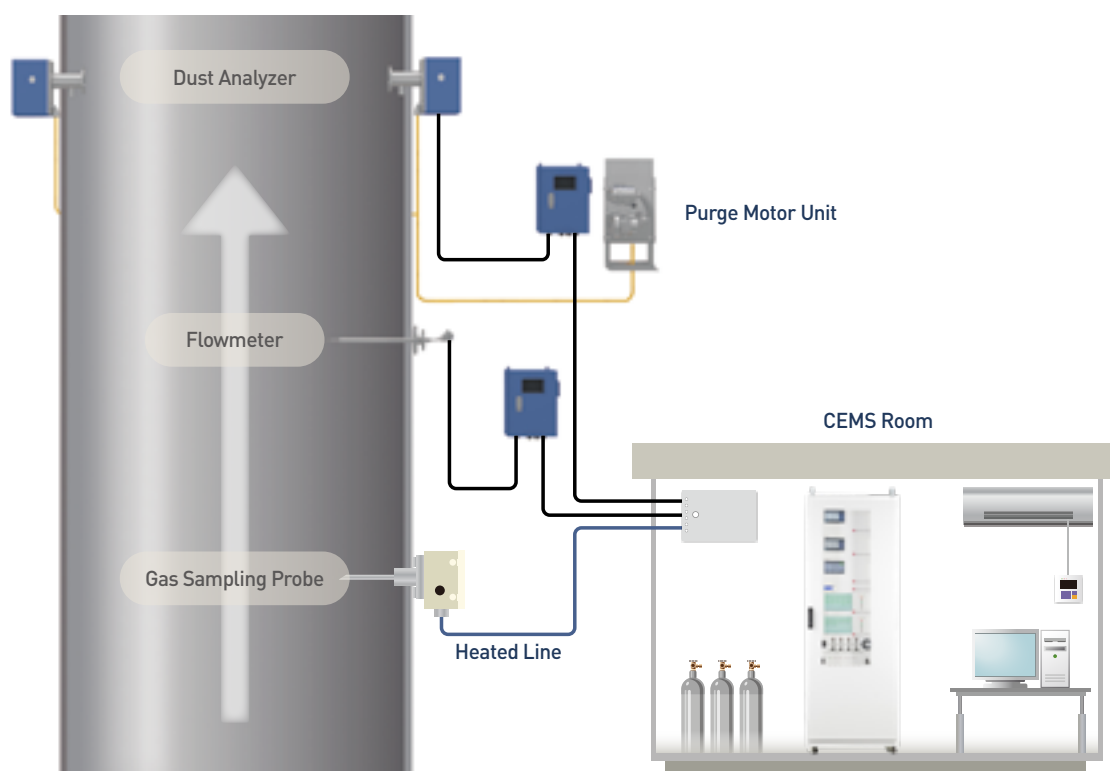




EXTRACTIVE MONITORING TYPE

Extractive type analyzers extract sample gas from stack/duct through sampling probe and deliver it to the conditioning system using heated sampling line. Conditioning system removes moisture and particles from the sampled gas and send to the analyzer.

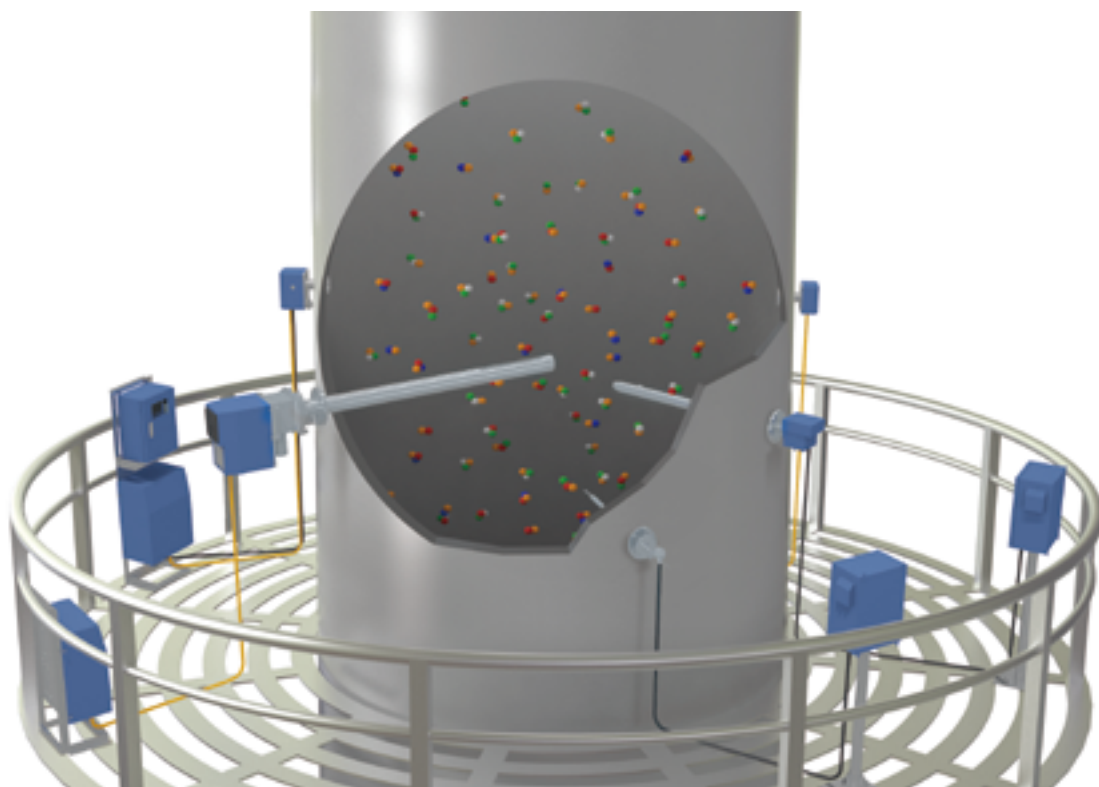
This system is appropriate for extreme operating conditions since the system does not get affected by the installation site's ambient temperature and vibration. It also allows better accessibility as it can be monitored and controlled in sheltered location away from the extraction point.



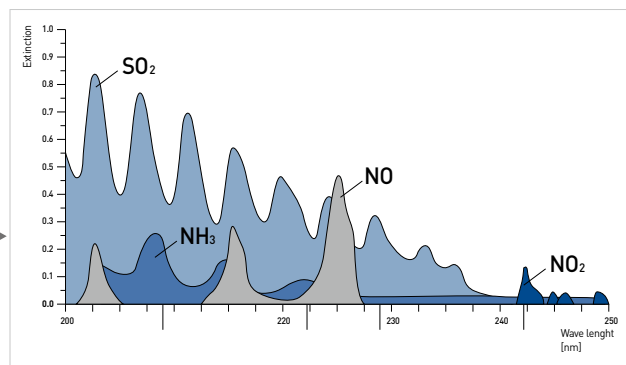
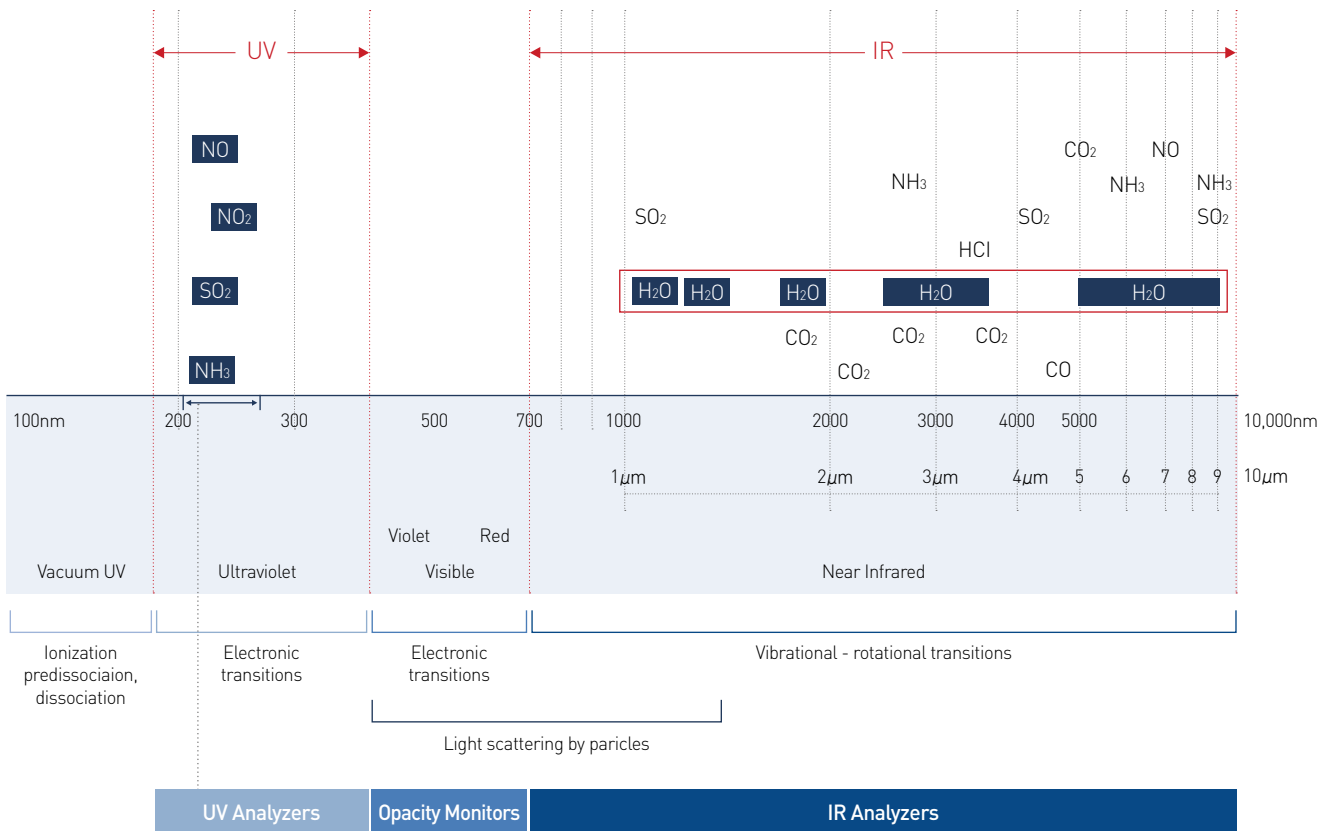


IN-SITU MONITORING TYPE

In-situ type analyzers measure the flowing gas inside the stack/duct directly without sampling process. This system features prompt response time and simple installation and Maintenance.



Pros. & Cons. (UV vs IR)



Ultraviolet, UV

- Advanced precision due to short wavelength with minimized noise
- Advanced precision due to exclusion of interference from H₂O content
- Measurable gas components are limited to NO_x, SO₂, and NH₃

Infrared, IR

- Capable of measuring various gas components
- Lowered precision due to long wavelength with high noise
- Impossible to completely eliminate the interference from H₂O content as H₂O absorption ranges are widely distributed

ANALYZER BY COMPONENTS



NO	Type	Model	SO ₂	NO _x	HCl	HF	NH ₃	CO	CO ₂	O ₂	Dust	Flow	CH ₄
1	In-Situ Type	DGA-X*	●	●			●						
2		DGA-XP	●	●						●			
3		TGA Series			●	●	●	●			●		
4		GGA-70-1*								●			
5		LCD-80*										●	
6		LCD-80S										●	
7		LCD-82										●	
8		LGS-80										●	
9		PGA Series											●
10		SCD-90											●
12	Sampling Type	DSM-XG	●	●						●			
13		DSM-XK	●	●						●			
14		DSB-X	●	●									
15		MSY-70								●			
16		GSY-70								●			
17		RSM-61							●	●			
18		LSM-30			●								
19		LSM-50						●					
20		LGH-80										●	
21		CSM-20			●								

* Explosion Proof Type Available

DGA-X In-Situ

UV Absorption NO_x, SO₂, NH₃

Multi gas analyzer by UV DOAS [UV absorption] measuring principle, which features almost no interference by moisture and particles. Best suited for process monitoring such as SCR/FGD, and also applicable for CEMS.



Technical Specifications

Measured Components	SO ₂ , NO, NO ₂ , NH ₃
Measurement Principles UV	Differential Optical Absorption Spectroscopy (DOAS)
Measuring Ranges	SO ₂ : Min 0~50 / Max 0~2000 ppm NO _x : Min 0~40 / Max 0~2000 ppm NH ₃ : Min 0~10 / Max 0~50 ppm
Min. Measuring Unit	0.1ppm
Accuracy	< ±1% FS
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±1% FS
Repeatability	< ±1% FS
Linearity	< ±1% FS
Response Time	< 5 seconds

System Components

Main Unit / Probe / Power Distribution Panel / Air Purge Unit / Master Flange / Cables

Options

Probe Protector / Teflon Coated Probe
ACU (Auto Calibration Unit)
Higher Enclosure or Protection Level
Regulator & Valve / Calibration Gas

Certificates / Approvals

Type Approval (Korea)
TUV (Germany)
CPA, CCEP (China)
EAC, PAC (Russia)

Features

- Simultaneous measurements for two components among NO_x, SO₂, and NH₃
- Less interference from moisture and particles as it uses UV light source
- NO_x converter is not required as it measures NO and NO₂ separately
- Enclosure level up to IP66 and NEMA4X
- Real Gas Calibration using patented Auto Calibration Unit (ACU)

Options

DGA-X with ACU
(Real Gas Calibration)



Options

DGA-X
(Separated control Unit)



Other Specifications

Measurement Conditions

Operating Temperature	-20 ~ +55 °C
Gas Temperature	< +900 °C

Communication

Analog Outputs	2 Channel, 4 ~ 20 mA
Digital Outputs	4 Channel
Digital Inputs	2 Channel
Display & Input Device	7" LCD Monitor (Touch Screen)
Interface	RS232,422,485 / LAN (Ethernet) / Hart

Dimension & Power Supply

Dimensions	W300 x D420 x H413 mm
Weight	22 kg
Enclosure Rating	IP65 (IP66)
Voltage	110/220 VAC, 50/60 Hz
Power Consumption	500 W

Probe

Materials	SUS 316L or SUS 316Ti
Length	1.0 M, 1.5 M, 2.0 M
Measurement Section Length	300 mm, 500 mm
Gas Flow Rate	> 1 m/s
Weight	1.5 M : 20 kg 2.0 M : 25 kg
Air Purge	Necessary
Temperature Sensor	PT 1000

Purge Air Unit

Dimensions	W550 x D350 x H850 mm
Weight	15 kg
Voltage	3P 480 VAC or 1P 220 VAC
Power Consumption	1.0 kW ~ 1.5 kW

DGA-X Ex.

In-Situ

UV Absorption

NO_x, SO₂, NH₃

Explosion proof type DGA-X. Applicable to plants with hazardous area, typically Oil refinery and chemical production plants.

Technical Specifications

Measured Components	SO ₂ , NO, NO ₂ , NH ₃
Measurement Principles	Differential Optical Absorption Spectroscopy (DOAS)
Measuring Ranges	SO ₂ : Min 0-50 / Max 0-2000 ppm NO _x : Min 0-40 / Max 0-2000 ppm NH ₃ : Min 0-10 / Max 0-50 ppm
Min. Measuring Unit	0.1 ppm
Accuracy	< ±1% FS
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±1% FS
Repeatability	< ±1% FS
Linearity	< ±1% FS
Response Time	< 5 seconds

System Components	Main Unit / Probe / Junction Box / Purge System / Master Flange / Cables
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Options	Air Purge Unit (Air pump, Air filter, Air hose)
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Features

- Simultaneous measurements for two components among NO_x, SO₂, and NH₃
- Less interference from moisture and particles as it uses UV light source
- NO_x converter is not required as it measures NO and NO₂ separately
- Explosion proof IIC T4

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +55 °C
	Gas Temperature	< +900 °C
Communication	Analog Outputs	4~20 mA, 2 Channel
	Digital Outputs	4 Channel (DO 4ch)
	Digital Inputs	2 Channel (DI 2ch)
	Display & Input Device	7" LCD Monitor (Touch Screen)
	Interface	RS232, 422, 485 / LAN (Ethernet) / Hart
Dimension & Power Supply	Dimensions	W300 x D380 x H420 mm
	Weight	1.5 M, 20 kg / 2.0 M, 25 kg
	Enclosure Rating	IP65
	Voltage	110/220 VAC (optional), 50/60 Hz
	Power Consumption	MAX 500 W

Probe	Materials	SUS 316L or SUS 316Ti
	Length	1.0 M, 1.5 M, 2.0 M
	Measurement Section Length	300 mm, 500 mm
	Gas Flow Rate	> 1 m/s
	Weight	1.5 M : 20 kg 2.0 M : 25 kg
Air Purge	Necessary	
Temperature Sensor	PT 1000	

Purge Air Unit	Dimensions	W183 x H367.5 x L153 mm
	Weight	13 kg
	Voltage	110/220 VAC (optional), 50/60 Hz
	Power Consumption	100 W

DGA-XP

In-Situ

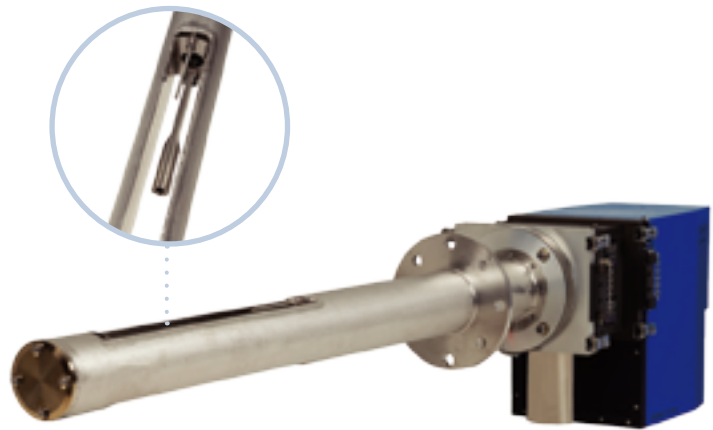
**DONGWOO
OPTRON**

UV Absorption/Zirconia
NO_x, SO₂, O₂

Specialized for CEMS, DGA-XP simultaneously measures NO_x, SO₂, and O₂ using UV DOAS (NO_x, SO₂) and Zirconia (O₂)

Technical Specifications

Measured Components	NO _x , SO ₂ , O ₂
Measurement Principles	UV (NO _x , SO ₂) / Zirconia (O ₂)
Measuring Ranges	NO _x : Min 0-50 / Max 0-200 ppm SO ₂ : Min 0-50 / Max 0-200 ppm O ₂ : 0-25%
Min. Measuring Unit	0.1ppm(NO _x , SO ₂), 0.01vol%(O ₂)
Accuracy	< ±2% FS
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±2% FS
Repeatability	< ±2% FS
Linearity	< ±2% FS
Response Time	< 5 seconds



System Components Main Unit / Probe / Power Distribution Panel / Air Purge Unit / Master Flange / Cables

Options Probe Protector / Teflon Coated Probe
ACU (Auto Calibration Unit)
Higher Enclosure or Protection Level
Regulator & Valve / Calibration Gas

Certificates / Approvals Type Approval (Korea)

Features

- Simultaneous measurements for two components among NO_x, SO₂, and O₂
- Less interference from moisture and particles as it uses UV light source
- NO_x converter is not required as it measures NO and NO₂ separately

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +55 °C
	Gas Temperature	< +200 °C

Communication	Analog Outputs	3 Channel, 4 ~ 20 mA
	Digital Outputs	6 Channel
	Digital Inputs	3 Channel
	Display & Input Device	7" LCD Monitor (Touch Screen)
	Interface	RS232,422,485 / LAN (Ethernet) / Hart

Dimension & Power Supply	Dimensions	W300 x D420 x H413 mm
	Weight	22 kg
	Enclosure Rating	IP65
	Voltage	110/220 VAC, 50/60 Hz
	Power Consumption	500 W

Probe

Materials	SUS 316L or SUS 316Ti
Length	1.2 M ~ 2.5 M
Measurement Section Length	500 mm / Adjustable
Gas Flow Rate	> 1 m/s
Weight	1.5 M : 25 kg 2.0 M : 30 kg
Air Purge	Necessary
Temperature Sensor	PT 1000

Purge Air Unit

Dimensions	W550 x D350 x H850 mm
Weight	15 kg
Voltage	3P 480 VAC or 1P 220VAC
Power Consumption	1.0 kW ~ 1.5 kW

RGA-60

In-Situ

TDLS
CO

Tunable diode laser (TDL) is used to scan for a very narrow range of wavelengths, so that CO measurements are made without interference from other components. In-situ type measurements do not require preprocessing.

Technical Specifications

Measured Components	CO
Measurement Principles	TDLS (Tunable Diode Laser Spectroscopy)
Measuring Ranges	CO: 0-1000ppm
Min. Measuring	0.1ppm
Accuracy	< ±1.0 ppm
Zero Drift (24 hours)	<±1% FS
Span Drift (24 hours)	<±1% FS
Repeatability	< ±2% FS
Linearity	< ±1% FS
Response Time	< 5 seconds



System Components	Main Unit / Probe / Power Distribution Panel Unit / Master Flange / Cables
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Features	<ul style="list-style-type: none"> • Zero interference by other gas components by using TDL measuring principle • Less interference from moisture and dust • Rapid response time and high sensitivity by using laser scanning of extremely narrow range
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Options	Probe Protector / Teflon Coated Probe Higher Enclosure or Protection Level Regulator & Valve / Calibration Gas
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Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +55 °C
	Gas Temperature	< +450 °C

Communication	Analog Outputs	2 Channel, 4 ~ 20 mA
	Digital Outputs	4 Channel
	Digital Inputs	2 Channel
	Display & Input Device	7" LCD Monitor (Touch Screen)
	Interface	RS232,422,485 / LAN (Ethernet) / Hart

Dimension & Power Supply	Dimensions	W300 x D420 x H413 mm
	Weight	20 kg
	Enclosure Rating	IP65 (IP66)
	Voltage	110/220VAC, 50/60 Hz
Power Consumption	300 W	

Probe	Materials	SUS 316L or SUS 316Ti
	Length	0.5 ~ 2.5M (Adjustable)
	Measurement section Length	500 mm
	Gas Flow Rate	> 1 m/s
	Weight	1.5 m : 20 kg 2.0 m : 25 kg
온도 센서	PT 1000	

TGA-50

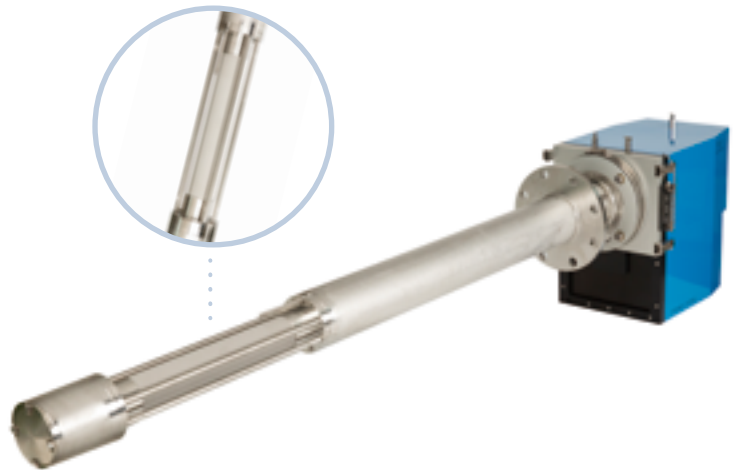
In-Situ

TDLS
NH₃

Zero interference from other components by scanning wavelength in a very narrow range using a Tunable Diode Laser (TDL). Optimized solution for NH₃ monitoring at coal plant's outlet of denitration facility with high SO₂ concentration.

Technical Specifications

Measured Components	NH ₃
Measurement Principles	TDLS (Tunable Diode Laser Spectroscopy)
Measuring Ranges	Min 0-10 / Max 0-50 ppm
Min. Measuring Unit	0.1 ppm
Accuracy	< ±1.0 ppm
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±1% FS
Repeatability	< ±2% FS
Linearity	< ±1% FS
Response Time	< 5 seconds



System Components	Main Unit / Probe / Power Distribution Panel Unit / Master Flange / Cables
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Options	Probe Protector / Teflon Coated Probe Higher Enclosure or Protection Regulator & Valve / Calibration Gas
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Certificates/ Approvals	Type Approval (Korea)
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Features	<ul style="list-style-type: none"> • Zero interference by other gas components by using TDL measuring principle • Less interference from moisture and dust • Rapid response time and high sensitivity by using laser scanning of extremely narrow range • Optimized for measuring NH₃ at the end of a denitration facility with high SO₂ concentration
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Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +60°C
	Gas Temperature	< +550 °C
	Gas Pressure	±60 hPa (±611 mmH ₂ O)

Communication	Analog Outputs	2 Channel, 4 ~ 20 mA
	Digital Outputs	4 Channel
	Digital Inputs	2 Channel
	Display & Input Device	7" LCD Monitor (Touch screen)
	Interface	RS232, 422, 485 / LAN / Hart

Dimension & Power Supply	Dimensions	W300 x D420 x H413 mm
	Weight	22 kg
	Enclosure Rating	IP65 (IP66, NEMA4X)
	Voltage	100 ~240 VAC, 50/60 Hz
Power Consumption	500 W	

Probe	Materials	SUS 316L or SUS 316Ti	
	Length	1.0 M ~ 2.0 M (Adjustable)	
	Measurement Section Length	500 mm	
	Gas Flow Rate	> 1 m/s	
	Weight	1.5 m	: 20 kg
		2.0 m	: 25 kg
Temperature Sensor	PT 1000	Probe adapter : 5 kg	

LCD-80

In-Situ

Light Transmission Dust (Dry type)

Continuous dust monitoring system with Light Transmission method. Using a high efficiency laser diode with 645nm-660nm red visible light wavelength as a light source, the amount of light reaching the measuring detector is measured and converted into dust concentration.

Technical Specifications

Measured Components	Dust
Measurement Principles	Laser (Optical transmission method)
Measuring Ranges	Min 0-15 / Max 0-10,000 mg/m ³
Min. Distances	1-10 m
Accuracy	< ±0.5% F.S
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±2% FS
Repeatability	< ±1% FS
Linearity	< ±2% FS
Response Time	< 5 seconds
Enclosure Rating	IP65

System Components	Transceiver Unit
	Reflector Unit
	Analyzer Unit / Cables
	Master Flange / Air Purge Unit

Options	Calibration Zig
	Main Unit Cabinet
	Higher Enclosure or Protection Level

Certificates / Approvals	Type Approval (Korea)
	CPA (China)
	EAC, PAC (Russia)



Features

- Simple optical alignment check with window viewer
- High accuracy at any concentrations-
Double-Path analysis for low concentration sites
and Single-Path analysis for high concentration sites
- Enclosure level up to IP66 and NEMA4X

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +60 °C (-20 ~ +70 °C)
	Operating Pressure	3 bar (≠ 300 kPa)
	Operating Humidity	0 ~ 95% RH
	Gas Temperature	-30 ~ +600 °C
	Gas Pressure	-50 ~ 30 hPa

Communication	Analog Outputs	1 Channel, 4 ~ 20mA
	Digital Outputs	3 Channel
	Digital Inputs	1 Channel / DI Voltage 12 VDC-24 VDC
	Display & Input Device	7" LCD touch panel (Touch screen / USB)
	Interface	RS232,422,485 / TCP-IP Via Ethernet / Hart

Dimension & Power Supply [Analyzer Unit]

Materials	SUS 304
Voltage	100 ~ 240 VAC, 50/60 Hz
Power Consumption	200 W (Max.)
Dimensions	W400 x D201 x H500 mm
Weight	18.5 kg

Dimension & Power Supply [Transceiver Unit]

Materials	SUS 304, AL 6061
Voltage	12 V / 24 V
Dimensions	W279 x D150 x H200 mm
Weight	4.8 kg

Dimension & Power Supply [Reflector Unit]

Materials	SUS 304, AL 6061
Voltage	N/A(24V with heater option)
Dimensions	W279 x D150 x H200 mm
Weight	4.6 kg

LCD-82

In-Situ

Light Transmission Dust (Dry type)

Probe type dust analyzer. LCD-82 eliminates the conventional disadvantages of cross-duct type dust analyzers, such as disalignment of transceiver and reflector due to duct vibration or distortion.

Technical Specifications

Measured Components	Dust, Opacity
Measurement Principles	Laser (Optical transmission method)
Measuring Ranges	Dust : Min 0-1000 mg/m ³ / Max 0-20000 mg/m ³ Opacity : 0-100%
Min. Distances	0.1 mg/m ³
Accuracy	< ±0.5% FS
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±2% FS
Repeatability	< ±1% FS
Linearity	< ±2% FS
Response Time	< 5 seconds
Enclosure Rating	IP65 (Analyzer Panel)

System Components	Transceiver Probe Unit
	Reflector Unit
	Analyzer Unit / Cables
	Master Flange / Air Purge Unit

Options	Calibration Zig
	Main Unit Cabinet
	Higher Enclosure or Protection Level

Certificates / Approvals	Type Approval (Korea)
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- | | |
|----------|--|
| Features | <ul style="list-style-type: none"> • Probe type allows stable measurement in high concentration • Double Path measurement with measuring probe allows stability under vibration or distortion • Improved durability with patented probe protector |
|----------|--|

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +55 °C
	Operating Pressure	3 bar (≒ 300 kPa)
	Operating Humidity	0 ~ 95% RH
	Gas Temperature	-30 ~ +300 °C
	Gas Pressure	-50 ~ 30 hPa

Communication	Analog Outputs	1 Channel, 4 ~ 20mA
	Digital Outputs	3 Channel
	Digital Inputs	1 Channel / DI Voltage 12 VDC-24 VDC
	Display & Input Device	7" LCD Touch Panel (Touch Screen/USB)
	Interface	RS232,422,485 / LAN (Ethernet) / Hart

Purge Air Unit	Dimensions	W550 x D350 x H850 mm
	Voltage	15 kg
	Weight	3P 480 VAC or 1P 220 VAC
	Power Consumption	1.0 kW ~ 1.5 kW

Dimension & Power Supply [Analyzer Unit]	Materials	SUS 304
	Dimensions	W400 x D201 x H500 mm
	Weight	18.5 kg
	Voltage	110/220 VAC, 50/60 Hz
	Power Consumption	200 W

Dimension & Power Supply [Probe Unit]	Materials	SUS 316, SUS 316Ti
	Weight	0.5 ~ 2.5 m
	Voltage	10 ~ 20 kg

LGS-80

In-Situ

Forward Light Scattering Dust (Dry type)

Measures the concentration of dust by laser light scattering method.
Measurements from very low by laser light scattering method.
Measurements for very low concentrations are possible using forward light scattering, and measurements up to mid-range concentrations are possible.

Technical Specifications

Measured Components	Dust
Measurement Principles	Forward Light Scattering
Measuring Ranges	Min 0~15 / Max 0~200 mg/m ³
Measurable Minimum Thickness	0.05 mg/m ³
Min. Measuring Unit	0.1 mg/m ³
Zero Drift (24 hours)	< ± 1% FS
Span Drift (24 hours)	< ± 2% FS
Repeatability	< ± 1% FS
Linearity	< ± 2% FS
Response Time	< 5 seconds , 1~600 sec(selectable)

System Components	Main Unit / Probe
	Air purge Unit (Air pump, Air filter, Air hose)
	Master Flange / Cables

Certificates/ Approvals	Type Approval (Korea)
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Features

- Low concentration measurement as low as 0.05mg/m³ by using light scattering method
- Easily installed on the wall of the duct
- Prevents contamination of probe internal parts by supplying clean purge air
- Periodic self-calibrating using equivalent light scattering filter inserted
- Software upgrade, data backup and download using USB

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +60 °C
	Gas Temperature	< +150 °C
	Gas Flow Rate	4 ~ 20 m/s
	Gas Pressure	-50 ~ 10 mbar
	Gas Humidity	< 99%RH
	IP grade	IP54 (Electrical device IP65)

Communication	Analog Outputs	1 Channel, 4~20 mA
	Digital Outputs	4 Channel
	Digital Inputs	1 Channel
	Display & Input Device	7" LCD Touch Panel
	Interface	RS232,422,485

Dimension & Power Supply [Analyzer Unit]

Materials	SUS 304
Dimensions	W440 x D266 x H500 mm
Weight	20 kg
Voltage	110/220 VAC, 50/60 Hz, 500W
Power Consumption	500 W

Dimension & Power Supply [Probe Unit]

Materials	SUS 316, SUS 316Ti
Length	541 mm , 868 mm
Weight	4.8 kg

Dimension & Power Supply [Purge Air Unit]

Dimensions	W550 x D350 x H850 mm
Voltage	15 kg
Weight	3P 480 VAC or 1P 220 VAC
Power Consumption	1.0 kW ~ 1.5 kW

LGH-80

Extractive

Forward Light Scattering Dust (Wet type)

Converting the intensity of the Mie Scattering Light to concentration of the dust collected from the stack/duct. Using the ejector principles, it eliminates the influence of moisture which is included in the sample taken by heating up above 130°C Increased accuracy by sampling at constant velocity inhalation.

Technical Specifications

Measured Components	Dust
Measurement Principles	Forward Light Scattering
Measuring Ranges	Min 0~15 / Max 0~200 mg/m ³
Measurable Minimum Thickness	0.05 mg/m ³
Min. Measuring Unit	0.1 mg/m ³
Zero Drift (24 hours)	< ± 1% FS
Span Drift (24 hours)	< ± 2% FS
Repeatability	< ± 1% FS
Linearity	< ± 2% FS
Response Time	< 5 seconds , 1~600 sec (selectable)

System Components	Main Unit / Sample Probe / Heating Chamber / Measuring Chamber and Flow Control Unit / Measuring Probe Unit / Air Purge Unit / Master Flange / Cables
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Options	PGA-91 Pitot Tube Flowmeter
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Certificates / Approvals	Type Approval (Korea)
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- | | |
|----------|--|
| Features | <ul style="list-style-type: none"> • Low concentration measurement as low as 0.1mg/m³ by using light scattering method • Wet type measurement prevents moisture interference • Periodic blow-back purging prevents dust accumulation in extractive system • Periodic self-calibrating using equivalent light scattering filter inserted • Increased accuracy by sampling at constant velocity inhalation |
|----------|--|

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +60 °C
	Gas Temperature	< +150 °C
	Gas Flow Rate	4~20 m/s
	Gas Pressure	-50 ~ 20 mbar
	Gas Humidity	< 1 Weight %

Communication	Analog Outputs	1 Channel, 4~20 mA
	Digital Outputs	4 Channel
	Digital Inputs	1 Channel
	Display & Input Device	7" LCD Touch Panel
	Interface	RS232,422,485

Dimension & Power Supply [Analyzer Unit]	Materials	SUS 304
	Dimensions	W800 x D600 x H1806 mm
	Weight	45 kg
	Voltage	110/220 VAC, 50/60 Hz
	Power Consumption	2 kW

Dimension & Power Supply [Purge Air Unit]	Dimensions	W550 x D350 x H850 mm
	Voltage	15 kg
	Weight	3P 480 VAC or 1P 220 VAC
	Power Consumption	1.0 kW ~ 1.5 kW

Dimension & Power Supply [Probe Unit]	Materials	PVDF
	Length	600 mm
	Weight	0.5 kg

PGA Series

In-Situ

Pitot-tube Flowmeter

Using the differential pressure (dynamic pressure) of S-Type Pitot-Tube to obtain the flow rate in the stack/duct. Partial modification of Pitot-Tube structure is available according to the operation.

Technical Specifications

Measured Components	Flow rate (Vs), Pressure dynamic (Pd), Pressure Static (Ps), Pressure ambient (Pa), Temperature (Ts)
Measurement Principles	Pitot-tube
Measuring Ranges	Vs 0~50 m/s, Pd 2.5~254 mmH ₂ O, Pa 500~1,100 hPa
Accuracy	< ±0.5% FS
Repeatability	< ±0.5% FS
Linearity	< ±1% FS
Response time	< 5 seconds

System Components	Analyzer Main Unit / S-Type Pitot Tube Master Flange / Cables
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Options	Main Unit Cabinet Teflon Coated Probe
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Certificates / Approvals	Type Approval (Korea) CPA (China) EAC (Russia)
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Features	<ul style="list-style-type: none"> • Simple installation and maintenance by using Pitot-Tube method • Remote Zero-calibration
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Other Specifications

Measurement Conditions	Operating Temperature	-18 ~ +60 °C
	Gas Temperature	< 500 °C

Communication	Analog Outputs	4 ~ 20 mA, 2 Channel and HART communications standard 1 Channel
	Analog Inputs	4 ~ 20 mA, 1 Channel (Internal)
	Digital Outputs	4 Channel
	Digital Inputs	1 Channel
	Display & Input Device	7" LCD Monitor (Touch Screen)
	Interface	RS485 and RS232, RS422, Ethernet

Dimension & Power Supply	Dimensions	W350 x D480 x H243 mm
	Weight	25 kg
	Enclosure Rating	IP65 (Optional)
	Voltage	220 VAC, 50/60 Hz
	Power Consumption	60 W

Pitot Tube	Materials	SUS 316L or SUS 316-Ti
	Length	500 mm ~ 2,500 mm (Adjustable)
	Max. Gas Temperature	< 500 °C
	Gas Flow Rate	> 0.01 m/s
	Weight	1.5 M : 10 kg 2.0 M : 15 kg
	Air Purge	Necessary
	Temperature Sensor	K type thermocouple

SCD-90

In-Situ

**DONGWOO
OPTRON**

Ultrasonic Flowmeter

Cross-duct type flowmeter using ultrasonic signals.

Technical Specifications

Measured Components	Flow rate (Vs), Pressure dynamic (Pd), Pressure Static (Ps), Pressure ambient (Pa), Temperature (Ts)
Measurement Principles	Ultrasonic
Measuring Ranges	0~50 m/sec
Accuracy	± 0.1 m/sec
Min. Measuring Unit	0.1
Repeatability	< -2%
Linearity	< -5%
Response Time	< 60 sec

System Components	Analyzer Main Unit / Ultrasonic Transducers Air Purge Unit Master Flange / Cables
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Options	Probe Protector / Teflon Coated Probe Higher Enclosure or Protection Regulator & Valve / Calibration Gas
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Features

- No interference by humidity and temperature
- More accurate solution for stack with big diameter

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +50°C
	Gas Temperature	0 ~ 150°C
	Measuring Length	1~10m

Communication	Analog Outputs	4~20mA, 1 Channel
	Digital Outputs	3ch
	Digital Inputs	-
	Display & Input Device	7" LCD Monitor (Touch Screen)
	Interface	RS232, 485

Dimension & Power Supply

Dimensions	W350 X D243 X H480
Weight	25 kg
Voltage	220 V
Power Consumption	60 W

Dimension & Power Supply [Purge Air Unit]

Dimensions	W550 x D350 x H850 mm
Weight	15 kg
Voltage	3P 480 VAC or 1P 220 VAC
Power Consumption	1.0 kW ~ 1.5 kW

GGA-70-1

In-Situ

Zirconia
O₂

By applying Zirconia (ZrO₂) sensor, changes in Electromotive Force (EMF) due to the ionization reaction among platinum (Pt) electrodes to be converted to the partial pressure (concentration) of oxygen molecules in the flue gas. Most widely accepted O₂ measuring method at any facility, from boiler to CEMS.

Technical Specifications

Measured Components	O ₂
Measurement Principles	Zirconia (ZrO ₂)
Measuring Ranges	0~25% vol. / 0~100% vol.
Min. Measuring Unit	0.01%
Accuracy	< ± 1% FS
Zero Drift (24 hours)	< ± 1% FS
Span Drift (24 hours)	< ± 1% FS
Repeatability	< ± 1% FS
Linearity	< ± 1% FS
Response Time	< 5 seconds



System Components	Detector / Analyzer Main Unit
	Calibration Gas Unit / Master Flange / Cables

Options	Detector Protector / Teflon Coated Detector
	Higher Enclosure or Protection Level
	Regulator & Valve / Calibration Gas

Certificates / Approvals	Type Approval (Korea)
	CCEP (China)

Features	• K-type TC with excellent linearity of temperature and electromotive force applied
	• High efficiency with light weight and low thermal conductivity
	• Periodic automatic diagnosis function to maintain accuracy
	• Built-in IC with CJC (Cold Junction Compensation)
	• Noise reduction and extended heater lifetime by applying Zero-Crossing function
	• Enclosure level up to IP66 and NEMA4X

Other Specifications

Measurement Conditions	Operating Temperature	-20 ~ +60 °C
	Operating Humidity	0 ~ 95% RH
	Gas Temperature	0 ~ +800 °C
	Gas Pressure	-5 ~ 250 kPa

Communication	Analog Outputs	4 ~ 20 mADC, 2 Channel / 1 ~ 5VDC, 2 Channel
	Digital Outputs	4 Channel
	Digital Inputs	2 Channel
	Display & Input Device	4.3" LCD touch panel
	Interface	RS232, 422, 485 / LAN / Hart / USB
	Storage Device	Flash Memory

Dimension & Power Supply	Dimensions	W370 x D200 x H480 mm
	Weight	14 kg
	Enclosure Rating	IP65
	Voltage	100 ~ 240 VAC, 60 Hz
	Power Consumption	Max. 300W (Max. 400W when using Gas Panel Heater)

Analyzer Sensor	Materials	SUS 316L or SUS 316Ti
	Length	1.0 m, 1.5 m
	Heating Temperature	+750 °C
	Weight	1.0 M : 10 kg 1.5 M : 15 kg
	Temperature Sensor	PT 1000 (Optional)

Calibration Gas Unit (Frame Type)	Materials	SUS 304
	Dimensions	W1650 x D340 x H340 mm
	Operating Temperature	0 ~ +40 °C
	Weight	14 kg

Calibration Gas Unit (Panel Type)	Materials	SUS 304
	Dimensions	W500 x D300 x H1,200 mm
	Operating Temperature	-20 ~ +60 °C
	Weight	35 kg (46 kg including base)

EXTRACTIVE TYPE SYSTEM

19" Rack Configuration
for CEMS



Technical Index

Measurement Principles

S02, NO, N02	UV DOAS
CO, C02	NDIR
O2	Paramagnetic, Zirconia
HCl	TDLS

DAS (Data acquisition system)

AD Converter	Capable of storing 5-minute data for more than 10 days. Displays alarm message on the screen in case of malfunction. Available in 19 inch Rack-mount Type and Panel Type.
Data Logger	Advanced performance with Quad-Core CPU and guaranteed stability with Embedded Linux Operating System. Capable of storing more than 1-year amount of 5-minute data.
FEP	

Gas Sampling & Conditioning system

Component	Sampler, Cooler, Needle Valve, MD Dryer, Drain pump, Moisture Detector, Solenoid Valve, Menbrabe Filter
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DST-X

Extractive

UV Absorption / Paramagnetic
NO_x, SO₂, O₂

Extractive type analyzer with UV absorption (NO_x, SO₂) and Zirconia(O₂) Principle. Additional conditioning process can be structured depending on the operating conditions. Optimized for CEMS application, as well as process monitoring at sites with low dust concentration.

Technical Specifications

Measured Components	NO _x , SO ₂ , O ₂
Measurement Principles	UV (NO, NO ₂ , SO ₂) / Paramagnetic (O ₂)
Measuring Ranges	NO : Min 0~40 / Max 0~2000 ppm NO ₂ : 0~100 ppm SO ₂ : Min 0~50 / Max 0~2000 ppm O ₂ : Min 0~25 / Max 0~100%
Min. Measuring Unit	0.1ppm
Accuracy	< ±1% FS
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±1% FS
Repeatability	< ±1% FS
Linearity	< ±2% FS
Response Time	< 5 seconds

System Components	Main Unit Cables
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Options	Sample Probe / Sample Line / Sample Pump Higher Enclosure or Protection Level Conditioning Systems(Cooler, Filter, Valve, Drain Pump etc.) Distribution Panel Rack Panel / Regulator / Calibration Gas
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Certificates / Approvals	Type Approval (Korea) TUV (Germany) EAC, PAC(Russia)
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Features

- Paramagnetic Cell (high-performance sensor type) applied which has semi-permanent lifetime
- Less interference from moisture and dust as it uses UV as light source
- Individual measurement for NO or NO₂ (No need for NO_x converter)

Other Specifications

Measurement Conditions	Operating Temperature	+10 ~ +50 °C
	Operating Humidity	0 ~ 99% RH
	Gas Temperature	< +900 °C (100°C for measuring cell)
	Gas Flow Rate	0.5 L/min ~ 1.5 L/min
	Sampling Method	Gas Cooler
	Sampling Pump	Diaphragm Pump
	Sampling Tube	PTFE
	Operating Pressure	800 ~ 1100 mbar

Communication

Analog Outputs	6 Channel, 4 ~ 20 mA
Digital Outputs	12 VDC, 4 Channel Digital Loop : 4 Channel (Max. 1A)
Digital Inputs	3 Channel
Display & Input Device	7" LCD Monitor (Touch Screen / USB)
Interface	RS232,422,485 / LAN (Ethernet) / Hart

Dimension & Power Supply

Materials	SUS 304, AI 6061
Dimensions	W440 x D550 x H240 mm
Weight	30 kg
Voltage	110/220 VAC, 50/60 Hz
Power Consumption	MAX 300 W

DSM-XK

Extractive

UV Absorption / Zirconia
NO_x, SO₂, O₂

Extractive type analyzer with UV absorption (NO_x, SO₂) and Zirconia(O₂) Principle. Additional conditioning process can be structured depending on the operating conditions. Optimized for CEMS application, as well as process monitoring at sites with low dust concentration.

Technical Specifications

Measured Components	NO _x , SO ₂ , O ₂
Measurement Principles	UV (NO, NO ₂ , SO ₂) / Zirconia (O ₂)
Measuring Ranges	NO : Min 0~40 / Max 0~2000 ppm NO ₂ : 0~100 ppm SO ₂ : Min 0~50 / Max 0~2000 ppm O ₂ : Min 0~25 / Max 0~100%
Min. Measuring Unit	0.1ppm
Accuracy	< ±1% FS
Zero Drift (24 hours)	< ±1% FS
Span Drift (24 hours)	< ±1% FS
Repeatability	< ±1% FS
Linearity	< ±2% FS
Response Time	< 5 seconds

System Components	DSM-XK Main Unit Main Unit
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Options	Sample Probe / Sample Line / Sample Pump Higher Enclosure or Protection Level Conditioning Systems(Cooler, Filter, Valve, Drain Pump etc.) Distribution Panel Rack Panel / Regulator / Calibration Gas
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- Features**
- Cost-effective compared to DST-X by replacing paramagnetic O₂ sensor to zirconia sensor

Other Specifications

Measurement Conditions	Operating Temperature	+10 ~ +50 °C
	Operating Humidity	0 ~ 99% RH
	Gas Temperature	< +900 °C (100°C for measuring cell)
	Gas Flow Rate	0.5 L/min ~ 1.5 L/min
	Sampling Method	Gas Cooler
	Sampling Pump	Diaphragm Pump
	Sampling Tube	PTFE
	Operating Pressure	800 ~ 1100 mbar

Communication	Analog Outputs	6 Channel, 4 ~ 20 mA
	Digital Outputs	12 VDC, 4 Channel Digital Loop : 4 Channel (Max. 1A)
	Digital Inputs	3 Channel
	Display & Input Device	7" LCD Monitor (Touch Screen / USB)
	Interface	RS232,422,485 / LAN (Ethernet) / Hart

Dimension & Power Supply	Materials	SUS 304, AI 6061
	Dimensions	W440 x D550 x H240 mm
	Weight	30 kg
	Voltage	110/220 VAC, 50/60 Hz
	Power Consumption	MAX 300 W

RSM-61

Extractive

NDIR
CO, CO₂

Extractive type CO analyzer with Nondispersive Infrared (NDIR) principle.
Fast and reliable monitoring with single gas measurement.

Technical Specifications

Measured Components	CO, CO ₂
Measurement Principles	NDIR (Non-dispersive Infrared Absorption)
Measuring Ranges	CO: Min 0~100 / Max 0~600 ppm CO ₂ : Min 0~25 / Max 0~50 %
Accuracy	< ±2% FS
Zero Drift (24 hours)	< ±2% FS
Span Drift (24 hours)	< ±2% FS
Repeatability	< ±2% FS
Linearity	< ±2% FS
Response Time	< 5 seconds

System Components	Main Unit Cables
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Options	Sample Probe / Sample Line / Sample Pump Higher Enclosure or Protection Level Conditioning Systems(Cooler, Filter, Valve, Drain Pump etc.) Distribution Panel Rack Panel / Regulator / Calibration Gas
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Certificates / Approvals	Type Approval (Korea) EAC, PAC(Russia)
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Features	<ul style="list-style-type: none"> Efficient and cost-saving when only CO/CO₂ to be monitored
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Other Specifications

Measurement Conditions	Operating Temperature	+5 ~ +45 °C
	Operating Humidity	0 ~ 90% RH
	Gas Temperature	< +900 °C (100 °C for measuring cell)
	Gas Flow Rate	0.2 L/min ~ 1.5 L/min
	Sampling Method	Electronic Gas Conditioner
	Sampling Pump	Diaphragm Pump
	Sampling Tube	PTFE
	Operating Pressure	800 ~ 1100 mbar

Communication	Analog Outputs	2 Channel, 4 ~ 20 mA
	Digital Inputs	Digital Input 1 Channel (Voltage 12 VDC ~ 24 VDC)
	Display & Input Device	7" LCD Monitor (Touch Screen / USB)
	Interface	RS232, 422, 485 / LAN (Ethernet) / Hart

Dimension & Power Supply	Materials	SUS 304, AI 6061
	Dimensions	W485 x D551 x H178 mm
	Weight	10 kg
	Voltage	110/220 VAC, 50/60 Hz
	Power Consumption	MAX 165 W

LSM-30

Extractive

TDLS
HCL

Extractive type HCL analyzer with TDLS (Tunable Diode Laser) principle. TDL scans a very specific light absorption wavelength range, and thus can clearly exclude possible interference zone of other adjacent gas components.

Technical Specifications

Measured Components	HCL
Measurement Principles	TDLS (Tunable Diode Laser Spectroscopy)
Measuring Ranges	Min 0~20 / Max 0~100 ppm
Accuracy	< ±2% FS
Zero Drift (24 hours)	< ±2% FS
Span Drift (24 hours)	< ±2% FS
Repeatability	< ±2% FS
Linearity	< ±2% FS



System Components

Main Unit

Options

Sample Probe / Sample Line / Heating Block
Distribution Panel
Rack Panel / Regulator / Calibration Gas

Features

- Less interference from other other gascomponents as TDL scans very narrow range of light wavelength (0.035 um)
- Less interference from moisture and dustcompared to other measuring principles
- Analysis in low flow rate is possible by minimizing measuring cell capacity

Other Specifications

Measurement Conditions

Operating Temperature	-20 °C ~ +50 °C (-40 °C ~ +80 °C)
Operating Humidity	0 ~ 99% r.H.
Gas Temperature	< +190 °C
Cell Temperature	+190 °C
Cell Heating time	45 min (When heating from +25°C)
Gas Humidity	MAX 20% abs. H ₂ O
Gas Flow Rate	1.0 L/min ~ 5.0 L/min
Sampling Pump	Heated Diaphragm pump
Sampling Tube	PTFE
Operating Pressure	800 ~ 1,100 mbar

Communication

Analog Outputs	2 Channel, 4 ~ 20mA
Digital Outputs	12 VDC, 4 Channel
Digital Inputs	Digital 4Ch / Current, DI Voltage 12 VDC ~ 48 VDC
Display & Input Device	7" LCD Monitor (Touch screen / USB)
Interface	RS232, 422, 485 / TCP-IP Via Ethernet / Hart Communication

Dimension & Power Supply

Materials	SUS 304, Al 6061
Dimensions	W440 x D550 x H240 mm
Weight	20 kg
Voltage	88 ~ 264 VAC, 48 ~ 63 Hz
Power Consumption	MAX 165 W

CEMS DATA ACQUISITION SYSTEM

Data Logger & FEP

Advanced performance with Quad-Core CPU and guaranteed stability with Embedded Linux Operating System. Capable of storing more than 1-year amount of 5-minute data.

DLD-7 Data Logger

Specification

CPU	IMX6Q (coretex-A9) 1.0 GHz
OS	Embedded Linux
Hard Disk	250 GB
RAM	DDR3 2G
Display & Input Device	10.1 Inch , Touch Screen
USB	4 Port , Data back up available
RS-232C	10 Port , 7 Slot (Additional Installation available)
Digital Inputs/Outputs	More than 32 Port (Additional Installation available)
Analog Inputs/Outputs	More than 32 Port (Additional Installation available)
Dimensions	W485 x D330 x H177 mm



DLD-7F FEP

Specification

CPU	IMX6Q (coretex-A9) 1.0 GHz
OS	Embedded Linux
Hard Disk	250 GB
RAM	DDR3 2G
Display & Input Device	10.1 Inch , Touch Screen
USB	4 Port , Data back up available
RS-232C	10 Port , 7 Slot (Additional Installation available)
Ethernet	1 Port
Dimensions	W485 x D330 x H177 mm



Temp. Sensor & AD Converter

Capable of storing 5-minute data for more than 1 D days. Displays alarm message on the screen in case of malfunction. Available in 19 inch Rack-mount Type and Panel Type.

DLD-7A AD Converter

Specification

Display & Input Device	7" LCD (2 Row, 16 Channel)
Memory	32 Mbyte (10days storage)
Input	PT100 (0~300°C) Thermocouple K-type (0°C~1275°C)
Output	RS232, RS485
Voltage	110/220 VAC, 50/60 Hz, 0.42A/230 VAC
Dimensions	W435 x D350 x H44 mm



With Precision, For Environment
DONGWOO OPTRON Co., Ltd.



Certificates & Approvals

Korean Type Approval

German TUV

Chinese CPA, CCEP

Russian EAC, PAC

ABS PDA

ISO 9001

ISO 14001

ISO 45001



Track Record

SCR

Company	Project	Gas Analyzer	Q'ty	Date	Company	Project	Gas Analyzer	Q'ty	Date
Korea South-East Power (KOEN)	Young-Heung #3,4	NOx	4	2012-Oct.	Korea Western Power (WP)	Tae-Ahn #1,3,5,6	NOx	16	2012-Jan.
	Young-Heung #3	NOx	4	2015-May.		Tae-Ahn #2,4	NOx	8	2013-Mar.
	Young-Heung #2	NOx	2	2015-Oct.		Tae-Ahn #8	NOx	4	2013-May
	Young-Heung #4	NOx	2	2016-Feb.		Tae-Ahn #6	NOx	2	2015-Mar.
	Young-Heung #1	NOx	2	2016-Mar.		Tae-Ahn #7	NOx	4	2015-Nov.
	Young-Heung #4	NOx	1	2017-Sep.		Tae-Ahn #3,4	NOx	2	2016-Mar.
	Young-Heung #4	NOx	1	2018-Aug.		Tae-Ahn #5	NOx	2	2016-May.
	Young-Heung #2	NOx	4	2019-Mar.		Tae-Ahn #7,8	NH3	4	2016-Oct.
	Young-Heung #1	NOx	4	2019-Oct.		Tae-Ahn #5,6	NOx	4	2019-Dec.
	Young-Heung #4	NOx	2	2019-Nov.		Tae-Ahn #1-4	NOx/NH3	6	2020-Mar.
	Young-Heung #1,2	NOx	4	2020-Mar.	Pyeong-Taek #2	NOx	4	2014-May.	
	Young-Heung #3,4	NOx	2	2021-Oct.	Pyeong-Taek #1	NOx	4	2015-Mar.	
	Sam-Chun-Po #3,4	NOx	4	2012-Nov.	Korea Midland Power (KOMIPO)	Bo-Ryeong #7	NOx	4	2017-Apr.
	Sam-Chun-Po #3,4	NOx/NH3	4	2013-Mar.		Bo-Ryeong #8	NOx	2	2017-Aug.
	Sam-Chun-Po #1,2	NOx/O2	4	2016-Mar.		Bo-Ryeong #7,8	NOx	2	2017-Nov.
	Sam-Chun-Po #3	NOx/O2	2	2017-Nov.		Bo-Ryeong #8	NOx	4	2018-Apr.
	Sam-Chun-Po #3,4	NOx/NH3	4	2018-May.		Bo-Ryeong #8	NOx	1	2018-Aug.
	Sam-Chun-Po #4	NOx/O2	2	2018-Jul.	Bo-Ryeong #7,8	NOx	3	2019-Apr.	
	Sam-Chun-Po #3,4	NH3	4	2022-Apr.	Korea Southern Power (STX Heavy Industry)	Sam-Chuk Green #1,2	NOx	16	2013-Dec.
	Yong-Dong #1,2	NOx	4	2019-Apr.			NOx/NH3	8	
Yeosu #1,2	NH3	3	2022-Sep.		O2	16			
Korea Southern Power (KOSPO)	Ha-Dong #8	NOx	4	2013-May.	Hanhwa Total [Hanmo]	Hanhwa Total	NOx	2	2014-Jul.
	Ha-Dong #5	NOx	4	2013-Aug.			NH3	1	
	Ha-Dong #1,4	NOx	4	2014-Mar.		O2	1		
	Ha-Dong #6	NOx	4	2014-Jul.	GS Donghae Elec. Power (STX Heavy Industry)	Buk-Pyeong #1,2	NOx	10	2015-Feb.
	Ha-Dong #1	NOx/NH3	2	2014-Nov.			NH3	4	
	Ha-Dong #7	NOx	4	2014-Nov.	Dongsuh Foods Corp. [ECOPRO]	Chang-Won Plant	NOx/NH3	1	2015-Dec.
	Ha-Dong #2-4	NOx/NH3	6	2015-Apr.		Bu-pyeong Plant	NOx/NH3	1	2016-Jan.
	Ha-Dong #5-8	NH3	8	2015-Apr.	GS E&R [KeumKang CNT]	Po-Chun Heat & power	NOx/NH3	2	2015-Dec.
	Ha-Dong #8	NOx/SO2	4	2017-Jun.		S-Oil [Welcron KangWon]	S-Oil Onsan Plant	NOx	1
	Ha-Dong #3	NOx	2	2019-Nov.			NH3	1	
	Ha-Dong #4	NOx	2	2019-Dec.	Korea Western Power [GE PSK]	Shin-Pyeong-Taek #1	NOx/O2	4	2017-Oct.
	South Jeju #1,2	NOx/NH3	2	2018-Apr.			NH3	2	
	Ahn-Dong Combined #1	NOx	2	2018-Dec.	Korea Western Power [Halla]	Tae-Ahn IGCC	NOx	2	2017-Dec.
	Ahn-Dong Combined #1	NOx/NH3	1	2018-Dec.			NH3	1	
	Ahn-Dong Combined #1	NOx/NH3	1	2021-Oct.		O2	2		
	Sam-Cheok #1	NOx/NH3	2	2020-Dec.	Go-sung Green Power (hanshin B-tec)	Go-sung Hai Power Aux-Boiler	NOx	3	2018-Jun.
	Sam-Cheok #1,2	NOx/NH3	6	2021-Jun.			NH3	3	
	Sam-Cheok #1,2	NOx/SO2	4	2022-Mar.			O2	2	
	EWP (Korea)	Dang-Jin #5	NOx	2	2012-May.		CO	1	
		Dang-Jin #2	NOx	2	2013-Sep.	Sejong City [FK Engineering]	Sejong City Crematory Facility #1	NOx/NH3	1
Dang-Jin #3,4		NOx	4	2014-Sep.			O2	1	
Dang-Jin #3,4		O2	4	2014-Sep.	Sejong City Crematory Facility #2		NOx/NH3	1	2019-Oct.
Dang-Jin #7		NOx/NH3	1	2014-Oct.			O2	1	
Dang-Jin #7,8		NOx/NH3	3	2015-Jun.	Sejong City Crematory Facility #3		NOx/NH3	1	2021-Sep.
Dang-Jin #5,6		NOx/NH3	4	2015-Sep.			O2	1	
Dang-Jin #1,3		NOx	10	2018-Jul.	Huvis [Seoul Sharp Heavy Industries]	Huvis #1	NOx	1	2018-Dec.
Dang-Jin #1,3		O2	4	2018-Jul.			NOx/NH3	1	
Dang-Jin #7,8		NOx/NH3	8	2019-Jan.		O2	1		
Dang-Jin #2,4		NOx	6	2019-Mar.	Korea Southern Power [EMKO]	South Jeju Combined #1,2	NOx	4	2019-Jan.
Dang-Jin #2,4		O2	4	2019-Mar.			NH3	2	
Dang-Jin #2,4		NOx/NH3	4	2019-Nov.		O2	4		
Dang-Jin #5,6		NOx	8	2020-May.	LG Chemical [KENTEK]	LG Chemical Dae-San Plant	NOx/NH3	1	2019-Apr.
Ulsan #4,5		NOx/NH3	8	2016-Sep.		LG Chemical [Green Works]	LG Chemical Na-Ju Plant	NOx/NH3	
Ulsan #6		NH3	2	2017-Jul.					
Ho-Nam #1,2		NH3	4	2020-Nov.					

Track Record

Company	Project	Gas Analyzer	Q'ty	Date
Korea East-West Power [Halla]	Ulsan Combined #1-6	NOx	24	2019-Jul.
		NH3	12	
		O2	24	
Korea Southern Power [Hae Lim Engineering]	Youngwol LNG Power #1-3	NOx	9	2019-Aug.
		NOx/NH3	6	
Orion Engineered Carbons [SC Engineering]	Orion Engineered Carbons Yeo-Su Plant	NOx	6	2019-Jan.
		SO2	1	
		O2	1	
		Flow	2	
Hyundai Steel [ECOPRO]	Hyundai Steel Dangjin, Soonchun Plant	NOx/NH3	2	2019-Aug.
		O2	2	
	Dangjin #1	NOx/NH3	1	2020-Sep.
		O2	1	
KG ETS [Daon Technology]	KG ETS Incineration #3	SO2	1	2019-Sep.
GS Caltex [GFutec]	GS Caltex Yeosu Plant MFC	NOx/NH3	5	2019-Sep.
		Nox	5	2020-Jan.
KOEN [Keumhwa C&E]	Bundang Combined #1-5, #7	NOx	6	2020-Jan.
		O2	12	
		NOx/NH3	6	
Gunjang Energy [Blue Bird]	SMGE S1 SCR	NOx/NH3	3	2020-Feb.
		O2	2	
Gangneung Eco Power [GEP] [Hanshin B-tec]	Gangneung Ahnin Aux BLR	NOx	3	2020-Apr.
		NH3	3	
		O2	2	
		CO	1	
Seetec [ECOPRO]	Seetec SCR	NOx/NH3	2	2020-May.
SMGE S1 [Sumitomo SHI FW]	SMGE S1 BLR	SO2	1	2020-Jun.
		CO	1	
Korea Midland Power [Daon Tech]	Shin Boryong Aux BLR	NOx	2	2020-Oct.
		NH3	2	
		O2	2	
Kumho P&B Chemicals [ShinHan Engineering]	Yeosu #1	NOx/NH3	1	2020-Dec.
Tongsuh Pertochemical Corp. [ECOPRO]	Ulsan	NOx/NH3	1	2021-Mar.
Naepo Green Energy [GE GAS POWER]	Naepo Combined	NOx	2	2021-Jun.
		NH3	1	
		O2	2	
Korea East-West Power [Doosan Heavy Industries]	Dangjin Power #1-4	NH3	8	2021-Aug.
		NOx/SO2	24	2021-Sep.
Odfjell Terminals Korea [Ecopro HN]	Ulsan	NOx/NH3	1	2021-Aug.
Tongyeong Eco Power [GE GAS POWER]	Tongyeong Natural Gas #1,2	NOx	4	2021-Sep.
		NH3	2	
		O2	4	
Korea Southern Power [GE GAS POWER]	ShinSejong Combined #1	NOx	4	2021-Sep.
		NH3	1	
		O2	2	
GS Donghae Electric Power [Orbis]	Bukpyeong Power #1	CO/CO2	1	2021-Oct.
Korea Western Power [SNT Energy]	Tae-an #7,8	NOx	24	2021-Nov.
		NH3	12	

Company	Project	Gas Analyzer	Q'ty	Date
Korea Southern Power [Daon Technology]	Sancheok Aux-boiler	NOx	1	2021-Nov.
		NH3	2	
		O2	1	
Korea Western Power [Haelimengineering]	Gimpo Cogeneration #1	NOx/NH3	2	2021-Dec.
		O2	1	2022-Apr.
		NOx	1	
Korea South-East Power [Sae-A STX Entech]	Yeongheung #1,2	NOx	12	2021-Dec.
		NH3	4	
		O2	4	
		SO3	8	
Korea Southern Power [Emko]	Shin Incheon #3-8	NOx/O2	12	2021-Dec.
		NH3	6	2021-Dec.
POSCO [Nanotuna engineering]	Pohang 1 Electronical Steel	NOx	1	2021-Dec.
		NOx/NH3	1	
		O2	1	
Korea District Heating Corp. [SNT Energy]	Daegu, Cheongju Combined	NOx	4	2022-Jan.
		NH3	2	
		O2	4	2022-Jul.
		CO	2	
		THC	2	
Korea Southern Power [Gangwon Energy]	SjinSejong Combined Aux-Boiliter	NOx	1	2022-Feb.
		NH3	1	
		O2	2	
Korea District Heating Corp. [Daeyoung C&E]	Yangsan Combined	NOx	2	2022-Feb.
		NH3	1	
		O2	1	
APOC [Gangwon Energy]	APOC PDH/UTOS (Saudi Arabia)	NOx	1	2022-Jun.
		O2	1	2022-Jun.
Korea District Heating Corp. [Hanshin B-tec]	Cheongju branch Peak Boiler #1,2	NOx	4	2022-Sep.
		NH3	2	2022-Sep.
Dongwoo E&I	Dae-Gu Dyeing Industrial Complex #1-3	NOx/SO2	3	2016-Sep.
		NOx/NH3	3	
LG Chem.	LG Chem Naju Plant	NOx/NH3	1	2016-May.
Mapo Resource Recovery	Mapo Resource Recovery	O2	3	2016-Oct.
Hu-Chems	Hu-Chems	NOx/NH3	1	2016-Dec.
		NOx/NH3	1	2020-Jan.
		NOx	1	2020-May.
		NOx/NH3	1	2022-Feb.
		NOx/NH3	1	2022-May.
Huaneng Thermal Power Plant	Huaneng Thermal	NOx	4	2018-Nov.
Hanhwa	Yeo-su #1-3	NOx	3	2019-May.
		NOx/NH3	3	
Sithe Korea	Sithe Yeosu #1,2	NOx	1	2021-Aug.
		NOx/NH3	1	
Yeosu Urban Management Corp.	Waste Incineration Facility	NOx	1	2021-Jun.
LH	Daejeon Energy Business Team	NOx	1	2021-July.
		CO/CO2	1	2021-July.
		NH3	1	2021-July.
GS Donghae Elec. Power	Bukpyeong #1	CO	1	2022-Feb.
		NOx	1	2022-Apr.
JEIL TECH INDUSTRY	Hu-Chems Nakpo Wharf	NOx/NH3	1	2022-Apr.
FOURONE SYSTEM	Busan Fashion Center	NOx	1	2022-Apr.
		O2	1	2022-Apr.
GRM	Danyang	NOx	1	2022-Apr.

FGD

Company	Project	Gas Analyzer	Q'ty	Date
Korea South-East Power (KOEN)	Young-Heung #4	SO2	2	2016-Jan.
	Young-Heung #2	SO2	2	2016-Nov.
	Young-Heung #3	SO2	2	2017-Feb.
	Young-Heung #1	SO2	2	2017-Mar.
	Young-Heung #3	SO2	1	2017-Sep.
	Young-Heung #4	SO2	1	2018-Apr.
	Young-Heung #6	SO2	2	2019-Feb.
	Young-Heung #3,4	SO2	2	2019-Nov.
	Young-Heung #5	SO2	3	2020-Jan.
	Sam-Chun-Po #3,4	SO2	4	2012-Nov.
	Sam-Chun-Po #1,2	SO2	2	2014-Sep.
	Sam-Chun-Po #2	SO2	2	2016-Apr.
	Sam-Chun-Po #3,4	SO2	4	2018-May.
Korea Southern Power (KOSPO)	Ha-Dong #1,3	SO2	2	2011-Nov.
	Ha-Dong #2,4,5,6	SO2	4	2012-Jun.
	Ha-Dong #1-6	SO2	6	2014-Dec.
	Ha-Dong #1-4	NOx/SO2	8	2018-May.
	Ha-Dong #5-8	NOx/SO2	8	2018-May.
	Ha-Dong #8	SO2	2	2019-Mar.
	Ha-Dong #5,6	NOx/SO2	6	2019-Nov.
	Ha-Dong #7	NOx/SO2	6	2019-Nov.
	Ha-Dong #1-4	SO2	4	2020-Mar.
	South Jeju #1,2	NOx/SO2	4	2017-Apr.
South Jeju #1,2	NOx/NH3, SO2	2	2019-Dec.	
Korea East-West Power (EWP)	Dang-Jin #1	SO2	1	2011-Mar.
	Dang-Jin #1-4	NOx/SO2	4	2019-Aug.
	Dang-Jin #1-4	Dust	4	2019-Aug.
	Dang-Jin #8	SO2	2	2019-Dec.
	Ulsan #6	SO2	1	2011-Oct.
Korea Western Power (WP)	Tae-Ahn #6	SO2	2	2015-Mar.
	Tae-Ahn #7	SO2	2	2015-Sep.
	Tae-Ahn #5	SO2	1	2016-Apr.
	Tae-Ahn #5,8	SO2	3	2016-Oct.
Tae-Ahn #1-4	SO2	2	2020-Mar.	
Korea East-West Power [STX Heavy Industry]	Dang-Jin #9,10	SO2	12	
	Dang-Jin #9,10	O2	4	2014-Mar.
Korea Midland Lower [Doosan Heavy Industry]	Shin-Bo-Ryeong #1,2	SO2	12	
	Shin-Bo-Ryeong #1,2	O2	4	2014-Nov.
Korea Western Power [STX Heavy Industry]	Tae-Ahn #9,10	SO2	12	2014-Nov.
GS Donghae Elec. Power [STX Heavy Industry]	Buk-Pyeong #1,2	SO2	10	2015-Feb.
Goseong Green Power [KC Cottrell]	Goseong Hai Power #1,2	SO2	12	2019-Jul.
		O2	4	
SMGE S1 [KC Cottrell]	SMGE S1 FGD	SO2	1	2020-Oct.
Dust	1			
Gangneung Eco Power (GEP)[KC Cottrell]	Gangneung Ahnin Aux BLR #1,2	SO2	12	2020-Oct.
		O2	4	
Korea South-East Power [Sae-A STX Entech]	Yeongheung #1,2	NOx/SO2	6	2021-Dec.
		SO2	6	
		O2	4	
Korea East-West Power [Daekyeong Engineering]	Dangjin #4	Dust	1	2021-Dec.
Korea East-West Power [Haelimengineering]	Donghae Coal Fired Power Plant #1,2	NOx/SO2	4	2022-Sep.
		HCl	2	2022-Sep.
		HF	2	2022-Sep.
Nexgentechology	Dangjin Power #1-4	O2	8	2021-Sep.

EP

Company	Project	Gas Analyzer	Q'ty	Date
Korea Southern Power (KOSPO)	Ha-Dong #2	Dust	2	2019-Aug.
OCI [Seoul Sharp Heavy Industries]	OCI Gwang-Yang Plant	Dust	1	2019-Jul.
Gangneung Eco Power (GEP) [KC Cottrell]	Gangneung Ahnin Aux BLR #1,2	Dust	16	2020-Sep.
		Dust	12	
LS-Nikko Copper [Seoul Sharp Heavy Industries]	On-San #1,2	SO2	1	2020-Oct.
		SO2	1	2021-Mar.
LS-Nikko Copper [Sun-Woo]	On-San #1,2	Flow	2	2020-Oct.
		Flow	3	2021-Mar.
Jawa [KC Cottrell]	JAWA #9,10	Dust	4	2021-Sep.
Ryuju Thermal Power	Ryuju Thermal	Dust	2	2019-Oct.

CEMS

Company	Project	Gas Analyzer	Q'ty	Date
Korea South-East Power (KOEN)	Sam-Chun-Po #5	NOx/SO2	1	2012-Nov.
	Ha-Dong #1-8	NOx/SO2	8	2012-Jun.
Korea Southern Power (KOSPO)	Ha-Dong #1-8	NOx/SO2	8	2017-Mar.
	Sam-Cheok #1	NOx/SO2	1	2020-Sep.
	Yeong-Wol #1-3	NOx/O2	3	2020-Nov.
Korea East-West Power (EWP)	Dang-Jin #1-8	NOx/SO2	8	2011-Oct.
	Dang-Jin #9,10	O2	2	2021-Apr.
Korea Midland Power (KOMIPO)	Jeju #2	NOx/SO2	1	2012-Apr.
	Jeju #3 GT	NOx/SO2	2	2019-Jan.
		O2	2	
		Flow	2	
		D/L, FEP, Temp	2	
	Jeju Combined #1,2	NOx/SO2/O2	2	2017-Mar.
		Dust	2	
		Flow	2	
		D/L, FEP, Temp	2	
	Bo-Ryeong #1,2	NOx/SO2	2	2012-Apr.
NOx/SO2		2	2016-Jun.	
Paju Branch #1,2	NOx	2	2017-Mar.	
	O2	2		
Gwang-Gyo Branch #1	Flow	2	2017-Mar.	
	D/L, FEP, Temp	2		
	NOx	1		
	O2	1		
Korea District Heating Corp. (KDHC)	Pan-Gyo Branch #1	D/L, FEP, Temp	1	2017-Mar.
		NOx	1	
		O2	1	
Hwa-Sung Branch #1,2	Hwa-Sung Branch #1,2	Flow	1	2017-Mar.
		D/L, FEP, Temp	1	
		NOx	2	
		O2	2	
Hwa-Sung Branch #1,2	Hwa-Sung Branch #1,2	Flow	2	2017-Mar.
		D/L, FEP, Temp	2	

Track Record

Company	Project	Gas Analyzer	Q'ty	Date	Company	Project	Gas Analyzer	Q'ty	Date
Korea District Heating Corp. (KDHC)	Yong-In Branch #1	NOx/SO2	1	2017-Apr.	POSCO [C&A]	Gwang-yang Plant	NOx/SO2/O2	5	2019-Sep.
		O2	1		Langkawi Incineration [SRS Environment Plant]	Langkawi Incineration #1	NOx/SO2/O2	1	2019-Nov.
		Dust	1				CO	1	
		Flow	1				HCl	1	
		D/L, FEP, Temp	1				Dust	1	
			D/L, Temp				1		
	Sam-Song Branch #1,2	NOx	2		Shinyong Porte [Seoul Sharp Heavy Industries]	Goseong Wood Pellet Wet ESP	NOx/SO2/O2	1	2020-Jan.
		O2	2				Dust	1	
		Flow	2				Flow	1	
	Su-Won Branch #1,2	D/L, FEP, Temp	2		Gangneung Eco Power (GEP) [Hanshin B-tec]	Gangneung Ahnin Aux BLR #1	D/L, Temp	1	2020-Apr.
		NOx/SO2	2				NOx/O2	1	
		O2	2				Dust	1	
		Dust	2				Flow	1	
	Dae-Gu Branch #1,2	Flow	2		Yang-San Cogeneration [Hanjin Heavy Industries]	Yang-San Cogeneration	D/L, Temp	1	2020-Nov.
		D/L, FEP, Temp	2				NOx	1	
		NOx/SO2	2				O2	1	
		O2	2				Flow	1	
	Dae-Gu Branch #3,4	Dust	2		Samyang Food [Sookook]	Miryang #1	D/L, FEP, Temp	1	2021-Feb.
		Flow	2				NOx	1	
		D/L, FEP, Temp	2				O2	1	
NOx/SO2/O2		1	D/L, Temp	1					
Dust		2	HangangCM [Enprotech]	Hwasung #1			NOx	1	
Flow	2	O2			1				
D/L, FEP, Temp	2	Flow			1				
		D/L, Temp			1				
Jung-Ang Branch #3	NOx/O2	1	Korea Southern Power [Daewoo E&C]	ShinSejong Combined #1	NOx	1	2021-Mar.		
	Flow	1			O2	1			
	D/L, Temp	1			Dust	1			
Yang-San Branch #1,2	NOx	2	POSCO Chemical [POSCO E&C]	Pohang Anode Materials	CO, CO2	1	2021-May.		
	O2	2			SO2/ NOx	1			
	Flow	2			Dust	1			
	D/L, FEP, Temp	2			Flow	1			
Guang-Ju/Jeon-Nam Branch #1,2	NOx	2	Korea Gas Corporation [Bio Friends]	Gwangju #1, Changwon #1	D/L, FEP, Temp	1	2021-Oct.		
	O2	2			NOx	2			
	Flow	2			Flow	2			
	D/L, FEP, Temp	2			D/L, Temp	2			
Seoul Energy	Mok-dong Combined #1	NOx	1	Pyeong tak #1		NOx	1	2022-Aug.	
		O2	1			Flow	1		
	Mok-dong Combined #2,3	Flow	1	UGPS [SK ECO PLANT]	Ulsan GPS Combined #1,2	NOx/O2	2	2021-Oct.	
		D/L, Temp	2			Flow	2		
						D/L, FEP, Temp	2		
	Ma-gok Group Energy #1	NOx	2	Hyundai Oilbank [Hyundai Cosmo]	Daesan #1,2	NOx/SO2	2	2021-Oct.	
		O2	2			O2	2		
Flow		2	Dust			2			
D/L, Temp		2	Flow			2			
No-won #3,4	D/L, Temp	2	Korea Southern Power [Daewoo E&C]	South Jeju Combined #1,2	D/L, Temp	2	2019-Feb.		
	NOx	2			NOx/SO2	2			
	O2	2			O2	2			
GS Donghae Elec. Power [BHI]	Buk-Pyeong #1,2	Flow	2	Korea Southern Power [Gangwon Energy]	SjinSejong Combined Aux-Boiliter	Flow	1	2022-Feb.	
		D/L, Temp	2			Flow	1		
		D/L, FEP, Temp	2			D/L, FEP, Temp	1		

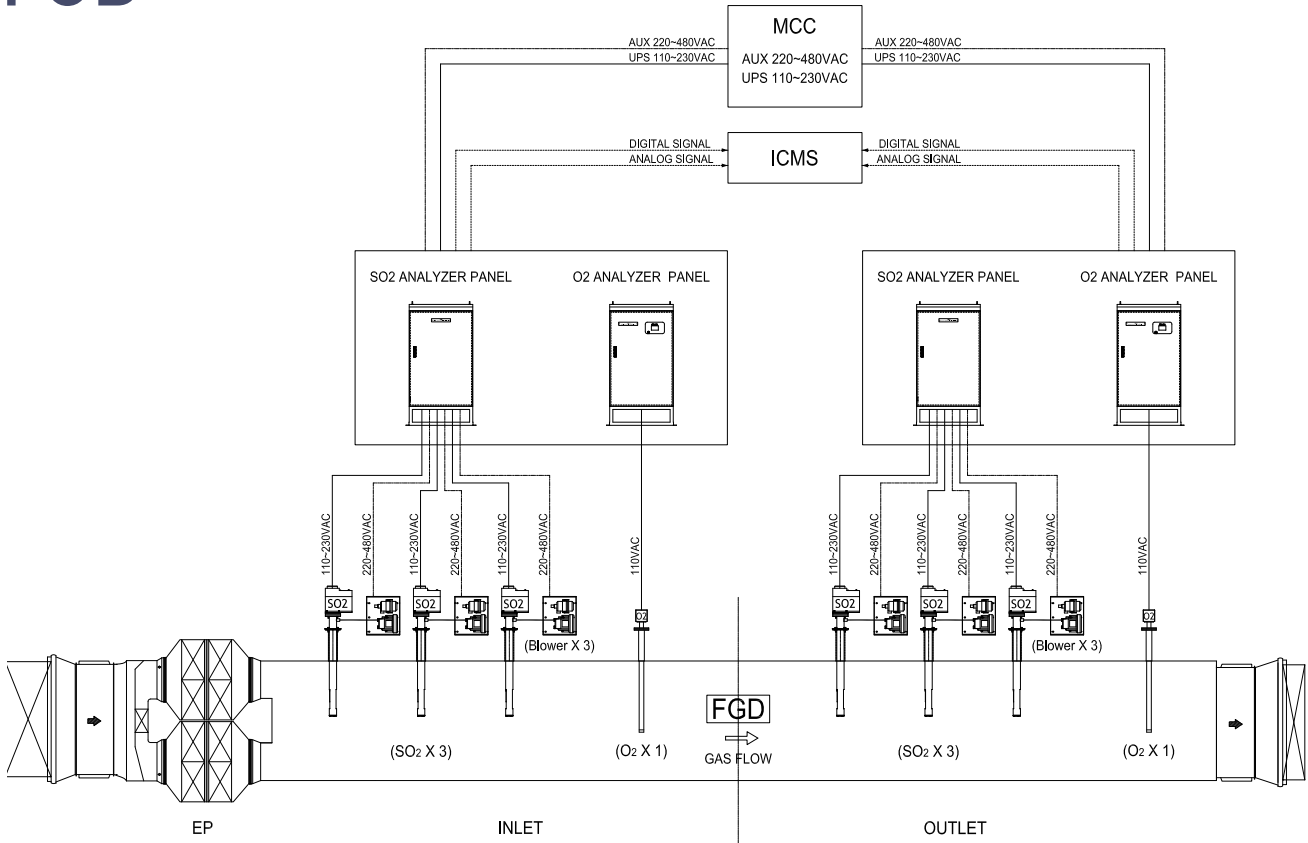
Company	Project	Gas Analyzer	Q'ty	Date	Company	Project	Gas Analyzer	Q'ty	Date					
Andalan Paper [JM-Vistec]	PT.Riau Andalan Pulp & Paper (Singapore)	O2	3	2022-Feb.	Sein ENT	Green Environment	NOx/SO2/O2	1	2016-Nov.					
		Dust	3				CO	1						
		Flow	3				HCl	1						
Korea District Heating Corp. [Kumho EnC]	Geomdan #1,2	NOx	2	Dust			1							
		O2	2	Flow			1							
		Flow	2	Temp	1									
Sejong CEMS	Asan Incineration	O2	1	2016-Apr.	SsangYong C&B	SsangYong C&B	NOx/SO2/O2	2	2017-Jan.					
	Miwon Chemicals Gongju Plant #1	SO2	1	2019-Sep.			CO	2						
Woori CEMS	Hyundai Steel (Dang-Jin)	O2	3	2016-Aug.			HCl	2						
Samyang	Incheon 1 Plant	NOx/SO2	1	2016-May.			Dust	2						
		Dust	1	2017-Nov.			Flow	2						
		O2	1	2017-Nov.	D/L, Temp	2								
Mona Lisa	Mona Lisa	NOx/SO2/O2	1	2016-May.	Gigu Environment	Mirae Paper #1,2	NOx/SO2/O2	2	2017-Feb.					
		CO	1				CO	2						
		HCl	1				HCl	2						
		Dust	1				Dust	2						
		Flow	1				Flow	2						
		D/L, Temp	1		D/L, FEP, Temp	2								
Yangju City	Yangju Incineration	NOx/SO2/O2	2	2016-Jun.	Hu-Chems #1		NOx	1	2017-Apr.					
		CO	2				Huvis #1		NOx/SO2/O2	1	2017-May.			
		HCl	2		Flow	1								
		Dust	2		Dust	1								
		Flow	2		D/L, Temp	1								
		D/L, FEP, Temp	2		Pyeong-taek Energy	Pyeong-taek Energy #1-3	NOx/O2	3	2017-Mar.					
NOx/SO2/O2	1	Flow	3											
CO	1	D/L, FEP, Temp	3											
Dust	1	Korea Cast Iron Pipe Ind.	Korea Cast Iron Pipe Ind.	NOx/SO2/O2			2	2017-Mar.						
HCl	1			Dust			3							
Flow	1			Temp			3							
Dongyang Environment	Dongyang Environment Muan Plant	D/L, FEP, Temp	1	2021-Sep.	Kyung Hee Medical Center	Kyung Hee Medical Center #1	NOx	1	2017-May.					
		Dust	1				O2	1						
		HCl	1				Flow	1						
		Su Engineering	Seoul Metropolitan Govt. Jungrang Recovery #1,2		NOx/SO2/O2	2	2016-Oct.	AvanStrate Korea	AvanStrate Korea #1-3	NOx/SO2/O2	3	2017-Aug.		
					CO	2				Dust	3			
					Flow	2				Flow	3			
D/L, Temp	2		D/L, FEP, Temp	3										
WTC #1-3			NOx	3	2017-Apr.	POSCO				POSCO Jung-Eup Lab. #1	NOx/SO2/O2		1	2017-Nov.
			O2	3							CO		1	
		Flow	3	HCl			1							
D/L, FEP, Temp	3	Dust	1											
KTL [Hana E&G]	KTL (Korea Testing Lab)	SO2/O2	1	2017-May.	Kangwon Univ.		Kangwon Univ.	NOx	1		2018-Apr.			
		NOx	1					Busan Environmental Corp. [Green System]	Busan Sewage Treatment Plant			CO2	1	
O2	1	Geumsan City [Korea Environment Corp. (KECO)]	Geumsan Incineration #1	NOx/SO2/O2		1				2018-Jul.				
Dust	1			CO		1								
Flow	1			HCl	1									
D/L, Temp	1			Dust	1									
Incon	Kye-Ryong Incineration #1			NOx/SO2/O2	1	2017-Jun.	Flow	1						
		CO	1	D/L, Temp	1									
		HCl	1											
		Flow	1											
		Dust	1											
		D/L, Temp	1											

Track Record

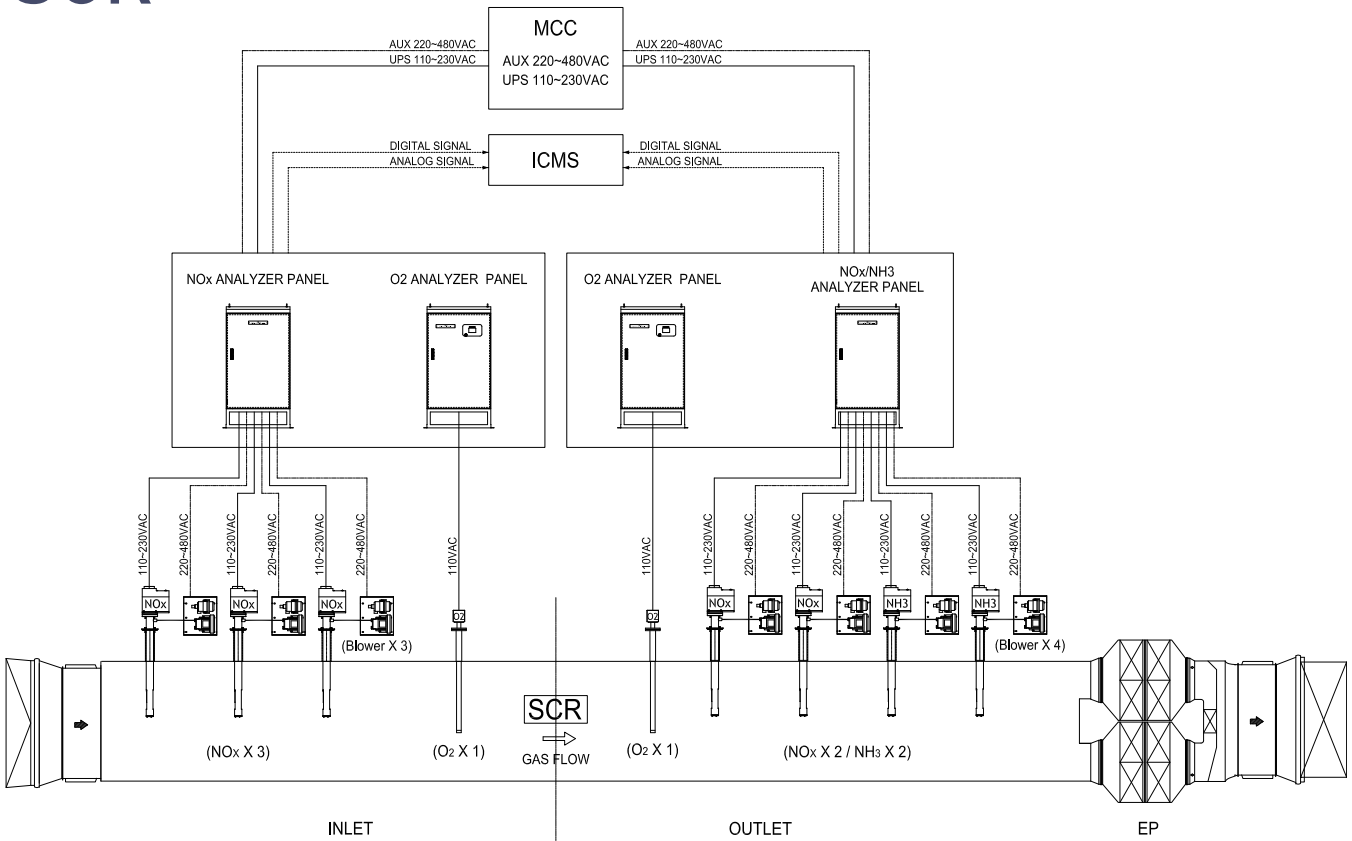
Company	Project	Gas Analyzer	Q'ty	Date	Company	Project	Gas Analyzer	Q'ty	Date			
TRUSUR	TRUSUR (Indonesia)	Flow	1	2018-Aug.	Yujin Metal	Chungju #1	NOx/SO2	1	2020-Oct.			
Sinograin	Sinograin Granary Storehouse (China)	Dust	5	2019-Jan.			Dust	1				
Byeollae Energy	Byeollae Energy #1,2	NOx	2	2019-Jun.			Flow	1				
		O2	2		D/L, Temp	1						
		Flow	2		Dongil Steel	Ansung #1-5	NOx/SO2	5	2020-Nov.			
NOx/SO2/O2	1	Flow	5									
CO	1	O2	1									
Samdoo Dye Works	Samdoo Dye Works #1	HCl	1	2019-Nov.	D/L, FEP, Temp	5						
		Dust	1		SEGI Retech	Yeongcheon #1,2	NOx/SO2	2	2020-Nov.			
		Flow	1				Flow	2				
		D/L, Temp	1				D/L, FEP, Temp	2				
		Bookook Industries	Bookook Industries #1,2		NOx/SO2/O2	2	2019-Dec.	Yeongcheon Combined Stack	NOx/SO2	1	2021-Sep.	
Flow	2			Flow	1							
D/L, FEP, Temp	2			D/L, Temp	1							
Dream Ascon	Dream Ascon #1,2	NOx	2	2019-Dec.	AMT	Iksan #1,2	NOx	2	2020-Nov.			
		O2	2				O2	2				
		Flow	2				Flow	2				
		D/L, FEP, Temp	2				D/L, FEP, Temp	2				
Sung-Hoon Eng.	Sung-Hoon Eng. #1-5	NOx/SO2	5	2020-Mar.	Hankuk SLGA	Incheon #1	NOx	1	2020-Nov.			
		Flow	5				O2	1				
		D/L, FEP, Temp	5				Flow	1				
Sithe Korea	Sithe Yeosu #1,2	NOx/O2	2	2020-Mar.	Donghwa	Incheon #1	NOx/SO2	1	2020-Dec.			
		Flow	2				Flow	1				
		D/L, FEP, Temp	2				D/L, Temp	1				
Kukil Paper	#1	NOx	1	2020-Apr.	Daesung	Incheon #1	NOx/SO2	1	2020-Dec.			
		O2	1				Flow	1				
		Flow	1				D/L, Temp	1				
		D/L, FEP, Temp	1				Hyundai Motors	Ulsan #1-13		NOx	8	2020-Dec.
NOx	2	Flow	8									
O2	2	D/L, FEP, Temp	13									
Suwan Energy	#1,2	Flow	2	2020-May.	Suwon-Si Sewerage	Sludge facility #1	NOx	1	2021-Jan.			
		D/L, FEP, Temp	2				Flow	1				
		Deokyang Chemical	#1				NOx	1		2020-May.	Dukyang	Ulsan Plant 2 #1
O2	1			O2	1							
Flow	1			Flow	1							
D/L, FEP, Temp	1			D/L, Temp	1							
Ansan Urban Development	ASUDI #2	NOx	1	2020-Mar.	Hansol Paper	Daejeon #2,3	NOx/O2	2	2021-Jan.			
		CNCICY Energy	#1-6				NOx	6		2020-Jun.	CO	2
							O2	6			Flow	2
Flow	6			D/L, FEP, Temp			2					
Lotte Aluminium	Pyeong Tak #1	D/L, FEP, Temp	6	2020-Apr.			Cheon-an #1	#1		NOx/O2	1	2021-Apr.
		NOx/SO2	1							Flow	1	
		Dust	1		D/L, Temp	1						
		Flow	1		Yncc	Plant 1 #1-7			NOx/O2	30	2021-Feb.	
D/L, FEP, Temp	1	Plant 2 #1-10	Dust	1								
Nox	1	Plant 3 #1-9	Flow	30								
Jincheon #1	Jincheon #1	Flow	1	2022-Jan.	Plant 4 #1-5	#1	D/L, FEP, Temp	30				
		D/L, Temp	1									
		NOx	1									
		O2	1									
ASA	Wanju #1	Flow	1	2020-Sep.								
		D/L, Temp	1									
		NOx/O2	3									
		Flow	3									
SamHyun	Eum-Sung #1-3	D/L, FEP, Temp	3	2020-Oct.								
		NOx/O2	3									
		Flow	3									
Daehan Feed	Incheon #1	D/L, FEP, Temp	3	2020-Sep.								
		NOx	1									
		O2	1									
		Flow	1									
		D/L, Temp	1									

Company	Project	Gas Analyzer	Q'ty	Date	Company	Project	Gas Analyzer	Q'ty	Date		
Hyundai Steel	Pohang #1~6	NOx	6	2021-Feb.	Prince Paper	Yesan #1	NOx/SO2	1	2021-Apr.		
		FEP	1				Dust	1			
	Suncheon Steelworks #1~4, #2	NOx	5				O2	1			
		FEP	4				Flow	1			
		NOx	5				D/L, Temp	1			
		FEP	4								
Sambo	Changwon #1	NOx/SO2	1	2021-Feb.	OCI	Pohang #1-3	NOx/SO2/O2	3	2021-May.		
		Flow	1				Dust	1			
		D/L, Temp	1				Flow	3			
	Seosan #1~4	NOx/SO2	4				D/L, FEP, Temp	3			
		Flow	4								
		D/L, FEP, Temp	4								
Geumgang	Eum-Sung #1,2	NOx/SO2	2	2021-Mar.	KOLON Industries	Gumi #1	NOx	1	2021-July.		
		Flow	2				O2	1			
		D/L, FEP, Temp	2				Dust	1			
	Unyang #1	NOx	1				2022-July.	Gumi #8		NOx/O2	2
		Flow	1							Flow	2
		D/L, Temp	1							D/L, Temp	2
Ottogi	Dapung #5	NOx	1	2021-July.	Gyongsan #1, 2	NOx			2		
		O2	1			O2			2		
		Flow	1			Dust			2		
		D/L, Temp	1			Flow	2				
Dongil Industries	Pohang FERRO ALLOY #1-5	NOx/SO2	5			2021-Apr.			D/L, FEP, Temp	2	
LS Cable&System	Gumi #1	NOx/SO2	1			2021-Mar.	Hyunsung Ceramic	Hongsung #1	NOx	1	2021-Aug.
		Flow	1	Dust	1						
		D/L, Temp	1	Flow	1						
Hyundai Sungwoo Casting	Chungju #1,2	NOx	2	2021-Apr.	Jeonbuk National University Hospital	Boiler	NOx	1	2021-Oct.		
		Flow	2				O2	1			
		D/L, FEP, Temp	2				Flow	1			
ETI	Authorized Organization for Gas Analyzer Certificate	NOx/SO2/O2	1	2021-Mar.	SIMPAC	Dangjin #1~3	NOx/SO2	3	2021-Nov.		
		HCL	1				2021-Nov.	Dangjin #3		Flow	1
		CO	1							D/L, Temp	1
		Dust	1								
		D/L	1								
Husteel	Dangjin #1,2	NOx	2	2021-Mar.	Hae-undae Hillstate We've APT	Cogeneration Supply #1	NOx/O2	1	2021-Nov.		
		Flow	2				Flow	1			
		D/L, FEP, Temp	2				D/L, Temp	1			
SeAH CSS	So-gyeong #2	NOx/SO2/O2	1	2021-Apr.	GS Donghae Elec. Power	Bukpyeong #2	O2	1	2022-Apr.		
		Flow	1				2022-May.	Chungju #1		NOx/O2	1
		D/L, Temp	1							Flow	1
KEP	Ulsan #1~6	NOx/O2	6	2021-Apr.	Samil C&S		D/L, Temp	1	2022-May.		
		Dust	6				NOx/SO2	2			
		Flow	6				Flow	2			
		D/L, FEP, Temp	6				D/L, FEP, Temp	2			
Dongsuh Foods Corp.	Jincheon #1	NOx	1	2021-Apr.	Samsyeong Industry	Kimhae #1,2	NOx	1	2022-May.		
		O2	1				NOx	1			
		Flow	1				Flow	1			
		D/L, Temp	1				D/L, Temp	1			
Moorim SP	Daegu Blr #1,2	NOx	2	2021-Apr.	KUKDO	Busan Fac.2	NOx	1	2022-May.		
		O2	2				O2	1			
		Flow	2				Flow	1			
		D/L, FEP, Temp	2				D/L, Temp	1			
ILJIN Electric	Ansan #1,2	NOx	2	2021-Apr.	DR AXION	Wonsan	NOx	1	2022-July.		
		Flow	2				Flow	1			
		D/L, FEP, Temp	2				D/L, Temp	1			
YeongHwa Metal	Changwon	NOx/SO2	1	2022-Aug.	Green Chemical	Seosan	NOx/O2	1	2022-Aug.		
		Flow	1				Flow	1			
		D/L, Temp	1				D/L, Temp	1			

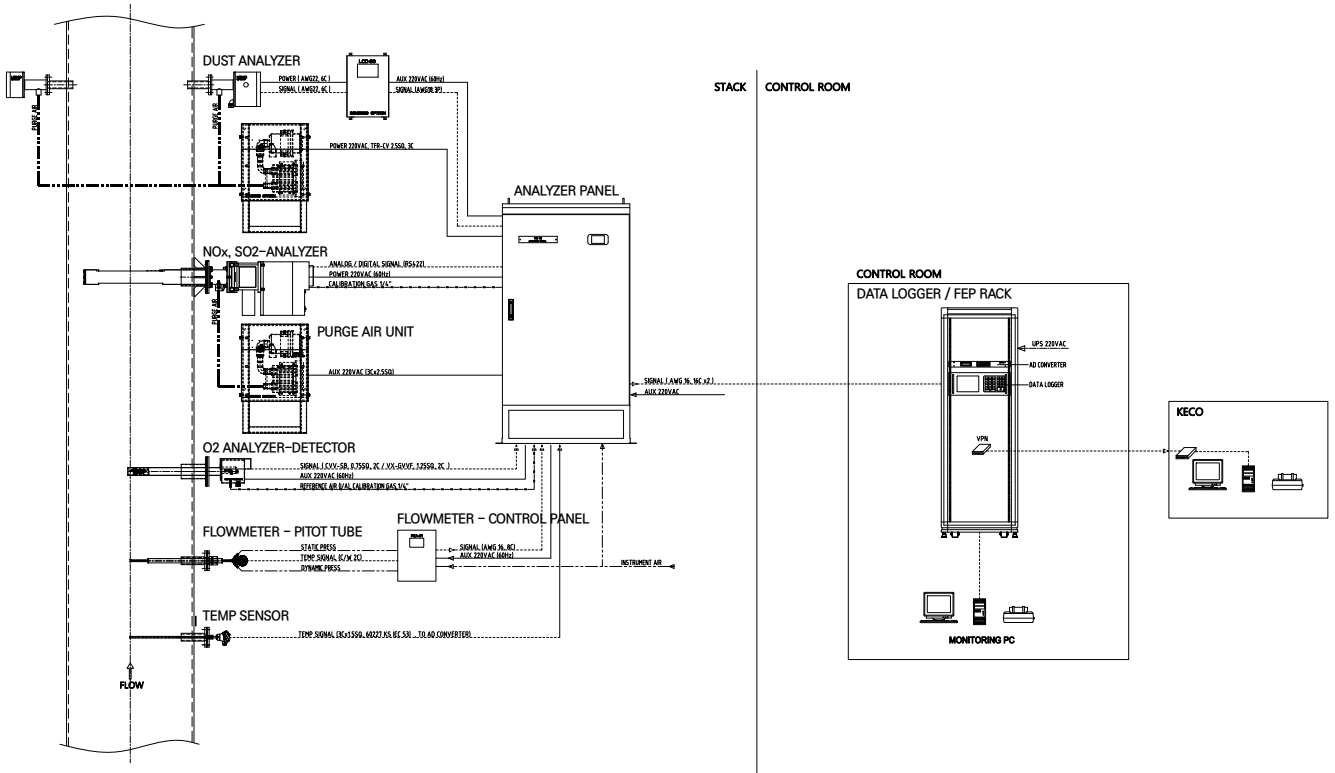
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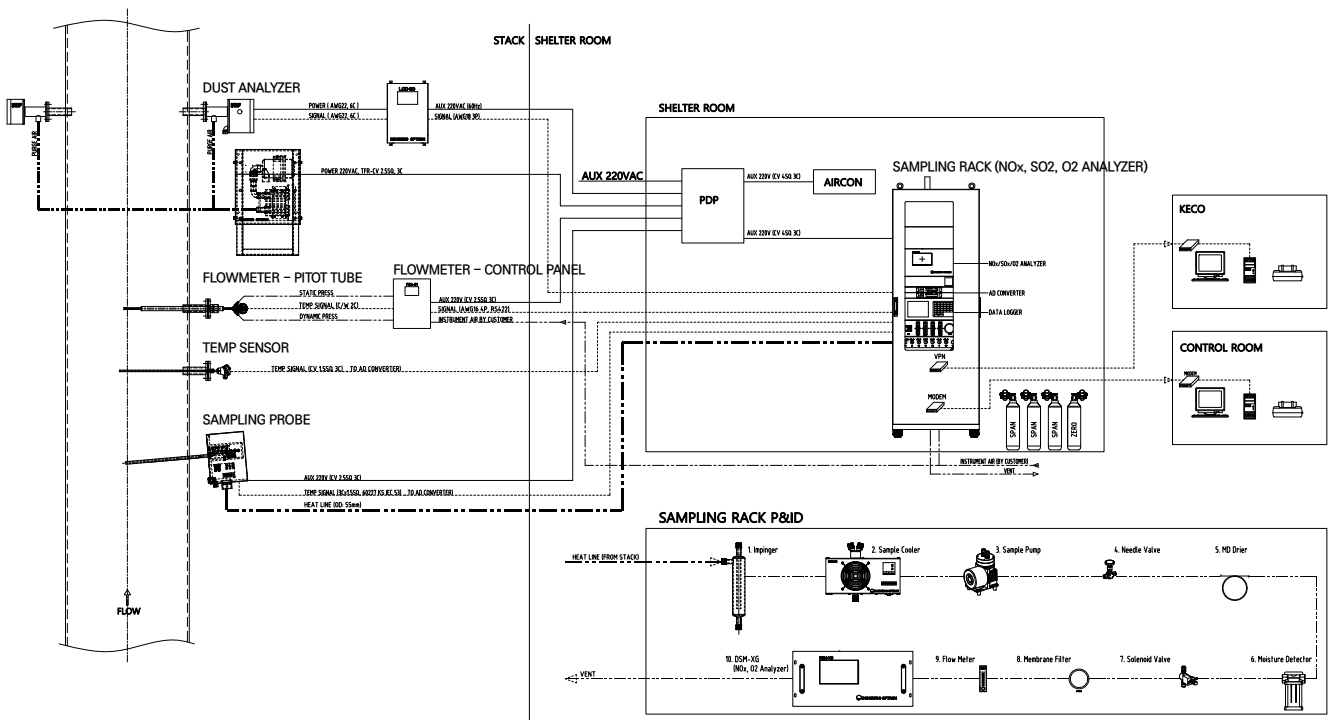
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