Fuji Electric

Innovating Energy Technology

Gas Analyzers

NDIR / Laser / Zirconia / Paramagnetic / Thermal Conductivity

We offer the best gas analyzers created from many years of experience and advanced technology.

21C2-E-0005e

We suggest the most suitable "Gas Analyzer" for your situation.

NDIR Gas Analyzer Systems ▶ P. 4–5

Monitors up to 7 gas components
Long-term superior stability

Applications

Waste incinerators, boilers

NOx | SO_2 | CO_2 | CO | O_2 | HCl | Dust

NDIR Gas Analyzers ▶ P. 6–7

Simultaneous and continuous measurement of up to 5 components
Long-term stability for wide measurement range

Applications

Steel plants (converter furnaces, blast furnaces), gas manufacturing facilities

NOx | SO_2 | CO_2 | CO | CH_4 | O_2

NDIR Gas Analyzer for heat treatment furnace ▶ P. 8

Simultaneous and continuous measurement of 2 components among CO_2, CO, and CH_4

Applications

Heat treatment furnaces (gas generators, carburizing furnaces)

CO_2 | CO | CH_4

Compact NDIR Gas Analyzers ▶ P. 9

Gas sampling devices incorporated
Simultaneous measurement of up to 5 components

Applications

Chemical labs, plant labs

NOx | SO_2 | CO_2 | CO | CH_4 | O_2

Laser Gas Analyzers ▶ P. 10–11

In-situ measurement:
High speed and stability for optimizing your process

Applications

Waste incinerators, large industrial boilers, chemical plants

NH_3 HCl O_2 CO CO_2

Zirconia Oxygen Analyzers ▶ P. 12–13

Ideal for combustion management
Fast response without the need for gas sampling devices

Ex-proof

Applications

Boilers, incinerators, industrial furnaces, petrochemical plants

O_2

Paramagnetic Oxygen Analyzers ▶ P. 14

Non-contact sensor offers long-term superior stability
Fast response, ideal for combustible gas measurement

Applications

Incinerators, industrial furnaces

O_2

Thermal Conductivity Gas Analyzer ▶ P. 15

Reliable and continuous measurement of H_2, He, Ar, etc.

Applications

Semiconductor manufacturing facilities, industrial gas generating facilities, H_2 gas related facilities

He Ar H_2 CH_4 CO_2

NDIR Gas Analyzers (for replacement) ▶ P. 16

Designed for easy replacement

Gas Sampling Devices ▶ P. 17

NDIR Gas Analyzer Systems

Monitors up to 7 gas components
Long-term superior stability

Simultaneous measurement of up to 5 components in flue gas

NOx | SO_2 | CO_2 | CO | O_2

ZSJ

Japanese type approval
SAS182 (SO_2 analyzer)
SAC182 (CO analyzer)
SAN181 (NOx analyzer)
SE171 (zirconia O_2 analyzer)
SF172 (paramagnetic O_2 analyzer)

Features

- Single-beam NDIR
- Long-term superior stability
- Zero-point stability through sample switching system
- Automatic calibration
- Space-saving design that enables the maintenance work from front side

Specifications

Target	Flue gas from incinerators and boilers
Measurable components	NOx, SO_2, CO_2, CO, O_2
Principle	Single-beam NDIR + zirconia or paramagnetic O_2 sensor
Measurement range	NOx: 0 … 50 … 5000 ppm
	SO_2: 0 … 50 … 5000 ppm
	CO_2: 0 … 10% / 0 … 20%
	CO: 0 … 50 … 5000 ppm
	O_2: 0 … 10 vol% / 0 … 25 vol%
Repeatability	±0.5% FS
Linearity	±1% FS
Zero drift	±1% FS per week (O_2: ±2% FS per month)
Span drift	±2% FS per week (O_2: ±2% FS per month)
Response time	NOx, CO_2, CO, O_2: 2 min, SO_2: 4 min (for 90% response, from the analyzer inlet)
Output signal	4–20 mA DC
Contact output	During auto calibration, during maintenance, concentration alarm, CO peak count alarm, range identification, etc.
Contact input	Auto calibration start, range switchover, pump on/off, etc.
Functions	Auto calibration, O_2 correction, O_2 corrected average value, concentration alarm, CO peak count alarm, etc.
Display	Backlit LCD
Recorder	Paperless recorder (option)
Standard gas	Six 3.4L cylinders can be housed (option)
Power supply voltage	100, 110, 115, 200, or 230 V AC, 50/60 Hz
Dimensions	815 (W) × 1780 (H) × 700 (D) mm, outdoor use

Simultaneous measurement of up to 5 components in flue gas

NOx | SO_2 | CO_2 | CO | O_2 | N_2O | CH_4

ZSU

Japanese type approval
SAS172 (SO_2 analyzer)
SAC172 (CO analyzer)
SAN173 (NOx analyzer)
SE171 (zirconia O_2 analyzer)
SF172 (paramagnetic O_2 analyzer)

Features

- Double-beam NDIR
- Long-term superior stability
- Twin detectors for interference compensation
- Automatic calibration
- Space-saving design that enables the maintenance work from front side

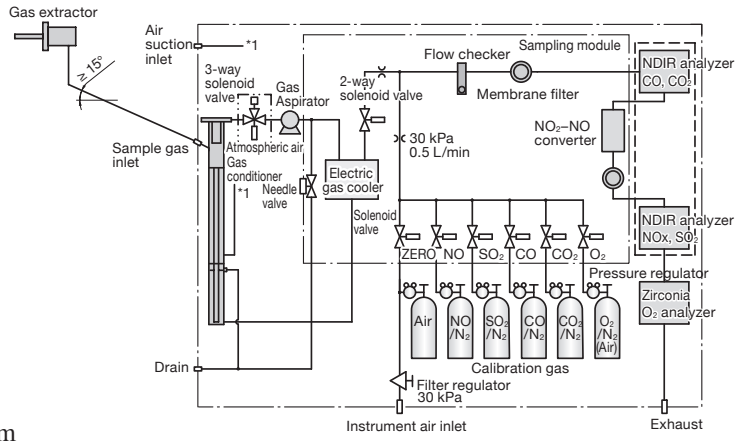
Specifications

Target	Flue gas from incinerators and boilers
Measurable components	NOx, SO_2, CO_2, CO, O_2 (Optional: N_2O, CH_4)
Principle	Double-beam NDIR + zirconia or paramagnetic O_2 sensor
Measurement range	NOx: 0 … 50 … 5000 ppm
	SO_2: 0 … 50 … 5000 ppm
	CO_2: 0 … 10% / 0 … 20%
	CO: 0 … 50 … 5000 ppm
	O_2: 0 … 10 vol% / 0 … 25 vol%
Repeatability	±0.5% FS
Linearity	±1% FS
Zero drift	±2% FS per week (O_2: ±2% FS per month)
Span drift	±2% FS per week (O_2: ±2% FS per month)
Response time	NOx, CO_2, CO, O_2: 2 min, SO_2: 4 min (for 90% response, from the analyzer inlet)
Output signal	4–20 mA DC
Contact output	During auto calibration, during maintenance, concentration alarm, CO peak count alarm, range identification, etc.
Contact input	Auto calibration start, range switchover, pump on/off, etc.
Functions	Auto calibration, O_2 correction, O_2 corrected average value, concentration alarm, CO peak count alarm, etc.
Display	Backlit LCD
Recorder	Paperless recorder (option)
Standard gas	Six 3.4L cylinders can be housed (option)
Power supply voltage	100, 110, 115, 200, or 230 V AC, 50/60 Hz
Dimensions	815 (W) × 1780 (H) × 700 (D) mm, outdoor use

Gas sampling system configuration example

ZSU

Simple and proven system



Simultaneous measurement of up to 7 components in flue gas

NOx | SO_2 | CO_2 | CO | O_2 | HCl | Dust

ZSU-7

Japanese type approval
SAS172 (SO_2 analyzer)
SAC172 (CO analyzer)
SAN173 (NOx analyzer)
SE171 (zirconia O_2 analyzer)
SF172 (paramagnetic O_2 analyzer)

Features

- Monitors up to 7 gas concentrations
- All the necessary equipment is housed in a space-saving cabinet
- Less electrical work because signal and power terminals are in one place
- Low-maintenance laser HCl analyzer
- 40% less power consumption compared to conventional models

Specifications

Target	Flue gas from incinerators and boilers
Measurable components	NOx, SO_2, CO_2, CO, O_2, HCl, dust
Principle	NOx, SO_2, CO_2, CO: NDIR O_2: zirconia HCl: laser Dust: electrostatic induction
Measurement range	NOx: 0 … 50 … 5000 ppm
	SO_2: 0 … 50 … 5000 ppm
	CO_2: 0 … 10% / 0 … 20%
	CO: 0 … 50 … 5000 ppm
	O_2: 0 … 10 vol% / 0 … 25 vol%
	HCl: 0 … 15 … 5000 ppm
	Dust: 0.01 … 1000 mg/m³
Repeatability	±0.5% FS (NDIR), ±2% FS (laser)
Zero & span drift	±2% FS per week (NDIR) ±2% FS per 6 months (laser)
Response time	120 s (NDIR), 1 … 5 s (laser)
Output signal	4–20 mA DC
Contact output	8 points (during maintenance, during auto calibration, analyzer abnormality, etc.)
Contact input	Auto calibration start, average value reset, measurement stop, etc.
Recorder	Paperless recorder (option)
Standard gas	Six 3.4L cylinders can be housed (option)
Power supply voltage	100 V AC, 50/60 Hz
Dimensions	1215 (W) × 1780 (H) × 700 (D) mm, outdoor use

NDIR Gas Analyzers

Single-beam | ZPA, ZPB, ZPG

NOx | SO_2 | CO_2 | CO | CH_4 | O_2

From low range (0–5 ppm) to 100%
Low-concentration measurement and drift-less measurement available

ZPA CE

ZPB CE

ZPG CE

Features

- Wide measurement range: from 0–5 ppm to 100%
- Excellent zero-point stability: ±0.5% FS per week (ZPB, ZPG)
- Simultaneous and continuous measurement of up to 5 components (ZPA, ZPB)
- Compact and lightweight: 483 (W) × 133 (H) × 382 (D) mm, ≤ 13 kg
- Simple structure for easy maintenance
- Built-in magnetic or galvanic O_2 sensor (optional)

Minimum measurement range

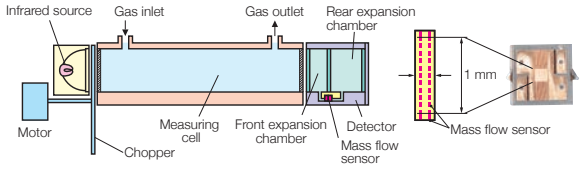
Compo-nents	Standard type (ZPA)	Drift-less type (ZPB)	Low-concentration measurement type (ZPG)
NO	0 … 200 ppm	0 … 50 ppm	0 … 10 ppm
SO_2	0 … 200 ppm	0 … 50 ppm	0 … 10 ppm
CO_2	0 … 100 ppm	0 … 50 ppm	0 … 5 ppm
CO	0 … 200 ppm	0 … 50 ppm	0 … 5 ppm
CH_4	0 … 500 ppm	-	-
O_2	0 … 5%	0 … 5%	0 … 5%

Specifications

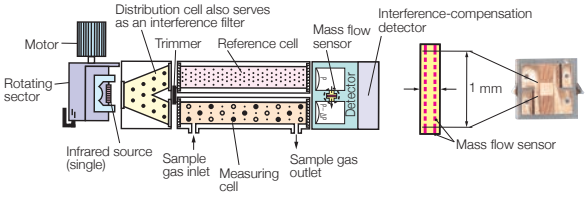
Type	Standard type		Drift-less type		Low-concentration measurement type	
Model	ZPA		ZPB		ZPG	
Principle	NDIR (single beam) O_2: magnetic, galvanic, or external zirconia analyzer					
Number of measurable components	Up to 5 (including O_2)				Up to 2 (including O_2)	
Measurable components and ranges	Min	Max	Min	Max	Min	Max
NO	0 … 200 ppm	0 … 5000 ppm	0 … 50 ppm	0 … 5000 ppm	0 … 10 ppm	0 … 100 ppm
SO_2	0 … 200 ppm	0 … 10 vol%	0 … 50 ppm	0 … 5000 ppm	0 … 10 ppm	0 … 100 ppm
CO_2	0 … 100 ppm	0 … 100 vol%	0 … 50 ppm	0 … 25 vol%	0 … 5 ppm	0 … 50 ppm
CO	0 … 200 ppm	0 … 100 vol%	0 … 50 ppm	0 … 5000 ppm	0 … 5 ppm	0 … 50 ppm
CH_4	0 … 500 ppm	0 … 100 vol%	-	-	-	-
O_2 (built-in galvanic analyzer)	0 … 10 vol%	0 … 25 vol%	0 … 10 vol%	0 … 25 vol%	0 … 10 vol%	0 … 25 vol%
O_2 (built-in magnetic analyzer)	0 … 5 vol%	0 … 100 vol%	0 … 5 vol%	0 … 100 vol%	0 … 5 vol%	0 … 100 vol%
	None	100 … 95 vol%	-	-	-	-
O_2 (external zirconia analyzer)	0 … 5 vol%	0 … 25 vol%	0 … 5 vol%	0 … 25 vol%	0 … 5 vol%	0 … 25 vol%
No. of measurement ranges	Up to 2 ranges per component					
Repeatability	±0.5% FS					
Linearity	±1% FS					
Zero drift	±2% FS per week		±0.5% FS per week			
Span drift	±2% FS per week		±2% FS per week			
Response time (for 90%)	10 s … 30 s (Depending on measurement range)		≤ 30 s Dead time varies within 5–20 seconds according to the setting for the sample switching.			
Output signal	4–20 mA DC or 0–1 V DC (ZPA and ZPB: ≤ 12 points, ZPG: ≤ 4 points)					
Display	LED-backlit LCD, instantaneous value, O_2 corrected instantaneous value, O_2 corrected average value, O_2 average					
Range switching	by key operation, automatic, or remotely (option)					
Contact input (option)	Voltage input: remote range-switching, auto-calibration remote start, remote hold, average reset					
Contact output (option)	SPDT relay contact: analyzer error, calibration error, range identification, during auto-calibration, solenoid valve operation for auto-calibration, H/L limit alarm, CO peak alarm					
Atmospheric pressure correction (option)	Provided as needed					
Standard functions	Output hold, auto/manual range switching					
Optional functions	Auto calibration, auto calibration remote start, remote output-hold, range identification contact output, H/L limit alarm, O_2 correction, O_2-corrected average values, average resetting contact input, CO peak alarm contact output					
Communication (option)	RS-485 (Modbus)					
Sample gas flow checker	Not provided		Provided			
Gas inlet/outlet	Rc 1/4 or NPT 1/4 internal thread					
Purge gas flow rate	1 L/min					
Reference gas	Not required		Required (dry N_2 or dry air)			
Operating environment	-20°C … +60°C, RH 90% or lower (no condensation)					
Mounting	19-inch rack mount					
Power supply voltage	100–240 V AC, 50/60 Hz					
Power consumption	Approx. 100 VA		Approx. 120 VA		Approx. 100 VA	
Dimensions	483 (W) × 133 (H) × 382 (D) mm					
Weight	Approx. 11 kg		Approx. 13 kg		Approx. 11kg	

Principle

Single-beam

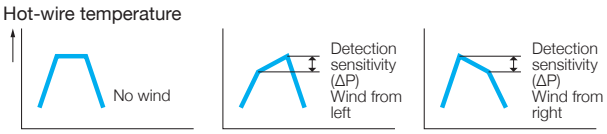


Double-beam High-sensitivity sensor offers a maximum rangeability of 1 : 25



● Mass flow sensor

Converts the infrared absorption into an electrical signal.
Excellent noise resistance thanks to the low impedance sensor.
The absence of moving parts makes the device resistant to vibration and semi-permanently usable.



Principle **The mass flow sensor measures the amount of infrared absorbed in the measurement cell.**

Double-beam **ZKJ** CE

NOx SO_2 CO_2 CO CH_4 N_2O O_2

Simultaneous and continuous measurement of up to 5 components
Double-beamed and high-performance model

Features

- Simultaneous and continuous measurement of up to 5 components
- Hardly affected by interference from other gases
- Superior functionality—calibration, alarm, calculation
- Easy-to-see LCD
- Maximum range ratio of 1 : 25
- Excellent zero-point stability: ±1% FS per week

Measurement range

Component	Minimum range	Maximum range
NO	0 … 50 ppm	0 … 5000 ppm
SO_2	0 … 50 ppm	0 … 10 vol%
CO_2	0 … 20 ppm	0 … 100 vol%
CO	0 … 50 ppm	0 … 100 vol%
CH_4	0 … 200 ppm	0 … 100 vol%
N_2O	0 … 200 ppm	0 … 2000 ppm
O_2	0 … 5 vol%	0 … 25 vol%

Specifications

Principle	NO, SO_2, CO_2, CO, CH_4, N_2O: NDIR (double-beam) O_2 : built-in paramagnetic sensor or external zirconia analyzer
Repeatability	±0.5% FS (±1% FS for the ranges below 50 ppm)
Linearity	±1% FS
Zero drift	±1% FS per week (±2% FS per week for 50–200 ppm range)
Span drift	±2% FS per week (±2% FS per day for the ranges below 50 ppm)
Response time (for 90%)	≤ 60 s
Output signal	4–20 mA DC or 0–1 V DC, up to 12 points
Contact input	Volt-free contact: remote range-switching, auto-calibration remote start, remote hold, average reset, pump on/off
Contact output	SPST-NO and SPDT contact: analyzer error, calibration error, range identification, during auto-calibration, pump on/off, CO peak alarm, H/L limit alarm, power interruption
Communication (option)	RS-232C (Modbus)
Display	LED-backlit LCD, instantaneous value, O_2 corrected instantaneous value, O_2 corrected average value, O_2 average
Power supply voltage	100–240 V AC, 50/60 Hz
Power consumption	250 VA
Dimensions and weight	483 (W) × 177 (H) × 600 (D) mm, approx. 22kg

NDIR Gas Analyzer for Heat Treatment Furnace

For optimal quality management

ZFG

CO_2 CO CH_4

Features

- High-accuracy with a repeatability of 0.5% FS
- Single-beam system: long-term stability and low maintenance
- Monitors concentration of CO_2, CO, CH_4 that correlate Carbon Potential (CP)
- CP calculation available (option)
- Simultaneous and continuous monitoring of CO_2 + CO, CH_4 + CO, CO_2 + CH_4
- Compact and lightweight
  About one-third volume and half weight of previous models ZAR and ZFU
- Panel mounting with cutout size of 206 (W) × 173 (H) mm

Specifications

Components	CO_2, CO, CH_4
Principle	Single-beam NDIR
Measurement range	CO_2: 0 … 0.5 … 100%
	CO: 0 … 0.5 … 100%
	CH_4: 0 … 1 … 10%
No. of components	≤ 2
No. of ranges	≤ 2 for each component
Repeatability	±0.5% FS
Zero and span drift	±2% FS per week

Response time (for 90%)	≤ 10 s
Output signal	4–20 mA DC, 0–1 V DC, 0–100 mV DC, or 0–10 mV DC
Contact output	Analyzer error, range identification
Contact input (option)	Remote range-switching, remote hold
Standard functions	Output hold, automatic light-off, analyzer error
Optional functions	CP calculation, etc.
Display	Backlit LCD
Power supply voltage	100–240 V AC, 50/60 Hz
Dimensions and weight	218 (W) × 211 (H) × 257 (D) mm, approx. 5 kg

NDIR CO_2 Controller

ZFP9 CE

CO_2

Features

- Wall mount type with built-in pump and filter
- Applications: protected horticulture, ventilation systems for buildings, controlled atmosphere storage facilities

Specifications

Target	CO_2 in air
Principle	Single-beam NDIR
Measurement range	0 … 0.2 … 20%
Repeatability	±1% FS
Zero drift	±10% per 6 months
Response time (for 90%)	≤ 10 s
Gas sampling	Suction pump and filter
Power supply voltage	100 V, 115 V, 200 V, or 220 V AC, 50/60 Hz
Dimensions and weight	220 (W) × 257 (H) × 85 (D) mm, approx. 3 kg

Biomass Gas Analyzer

ZPAF CE

CH_4 CO_2 H_2S O_2

Components and ranges

	1st range	2nd range	Principle
CH_4	0...20 vol %	0...100 vol %	Single-beam NDIR
CO_2	0...20 vol %	0...100 vol %	
H_2S	0...500 ppm	0...2000/5000 ppm	Constant-potential electrolytic
O_2	0...10 vol %	0...25 vol %	Galvanic fuel cell

Specifications

Repeatability	±0.5% FS (H_2S: ±2.0% FS)
Linearity	±1.0% FS (H_2S: ±2.0% FS)
Zero drift	±2% FS per week
Span drift	±2% FS per week (H_2S: ±2.5% FS per week or ±5% FS per day)
Response time (for 90%)	10-30s (H_2S: 180s)
Output	4-20mA DC or 0-1V DC
Contact input	12-24V DC, ≤ 9 points
Contact output	SPDT, ≤ 15 points
Communication (option)	RS-485 (Modbus)
Display	Backlit LCD
Power supply voltage	100-240 V AC, 50/60 Hz
Dimensions and weight	483 (W) × 133 (H) × 382 (D) mm, approx. 9 kg

Compact NDIR Gas Analyzer

With gas sampling devices incorporated

Simultaneous and continuous monitoring of up to 5 components among NOx, SO_2, CO_2, CO, CH_4, and O_2

ZSVF Analysis Unit + Sampling Unit

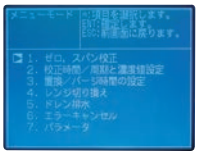
NOx | SO_2 | CO_2 | CO | CH_4 | O_2

Features

- Analysis unit and sampling unit can be separated for easy move and installation
- Suited to monitoring of flue gas, combustion gas, biogas, etc.

Sampling unit　　Analysis unit

- No installation work
- Interactive interface

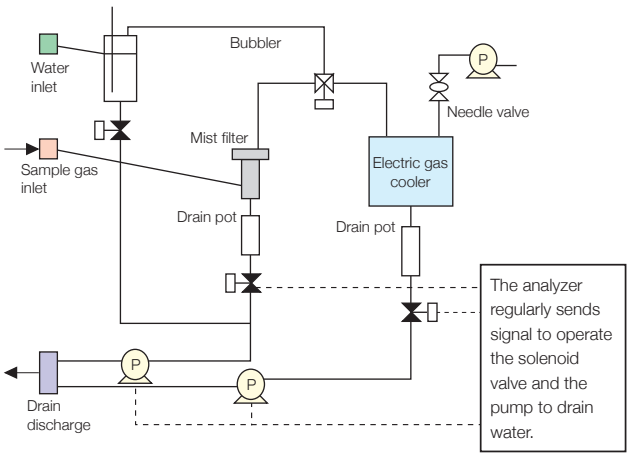


Menu screen

Range switching screen

Zero/span calibration

- CP calculation available
  The IR analyzer can ensure higher CP traceability than the zirconia O_2 analyzer because the IR analyzer simultaneously measures CO and CO_2 to calculate CP.
- Easy to maintenance
  Automatic water-discharge



Specifications

Measurable components	NOx, SO_2, CO_2, CO, CH_4, O_2
Principle	Single-beam NDIR + galvanic or paramagnetic O_2 sensor
Measurement range	NOx: 0 … 500 … 5000 ppm
	SO_2: 0 … 500 ppm … 1%
	CO_2: 0 … 200 ppm … 100%
	CO: 0 … 200 ppm … 100%
	CO_4: 0 … 1000 ppm … 100%
	O_2: 0 … 5/10/25%
Repeatability	±0.5% FS
Output signal	4–20 mA DC or 0–1 V DC Instantaneous value, O_2 converted instantaneous value, O_2 converted average value, CP calculation
Communication	RS-232C (Modbus)
Power supply voltage	100–115 V AC or 200–240 V AC, 50/60 Hz
Dimensions	Analysis unit: 365 (W) × 211 (H) × 514 (D) mm Sampling unit: 365 (W) × 377 (H) × 514 (D) mm
Weight	Analysis unit: approx. 12 kg Sampling unit: approx. 18 kg
Gas extractor (option)	Fixed type with flange, or unfixed type

Simultaneous and continuous measurement of up to 4 components among CO_2, CO, CH_4, and O_2

ZSVS Analysis unit

CO_2 | CO | CH_4 | O_2

Features

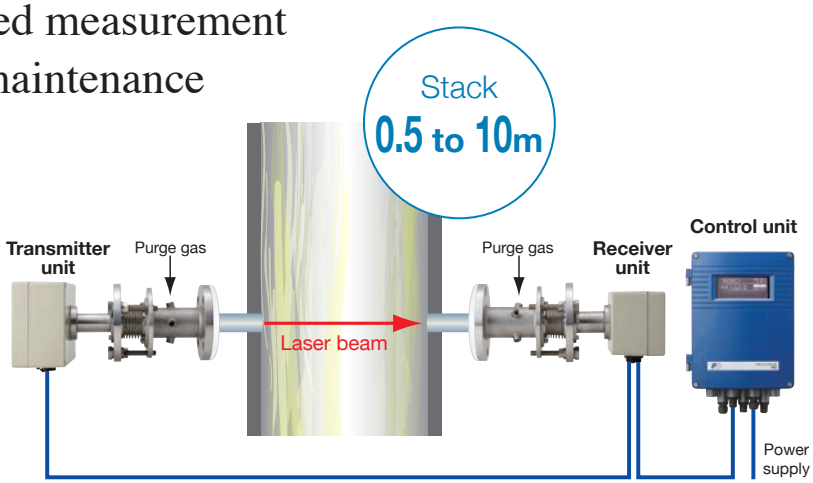
- Portable type with built-in pump, filter, and flowmeter
- CP calculation, O_2 correction, O_2 corrected average
- Easy-to-see LCD
- Single-beam system: long-term stability and low maintenance

Specifications

Components	CO_2, CO, CH_4, O_2
Principle	Single-beam NDIR + Galvanic O_2 sensor
Measurement range	CO_2: 0 … 200 ppm … 100%
	CO: 0 … 200 ppm … 100%
	CO_4: 0 … 1000 ppm … 100%
	O_2: 0 … 5/10/25%
Repeatability	±0.5% FS
Zero drift	±1% FS per day
Span drift	±1% FS per day
Response time (for 90%)	≤ 50 s
Output signal	4–20 mA DC or 0–1 V DC
Communication	RS-232C (Modbus)
Standard functions	CP calculation, O_2 correction, O_2 corrected average, automatic light-off
Display	Backlit LCD
Power supply voltage	100–115 V AC or 200–240 V AC
Dimensions	365 (W) × 211 (H) × 527 (D) mm

Laser Gas Analyzer

Insertion type offers high-speed measurement
Long-term stability and low maintenance



ZSS CE

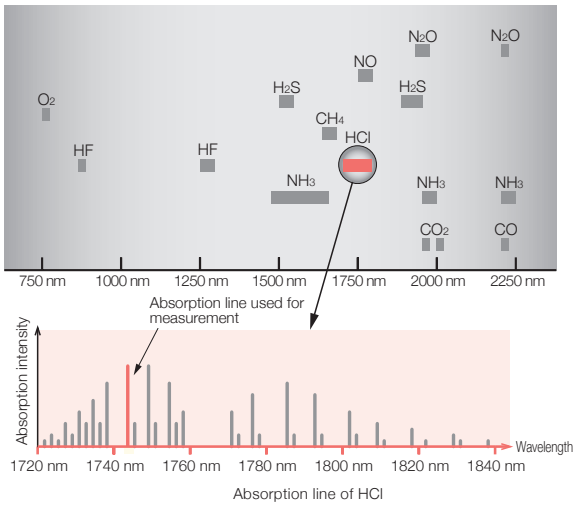
Features

- Fast response without sampling system
- Semiconductor laser ensures high precision and accuracy

Measurable components

NH_3 HCl O_2 CO CO_2

Absorption spectrum



Principle **The analyzer uses near infrared semiconductor laser and measures the change in absorption wavelength to determine the gas concentration.**

Zero point stability: ±2.0% FS per 6 months

Purge system reduces the risk of zero drift due to contamination

Energy saving and low maintenance

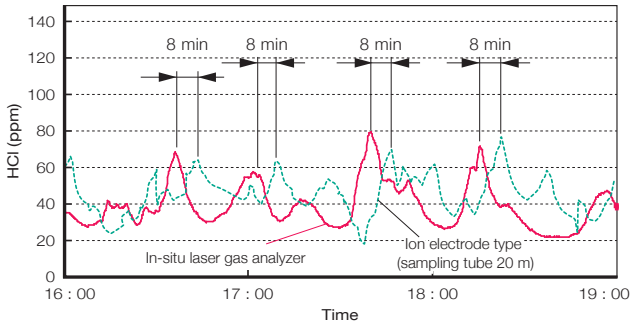
Energy consumption ≤ 80 VA
Maintenance work ≤ twice a year
Without the need for sampling devices and preconditioning, consumable parts and maintenance work are greatly reduced.

No sampling involved	**No preconditioning**
No filter	**No catalyst**

Fast response within 2 seconds

Compared to the ion electrode (sampling) method, the direct measurement provides remarkably faster response.

Comparison with sampling system



CO + O_2 analyzer available

Simultaneous measurement of CO and O_2 enables precise control of air-fuel ratio while reducing the cost of installation and maintenance.

ppm CO + O_2 (high-temperature)	vol% CO + O_2	ppm CO + O_2 (instrument air purge)
CO + CO_2		

R&D applications aimed at replacing fossil fuels

The fast response measurement of CO_2 and NH_3 makes ZSS suits for R&D applications.

Specifications

General

Principle	Non-dispersive infrared (NDIR)
Method	Cross-stack
Measurable components and ranges	See the table below
Light source	Near-infrared semiconductor laser
Laser class	CLASS 1 (O_2 analyzers of high-temperature version and instrument air purge version fall under CLASS 3B)
Power supply voltage	100–240 V AC, 50/60 Hz
Power consumption	80 VA
Calibration interval	every 6 months (depending on the operating environment)
Display	Backlit LCD
Display contents	Component, concentration (instantaneous value, average, O2 corrected instantaneous value, O2 corrected average value), alarm
Weight	Receiver unit and transmitter unit: approx. 10 kg each, control unit: approx. 8 kg
Dimensions (D × W × H)	Receiver unit (400 × 180 × 155 mm)
	Receiver unit (400 × 240 × 160 mm)
	Control unit (137 × 255 × 440 mm)
IP rating	IP65

Performance

Response	≤ 4 s (≤ 2 s in high-speed version)
Repeatability	±1.0% FS (depending on components and ranges) CO + O_2 measurement: ±2% FS
Linearity	±1.0% FS (depending on components and ranges) CO + O_2 measurement: ±3% FS
Zero drift	±2.0% FS per 6 months (depending on component and range) CO + O_2 measurement: ±4% FS per 6 months
Interference effect	±2.0% FS
Detection limit	1% of minimum range

Input/output signal

Analog output	4–20 mA DC or 1–5 V DC, 2 or 4 points Measured value and O_2 corrected value. Switchable between instantaneous value and average value
Analog input	4–20 mA DC, 2 points Sample gas pressure, temperature, velocity, O_2 concentration, water concentration, air purge pressure *Inputs are used for compensating concentration, O_2 correction, and alarm output.
Digital output	Relay contact output, 6 points Low light transmission, H/L limit alarm, analyzer error, during calibration / during hold, power interruption, environmental error
Digital input (option)	Voltage input received by photocoupler, 3 points Average value reset, switchover between instantaneous value and moving average value, remote hold

Installation environment

Ambient temperature	–20 to +55°C (Receiver unit, transmitter unit) –5 to +45°C (Control unit)
Ambient humidity	≤ 90% RH
Optical path length	0.5 to 10 m (0.5 to 5 m in CO + O_2 measurement)
Standard flange	JIS10K, 50A or 100A
Purge gas	See the table below. Purge gas pressure: ≥ 0.3 MPa
Purge gas flow rate	≥ 20 L/min
Gas conditions	See the table below Moisture: ≤ 50 vol% (no condensation) Pressure: ±10 kPa (Consult us for pressure above the limit.) Dust: Standard version: ≤ 10 g/m³ (N) Dust resistant version: ≤ 15 g/m³ (N)

Measurable components and ranges

	Measurable components		Min. range*	Max. range*	Gas temperature	Purge gas	4th code
Single beam 1-component analyzer	HCl		10 ppm	5000 ppm	≤ 400°C	Instrument air	C
	NH_3		15 ppm	5000 ppm	≤ 450°C		W
	CO (high range)		2.0 vol%	100 vol%	≤ 300°C		A
	CO (low range)		200 ppm	1 vol%	≤ 400°C		M
	CO_2		2.0 vol%	100 vol%	≤ 300°C		G
	O_2		10 vol%	100 vol%	≤ 300°C	N_2	P
	O_2 (high temperature)		4 vol%	100 vol%	≤ 1200°C		Q
	O_2 (instrument air purge)		25 vol%	100 vol%	400°C … 1200°C	Instrument air	T
Single beam 2-component analyzer	CO + CO_2		2.5 vol%	100 vol%	≤ 300°C	Instrument air	K
Double beam 2-component analyzer	ppm CO + O_2 (instrument air purge)	CO	200 ppm	2 vol%	400°C … 1200°C	Instrument air	V
		O_2	25 vol%	100 vol%			
	ppm CO + O_2 (high temperature)	CO	200 ppm	2 vol%	≤ 1200°C	N_2	U
		O_2	5 vol%	50 vol%			
	vol% CO + O_2	CO	2 vol%	50 vol%	≤ 300°C		S
		O_2	10 vol%	100 vol%			

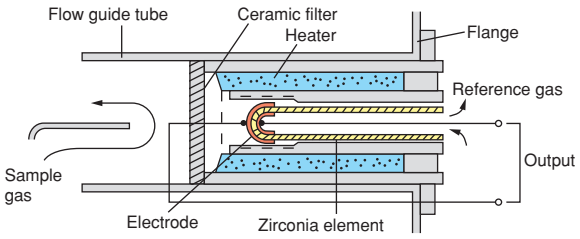
*The measurement ranges described above are for the optical path of 1 m.

Zirconia Oxygen Analyzers

Fast response without the need for gas sampling devices
Ideal for combustion control in boilers and incinerators

Principle

The analyzer makes use of the property of zirconium oxide that conducts oxygen ion when heated.
The analyzer can determine the O_2 concentration by sensing the electromotive force resulting from the difference in O_2 concentration between air and the sample gas.



Easily replaceable zirconia element

*Excluding ZSB

Fast response (4–7 seconds)
HART communication available

O_2

IP66

Converter ZKMA CE

IP67

Converter ZKMB CE

Detector ZFK8 CE

Features

- Easily replaceable zirconia element
- Fast response (4–7 seconds)
- IP66 or IP67 enclosure
- RS-485 or HART communication

Specifications

Target	O_2 in incombustible gas
Principle	Insertion type zirconia sensor
Range	0 … 2 … 50 vol% O_2 (user configurable)
Repeatability	±0.5% FS
Linearity	±2% FS
Response time (for 90%)	4 s … 7 s
Output signal	4–20 mA DC or 0–1 V DC
Contact output	6 points, SPST-NO contact: H/L limit alarm, during maintenance, during blowdown, during calibration, analyzer error
Contact input	3 volt-free contacts: selection from 7 items
Display	Backlit LCD
Communication	RS-485 (Modbus) or HART
Optional functions	Combustion efficiency display, blowdown, auto calibration, cock (selector valve), flowmeter
Converter installation	Panel mount or pipe mount
Cable length between converter and detector	≤ 100m
Power supply voltage	100–120 V AC or 200–240 V AC, 50/60 Hz

Flameproof type for hazardous applications

O_2 **Ex-proof**

Converter ZKME

Flow guide tube for high particulate

Detector ZFKE

Features

- Easily replaceable zirconia element
- Fast response (4–7 seconds)
- TIIS and NEPSI certified

Specifications

Target	O_2 in incombustible gas
Principle	Insertion type zirconia sensor
Range	0 … 2 … 50 vol% O_2 (user configurable)
Repeatability	±0.5% FS
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Response time (for 90%)	4 s … 7 s
Output signal	4–20 mA DC or 0–1 V DC
Contact output	6 points, SPST-NO contact: H/L limit alarm, during maintenance, during blowdown, during calibration, analyzer error
Contact input	3 volt-free contacts: selection from 7 items
Display	Backlit LCD
Communication	RS-485 (Modbus)
Optional functions	Combustion efficiency display, blowdown, auto calibration, cock (selector valve), flowmeter
Converter installation	Panel mount
Cable length between converter and detector	≤ 100 m
Power supply voltage	100–120 V AC or 200–240 V AC, 50/60 Hz

Integrated system

O_2

ZSB

Features

- Auto calibration and manual/auto blowdown Solenoid valve and other necessary equipment are included
- User configurable range within 2 … 50%
- Incomplete combustion indicator appears when O_2 is deficient

Specifications

Target	O_2 in incombustible gas
Principle	Insertion type zirconia sensor
Range	0 … 2 … 50 vol% O_2 (user configurable)
Repeatability	±0.5% FS
Linearity	±2% FS
Response time (for 90%)	4 s … 7 s
Output signal	4–20 mA DC or 0–1 V DC
Contact output	6 points, SPST-NO contact: H/L limit alarm, during maintenance, during blowdown, during calibration, analyzer error
Contact input	3 volt-free contacts: selection from 7 items
Display	Backlit LCD
Communication	RS-485 (Modbus)
Installation	Self-standing or wall-mounting
Cable length between converter and detector	≤ 20 m
Power supply voltage	100–120 V AC, 50/60 Hz

Paramagnetic Oxygen Analyzers

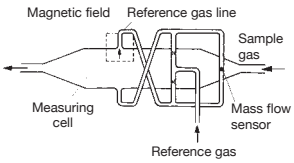
Fast response unaffected by combustible gas
Ideal for combustion control in industrial furnaces and incinerators

Fast response within 2 seconds Tolerant to interference

ZAJ

O_2

Principle



When the sample gas is placed in a magnetic field, oxygen molecules are attracted. This creates a pressure that is detected by a mass flow sensor.

Interference effects (ZAJ)

Background gas (100%)	Zero drift (%)
NO	+43
CO	+0.01
CO_2	-0.27
CH_4	-0.20

He	+0.30
H_2	+0.24
HCl	-0.30
NH_3	-0.26
SO_2	-0.22
N_2O	-0.02
H_2O	-0.02

Features

- Fast response within 2 seconds
- Tolerant to interference from other gas (H_2, CO_2, etc.)
- Suppressed ranges available (e.g. 21–100%O_2)
- No moving parts—low maintenance
- Automatic calibration, communication (option)

Specifications

Principle	Paramagnetic (pressure detection)
Measurement range	When reference gas is N_2: 0 … 0.5 … 100% O_2 (configurable)
	When reference gas is air: 21 … 23 … 100% O_2
	When reference gas is 100% O_2: 100 … 98 … 0% O_2 (configurable)
No. of ranges	2
Repeatability	±1% FS
Linearity	±1% FS
Response time (for 90%)	≤ 2 s
Output signal	4–20 mA DC
Contact output (option)	6 SPST-NO contacts: during calibration, etc. 4 SPDT contacts: H/L alarm, etc.
Contact input (option)	Remote range-switching, remote hold
Display	Backlit LCD
Communication (option)	RS-485 (Modbus)
Installation	19" rack or panel mounting, or benchtop
Power supply voltage	85–264 V AC, 50/60 Hz

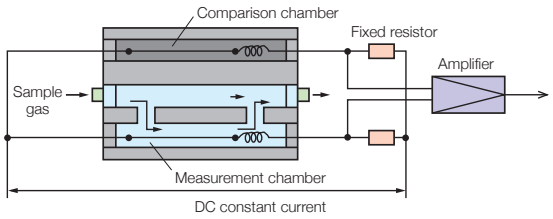
Thermal Conductivity Gas Analyzer

Reliable and continuous measurement of H_2, He, Ar, etc. We support the effective use of Hydrogen.

ZAF CE

He | Ar | H_2 | CH_4 | CO_2

Principle



Because the thermal conductivity is different among gas components, when there is a change in the concentration of the component under measurement, the thermal conductivity of the sample gas will change to affect the temperature of the platinum wire. The analyzer uses the temperature change to determine the gas concentration.

Features

- Easy-to-see LCD
- RS-232C Modbus (option)
- Auto calibration (option)
- Interference compensation (option)
- Concentration alarm output (option)
- Two switchable ranges (option)

Specifications

Principle	Thermal conductivity
Components	He, Ar, H_2, CH_4, CO_2
Measurement range	Depends on components and ranges
Repeatability	±1% FS
Linearity	±2% FS
Response time (for 90%)	≤ 60 s (standard), ≤ 10 s (fast response version)
Output signal	4–20 mA DC, 0–1 V DC, or 0–10 mV DC
Contact output (option)	5 SPST-NO contacts: during calibration, H/L alarm, etc.

Contact input (option)	3 volt-free contacts; output hold, range switching, auto-calibration start
Display	Backlit LCD
Communication (option)	RS-232C
Mounting	Panel mounting
Power supply voltage	100–240 V AC, 50/60 Hz
Dimensions	192 (W) × 240 (H) × 213 (D) mm
Weight	Approx. 5 kg

Measurable components and ranges

Sample gas	Reference gas*1	Measurement range	Maximum range ratio
H_2	N_2, (CO_2, Ar, He)	0 … 3, 5, 10, 20, 50, 80, 100% 100 … 90%, 100 … 80%	1 : 10
He	N_2, (CO_2, Ar), O_2, Air	0 … 5, 10, 20, 30, 40, 50, 80, 100% 100 … 90%, 100 … 80%	1 : 10
Ar	N_2, O_2, Air, (He)	0 … 10, 20, 50, 80, 100% 100 … 90%, 100 … 80%	1 : 5
CH_4	N_2, (CO_2, Ar, He)	0 … 20, 40, 50, 60, 80, 100% 100 … 80%	1 : 5
CO_2	N_2, O_2, Air, (He)	0 … 10, 20, 50, 100% 100 … 90%	1 : 5

*1: Those in parenthesis need consultation. Measurement of H_2 included in O_2 is not available.

NDIR Gas Analyzers for Replacement

New models with equal size and functionality to predecessors

ZRH → **ZPAH** **ZPA1**

Features

- Vertical and horizontal structures
- Continuous monitoring of 1 component among SO_2, CO_2, CO, CH_4 or 2 components of CO_2 + CO simultaneously
- Tolerant to interference
- Easy-to-see backlit LCD

ZRJ → **ZPAJ**

Features

- Simaltaneous and continuous monitoring of up to 4 components among NO_X, SO_2, CO_2, CO, CH_4, and O_2
- Tolerant to interference
- Easy-to-see backlit LCD

ZRG3 → **ZPG3**

Features

- Sample switching system offers improved zero-stability
- Simaltaneous and continuous monitoring of up to 2 components among NO_X, SO_2, CO_2, CO, O_2
- Tolerant to interference
- Easy-to-see backlit LCD

Gas Sampling Devices

Gas Extractor

ZBA

Samples target gas from stack
Up to 1300°C

Gas Filter

ZBB

Removes dust and/or mist

Gas Cooler

ZBC

Gas Dryer

ZBJ

Removes moisture and heat from sample gas

Flowmeter and Pressure Regulator

ZBD

Flowmeters are used to check the flow rate of sample gas. Pressure regulator controls the pressure of standard gas.

Valves

ZBF

Controls sample gas flow

Gas Aspirator

ZBG

Durable and corrosion-resistant pump that draws the sample gas into the analyzer

Draining

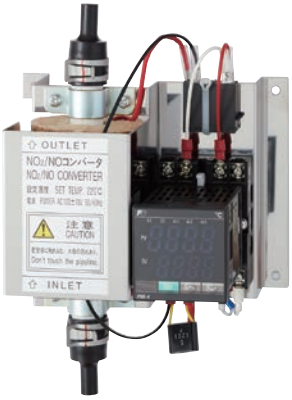
ZBH

Discharges water

Gas Converter

ZDL CE

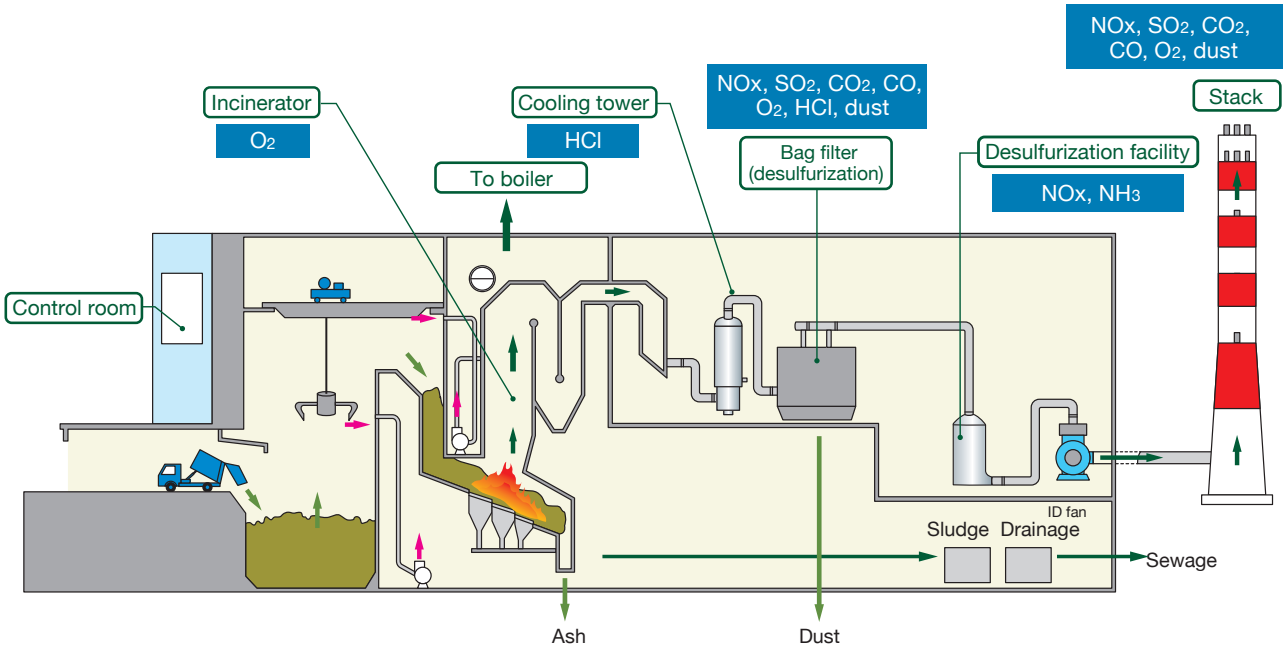
Converts NOx contained in sample gas into NO



Applications

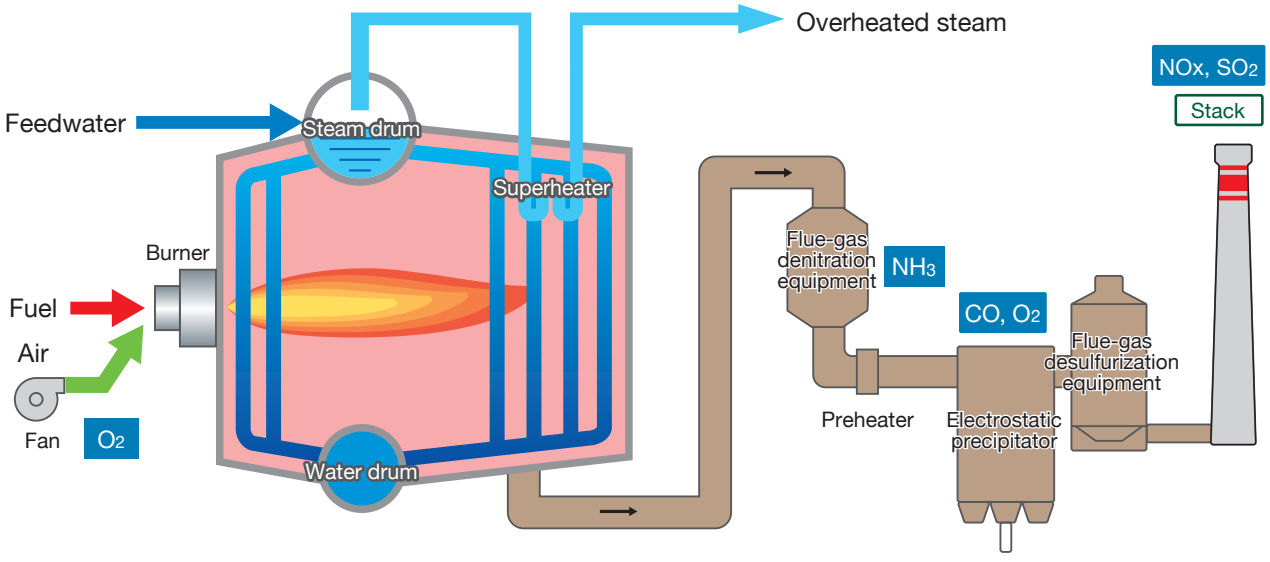
1 Refuse Incineration Plants

Gas analyzers are necessary for continuous emission monitoring required by legislation and regulations; furthermore, they enable optimal combustion control.



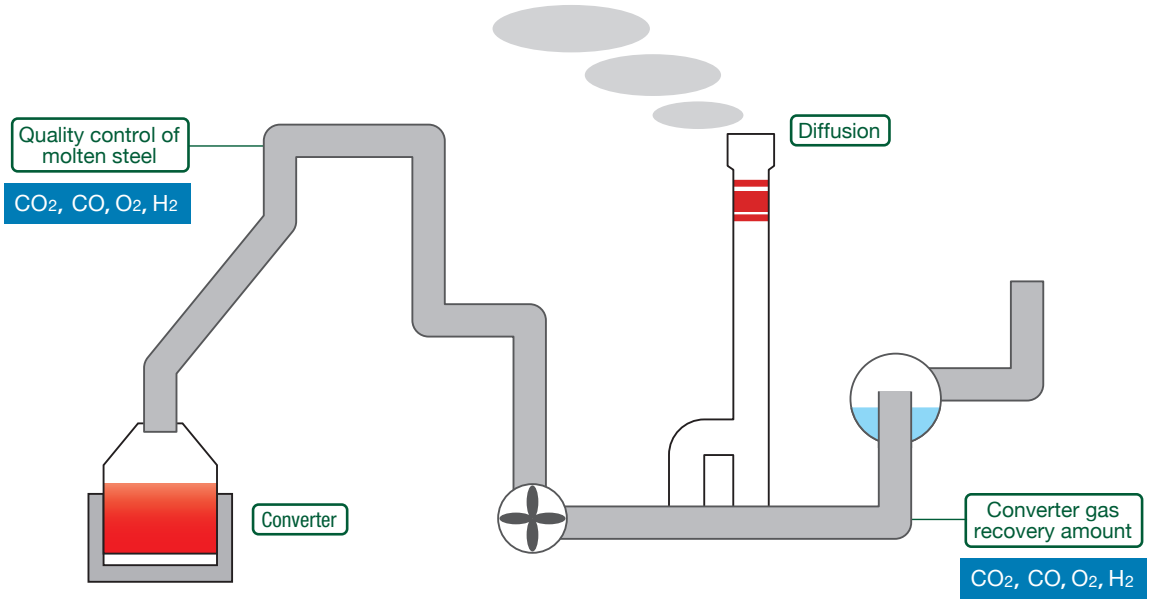
2 Large Industrial Boilers

Gas analysis enables optimal control of boiler combustion, reducing both fuel costs and emissions.



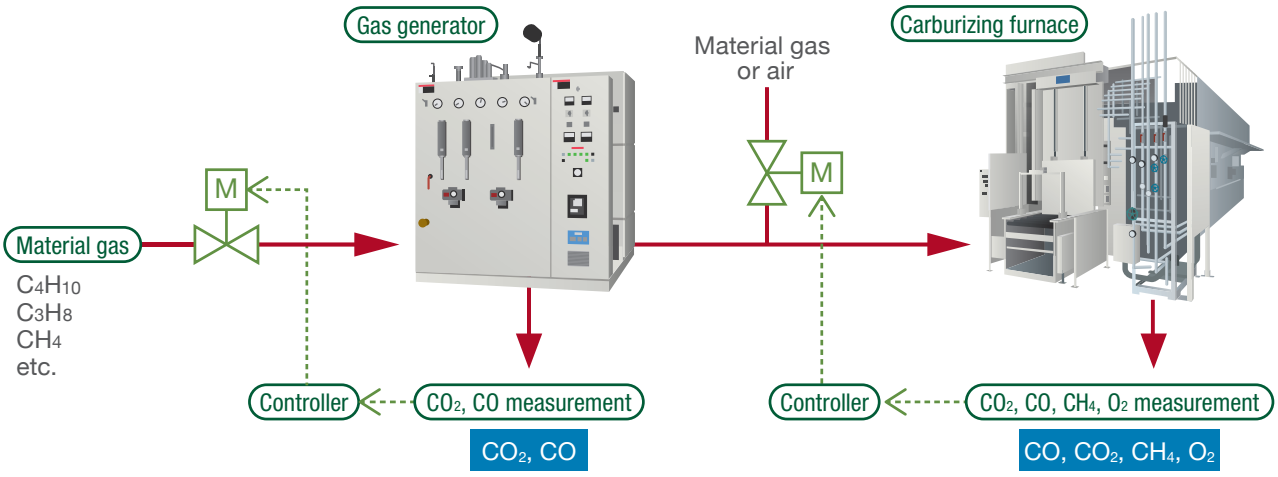
3 Converter Furnaces in Steelmaking Process

Monitoring the concentration of CO_2, CO, O_2, and H_2 can ensure the recovery of converter gas that can be reused as fuel.
It also enables oxygen amount control and decarburizing status check, which can lead to quality management of molten steel.



4 Heat Treatment Furnaces

Gas analyzers monitor components related to CP (carbon potential) such as CO_2, CO, CH_4, NH_3, H_2 and O_2, providing reliable quality control.



We produce satisfying products under strict quality control.

指定製造事業者指定書

計量法第９０条の規定に基づき下記のとおり
指定製造事業者の指定をします

（指　定）平成１４年４月１７日
（再交付）平成２９年７月　３日

経済産業大臣　世耕　弘成

記

指定番号　３９１９０１

届出製造事業者の名称　富士電機株式会社

指定する工場又は事業場の名称　富士電機株式会社　東京工場
京葉分室

所在地　山梨県甲斐市下今井７３２番地

事業の区分の略称　濃度計第一類

Japanese Measurement Legislation:
Designated Manufacturing Business Operator (No. 391901)

■ ISO 14001
Certificate No. EC97J1059
Tokyo Factory

■ ISO 9001
Certificate No. JMI-0122
Tokyo Factory

Find out more about our gas analyzers.

Gas Analyzers - Fuji Electric
www.fujielectric.com/products/sensors_measurements/instruments/product_series/anlz_gas.html

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