e-Front runners

Fuji Instrumentation & Control

Fuji Gas Analyzers

Fuji Electric Co., Ltd.

ECNO:300j

Conservation of sound environment is also our important task.

Our company commercialized an infrared type gas analyzer in 1954 and recently has developed unique analyzers one after another as represented by a CO/O$_2$ analyzer for monitoring of dioxins emission reguration and a simultaneous multi-component gas analyzer in order to enrich the product lineup.

Our company will continue offering analytical instruments helpful for protection of the global environment through the integration of new technologies and long experience.

INFRARED GAS ANALYZER best suited for measuring exhaust gas in stack

Simultaneous Measurement of 5 components; NO$_X$, SO$_2$, CO, CO$_2$ and O$_2$

Type: ZSU

CO, O$_2$ Gas Analyzer for stack gas

Type: ZSQ

Simultaneous Measurement of 7 components; NO$_X$, SO$_2$, HCℓ, CO, CO$_2$, O$_2$, Soot and Dusts

Type: ZSU-7

Compact Type NO$_X$, SO$_2$, CO, CO$_2$ and O$_2$ GAS ANALYZER

Type: ZSVF

CO GAS ANALYZER
for Air pollution monitoring

CO GAS ANALYZER for Automobile tunnel

Type: ZSA

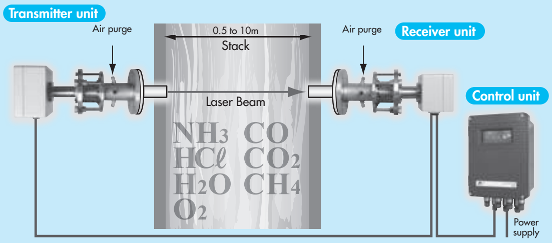
CO$_2$ CONTROLLER
best suited for building ventilation and green house

Type: ZFP

CROSS STACK LASER GAS ANALYZER

Fast measurement of NH$_3$ Gas or HCℓ, H$_2$O, CO, CO$_2$, CH$_4$, O$_2$ Gas concentration in Stack

Type: ZSS



CO, CO$_2$, CH$_4$ ANALYZER

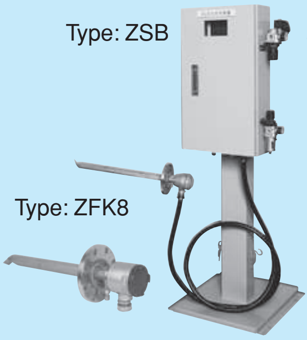
Type: ZFG

OXYGEN ANALYZER SERIES best suited for combustion control and energy saving

IN-SITU ZIRCONIA OXYGEN ANALYZER

Type: ZSB

Type: ZFK8



(Detector)

Type: ZKM1

(Converter)

Type: ZKM2

(Converter)

Type: ZKME

(Converter)

Fast response type PARAMAGNETIC ANALYZER

Type: ZAJ

Type: ZKG

ANALYZER best suited for measuring atmosphere gas in heat treatment furnace

● INFRARED system

Single beam type

CO, CO_2, CH_4, SO_2, NOx and O_2 measuring, 4-component analyzer

Type: ZRJ

NOx, SO_2, CO, CO_2, CH_4 and O_2 measuring, 5-component analyzer

Type: ZRE

Dual beam type

NOx, SO_2, CO, CO_2, CH_4 and O_2 measuring, 5-component analyzer

Type: ZKJ

NOx, SO_2, CO, CO_2 measuring, 1-component analyzer

Type: ZRC6

● THERMAL CONDUCTIVITY system

GAS ANALYZER

He, Ar, and H_2 measuring

Type: ZAF

Easy-to-carry **PORTABLE TYPE**

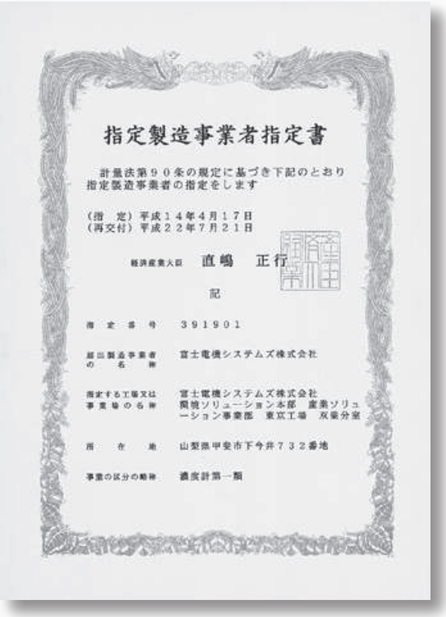
CO, CO_2, CH_4, O_2 analyzer

Type: ZSVS

Automobile exhaust gas analyzer for measurement of HC, CO, CO_2 and O_2

Type: ZKE

Satisfactory products for customers will be delivered 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２２年７月２１日

経済産業大臣　直嶋　正行

記

指定番号　３９１９０１

届出製造事業者の名称　富士電機システムズ株式会社

指定する工場又は事業場の名称　富士電機システムズ株式会社
環境ソリューション本部　産業ソリューション事業部　東京工場　双葉分室

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

"Status of manufacturer specified in the Measurement Law" already acquired: Specification No. 391901

ISO 14001 certification already obtained: Registration certificate No. EC97J1059

ISO 9001 certification already obtained: Registration certificate No. JMI-0122

INFRARED GAS ANALYZER

Is the air really safe?

Yes. Because a gas analyzer keeps an eye on pollutant gases.

Simultaneous Measurement of NO_x, SO_2, CO, CO_2 and O_2 for stack gas

Type: ZSU

Japanese pattern approval
SAS992-1 (SO_2 meter)
SAC992-1 (CO meter)
SAN991-1 (NO_x meter)
SE981 (O_2 meter)
SF011 (O_2 meter)

FEATURES

- ■Measurement by the infrared ray method (dual beam optics) excellent in long-term stability.
- ■Hardly affected by unintended gases because interference components' influence is corrected with twin detectors.
- ■Standard-equipped with automatic zero/span calibrating function.
- ■Space saving design allowing maintenance from the front of each analyzer.

SPECIFICATIONS

- ● Measuring object: Exhaust gas of Incinerator and boiler, etc.
- ● Measurable components: NO_x, SO_2, CO, CO_2, O_2
- ● Measuring system: Dual beam type infrared method (O_2: Zirconia method or Paramagnetic method)
- ● Measurement range: NO_x: 0 to 50 ·········· 5000ppm
  SO_2: 0 to 50 ·········· 5000ppm
  CO: 0 to 50 ·········· 5000ppm
  CO_2: 0 to 10 / 0 to 20%
  O_2: 0 to 10 / 0 to 25vol%
- ● Repeatability: ±0.5%FS
- ● Linearity: ±1%FS
- ● Zero/span drift: ±2%FS/week (O_2: ±2%/month)
- ● Response time: NO_x, CO, CO_2, O_2: 2 minutes, SO_2: 4 minutes (90% response, from the device inlet)
- ● Output signal: 4 to 20mA DC
- ● Contact output: Auto calibration status, maintenance status, concentration alarm, CO peak count alarm, range identification of each component, etc.
- ● Contact input: Auto calibration start, range changeover, pump ON-OFF, etc.
- ● Function: Auto calibration, O_2 correction, average value calculation, concentration alarm, CO peak count alarm, etc.
- ● Display: LCD with back light
- ● Recorder: 6-point recorder mounted (option)
- ● Power supply : 100V, 110V, 115V, 200V or 230V AC
- ● Outer dimensions: 800(W) x 1710(H) x 615(D) mm

Simultaneous Measurement of CO, O_2 Gas Analyzer for stack gas

Type: ZSQ

Japanese pattern approval
SAC984 (CO meter)
SE981 (O_2 meter)

FEATURES

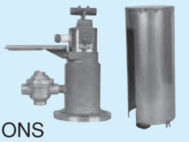
- ■Measurement by the infrared ray method (single beam optics) excellent in long-term stability.
- ■Provided with CO peak count alarm and self-diagnostic function.
- ■Standard-equipped with automatic zero/span calibrating function.
- ■Space saving design allowing maintenance from the front of each analyzer.

SPECIFICATIONS

- ● Measuring object: Exhaust gas of incinerator, etc.
- ● Measurable components: CO, O_2
- ● Measuring system: Single beam type infrared method (O_2: Zirconia method)
- ● Measurement range: CO:0 to 200·········2000ppm
  O_2: 0 to 25vol%
- ● Repeatability: ±0.5%FS
- ● Linearity: ±1%FS
- ● Zero/span drift: ±2%FS/week (O_2: ±2%/month)
- ● Response time: 90 seconds (90% response, from the device inlet)
- ● Output signal: 4 to 20mA DC
- ● Contact output: CO peak count alarm, auto calibration status, error status, etc.
- ● Function: Auto calibration, O_2 correction, average value calculation, CO peak count alarm, etc.
- ● Display: LCD with back light
- ● Recorder: 6-point recorder mounted (option)
- ● Power supply: 100V AC, 50/60Hz (110 to 240V AC: transformer built in)
- ● Outer dimensions: 600(W) x 1580(H) x 675(D) mm

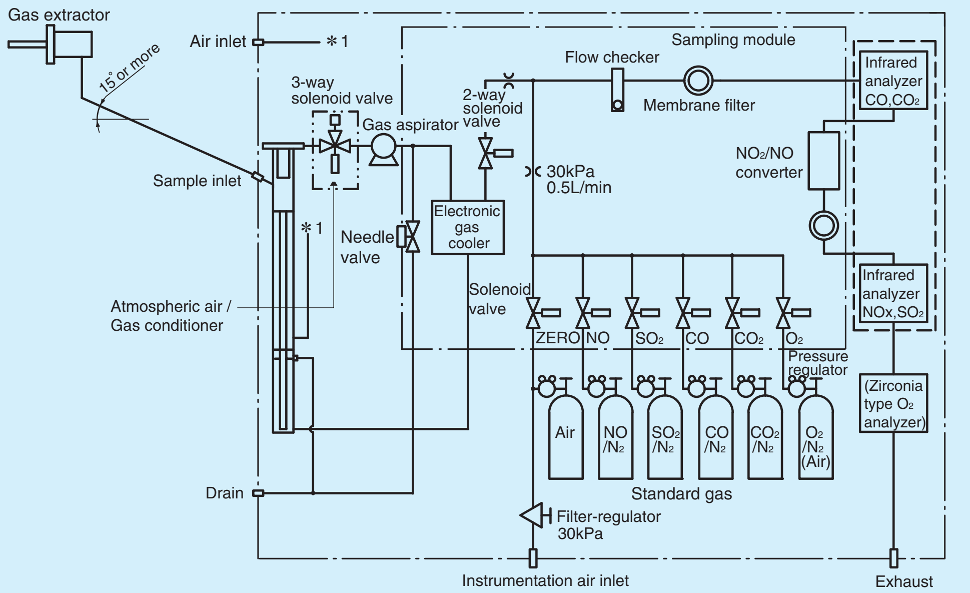
● Gas Sampling System Diagram example (ZSU type)

Gas extractor (ZBAK type)



◆ SPECIFICATIONS

- ● Temperature of gas used:
  Max 800 C (SUS extraction tube)
  Max 1500 C (SIC extraction tube)
- ● System: Electrical heating
- ● Material of extraction tube:
  SUS 316, or SIC + SUS 316
- ● Length of extraction tube:
  600 to 2000mm
- ● Mounting method: JIS 5K 65A flange
- ● Filter: SUS 316 wire mesh
- ● Sampling gas outlet: RC1/4
- ● Power supply voltage: 100V AC, 100 VA (for built-in heater)


Gas extractor
15° or more
Air inlet
＊1
Sample inlet
3-way solenoid valve
Gas aspirator
2-way solenoid valve
Flow checker
Sampling module
Membrane filter
Infrared analyzer CO,CO_2
NO_2/NO converter
30kPa 0.5L/min
Electronic gas cooler
Needle valve
＊1
Atmospheric air / Gas conditioner
Solenoid valve
ZERO
NO
SO_2
CO
CO_2
O_2
Pressure regulator
Infrared analyzer NO_x,SO_2
(Zirconia type O_2 analyzer)
Air
NO /N_2
SO_2 /N_2
CO /N_2
CO_2 /N_2
O_2 /N_2 (Air)
Standard gas
Drain
Filter-regulator 30kPa
Instrumentation air inlet
Exhaust

Simultaneous Measurement of NO_x,SO_2, HCℓ,CO, CO_2,O_2,Soot and Dusts for stack gas

Type: ZSU-7

Japanese pattern approval
SAS992-1 (SO_2 meter)
SAC992-1 (CO meter)
SAN991-1 (NO_x meter)
SE981 (O_2 meter)
SF011 (O_2 meter)

FEATURES

■Measurement can be taken by the infrared ray method (single beam type) having excellent stability and maintainability.

■All functions are included in the small locker of 600 (W) × 515 (D) × 1710 (H) mm.

■Zero and span auto calibration function is equipped as standard.

■Space-saving configuration that is accessible for maintenance on the front panel of the analyzer.

SPECIFICATIONS

- ● Measuring object: Exhaust gas of Incinerator and boiler, etc.
- ● Measurable components: NO_x, SO_2, HCℓ ,CO, CO_2, O_2, Soot and Dusts
- ● Measuring system: Dual beam type infrared method
  (O_2: Zirconia method, HCℓ : Laser method)
- ● Measurement range: NO_x: 0 to 50 ···················· 5000ppm
  SO_2: 0 to 50 ···················· 5000ppm
  HCℓ :0 to 15ppm·m ········ 5000ppm·m
  CO: 0 to 50 ···················· 5000ppm
  CO_2: 0 to 10 / 0 to 20%
  O_2: 0 to 10 / 0 to 25vol%
  Soot and Dusts: 0.01 to 1000mg/m^3
- ● Repeatability: ±0.5 FS (infrared method),
  ±2% FS (Laser method)
- ● Zero/span drift: ±2%FS/week
  (O_2: ±2% FS/month HCℓ : ±2% FS)
- ● Response time: NO_x, CO, CO_2, O_2: 2 minutes,
  SO_2: 4 minutes
  HCℓ :1 to 5 sec.
  (90% response, from the device inlet)
- ● Output signal: 4 to 20mA DC
- ● Contact output: 8 point (Auto calibration status, maintenance status,concentration alarm etc.)
- ● Contact input: Auto calibration start, range changeover etc.
- ● Recorder: Paperless recorder mounted (option)
- ● Power supply: 100V, 110V, 115V, 200V or 230V AC
- ● Outer dimensions: 1215(W) x 1780(H) x 700(D) mm

Simultaneous Measurement of NO_x, SO_2, CO, CO_2 and O_2 for stack gas

Type: ZSVF

FEATURES

■A maximum 5 components out of NO_x, SO_2, CO, CO_2, CH_4 and O_2 can be measured simultaneously.

■The large LCD screen with clear display assures simple operation.

■Single-beam infrared gas analyzer having excellent stability is adopted.

■The separate structure allows the analyzer unite and the pretreatment unit to be placed separately.

■Measurement can be taken continuously for up to 5 days.

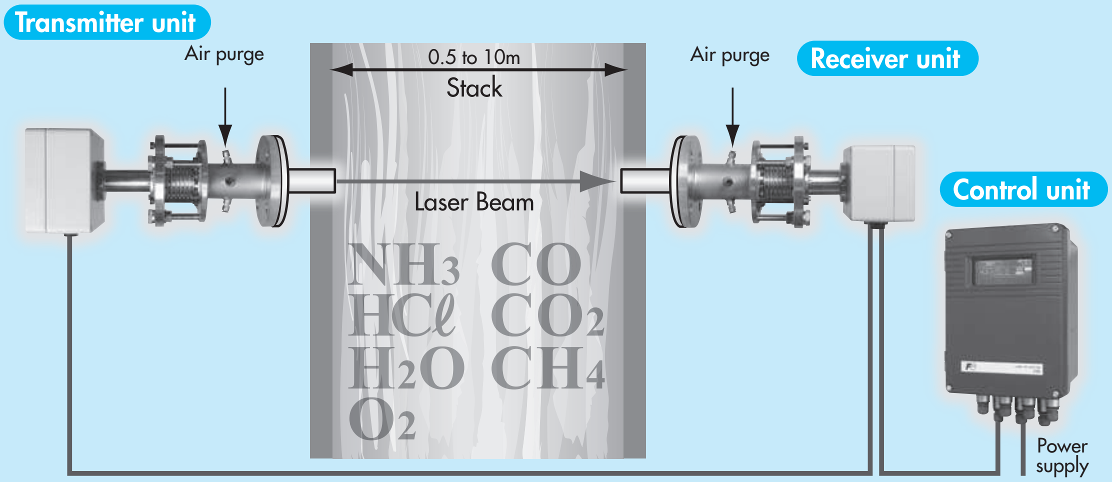
SPECIFICATIONS

- ● Measuring object: Combustion exhaust gas measurement, etc.
- ● Measurable components: NO_x, SO_2, CO, CO_2, CH_4, O_2
- ● Measuring system: Singlel beam type infrared method
  (O_2: Paramagnetic method or galvanic method)
- ● Measurement range: NO_x: 0 to 500 ············ 5000ppm
  SO_2: 0 to 500 ············ 1%
  CO: 0 to 200 ············ 100%
  CO_2: 0 to 200 ············ 100%
  CH_4: 0 to 2000ppm···· 100%
  O_2: 0 to 5 / 25%
- ● Repeatability: ±0.5%FS
- ● Linearity: ±2%FS
- ● Zero/span drift: ±1%FS/day
- ● Response time: 50 second for 90% response from the device inlet but 3 minutes for SO_2
- ● Output signal: 4 to 20mA DC or 0 to 1V DC
- ● Communication function: RS-232C (MODBUS)
- ● Functions: Auto calibration, O2 correction, average value calculation
- ● Indication: LCD with back light
- ● Power supply: 100 to 115V AC or 200 to 240V AC, 50/60Hz
- ● Outer dimensions: 365(W) x 574(H) x 514(D) mm

CROSS STACK Laser Gas Analyzer

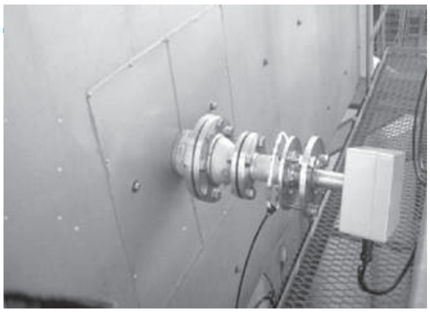
Fast measurement of NH_3 Gas or $HC\ell$, O_2, H_2O, CO, CO_2, CH_4 Gas concentration in Stack

Type: ZSS



FEATURES

- ■Excellent Long-term Stability, and Maintenance-free!
- ■Zero drift: ±2.0%FS
- ■Highly absorptive and corrosive gasses can be measured in low concentration.
- ■Usable in high temperature and dusty environment.
- ■Fast response (1 to 5 sec.) is available, and integration with the control system is feasible.

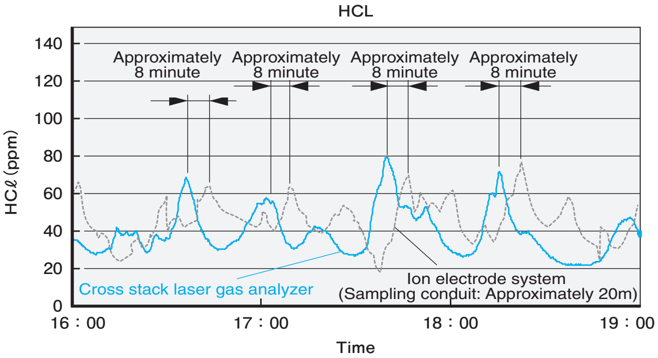


■Measurable components measurable range

Measurable components,	Min. measuring range	Max. measuring range
$HC\ell$	10ppm	5000ppm
NH_3	15ppm	5000ppm
$HC\ell+H_2O$	50ppm($HC\ell$)	1000ppm($HC\ell$) Note 1)
NH_3+H_2O	50ppm(NH_3)	1000ppm(NH_3) Note 1)
O_2	4vol%	50vol%
CO	2vol%	50vol%
CO_2	2vol%	50vol%
$CO+CO_2$	2.5vol%	50vol%
CH_4	100ppm	50vol%

Note 1) The H_2O range is fixed to 50 vol%.

■Case example of field measureing data



SPECIFICATIONS

Measurable gas	$HC\ell$, NH_3, $HC\ell+H_2O$, NH_3+H_2O, O_2 CO, CO_2, CH_4, $CO+CO_2$	Contact output	5 items (Outside the range of upper/lower limits, insufficient quantity of light received, device fault, on hold)
Measurement principle	Non-dispersive infrared absorbance system(NDIR)	Power supply voltage	100 to 240VAC approx. 70VA
Installation system	Cross stack system	Ambient temperature	Receiver/transmitter units -20 to 55˚C,
Laser class	CLASS 1M		Controller unit -5 to 45˚C, 90%R.H. or less
Measuring light path length	0.5 to 10m (stack/smokestack width)	Measuring gas temperature	1200˚C max.
Repeatability	±2.0% FS		
Zero/span drift	±2.0% FS (NH_3 ±3.0% FS when range is 20ppm or less)	Measuring gas pressure	±10kPa
Response time	1 to 5 seconds(90% response)	Outside dimensions (D×W×H)mm	Receiver unit (180×400×200mm)
Analog output	4 to 20mADC, 0 to 1VDC, 0 to 5VDC or 0 to 10VDC (depending on specification)		Transmitter unit (240×400×200mm) Controller unit (135×240×320mm)
Analog input	4 to 20mADC (2 or 6 points)	Mass	Receiver/transmitter units (approx. 10kg each), control unit (approx. 8kg)
Communication function	USB or RS-485 (MODBUS)		
Contact input (option)	3 items (Average value reset, remote hold, remote range switching, instantaneous value/average value switching)	Mounting method	Control unit (mounting on wall or piping), receiver/transmitter units (mounting on flange)

Infrared Type Gas Analyzer (Component)

Measuring method		Single beam system		Dual beam system	
Type		ZRE	ZRJ	ZKJ	ZRC6
Appearance					
Measurable gas components & minimum range	NO	0 to 200ppm	0 to 500ppm	0 to 50ppm	0 to 100ppm
	SO_2	0 to 200ppm	0 to 500ppm	0 to 50ppm	0 to 100ppm
	CO	0 to 200ppm	0 to 200ppm	0 to 50ppm	0 to 100ppm
	Low concentrationCO	–	–	–	–
	CO_2	0 to 100ppm	0 to 500ppm	0 to 20ppm	0 to 50ppm
	CH_4	0 to 500ppm	0 to 1000ppm	0 to 200ppm	–
	O_2 meter built in	0 to 5%	0 to 5%	0 to 5%	–
Number of measurable gas components		1 to 5	1 to 4	1 to 5	1
Repeatability		0.5% of full scale			
Zero drift		Within 2% of full scale/week			
Span drift		Within 2% of full scale/week			
Response speed (90% response)		Within 60 seconds	Within 15 seconds / 2 components Within 30 seconds / 4 components	Within 60 seconds	Within 20 seconds
Analog output	4 to 20mA DC	●	●	●	●
	0 to 1V DC	●	●	●	●
Communication interface		●RS485 (Option)	●RS232C (Option)	●RS232C (Option)	–
Contact output		●	●	●	–
Contact input		●Option	●	●	●
Indication		LCD with back light	LCD with back light	LCD with back light	–
Function	Automatic calibration	●Option	●	●	–
	Upper/lower limit alarm	●Option	●	●	–
	Average calculation	●Option	●Option	●Option	–
	O_2 correction	●Option	●Option	●Option	–
	CO peak count	–	●Option	●Option	–
Power supply		100 to 240V AC	100 to 240V AC	100 to 240V AC	100 to 240V AC
Outer dimensions (W x H x D) mm		483×133×418	483×177×493	483×177×690	433×176×229

Compact type infrared gas analyzer

Type: ZSVS

PORTABLE ANALYZER
120.1
120.8
80.8
110.2
42.0

FEATURES

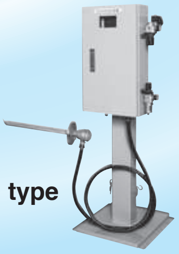
- ■The gas concentrations of 4 components among CO_2, CO, CH_4 and O_2 measured simultaneously and continuously with a single gas analyzer.
- ■Transportable with built-in pump, filter and flow meter.
- ■Provided with computation functions such as CP calculation, O_2 correction, moving average, etc.
- ■Smooth operation in an interactive way through a large-size LCD.
- ■Excellent in long-term stability and easy maintenance using single beam system.

SPECIFICATIONS

- Measurable components: CO_2, CO, CH_4 and O_2
- Measuring system: Single beam type infrared method
  (O_2: galvanic cell method)
- Measurement range: 0 to 200 --------100%CO_2
  0 to 200 --------100%CO
  0 to 100 --------100%CH_4
  0 to 5/25%O_2
- Numbers of range: Max. 3 ranges
- Measurable components:Max. 4 components
- Repeatability: Drift: Within ±1.0% of full scale/day
- Response time: Less than 50 seconds
  (90% response from the gas inlet)
- Output signal: 4 to 20mA DC or 0 to 1V DC
- Communication function: RS232C (MODBUS)
- Standard function: CP calculation, O_2 correction, O_2-corrected moving average value, automatic OFF, etc.
- Indication: LCD with back light
- Outer dimensions: 365(W) x 211(H) x 527(D) mm
- Power-supply voltage: 100 to 115V AC or 200 to 240V AC

ZIRCONIA OXYGEN ANALYZER

This type of oxygen analyzer is capable of measuring oxygen gas even without a gas aspirator, gas cooler, etc.
Optimum for combustion control of boiler, refuse incinerator, sludge incinerator, heating furnace, etc.

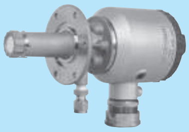


Self stand type

IP66 Type

IP67 Type

Frame-proof Type



Detecting unit

Self-stand type accommodating necessary devices.

Type: ZSB

FEATURES

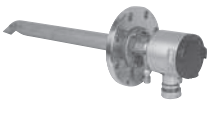
- Automatic calibration and manual/auto blow-down functions are provided. A solenoid valve and other necessary devices are incorporated.
- Measuring range is freely settable within 2 to 50%.
- Incomplete combustion level indication is selected when oxygen becomes inadequate.

SPECIFICATIONS

- Measuring object: Oxygen in combustion exhaust gas
- Measuring range: 0 to 2-----50vol% O_2 (freely settable)
- Repeatability: ±0.5%FS
- Linearity: ±2%FS
- Response time: Within 10 seconds (From calibration gas inlet)
- Oxygen concentration output signal: 4 to 20mA DC or 0 to 1V DC
- Contact output: 4 points (1a relay contact) Upper/lower limit alarm, maintenance status, blow down status, contact output during calibration
- Contact input: Auto calibration start, inhibit calibration
- Indication: Oxygen concentration display (3-digit LED), mode display (3pcs LED), operation/setting display(16-digit, 2-line LCD)
- Combustion efficiency display: Option
- Communication interface: RS485 (option)
- Calibration method: Automatic, manual by key operation, input from external contact
- Power supply: 100, 115 or 230V AC 50/60Hz
- Construction: Pipe stand type or wall mounting type
- Cable length from converter part to detector: 20m, max.

Compact and High capacity

Detector type: ZFK8



type: ZKM1

type: ZKM2

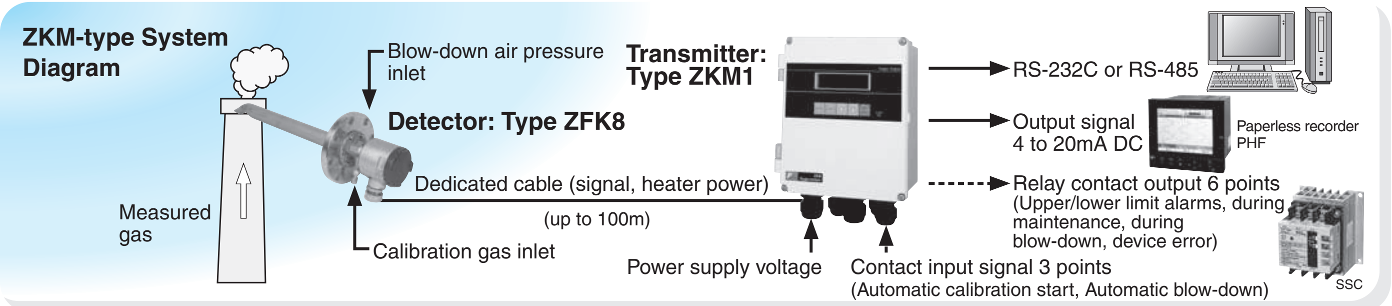
FEATURES

- Modular detector design allows easy field replacement of zirconia element.
- High-speed response of 4 to 7 seconds.
- Case structure available in two types: IP66 and IP67.
- May be programmed without opening the case cover (ZKM1).

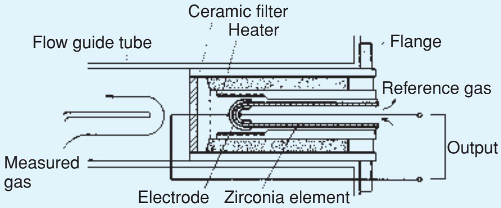
SPECIFICATIONS

- Measuring object: Oxygen in combustion exhaust gas
- Measuring range: 0 to 2-----50vol% O_2 (freely settable)
- Repeatability: ±0.5%FS
- Linearity: ±2%FS
- Response time: 4 to 7seconds (from inlet for calibration gas)
- Oxygen concentration output signal: 4 to 20mA DC or 0 to 1V DC
- Contact output: 6 points (1a relay contact)
  Alarm, instrument error, under maintenance, under blow down, zero gas span for out put calibration.
- Input contact: 3 points (no voltage contact)
  Blow down, starting calibration, heater OFF, range change, external hold
- Concentration value indication: Digital indication in 4 digits
- Combustion efficiency display: Option
- Communication function RS232C or RS485 (MODBUS)
- Calibration method: Automatic, manual by key operation, input from external contact
- Power supply: 100 to 120V AC or 200 to 240V AC 50/60Hz
- Mounting method : Mounting on panel surface, or pipe stand
- Cable length from converter part to detector: 100m, max.

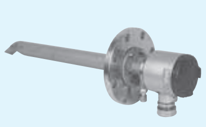
ZKM-type System Diagram

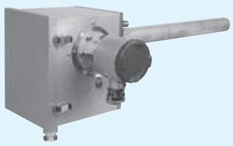

Measured gas
Blow-down air pressure inlet
Detector: Type ZFK8
Dedicated cable (signal, heater power)
(up to 100m)
Calibration gas inlet
Transmitter: Type ZKM1
Power supply voltage
RS-232C or RS-485
Output signal 4 to 20mA DC
Paperless recorder PHF
Relay contact output 6 points (Upper/lower limit alarms, during maintenance, during blow-down, device error)
SSC
Contact input signal 3 points (Automatic calibration start, Automatic blow-down)

A flow guide tube skillfully utilizing the flow of the measured gas assures fast response.



Detectors applicable for various fields


Standard type


800 to 1500 C:
with ejector

Various combinations of detector and flow guide tube have been prepared for use under different site conditions.

Note) Blow-down refers to a function for blowing away the dust accumulating in the flow guide tube of detector unit by compressed air.

Application	Temperature	Gas flow	Dust	Remarks	Adaptable detector/flow guide tube	Mounting method
Boiler, etc. (General- purpose)	600°C or less	5 to 20m/s	Below 0.2g/Nm^3	Fuel: Gas, oil	General-purpose	JIS 5K 65A
			Below 10g/Nm^3	Fuel: Coal	With blow-down nozzle	JIS 5K 80A
Garbage incinerator, Sludge incinerator (For anti-corrosion)	600°C or less	5 to 20m/s	Below 1g/Nm^3	Small amount of moisture in gas	For anti-corrosion	JIS 5K 65A
			Below 10g/Nm^3		For anti-corrosion with blow-down nozzle	JIS 5K 80A
			Below 25g/Nm^3		For anti-corrosion high dust	JIS 5K 80A
			Below 25g/Nm^3		For anti-corrosion high dust with cover	JIS 5K 80A
Heating furnace (General- purpose)	800°C or less	1m/s or less	Below 1g/Nm^3	Small amount of moisture in gas	With ejector	JIS 10K 65A
	1500°C or less	1m/s or less	Below 1g/Nm^3		With ejector	JIS 10K 65A

Flame-proof type

Detector type: ZFKE

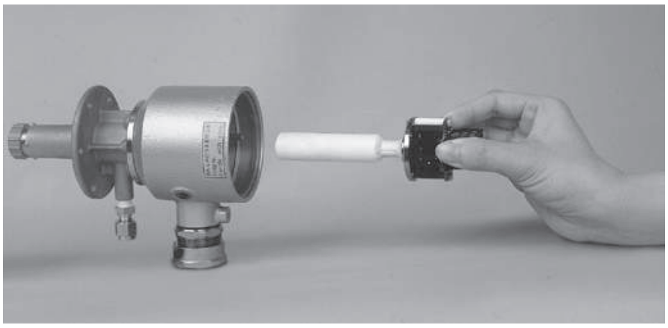
Conveter type:ZKME

FEATURES

■Modular detector design allows easy field replacement of zirconia element.
■High-speed response of 4 to 7 seconds.
■May be programmed without opening the case cover.
■Flame-proof type available for explosive atmospheres TIIS Exd IIB T6, NEPSI/Eexd IIC T6 ExII2G

SPECIFICATIONS

- Measuring object: Oxygen in combustion exhaust gas
- Measuring range: 0 to 2-----50vol% O_2 (freely settable)
- Repeatability: ±0.5%FS
- Linearity: ±2%FS
- Response time: 4 to 7seconds (from inlet for calibration gas)
- Oxygen concentration output signal: 4 to 20mA DC or 0 to 1V DC
- Contact output: 6 points (1a relay contact)
  Alarm, instrument error, under maintenance, under blow down, zero gas span for out put calibration.
- Input contact: 3 points (no voltage contact)
  Blow down, starting calibration, heater OFF, range change, external hold
- Concentration value indication: Digital indication in 4 digits
- Combustion efficiency display: Option
- Communication function RS232C or RS485 (MODBUS)
- Calibration method: Automatic, manual by key operation, input from external contact
- Power supply: 100 to 120V AC or 200 to 240V AC 50/60Hz
- Mounting method : Mounting on panel surface
- Cable length from converter part to detector: 100m, max.


Easily replaceable zirconia element

Zirconia O_2 analyzer for ZRJ, ZKJ, ZRE(Built-in type)

Type: ZFK7

OXYGEN ANALYZER

The combination table of NDIR gas analyzer and Zirconia O_2 analyzer

NDIR gas analyzer	Zirconia O_2 analyzer
ZRJ	ZFK7
ZKJ	ZFK7
ZRE	ZFK7

SPECIFICATIONS

- Measuring system: Zirconia method
- Measurement range: 0 to 25%
- Repeatability: ±0.5%FS
- Zero drift: ±1%FS/week
- Span drift: ±2%FS/week
- Response time: Within 20 seconds (From calibration gas inlet)
- Power supply: 100 to 115V AC or 200 to 240V AC, 50/60Hz
- Outer dimensions: 170(W) x 140(H) x 190(D) mm

PARAMAGNETIC OXYGEN ANALYZER

Paramagnetic oxygen analyzers maintaining quick response unaffected by combustible gases. Most suited for combustion control of heat treatment furnaces and combustion furnaces, and for chemical experiment.

Fast response type

Oxygen Analyzer
21.00

Reference gas needless type

2-second fast response ZAJ-type

Type: ZAJ

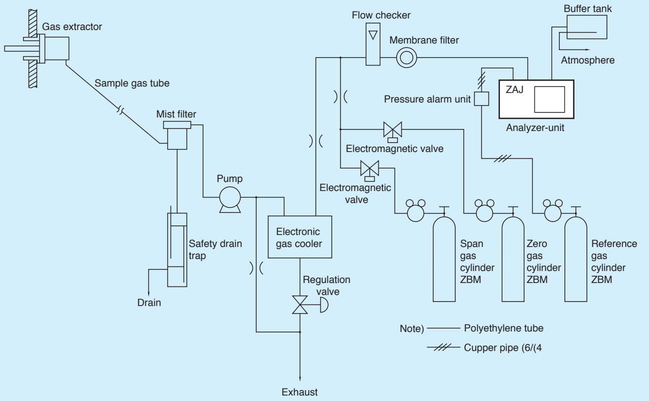
FEATURES

- ■Response as high as 2 seconds.
- ■Hardly affected by other gases (such as H_2 and CO_2).
- ■A suppression range such as 21 to 100% O_2 is settable.
- ■Gas-contacting parts are made of corrosion-resisting material
- ■Automatic calibration function and communication function can be incorporated (at option).

SPECIFICATIONS

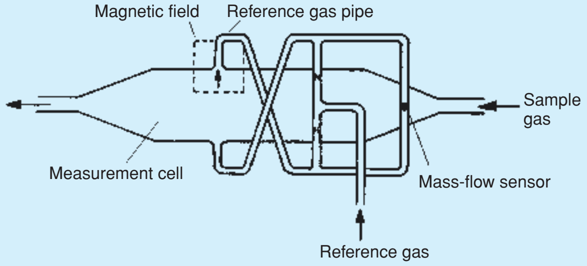
- ● Measuring principle: Paramagnetic method (Pressure detect type)
- ● Measurement range: (1) When reference gas is N_2
  0 to 2 --------100%O_2 (freely settable)
  (2) When reference gas is air
  21 to 23 -----100%O_2 or
  21to 19 ---------0%O_2 (freely settable)
  (3) When reference gas is 100%O_2
  100 to 98 -------0%O_2 (freely settable)
- ● Numbers of range: 2 ranges
- ● Repeatability: ±0.5%FS (in 10%O_2 or higher range)
- ● Linearity: ±2%FS
- ● Response time: Within 2 seconds (From sample gas inlet)
- ● Oxygen concentration output signal: 4 to 20mA DC or 0 to 1V DC
- ● Moving average time: 0 to 99.9 seconds
- ● Contact output: 2 points (1a relay contact) Calibration status, contact output of analyzer error
- ● Contact input (Option): Remote range changeover, output hold
- ● Indication: LCD display, Oxygen concentration display (4-digit),range display(4-digit), message display (24-digit, 2-line)
- ● Alarm output: Upper/lower limit alarm (Option)
- ● Communication interface: RS232 (Option)
- ● Automatic calibration method: Zero/span automatic calibration function (option)
- ● Power supply: 100 to 240V AC, 50/60 Hz
- ● Mounting method: Mounting on 19-inch rack, flush mounting on panel or desk top mounting

● ZAJ Type Gas Sampling System Diagram (Combustion exhaust gas example)


Gas extractor
Sample gas tube
Mist filter
Pump
Safety drain trap
Drain
Electronic gas cooler
Regulation valve
Exhaust
Flow checker
Membrane filter
Electromagnetic valve
Electromagnetic valve
Pressure alarm unit
ZAJ
Analyzer-unit
Buffer tank
Atmosphere
Span gas cylinder ZBM
Zero gas cylinder ZBM
Reference gas cylinder ZBM
Note)
Polyethylene tube
Cupper pipe (6/(4

● ZAJ Type Measuring Principle Diagram

When the measured gas is placed in a magnetic field, oxygen molecules will be attracted. This gives rise to a pressure, which is detected by a mass flow sensor.


Magnetic field
Reference gas pipe
Sample gas
Measurement cell
Mass-flow sensor
Reference gas

Scarcely affected by interference gasses

ZAJ type case (Deviation of zero point caused by flowing interference gas component at 100%)

Interference gas	Deviation in O_2%
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

Reference gas needless ZKG-type

Type: ZKG

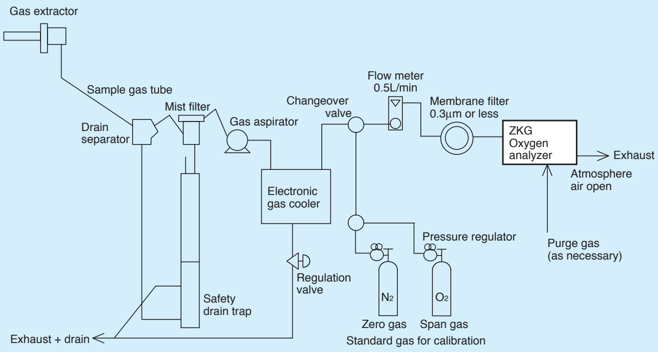
FEATURES

- Response as high as 15 seconds.
- Hardly affected by other gases (such as H_2 and CO_2).
- The front area measuring 220 x 443 mm is mounted flush with a panel.

SPECIFICATIONS

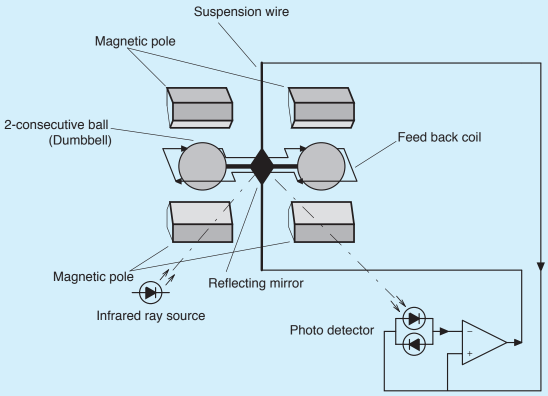
- Measuring principle: Paramagnetic method (Dumbbell type)
- Measurement range: 0 to 10,25,50,100%O_2 (as specified)
- Numbers of range: 1 or 2 ranges (as specified)
- Repeatability: ±0.5%FS
- Linearity: ±1.0%FS
- Zero drift: ±2.0%FS/week
- Span drift: ±2.0%FS/week
- Response time: Within 15 seconds (From calibration gas inlet)
- Oxygen concentration output signal: 4 to 20mA DC or 0 to 1V DC
- Indication: 4-digit LED (Oxygen concentration indication) in red
- Power supply: 100 to 240V AC, 50/60 Hz
- Mounting method: Mounted flush on panel
- Outer dimensions: 190(W) x 240(H) x 234(D) mm

● ZKG type Gas Sampling System Diagram (Boiler exhaust gas example)


Gas extractor
Sample gas tube
Drain separator
Mist filter
Gas aspirator
Changeover valve
Flow meter 0.5L/min
Membrane filter 0.3μm or less
ZKG Oxygen analyzer
Exhaust
Atmosphere air open
Electronic gas cooler
Pressure regulator
Purge gas (as necessary)
Regulation valve
Safety drain trap
N2
O2
Zero gas
Span gas
Standard gas for calibration
Exhaust + drain

● ZKG type Measuring Principle Diagram

There are two glass spheres in the cell.
When oxygen molecules flow there, they will be attracted toward the stronger magnetic field to cause a positional change of the spheres.
The displacement of the spheres is detected with a light receiving element.


Suspension wire
Magnetic pole
2-consecutive ball (Dumbbell)
Feed back coil
Magnetic pole
Reflecting mirror
Infrared ray source
Photo detector

Hardly affected by interference gasses

ZKG type case

Interference gas	Interference gas concentration	Deviation in O_2%
NO	2000ppm	+0.15
CO	100%	+0.1
CO_2	100%	−0.35
CH_4	100%	−0.25

CO_2 CONTROLLER

Protected Horticulture

For growing sweet melon and strawberry in greenhouse.

Storage of Fresh Produce

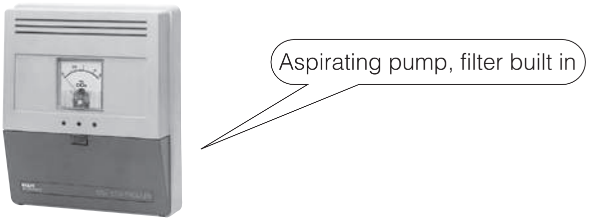
To create optimum environment for storage of fruit and vegetables.

Building Air-conditioning

For control of room ventilation in a building and save energy due to cooling and heating.

INFRARED CO_2 CONTROLLER with pomp built-in

Type: ZFP



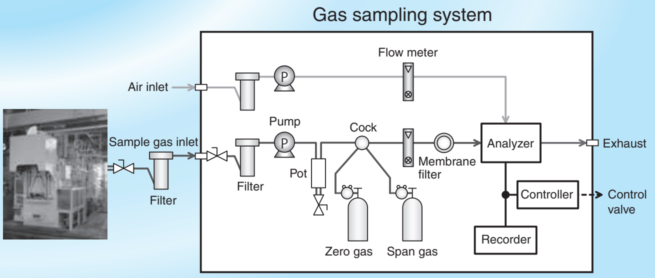
FEATURES

- With built-in suction pump and filter.
- Two 1c (SPDT) relay contacts incorporated.
- Analog output signal incorporated.

SPECIFICATIONS

- Measuring object: CO_2 concentration in air
- Measuring system: Single beam type infrared method
- Measurement range: 0 to 0.2 ---- 20%
- Repeatability: ±1.0% of full scale
- Zero drift: ±10% of full scale/6 months
- Response speed: Within 10 seconds (90% response)
- Concentration output signal: 4 to 20mA DC or 0 to 100mV DC
- Alarm output: Relay contact (2x1c) Upper limit, lower limit
- Indicator: Moving coil type, JIS 2.5 class
- Gas sampling: Aspirating pump, filter built in
- Power supply: 100V, 115V, 200V, or 220V AC, 50/60Hz
- Sample gas temperature: 0 to 50 C
- Outer dimensions: 220(W) x 257(H) x 85(D) mm
- Mass (Weight): Approx. 3kg

Gas analyzer for heat treatment furnaces



Gas analyzer for heat treatment furnaces

Type: ZFG

FEATURES

- Gas concentration in the furnace can be measured accurately. Repeatability: Within ±0.5% of full scale
- Due to use of single beam system for measurement, an excellent stability is ensured for a long period of time and maintenance is easy.
- The analyzer is capable of measuring gas concentrations of CO_2, CO and CH_4 components correlated to CP (carbon potential).
- CP calculation value can be displayed (option).
- The gas concentrations of 2 components of CO_2 + CO, CH_4 + CO, CO_2 + CH_4 can be measured simultaneously and continuously.

SPECIFICATIONS

- Measurable components: CO_2, CO, CH_4
- Measuring system: Single beam type infrared method
- Measurement range: CO_2: 0 to 0.5 ·····100%
  CO : 0 to 0.5······100%
  CH_4: 0 to 1···········10%
- Numbers of range: Max. 2 ranges
- Measurable components:Max. 2 components
- Repeatability: ±0.5% FS
- Drift:Within ±2.0% of full scale/week
- Response time:Less than 10 seconds (90% response from the device inlet)
- Output signal: 4 to 20mA DC or 0 to 100mV, 10mV DC
- Contact output: Instrument error, range identification signal
- Contact input:Remote range changeover, remote hold input
- Functions: CP calculation, output signal holding, Automatic OFF, etc
- Indication: LCD with back light
- Outer dimensions: 218(W) x 211(H) x 257(D) mm
- Power-supply voltage: 100 to 240V AC, 50/60Hz

Recorder (Option)

Paperless Recorder

Type: PHF

◇ SPECIFICATIONS

- Recording method: Built-in memory card
- Data format: ASCII (Data can be read directly into Excel), Binary (Data cannot be read directly into Excel)
- Storage capacity: 512MB, max. (Stores 3years data).
- Input points: 3 or 6 points
- Display contents: Trend, bar graph, digital, historical trend, event summary, etc.
- Alarm indication: Upper/lower limit alarm indication (alarm output is option)
- Input signal: Thermocouples, resistance bulbs, voltage/current
- Indication accuracy: ±(0.15%+1 digit) of input range
- Power supply: 100 to 240V AC
- Outer dimensions: 160(W) x 144(H) x 185(D) mm
- Others: Standard-supplied PC support software

Thermal Conductivity Gas Analyzer

Type: ZAF

FEATURES

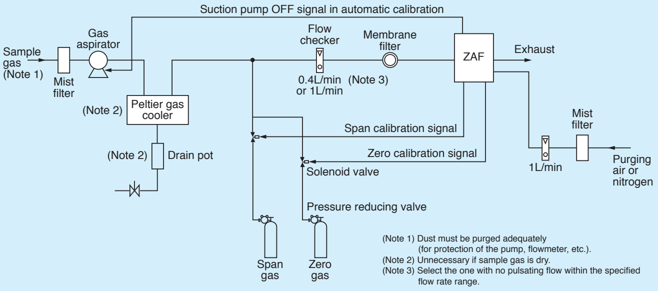
- ■Easy-to-see large LCD is helpful for efficient operation.
- ■Measured value output signals are linearizable (at option).
- ■Line voltage lies within 100 V to 240 VAC, 50/60 Hz.
- ■Zero point and span can be automatically calibrated (at option).
- ■Other gases interference is correctable (at option).
- ■Commuticable with other system through an RS-232C interface (MODBUS™)(at option).

SPECIFICATIONS

- ● Measuring principle: Meaturement of thermal conductivity
- ● Measurement component: He, Ar, H_2, CH_4, CO_2
- ● Measurement range: Refer to Table 1
- ● Repeatability: ±1%FS
- ● Drift: Within ±2% of full scale/week
- ● Response time(90% response) : High speed type within 10 sec
  Standard type within 60 sec
- ● Output signal: 4 to 20mA DC or 0 to 1V DC, 0 to 10 mV DC
- ● Display unit: LCD with backlight
- ● Mounting: Flush mounting on panel
- ● Power supply: 100 to 240V AC, 50/60 Hz
- ● Optional specifications:
  - Linearization
  - Relay contact output
  - Contact input
  - Interference gas meatured value input
  - Automatic calibration function
  - Communicating function

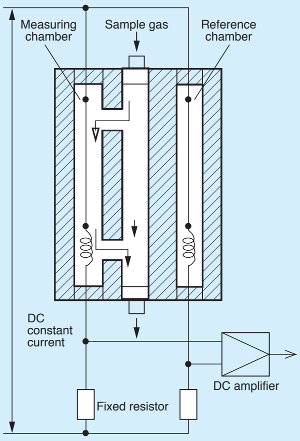
● Gas sampling system diagram (example)

Example of gas measurement in industrial furnace sintering furnace, etc.


Suction pump OFF signal in automatic calibration
Sample gas (Note 1)
Mist filter
Gas aspirator
Flow checker
Membrane filter
ZAF
Exhaust
0.4L/min or 1L/min
(Note 3)
(Note 2)
Peltier gas cooler
(Note 2)
Drain pot
Span calibration signal
Zero calibration signal
Solenoid valve
Mist filter
1L/min
Purging air or nitrogen
Pressure reducing valve
Span gas
Zero gas

(Note 1) Dust must be purged adequately (for protection of the pump, flowmeter, etc.).
(Note 2) Unnecessary if sample gas is dry.
(Note 3) Select the one with no pulsating flow within the specified flow rate range.

● Measuring principle


Measuring chamber
Sample gas
Reference chamber
DC constant current
DC amplifier
Fixed resistor

This thermal conductivity gas analyzer measures gas concentration by utilizing the different thermal conductivities of 2 gas components. In the detector, there are reference and measuring chambers in each of which a thin platinum wire is stretched. The reference chamber is filled with reference gas and through the measuring chamber, sample gas is flowed. Each platinum wire composes a bridge circuit in combination with an external fixed resistor, and it is heated by flowing a constant current. When there is a change in the concentration of the component under measurement, the thermal conductivity of sample gas will change to affect the temperature of the platinum wire in the measuring chamber. The resulting thermal change is taken out as a change in electric resistance, according to which the concentration of measured gas is calculated.

Thermal Conductivity Ratio of Gases

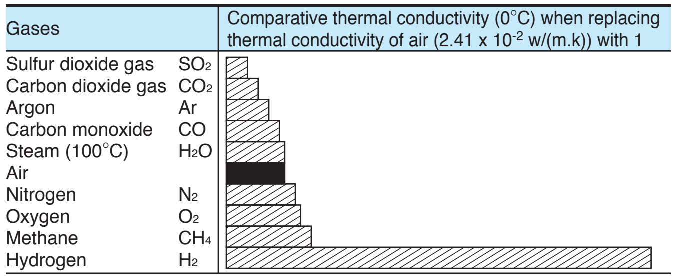


Table 1: Measurable Component and Measureble Range

Measured gas	Reference gas component (Note 1)	Measurable range	Range ratio (Note 2)
H_2	N_2, (CO_2, Ar, He)	0 to 3, 5, 10, 20, 50, 80, 100% 100 to 90, 100 to 80%	1 : 10
He	N_2, (CO_2, Ar) O_2, Air	0 to 5, 10, 20, 30, 40, 50, 80, 100% 100 to 90, 100 to 80%	1 : 10
Ar	N_2, O_2, Air, (He)	0 to 10, 20, 50, 80, 100% 100 to 90, 100 to 80%	1 : 5
CH_4	N_2, (CO_2, Ar, He)	0 to 20, 40, 50, 60, 80, 100% 100 to 80%	1 : 5
CO_2	N_2, O_2, Air, (He)	0 to 10, 20, 50, 100% 100 to 90, 80%	1 : 5

(Note 1) The parenthesized gases require inquiry.
(Note 2) Range ratio stands for maximum value.

Other gases' interference

Indication error of each measured value (vol%)

Interference component	He meter	CH_4 meter	Ar meter	CO_2 meter
H_2 1%	–	+5.8	−6.5	−8.0
CH_4 1%	+0.17	–	−1.15	−1.38
SO_2 1%	−0.31	−1.8	+2.1	+2.5
Ar 1%	−0.15	−0.87	–	+1.2
CO_2 1%	−0.125	−0.725	+0.83	–
O_2 1%	+0.019	+0.11	−0.125	−0.15
H_2O 1.5°C saturation	–	–	–	−0.56

AUTOMOBILE EXHAUST GAS ANALYZER

Type: ZKE

CO 020
HC 4
CO2 000

◇ SPECIFICATIONS

- ● Measuring components: HC, CO, CO_2, O_2
- ● Measurement range:
  - HC: 0 to 10000ppm
  - CO: 0 to 10%
  - CO_2: 0 to 20%
  - O_2: 0 to 25%
- ● Measuring method: Infrared ray system
  O_2: Galvanic sensor
- ● Certification number: JATA-CO, HC-5
- ● Communication interface: RS232C
- ● Indication: LCD with back light
- ● Power supply: 90 to 264V AC
- ● Outer dimensions: 270(W) x 156(H) x 365(D) mm
- ● Mass (Weight): Approx. 5kg

Basic Principle = NDIR

*NDIR: Non Dispersive Infrared Ray structure <Double beam type>

Certain gas absorbs certain range of infrared ray

It makes internal pressure in the left detector higher than one in the right detector.

By blocking the ray, the pressure in both detectors is equalized.

The changing volume of absorbing infrared ray is detected.

● Infrared single light source

There is less fluctuations of indication caused by the time lapsed of light source due to single source and dual beam method.

Single Light Source Provides

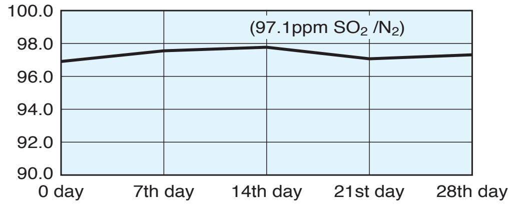
- Long Term Stability: ±0.5% to 2% FS/week

against dual light source.

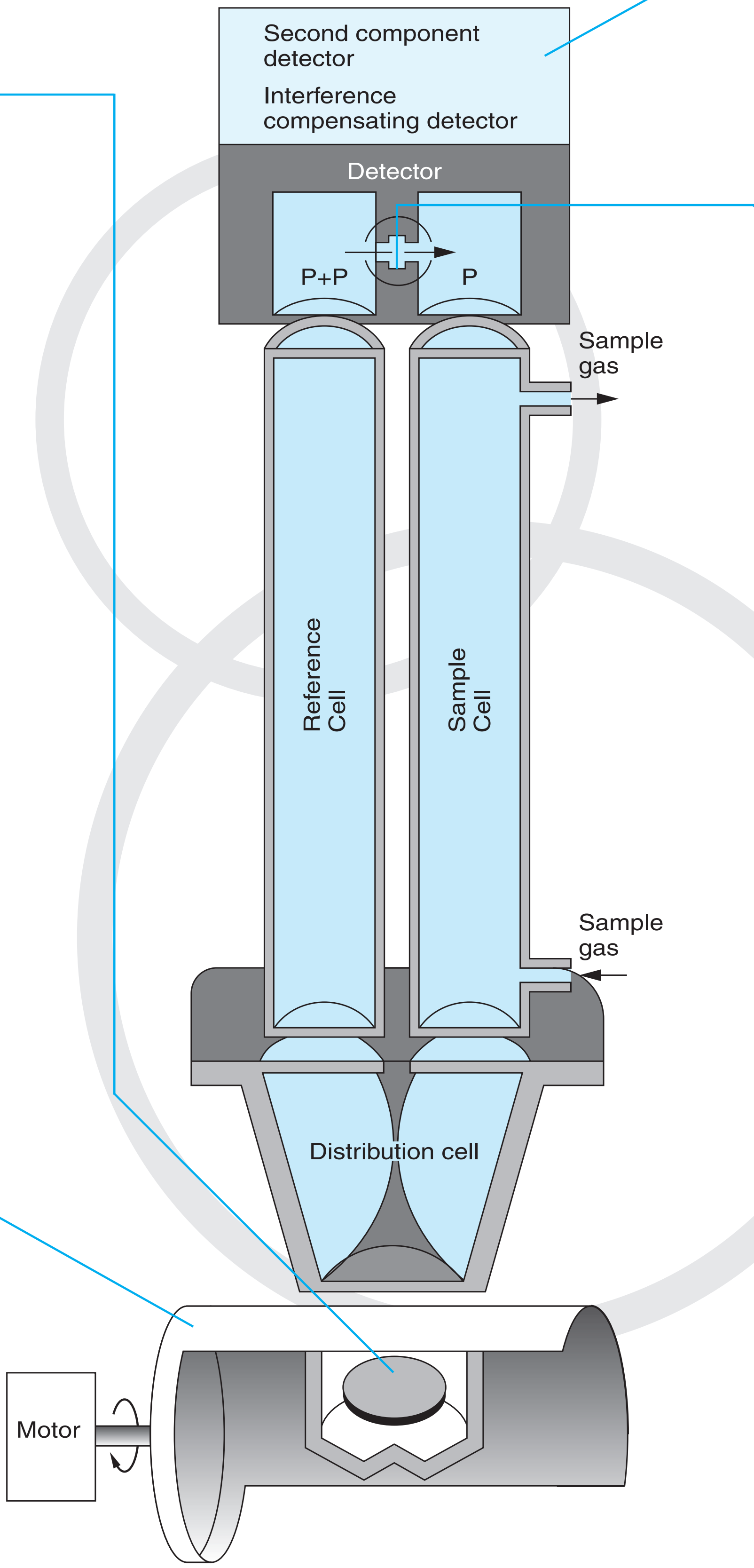
→Both sources cannot be exactly same

→It creates error in measurement

Our test data of span drift for 28 days: Less than 1%FS



● Drum type sector


Second component detector
Interference compensating detector
Detector
P+P
P
Sample gas
Reference Cell
Sample Cell
Sample gas
Distribution cell
Motor

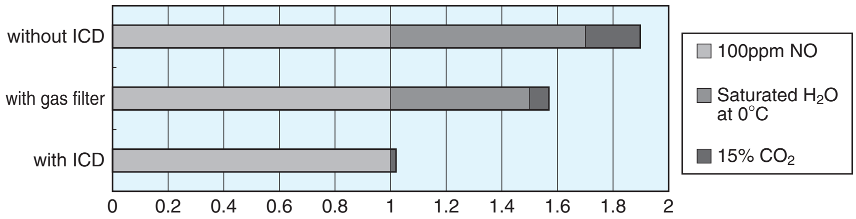
Interference Compensating Detector Eliminates

- Interference of Moisture

Cross sensitivity to moisture: Less than 2 ppm at 2 C of satulated H_2O

→Twin detector (Main detector + IC Detector) realizes excellent compensation.

Interference of moisture & CO_2 for NO measurement



Mass-flow sensor

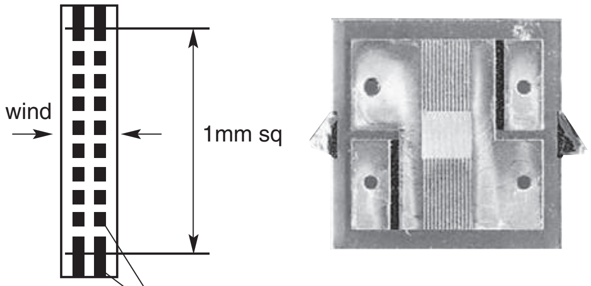
Basic Principle

Resistance measurement (Detecting Temp. change by Pressure change)

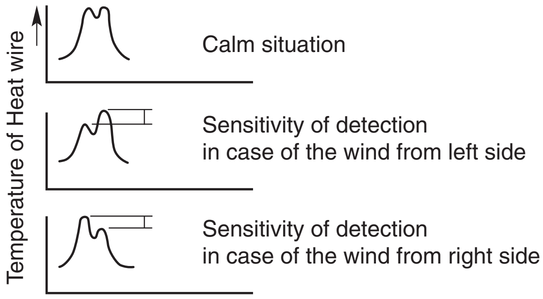
- No moving parts
- Great Noise proof due to low impedance sensor
- High sensitive sensor introduces good linearity
- Impure gas in detector which causes interference can be removed by making full vacuum condition.

Mass Flow Sensor Offers

1) Excellent Linearity: ±1%FS
2) High Rangeability : 20 to 1 against condensor microphone (10 to 1)
3) Less Effect by Vibration No moving mechanical parts

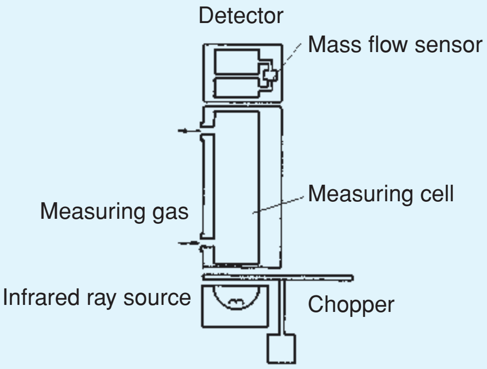


Detecting element of wind velocity of heat wire.



High sensitive / High stability / High vibration proof.
Super compact / Non-moving part

Single beam infrared analyzer (ZRE, ZRJ, ZFP)

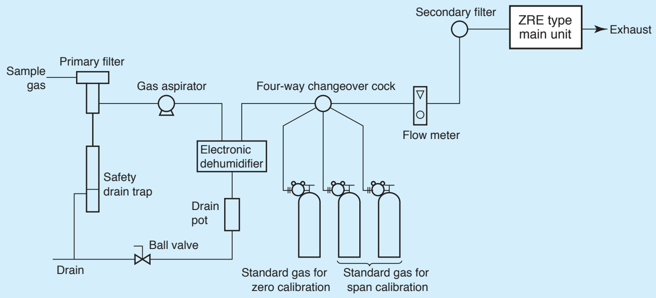


The dose of infrared-rays absorbed by measuring cell is detected with mass flow sensor.

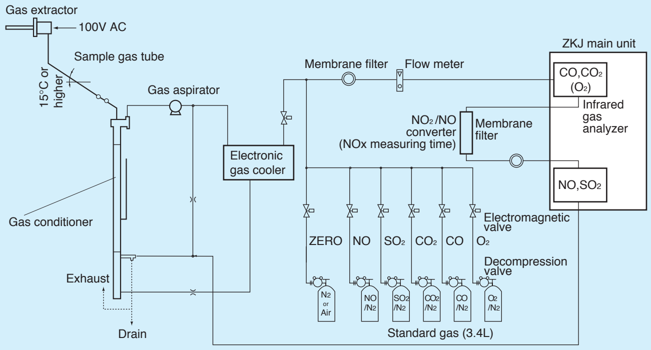
Gas Sampling System Diagram (Examples)

System components can be coordinated so as to match your application by utilizing rich experience.

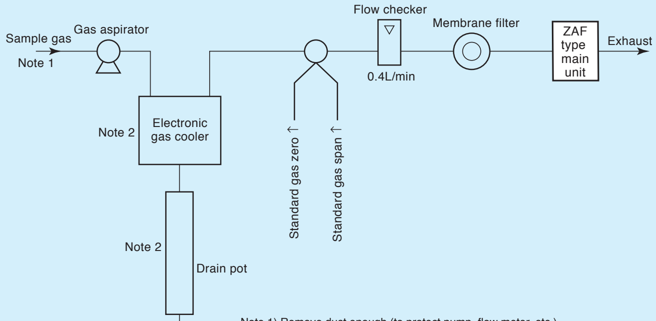
● ZRE Type (Gas measurement example of industrial furnaces, CA storage, etc.)


Secondary filter
ZRE type main unit
Exhaust
Primary filter
Sample gas
Gas aspirator
Four-way changeover cock
Flow meter
Electronic dehumidifier
Safety drain trap
Drain pot
Ball valve
Drain
Standard gas for zero calibration
Standard gas for span calibration

● ZKJ Type (5-component gas measurement example of industrial furnaces, CA storage, etc.)

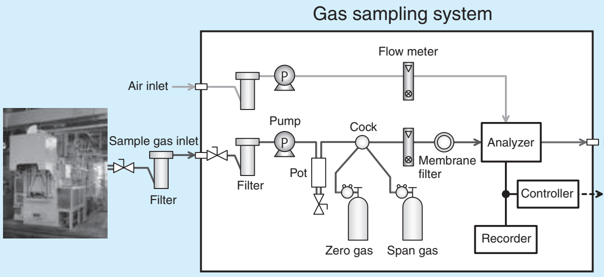

Gas extractor
100V AC
Sample gas tube
15°C or higher
Gas aspirator
Membrane filter
Flow meter
ZKJ main unit
CO,CO2 (O2)
Infrared gas analyzer
NO2 /NO converter (NOx measuring time)
Membrane filter
Electronic gas cooler
NO,SO2
Gas conditioner
Electromagnetic valve
ZERO
NO
SO2
CO2
CO
O2
Decompression valve
Exhaust
N2 or Air
NO /N2
SO2 /N2
CO2 /N2
CO /N2
O2 /N2
Drain
Standard gas (3.4L)

● ZAF Type (Gas measurement example of industrial furnaces, sintering furnace, etc.)


Flow checker
Membrane filter
Sample gas
Gas aspirator
Note 1
ZAF type main unit
Exhaust
0.4L/min
Note 2
Electronic gas cooler
Standard gas zero
Standard gas span
Note 2
Drain pot

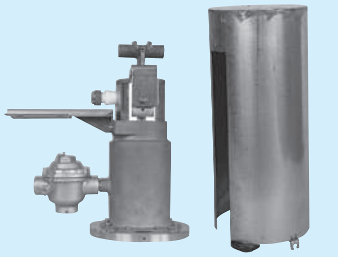
Note 1) Remove dust enough (to protect pump, flow meter, etc.)
Note 2) Unnecessary when sample gas is dry.

● ZFG Type (Heat treatment furnaces)

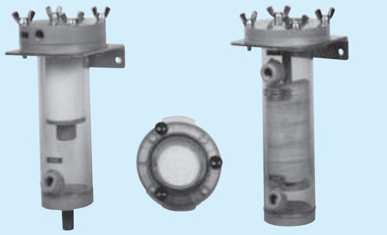

Gas sampling system
Flow meter
Air inlet
Pump
Cock
Sample gas inlet
Analyzer
Exhaust
Membrane filter
Pot
Filter
Filter
Controller
Control valve
Recorder
Zero gas
Span gas

Gas Sampling System Instrument

● Gas extractor (model: ZBA)

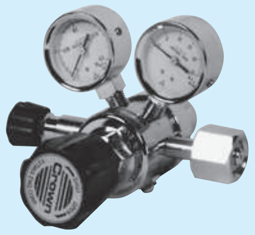


● Gas Filter, Gas washing separator and washing nozzle (model: ZBB)



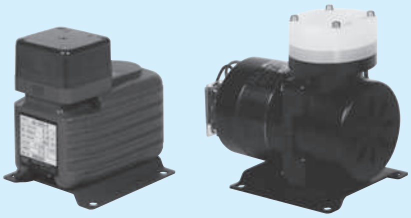
● Peltier gas cooler (model: ZBC) Gas dryer (model: ZBJ)

● Flow meter and regulator (model: ZBD)



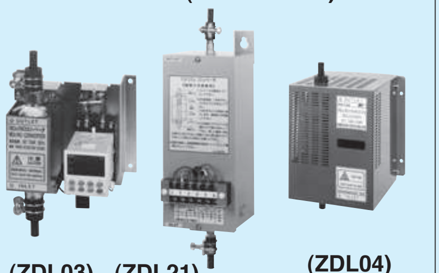
● Ball valves and selector valves (model: ZBF)

● Gas aspirator (model: ZBG)



● Drainings & other (model: ZBH)

● Gas converter (model: ZDL)



(ZDL03) (ZDL21) (ZDL04)

● Standard gas (model: ZBM)

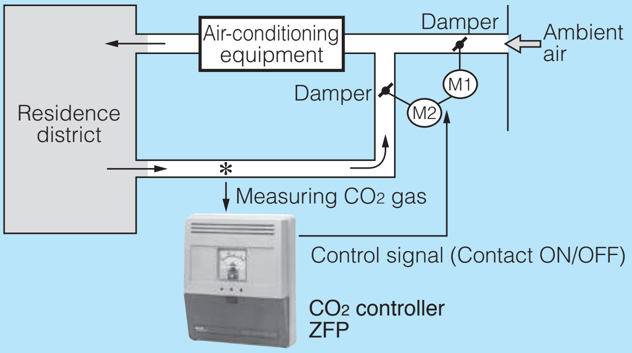
Applications of Analyzer

	Application	Measured gas	Model
Air pollution	Incinerator	SO_2, NO_x, CO, CO_2, O_2	ZSQ, ZSU
	Desulfurization and denitration of exhaust gas	SO_2, NO_x, O_2, NH_3	ZSU, ZSS
	General combustion furnaces (including boilers)	SO_2, NO_x, O_2, $HC\ell$	ZSU, ZSS
	Diesel generation	SO_2, NO_x, O_2	ZSU, ZSV
	Automobile exhaust gas	CO, HC, CO_2, O_2	ZKE
Biochemistry (microbes)	For fermentation	methanol, CO_2	ZRJ, ZSV, ZRE
	Incubator	CO_2, O_2	ZFP, ZKM, ZRJ, ZSV, ZRE
Ultra-low temperature	Superconduction device	He	ZAF
Storage and maturation of fruits		CO_2, O_2	ZFP, ZRJ, ZRE
Gas separation		O_2, Ar, He, CO	ZAJ, ZAF, ZRJ, ZRE
Iron and steel	Blast furnace	CO, CO_2, H_2, O_2	ZAF, ZAJ, ZRJ, ZRE, ZKM
	Converter funacer	CO, CO_2, H_2, O_2	ZAF, ZAJ, ZRJ, ZRE, ZKM
	Heat treatment furnace	CO, CO_2, O_2	ZKM, ZRJ, ZRE
	Sintering (pellet equipment)	CO, CO_2, O_2	ZRJ, ZAJ, ZRE
	Coke oven (CDQ)	CO, CO_2, H_2, O_2	ZAF, ZRJ, ZRE
Saving energy	Boiler, Heat treatment funacer	O_2, CO_2, CO	ZKM, ZSB, ZRE ZRJ, ZSQ, ZSU, ZSV
Hazard prevention	Detection of explosive gas (hydrocarbon gas and others)	HC	ZRJ
	Analysis of gases produced through combustion of new building materials	CO, CO_2, HC, O_2	ZRJ, ZRE
	Marine inert gas analysis	CO_2, O_2	ZRJ, ZRE, ZKM
Ceramic industry	Tunnel kiln	CO, O_2	ZRJ, ZAJ, ZRE, ZSV
	Cement	CO, CO_2, O_2	ZRJ, ZAJ, ZRE, ZKG
Water and Sewerage water	Sewerage incinerator	SO_2, NO_x, CO, O_2	ZSU
Thermal treatment	Generating furnace	CO_2	ZRJ, ZRE, ZSV
	Carburization furnace	CO_2,CO, O_2	ZRJ, ZRE, ZSV
	Annealing furnace	CO_2,CO, O_2	ZRJ, ZRE, ZSV
	Nitration furnace	NH_3	ZSS
Agriculture	Green house	CO_2	ZFP, ZSV
	Reserch of photo synthesis	CO_2	ZFP, ZRJ, ZRE, ZSV
Chemistry	Oil refining plant	CO, CO_2, CH_4	ZRJ, ZRE
	Petrochemical plant	CO, CO_2, CH_4	ZRJ, ZRE
	Gas production plant	CO, H_2, He, Ar, O_2, CO_2	ZAF, ZRJ, ZRE
Electronics	Solder furnace	O_2	ZKM
Environmental safeguard	Concentration in tunnel	CO	ZSA
	Parking area	CO, CO_2	ZSA, ZFP
	Building management Building ventilation system	CO_2	ZFP
Various scientific experiments	Laboratory	Various gases	ZFP, ZAJ, ZRJ, ZSV, ZRE
Fuel cell	Gas generation for fuel cell	H_2, CH_4, CO, CO_2	ZRJ, ZAF, ZRE
Bio mass energy		CO, CO_2, CH_4, H_2, O_2	ZRJ, ZAF, ZSV, ZRE

Examples of Application

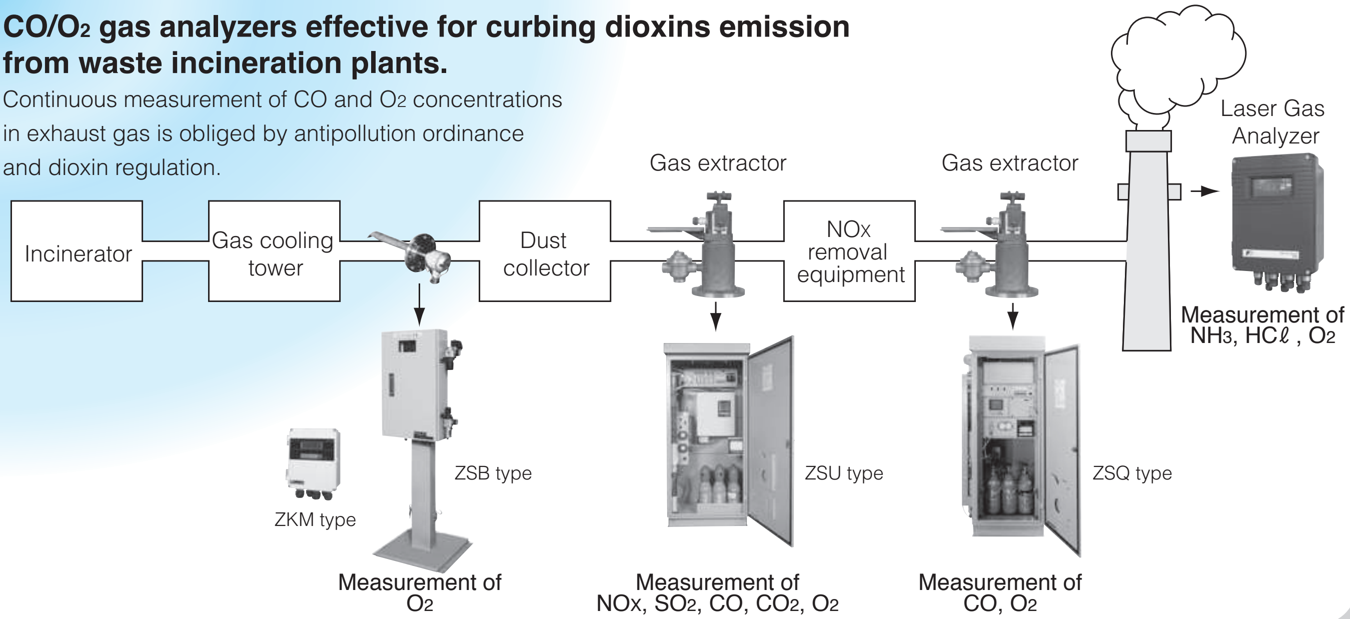
Most recommended for energy saving in air-conditioning of buildings is a CO_2 controller !

The CO_2 gas concentration in a room is required to be within 1,000 ppm by law in Japan. To meet this, the fresh outdoor air is always taken in. Control of the air intake at an appropriate level will save energy to run the air-conditioner for cooling and heating.


Residence district
Air-conditioning equipment
Damper
Ambient air
Damper
M1
M2
*
Measuring CO_2 gas
Control signal (Contact ON/OFF)
CO_2 controller ZFP

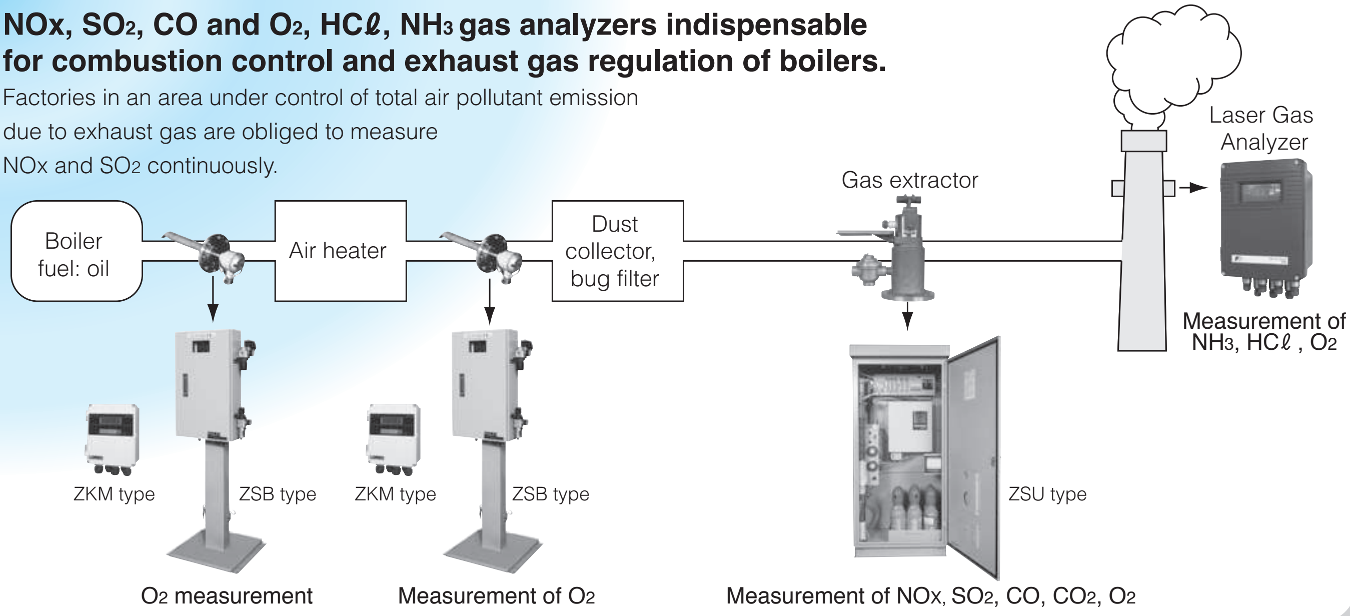
CO/O_2 gas analyzers effective for curbing dioxins emission from waste incineration plants.

Continuous measurement of CO and O_2 concentrations in exhaust gas is obliged by antipollution ordinance and dioxin regulation.


Incinerator
Gas cooling tower
Dust collector
Gas extractor
NOx removal equipment
Gas extractor
Laser Gas Analyzer
Measurement of NH_3, HCℓ , O_2
ZKM type
ZSB type
Measurement of O_2
ZSU type
Measurement of NO_X, SO_2, CO, CO_2, O_2
ZSQ type
Measurement of CO, O_2

NOx, SO_2, CO and O_2, HCℓ, NH_3 gas analyzers indispensable for combustion control and exhaust gas regulation of boilers.

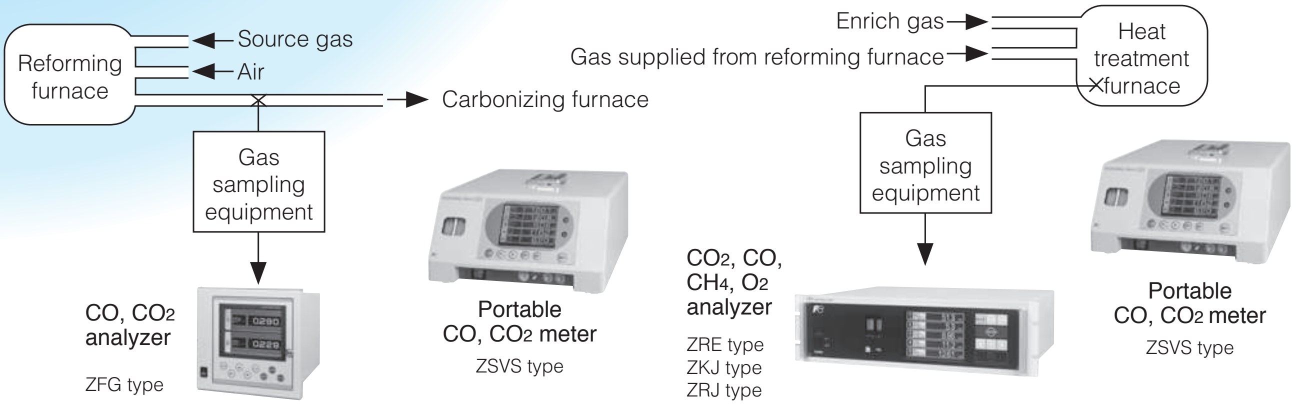
Factories in an area under control of total air pollutant emission due to exhaust gas are obliged to measure NOx and SO_2 continuously.


Boiler fuel: oil
Air heater
Dust collector, bug filter
Gas extractor
Laser Gas Analyzer
Measurement of NH_3, HCℓ , O_2
ZKM type
ZSB type
ZKM type
ZSB type
ZSU type
O_2 measurement
Measurement of O_2
Measurement of NO_X, SO_2, CO, CO_2, O_2

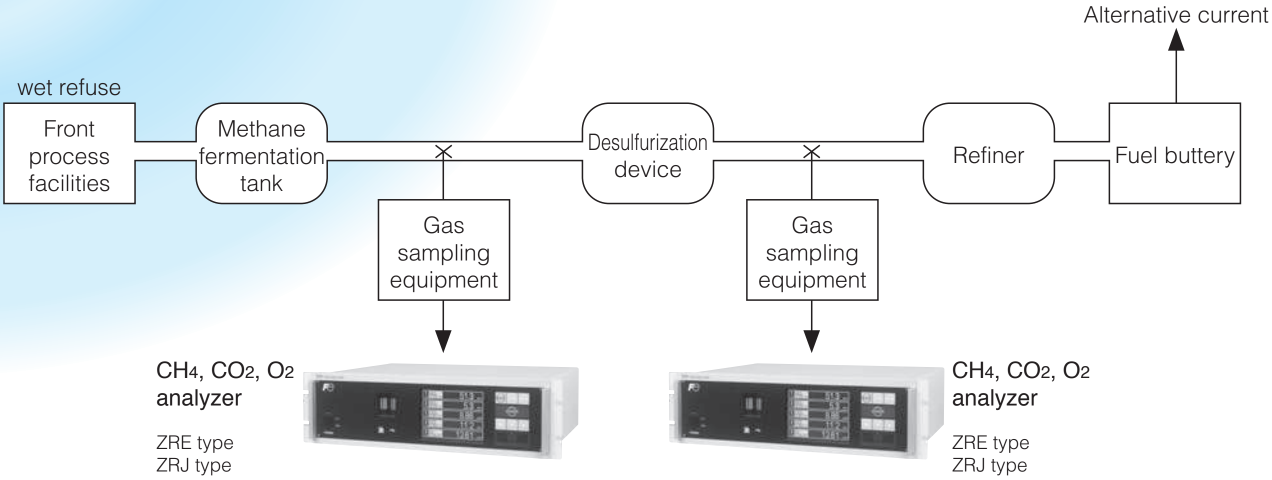
Infrared CO_2 gas analyzers essential for measuring CO_2 and O_2 of heat treatment and reforming furnaces.

Propane and butane gases are brought into contact with a hot catalyzer to generate the gases to be supplied into a carburizing furnace.
These gas analyzers measure each concentration of CO_2 and O_2 gases to be supplied into a carburizing furnace.

In iron treatment in a carburizing furnace, the CO_2 concentration of the in-furnace atmosphere is an index of furnace work.

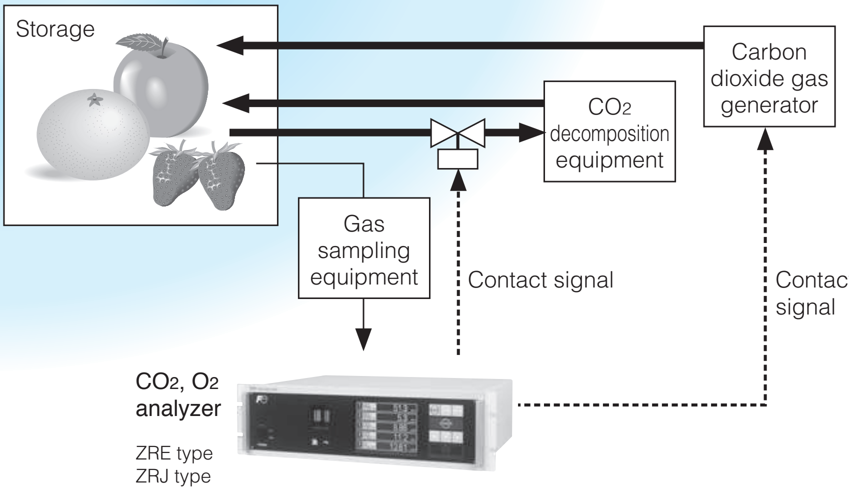

Reforming furnace
Source gas
Air
Carbonizing furnace
Gas sampling equipment
CO, CO2 analyzer
ZFG type
Portable CO, CO2 meter
ZSVS type
Enrich gas
Gas supplied from reforming furnace
Heat treatment furnace
Gas sampling equipment
CO2, CO, CH4, O2 analyzer
ZRE type
ZKJ type
ZRJ type
Portable CO, CO2 meter
ZSVS type

Infrared CH_4, CO_2 and O_2 gas analyzers optimum for bio-gas measurement.

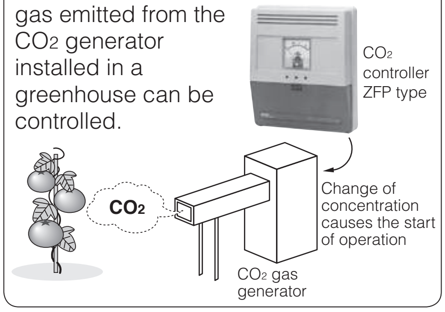

Alternative current
wet refuse
Front process facilities
Methane fermentation tank
Desulfurization device
Refiner
Fuel buttery
Gas sampling equipment
Gas sampling equipment
CH4, CO2, O2 analyzer
ZRE type
ZRJ type
CH4, CO2, O2 analyzer
ZRE type
ZRJ type

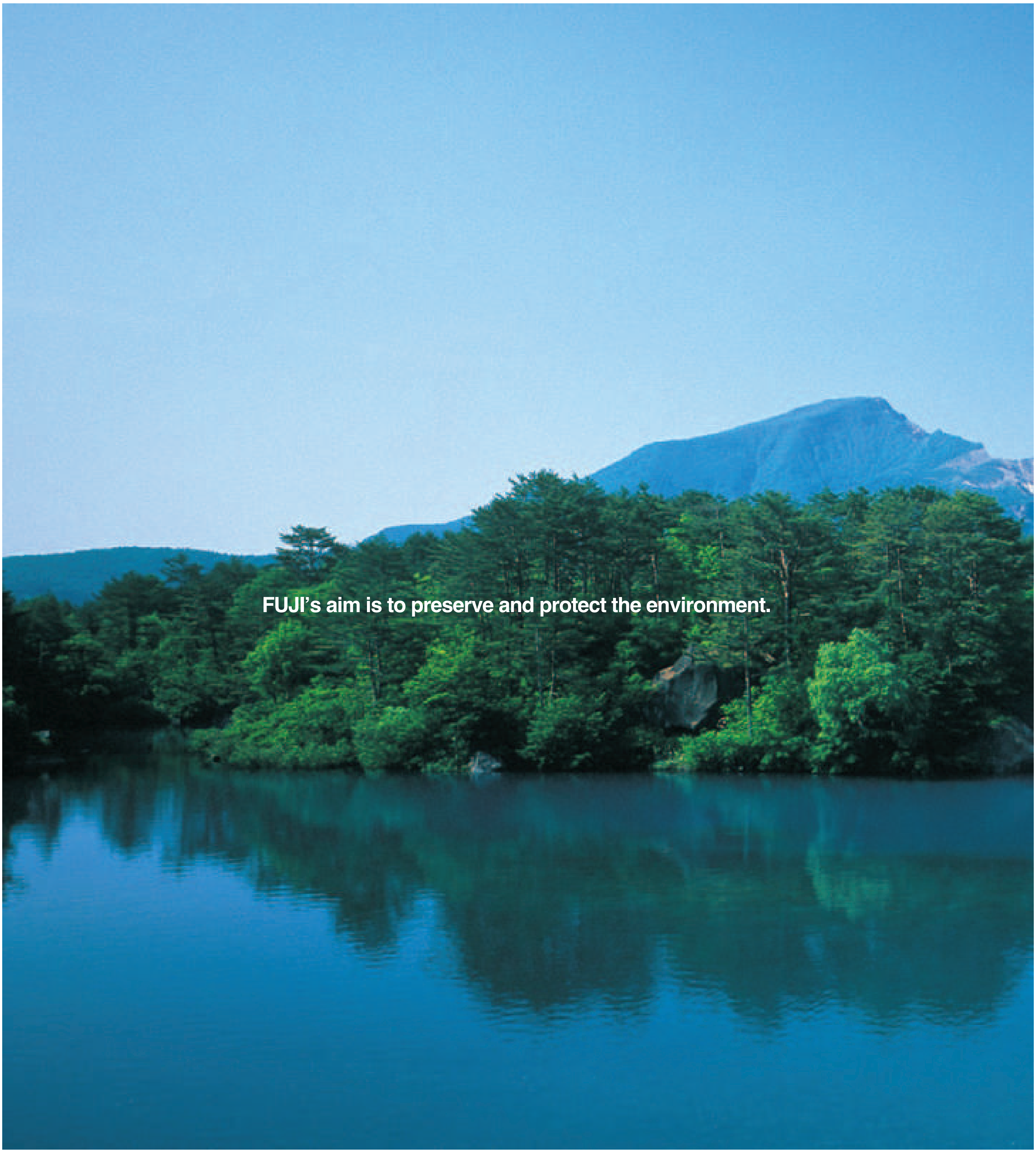
Infrared CO_2 and O_2 gas analyzer for storage of foodstuffs such as vegetable and fruit.

Foodstuffs can be kept fresh by controlling the CO_2 and O_2 concentrations properly in a storage house.


Storage
Carbon dioxide gas generator
CO2 decomposition equipment
Gas sampling equipment
Contact signal
Contact signal
CO2, O2 analyzer
ZRE type
ZRJ type

For growing vegetables, etc. steadily in a greenhouse, the internal CO_2 concentration needs to be kept constant. Because this controller incorporates a CO_2 sensor and control function, the concentration of CO_2 gas emitted from the CO_2 generator installed in a greenhouse can be controlled.


CO2 controller ZFP type
Change of concentration causes the start of operation
CO2
CO2 gas generator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