Fuji Electric

Innovating Energy Technology

advancetech
KEEPS YOU AHEAD

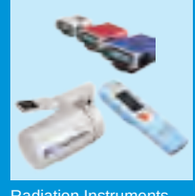
Measuring Instruments Line-Up

Providing the best measurement system solution


Electronic Transmitters


Ultrasonic Flowmeters


Gas Analyzers


Radiation Instruments


Recorders


Temperature Controllers

FEI/INST/006/R4

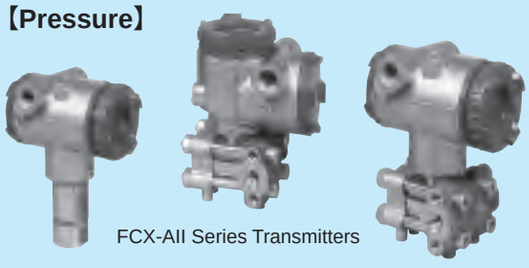
Rely on Fuji Electric,
because we know all about measurement.

INDEX

Product Panorama

Sensors

【Pressure】



FCX-AII Series Transmitters

【Differential Pressure/Flow Rate】

FCX-AII Series Transmitters

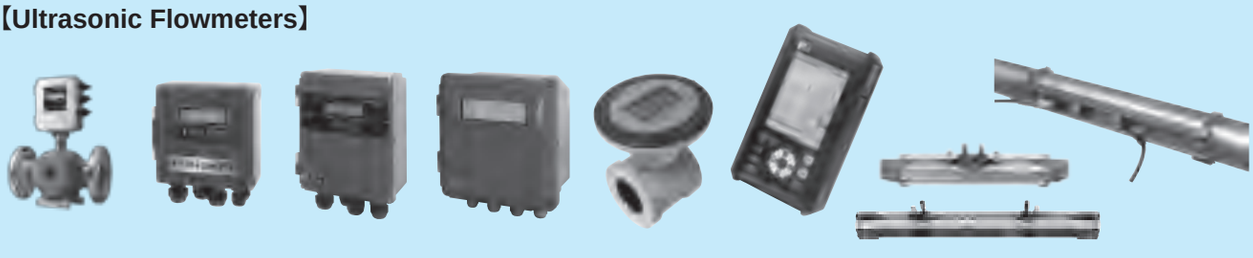
【Water Level】

Water Level Transmitter

【Liquid Level】

FCX-AII Series Transmitters

【Ultrasonic Flowmeters】



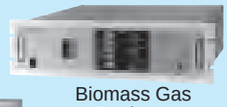
Environmental Instruments

【Gas Analyzer Systems】

Infrared Gas Analyzer System

【NDIR Gas Analyzers】

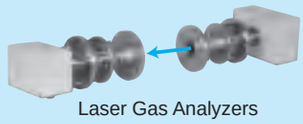
Compact NDIR Gas Analyzer



Biomass Gas Analyzer

Hydrogen Gas Analyzer

Double Beam NDIR Gas Analyzer



Laser Gas Analyzers

Single Beam NDIR Gas Analyzer

Control System

【Temperature Controllers and Recorders】


PXF9


PXF5


PXF4


PXR4 Socket type


PXH9


PUM
Module Type


RPDA


PXR3


PXE4


Paperless Recorders

PHU


PHL


PHF

Strip Chart Recorder


PHC


PHA

【Programmable display】

【PLC, DCS】


MICREX-SPF


MICREX-SX


MICREX-View XX

Environmental Instruments

【Gas Analyzers】


CO2 CO CH4 – CP
Gas Analyzer


CO_2 Controller


Ex-Proof Type


Compact Type Paramagnetic
Gas Analyzer


Biomass Gas Analyzers


Compact type Infrared Gas Analyzer



Zirconia Oxygen Analyzers

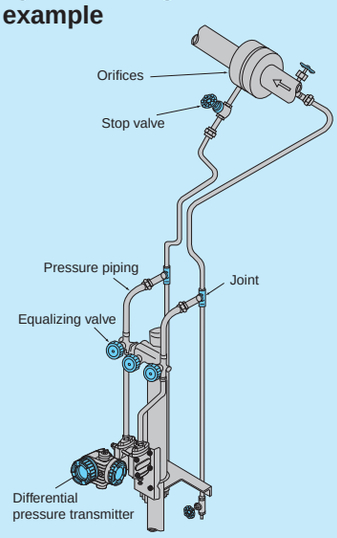

Paramagnetic Oxygen Analyzers


Thermal Conductivity
Gas Analyzers

Electronic Transmitters

For highly precise and accurate measurement of flow, level, differential and other pressures

System configuration example



Fuji Electric has long delivered Electronic Transmitters, incorporating the micro-capacitance silicon sensor, to our customers worldwide.
The FCX-AII series Transmitters feature compact dsign, high accuracy and performance, long-term stability. They also offer wide measuring range and provide a variety of diaphragm materials.

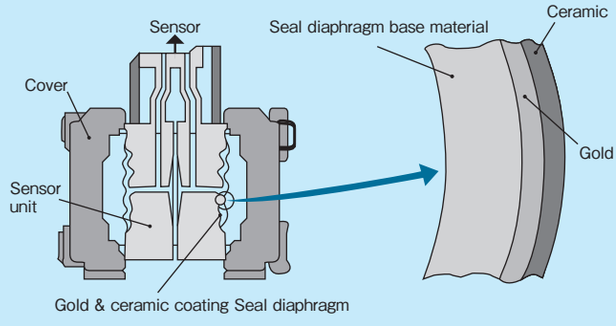
■ Common features

Accuracy rating	Up to ± 0.065% (standard) / ±0.04% (option)
Stability	±0.1% for 10 years
Output signal (2-wire)	4 to 20mA DC (HART and Fuji protocol supported)
Power supply voltage	10.5 to 45V DC
Update rate	60 ms or less
Enclosure structure	JIS C 0920 Waterproof (equivalent to IEC IP67, NEMA6/6P)
Housing structure	Type L or T
Hazardous approvals	TIIS, ATEX, FM, CSA, IECEx, NEPSI
Ambient temperature	-40 to 85°C (excluding explosion-proof type)

■ Wide range of diaphragm seals available

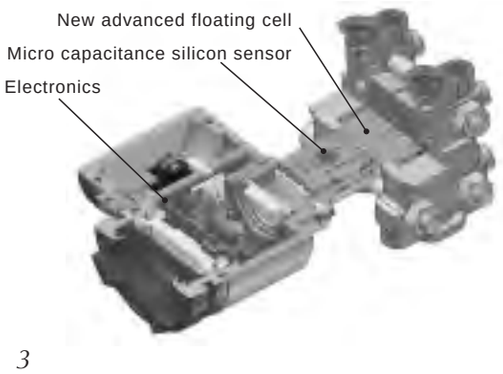
SUS316L(as standard), Hastelloy-C, Monel, Tantalum, Titanium, Zirconium, Hydrogen permeation prevention (Gold & ceramic coating or gold-plated SUS316L)

Hydrogen permeation barrier coating



Hand-held Communicator
(Type: FXW)

A handy type communicator with built-in battery, designed for facilitating communication with transmitters
- Remote function
  Measuring range, Damping, Data indication, Engineering unit, Calibration, Self diagnosis, Model No., Tag No., Burnout direction, etc.
- Power source: rechargeable battery
- Battery life: approx. 24 hours
- Printer (optional)
- Carrying case (optional)
- Weight: approx. 500 g



Micro capacitance silicon sensor

- Electrostatic capacitance type silicon sensor used for over a million transmitters. The crystal silicon material has reduced the size of the hysteresis, achieving excellent stability and reproducibility.
  Optimizing the configuration has helped realize output stability and long-term stability.

New advanced floating cell

- The advanced floating cell protects the sensor from various severe environmental conditions, assuring stability. The downsized sensor has facilitated handling in the field and has superior properties in terms of temperature, static pressure, and excessive pressure in comparison to our conventional model.

Absolute Pressure Transmitter
(Type: FKH)

■ Span, Operating pressure

Span limit (kPa abs)	Operating pressure (kPa abs)
8.125 to 130	0 to 130
31.25 to 500	0 to 500
187.5 to 3000	0 to 3000

■ Diaphragm material
SUS316L
■ Process connections
NPT1/2 (can be converted to Rc1/4, Rc1/2, or NPT1/4 with optional adapters)

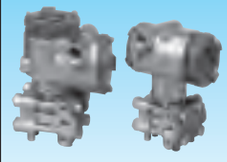
Pressure Transmitter
(Type: FKP)

■ Span, Operating pressure

Span limit (kPa)	Operating pressure (MPa)
8.125 to 130	-0.1 to 0.13
31.25 to 500	-0.1 to 0.5
187.5 to 3000	-0.1 to 3
625 to 10000	-0.1 to 10

■ Diaphragm material
SUS316L
■ Process connections
NPT1/2 (can be converted to Rc1/4, Rc1/2, or NPT1/4 with optional adapters)

Absolute Pressure Transmitter
(Type: FKA)



■ Span, Operating pressure

Span limit (kPa abs)	Operating pressure (kPa abs)
1.6 to 16	0 to 16
1.6 to 130	0 to 130
5 to 500	0 to 500
30 to 3000	0 to 3000

■ Diaphragm material
SUS316L, Hastelloy-C
Monel, Tantalum

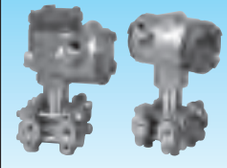
Pressure Transmitter
(Type: FKG)

■ Span, Operating pressure

Span limit (kPa)	Operating pressure (MPa)
1.3 to 130	-0.1 to 0.13
5 to 500	-0.1 to 0.5
30 to 3000	-0.1 to 3
100 to 10000	-0.1 to 10
500 to 50000	-0.1 to 50

■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Gold plated SUS316L, Gold and ceramic coating

Differential Pressure (flow) Transmitter
(Type: FKC)



■ Span, Operating pressure

Span limit (kPa)	Operating pressure (MPa)
0.1 to 1	-0.1 to 3.2
0.1 to 6	-0.1 to 10
0.32 to 32	-0.1 to 10/16/42
1.3 to 130	-0.1 to 10/16/42
5 to 500	-0.1 to 10/16/42
30 to 3000	-0.1 to 16/30

■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Gold plated SUS316L, Gold and ceramic coating

Level transmitter
(Type: FKE)

■ Span (kPa)
0.32 to 32
1.3 to 130
5 to 500
■ Flange size and rating
• ANSI/JPI 150LB, 300LB (1.5 in or 2 in 3 in or 4 in for each)
■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Titanium, Zirconium, Gold plated SUS316L

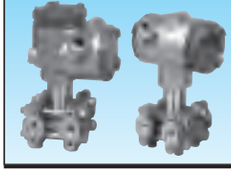
Remote Seal Type Pressure Transmitter
(Type: FKB)

■ Span (kPa)
1.3 to 130
5 to 500
30 to 3000
100 to 10000
500 to 50000
■ Flange size and rating
• ANSI/JPI 150LB, 300LB, 600LB (1/2 in or 3/4 in or 1.5 in or 2 in or 3 in or 4 in for each)
• Screw type/Wafer type
■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Titanium, Zirconium, Gold plated SUS316L

Remote Seal Type Differential Pressure Transmitter
(Type: FKD)

■ Span (kPa)
0.32 to 32
1.3 to 130
5 to 500
■ Flange size and rating
• ANSI/JPI 150LB, 300LB, 600LB (1/2 in or 3/4 in or 1.5 in or 2 in or 3 in or 4 in for each)
• Wafer type
■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Titanium, Zirconium, Gold plated SUS316L

Differential Pressure (flow) Transmitter
Foundation Fieldbus
(Type: FDC)

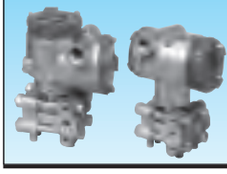


■ Span, Operating pressure

Span limit (kPa)	Operating pressure (MPa)
0.1 to 1	-0.1 to 3.2
0.1 to 6	-0.1 to 10
0.32 to 32	-0.1 to 10/16/42
1.3 to 130	-0.1 to 10/16/42
5 to 500	-0.1 to 10/16/42
30 to 3000	-0.1 to 16/30

■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Gold plated SUS316L, Gold and ceramic coating

Pressure Transmitter
Foundation Fieldbus
(Type: FDG)



■ Span, Operating pressure

Span limit (kPa)	Operating pressure (MPa)
1.3 to 130	-0.1 to 0.13
5 to 500	-0.1 to 0.5
30 to 3000	-0.1 to 3
100 to 10000	-0.1 to 10
500 to 50000	-0.1 to 50

■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Gold plated SUS316L, Gold and ceramic coating

Remote Seal Type Pressure Transmitter
Foundation Fieldbus
(Type: FDB...F)

■ Span (kPa)
1.3 to 130
5 to 500
30 to 3000
100 to 10000
500 to 50000
■ Flange size and rating
• ANSI/JPI 150LB, 300LB, 600LB (1/2 in or 3/4 in or 1.5 in or 2 in or 3 in or 4 in for each)
• Screw type/Wafer type
■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Titanium, Zirconium, Gold plated SUS316L

Remote Seal Type Differential Pressure Transmitter
Foundation Fieldbus
(Type: FDD...F)

■ Span (kPa)
0.32 to 32
1.3 to 130
5 to 500
■ Flange size and rating
• ANSI/JPI 150LB, 300LB, 600LB (1/2 in or 3/4 in or 1.5 in or 2 in or 3 in or 4 in for each)
• Wafer type
■ Diaphragm material
SUS316L, Hastelloy-C, Monel, Tantalum
Titanium, Zirconium, Gold plated SUS316L

Ultrasonic Flowmeters & Water Level Transmitter

Easy and non-intrusive installation on existing pipe!

<Features>

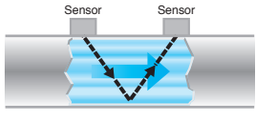
- Clamp-on sensor can be mounted outside the pipe
- Fast response within a second
- Independent of fluid temperature and pressure
- Wide range of models meet various needs
- Ultrasonic flowmeter for air also available

<Ultrasonic flowmeter line-up>

- Portable type (FSC)
- Standard type TIME DELTA-C (FSV)
- Hybrid type Duosonics (FSH)
- Compact type M-Flow (FLR)
- Advanced type (FSV)
- Ultrasonic Flowmeter for Air (FWD)

Transit-time (V method) measuring principle

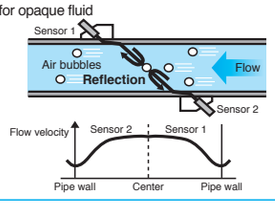
With ultrasonic pulses propagated diagonally between the upstream and downstream sensors, flow rate is measured by detecting the time difference generated by the flow.



Hybrid type measuring principle

Pulse doppler method

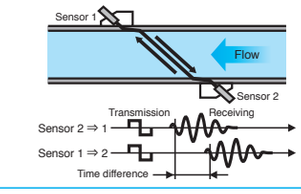
- Ultrasound pulses are transmitted into a liquid, and flow velocity profile is found and the flow rate is measured by using the characteristics that Doppler frequency of the echo from reflectors such as air bubbles and particles in the liquid changes according to flow velocity.
- Suitable for opaque fluid



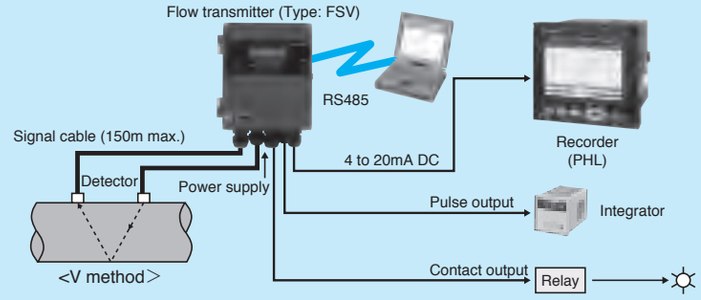
Automatically switched depending on fluid condition

Transit-time method

- Ultrasound pulses are propagated slanted both from the upstream and downstream, and flow rate is measured by detecting the time difference generated with the flow.
- Suitable for clean fluid



■ System configuration example

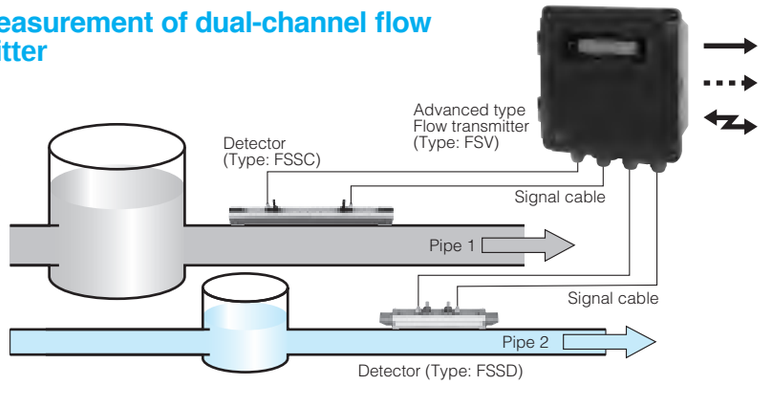


Fluid types and piping conditions

Fluid type	Uniform liquid in which ultrasonic waves can propagate (water, sea water, oil, etc.)
Turbidity	10,000 mg/L or less
Piping materials	Carbon steel, stainless steel, cast iron, PVC, FRP, copper, aluminum, acrylic, etc.
Lining materials	No lining, tar epoxy, mortar, rubber, Teflon, etc.
Fluid condition	Uniform flow in a filled pipe with no swirl

Simultaneous measurement of dual-channel flow with one transmitter

Capable of measuring flow rate in 2 separate pipes, and calculating average, totalized value, and difference.



- Analog output
  (4 to 20mA DC) 2 points
  Selectable up to 2 items from the list below.
  (1) Path 1 flow rate
  (2) Path 2 flow rate
  (3) Average value
  (4) Added value
  (5) Subtracted value
- Contact pulse output
  (4 points)
  Totalized flow, alarm etc.
- RS-485 (MODBUS) communication

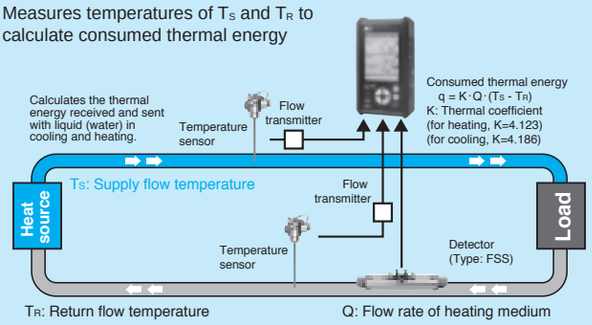
Portable Type Ultrasonic Flowmeter
(Type: FSC, FSS)

New portable flowmeter with data storage function on SD memory card.

Detector type	Small (ϕ13 to 300mm) Expendable (ϕ50 to 1200mm) High temperature (ϕ50 to 400mm) Large (ϕ200 to 6000mm)
Velocity	0 to ±0.3…±32m/s
Display function	Sensor spacing calculation, instantaneous value, total value, trend graph, logger, waveform, etc.
Data storage	SD memory card (up to 8GB)
Tolerance	1.0% of rate
Power supply voltage	Built-in rechargeable battery (Battery life: 12 hours)
Others	PC loader software (equipped as standard)
Option	Flow velocity profile display, printer

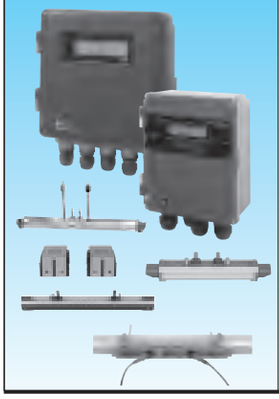
Consumed energy calculation function

Measures temperatures of T_S and T_R to calculate consumed thermal energy



■ Ultrasonic Flowmeters

Ultrasonic Flowmeter TIME DELTA-C
(Type: FSV, FSS)



- Small and lightweight (IP66 type front dimension: 142x170mm)
- Highly bubble resistant

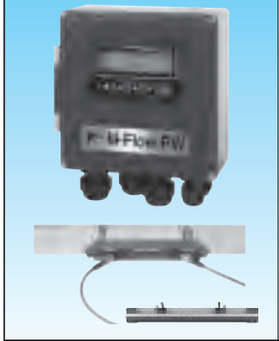
Detector type	Compact (ϕ25 to 225mm) General (ϕ50 to 1200mm) Small diameter (ϕ13 to 300mm) High-temperature (ϕ50 to 400mm) Large diameter (ϕ200 to 6000mm)
Velocity	0 to ±0.3…±32m/s
Display function	Sensor spacing calculation, instantaneous value, total value, etc.
Output signal	4 to 20mADC, Total pulse output RS485
Power supply voltage	100 to 240VAC, 50/60Hz or 10 to 30VDC
Accuracy	1.0% of rate
Enclosure	IP66 or IP67

Hybrid Type Duosonics
(Type: FSH, FSW)

- Pulse doppler method + transit time method
- Automatic switching according to flow condition

Detector type	Small diameter (ϕ50 to 100mm) Compact (ϕ100 to 200mm) Medium (ϕ200 to 500mm) Large (ϕ500 to 1000mm)
Velocity	0 to ±0.3…±4m/s
Display function	Graphic LCD (with back light) Instantaneous value, total value, etc.
Output signal	4 to 20mADC, Total pulse output RS485/RC232C Velocity profile (optional)
Power supply voltage	100 to 240VAC, 50/60Hz or 20 to 30VDC
Accuracy	0.5 to 1.0% of rate

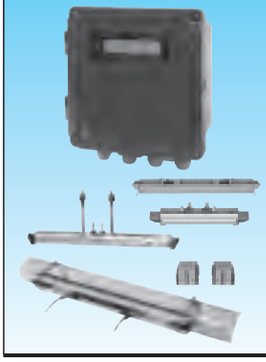
Ultrasonic Flowmeter M-Flow PW/BTU Meter
(Type: FLR, FSS)



- Small and lightweight (front dimension: 140x130mm)
- Highly bubble resistant

Detector type	Compact (ϕ25 to 225mm) General (ϕ50 to 1200mm)
Velocity	0 to ±0.3……±10m/s
Display function	Sensor spacing calculation, instantaneous value, total value, etc.
Output signal	4 to 20mADC, Total pulse output RS485 communication
Power supply voltage	100 to 240VAC, 50/60Hz or 20 to 30VDC
Accuracy	1.5% of rate (1.0% of rate version available)
Cable length	60m max. (between sensor and transmitter)

Advanced Type Ultrasonic Flowmeter
(Type: FSV, FSS)



- Consumed energy calculation
- Simultaneous flow measurement of 2 pipes with one transmitter
- High accuracy measurement by 2-path system for 1 pipe

Detector type	Compact (ϕ25 to 225mm) General (ϕ50 to 1200mm) Small diameter (ϕ13 to 300mm) High-temperature (ϕ50 to 400mm) Large (ϕ200 to 6000mm)
Velocity	0 to ±0.3…..±32m/s
Output signal	4 to 20mADC, Total pulse output, RS485
Accuracy	1.0% of rate
Power supply voltage	100 to 240VAC, 50/60Hz

■ Water Level Transmitter

Ultrasonic Flowmeter for Air
(Type: FWD)

- No pressure loss with no obstructions inside pipe
- Pipe size: 25mm to 200mm

Connection method	ϕ25mm: Rc1 ϕ32mm: Rc1-1/4 ϕ40 to ϕ80mm: Wafer connection ϕ100 to ϕ200mm: JIS10K flange
Target gas	Air (mainly factory air) Nitrogen (not for pipes larger than 100mm dia.)
Accuracy	2% of rate (depending on flow rate)
Power supply voltage	24VDC or built-in battery (battery life 10 years) (no output signal when using built-in battery)
Display	Instantaneous flow-rate, accumulated volume, pressure, temperature
Normal conversion	provided as standard

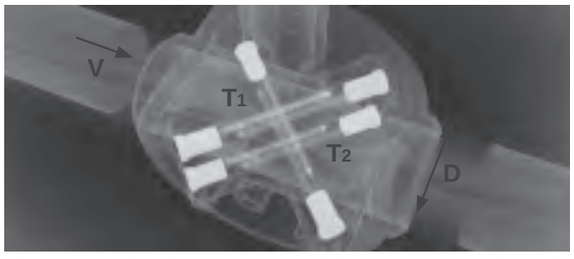
Water Level Transmitter
(Type: FQK)

The micro-capacitance silicon sensor of the detector suspended in water detects the water pressure applied to the diaphragm and convert it into a current output signal.

Measurement range	0 to 1.5…50m
Output signal	4 to 20mADC (2-wire)
Power supply voltage	24VDC (10.5 to 32V)
Tolerance	±0.2%
Arrestor	Included
Detector	SUS316 or for sewage water
Hollow cable	PVC or PE covering
Hollow cable length	Up to 100m
Option	Detector stand, chain

Spool Piece Ultrasonic Flowmeter (FST) for liquid applications

Measuring principle: parallel three-path, transit time difference method



The sensors placed on upstream and downstream emit ultrasonic pulse in turn, and detect the transit time difference of the pulse to calculate the flow rate.

Flow velocity : $V = K \cdot (T_2 - T_1)$

Pipe cross-sectional areas : $A = \frac{\pi D^2}{4}$

Flow rate: $Q = A \cdot V$

Pipe inner diameter	: **D**
Transit time with flow	: **T_1**
Transit time against flow	: **T_2**
Flow coefficient	: **K**

Advanced Features for a Wide Range of Applications

- Accuracy: ±0.2% of rate
- Easy-to-operate
- Low maintenance

Reliability. Safety. Convenience.

Reliability

Zero point adjustment
When the flow is stopped, the zero point can be adjusted with a single push of a button.

Damping
Used to reduce fluctuation of measured values.
Setting range: 0 to 100 s (in 0.1 second steps)

Low flow cut-off
Output can be cut off when the flow rate is low.
Setting range: 0 to 5 m/s (in 0.01 m/s steps)

Safety

Event-triggered alarms
Alarm output is activated upon instances of hardware error and/or process error.

Output burnout
When there is no fluid in the pipe or there are air bubbles in the fluid, the flowmeter holds the analog output and emits a contact output.

Flow switch
Contact output is emitted when the instantaneous flow rate has reached the high or low limit.

Total switch
Contact output is emitted when the total flow rate (forward direction) has reached the high limit.

Convenience

Unit selection
m/s, L/s, L/min, L/h, L/d, KL/d, ML/d, m^3/s, m^3/ min, m^3/h, m^3/d, Km^3/d, or Mm^3/d

Bi-directional range
User can configure a range for each of forward flow and reverse flow. Operating range can be emitted as contact output.

Auto-switchable ranges
User-defined two ranges can be switched automatically.

Electronic Personal Dosimeter DOSE-i

- Small and Lightweight
- Easy-to-Read Display
- Simple Operation

Portable Neutron Survey Meter NSN3

- Lightweight
- No ^{3}He or BF^{3}
- Wide Range Measurement
- 3-Way Power Supply

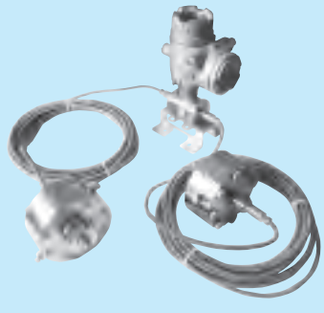
Electronic Personal Dosimeter NRF Series

- Compact and Lightweight
- Long Battery Life
- Colour Backlight
- Large Display

Dosimeter Reader

Reads entry/exit information, and writes the setting information recevied from computer system into the dosimeter

Nuclear Transmitter



- Smart or analog pressure transmitter (gauge or differential pressure) with remote seals.
- Referentials:
  - ISO 9001 v.2008
  - ISO 14001
  - HAF604
  - ATEX
  - QN100/QN200/QN300
  - RCC-E ed. 2007 et 2012
- “K3-A, K3-AD classified version”, smart and analog pressure transmitter (absolute, gauge or differential pressure).

Recorders

On Paper or Memory card?

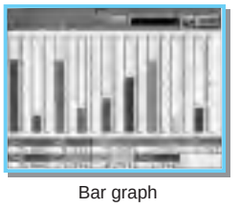
Our solutions include both paperless and inkjet Strip Chart recorders.

Industrial recorders are used to record process values such as temperature, pressure, flow rate in various industrial plants. Fuji Electric provides 100mm/180mm wide color inkjet recorders, and paperless recorders capable of storing data of approx. 4 years in a memory card. The paperless recorders can accept up to 36 inputs and allows you to view data in a wide variety of formats, including a bar graph, digital display, event summary, historical trend, etc.

Paperless Recorders

■ **Data of 4 years worth can be stored in a Memory card**

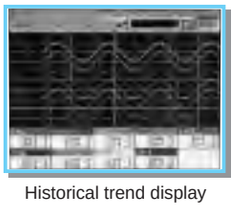
■ **Wide variety of display mode**



Bar graph

Digital display

Event summary display



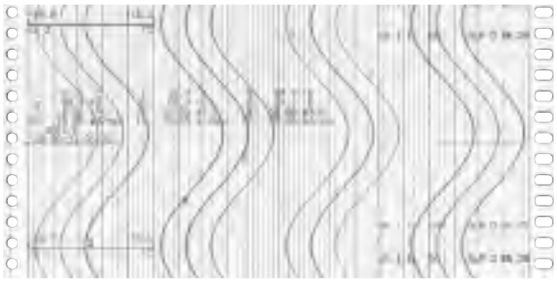
Historical trend display

■ **Ethernet and RS485 communication available**

Inkjet Strip Chart Recorder

■ **6-color high quality trace**

Trend recording



Daily report/ totalization

Paperless Recorders

PHL: front dimension 144 x 160mm

Paperless Recorder
(Type: PHL)

- Real-time data indication
- Large capacity data storage in Compact Flash

Input points	9 or 18
Input signal	Thermocouple (12 types), RTD (2 types), DC voltage/current
Scan rate	100ms
Calculation function	Integration, F-value calculation, difference calculation, square root extraction
Display	5.7in TFT color LCD (320 x 240 dots)
Display contents	Trend, bar graph, digital, historical trend, event summary, tag amount of memory used, analog meter, parameter settings
Recording medium	Compact Flash card (2GB max.) Storage capacity: approx. 4 years at display refresh cycle of 30 sec.
Data save cycles	1 seconds to 12 hours
Data format	ASCII or Binary (ASCII format data can be directly read by Microsoft Excel.)
PC Support software	Data viewer software Loader software for parameter setting/change
Power supply voltage	100 to 240 V AC 50/60Hz
Outer dimensions	160×144×185mm (panel mount)
Mass	Approx. 1.5kg
Option	Alarm output (10 points)/ DI (5), portable type alarm output (18)/ DI (5)/ RS485, Ethernet

Paperless Recorder
(Type: PHF)

- 3 or 6 inputs
- Ethernet communication (optional)

Input points	3 or 6
Input signal	Thermocouple (12 types), RTD (2 types), DC voltage/current
Scan rate	100ms
Calculation function	Difference calculation, square root extraction
Display	5.7 STN color LCD (320 x 240 dots)
Display contents	Trend, bar graph, digital, historical trend, event summary, tag, amount of memory used, parameter settings
Recording medium	Compact Flash card (2GB max.)
Data format	ASCII or Binary
PC Support software	Data viewer software Loader software for parameter setting/ change
Power supply voltage	100 to 240V AC 50/60Hz
Outer dimensions	160×144×185mm (panel mount)
Mass	Approx. 1.5kg
Option	Alarm output (10 points)/ DI (5), Ethernet

PHU: front dimension 300 x 300 mm

Paperless Recorder
(Type: PHU)

- Accept 9 to 36 inputs
- Large display

Input points	9, 18, 27, 36
Input signal	Thermocouple (12 types), RTD (2 types), DC voltage/current
Scan rate	100ms/9,18points,200ms/27, 36points
Calculation function	Integration, F-value calculation, difference calculation, square root extraction
Display	12in TFT color LCD (800 x 600 dots)
Display contents	Trend, bar graph, digital, historical trend, event summary, tag amount of memory used, analog meter, parameter settings
Recording medium	Compact Flash card (1GB max.)
Data save cycles	1 seconds to 12 hours
Data format	ASCII or Binary (ASCII format data can be directly read by Microsoft Excel.)
PC Support software	Data viewer software Loader software for parameter setting/ change
Power supply voltage	100 to 240 V AC 50/60Hz
Outer dimensions	300×300×221mm (panel mount)
Mass	Approx. 6.2 kg (full option)
Option	Digital I/O 16 points, relay contact output 10 or 20 points, open collector output 16 points, Ethernet

Inkjet Recorders

Microjet Recorder 180mm wide
(Type: PHA)

- 180mm wide, 6-color inkjet recording
- Programmable parameters allow flexible configuration

Chart width	180mm
Input points	Continuous recording: 6, 12 Intermittent recording: 6, 12
Input signal	Thermocouples (12 types) , RTD (2 kinds), DC voltage/current
Scan rate	320ms
Recording cycle	Continuous recording: 3 to 90sec. Intermittent recording: 30sec.
Display	Fluorescent (20 characters x 2 lines)
Calculation	Square root extraction, subtraction, scaling, input filter, etc.
Report generation	Daily report, totalization
Power supply voltage	100 to 240VAC 50/60Hz or 24VDC
External dimensions	288 × 288 × 199mm
Option	Communication function, alarm output, chart paper illumination lamp, external control

Microjet Recorder 100mm wide
(Type: PHC)

- 180mm wide, 6-color inkjet recording
- Programmable parameters allow flexible configuration

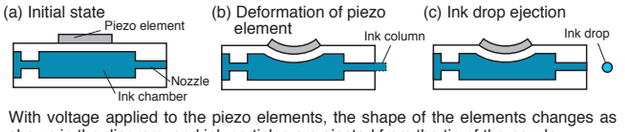
Chart width	100mm
Input points	Continuous recording: 3, 6 Intermittent recording: 6
Input signal	Thermocouples (12 types) , RTD (2 kinds), DC voltage/current
Scan rate	160ms (1 to 3 inputs) 320ms (6, 12 inputs)
Recording cycle	Continuous recording: 3 to 90sec. Intermittent recording: 30sec.
Display	Fluorescent (20 characters x 2 lines)
Calculation	Square root extraction, subtraction, scaling, input filter, etc.
Report generation	Daily report, totalization
Power supply voltage	100 to 240VAC 50/60Hz or 24VDC
External dimensions	144 × 144 × 199mm
Option	Communication function, alarm output, chart paper illumination lamp, external control

Microjet Recorder-E 100mm wide
(Type: PHE)

- 100mm wide, 6-color inkjet recording
- Factory configuration model

Chart width	100mm
Input points	Continuous recording: 1, 2 Intermittent recording: 6
Input signal	Thermocouples (12 types) , RTD (2 kinds), DC voltage/current
Scan rate	0. 2sec. (1 to 2 continuous recording) 30sec./all points
Recording cycle	Continuous recording: 2 to 40sec. Intermittent recording: 30sec.
Display	6-digit LED
Power supply voltage	100 to 120VAC 50/60Hz or 200 to 240VAC 50/60Hz
External dimensions	144×144×175mm (continuous recording type)
Option	Alarm output, external control

■ Mechanism of inkjet printing



With voltage applied to the piezo elements, the shape of the elements changes as shown in the diagram, and ink particles are ejected from the tip of the nozzle.
These particles are very small and fast, and draw a series of very small dots of about 0.3mm diameter on the chart paper.
These small dots are combined together to form characters and trace lines for clear visible recording.

Temperature Controllers

We have all you need for temperature control in our comprehensive product families.

■ Color LCD type PXF

PXF9
(96 × 96mm)

PXF5
(48 × 96mm)

PXF4
(48 × 48mm)

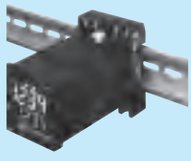
■ Economy type PXE

PXE
(48 × 48mm)

■ Low-cost type PXR

PXR3
(24 × 48mm)

■ Socket type PXR



PXR4
(48 × 48mm)

■ On/off contact output ＜Digital Thermostat＞

PXR3
(24 × 48mm)

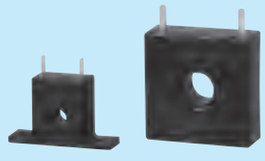
■ Single Loop Process PXH

PXH (96 × 96mm)

■ Multi Loop Programable RPDA

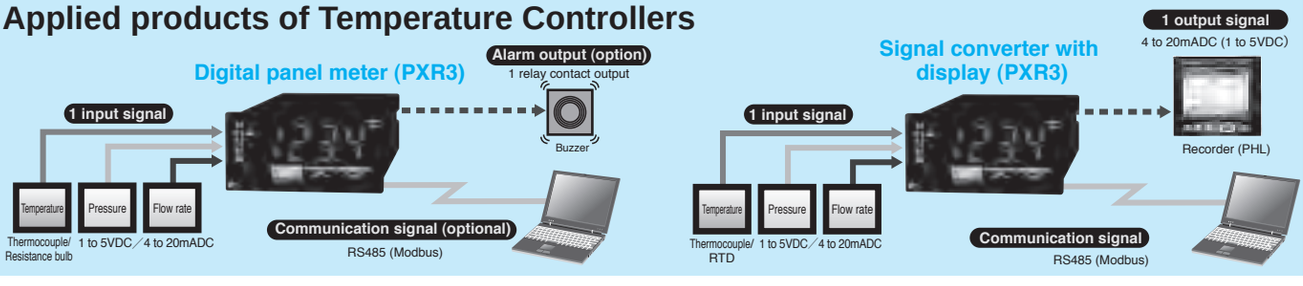
RPDA (72 × 144mm)

■ Current Detector for heater break alarm



CTL

Applied products of Temperature Controllers



Multi-loop module type Temperature Controller <PUM series>

Variations

Control Module (PUMA/B)

Analog Input/Output Module (PUMV)

Event Input/Output Module (PUME)

CC-LINK Communication Mdule (PUMCL)

PLC Communication Module (PUMCM)

PROFIBUS Communication Module (PUMCP)

Ethernet Communication Module (PUMCE)

Smart!

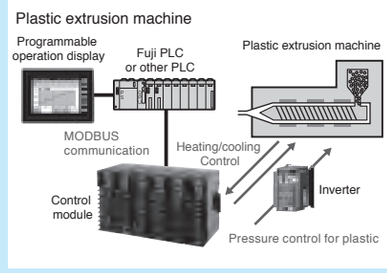
- Heater break alarm CT (8 points)
- Programless host communication

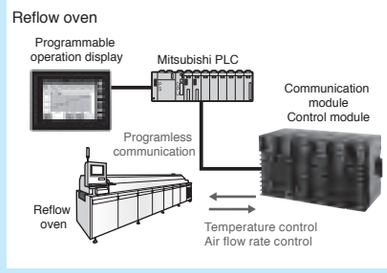
User friendly!

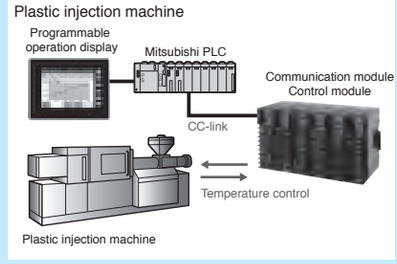
- Detachable terminal
- Simple loader operation

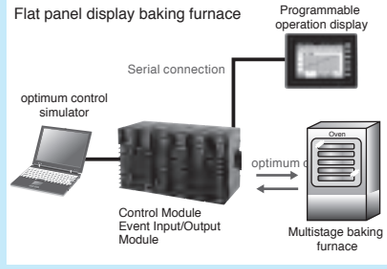
Fast!

- High-speed data communication [230.4kbps]
- Hi-speed data sampling









Multiloop Programmable Controller

PID Controller
Analog input signal: 7
[DC voltage, DC current. thermocouple (option), RTD (option)
Two thermocouple inputs or two RTD inputs are selectable.

Digital input signal : 10
[No-voltage contact or transistor contact ON/0 V, OFF/24 V, ON current/about 8 mA
Isolated from the internal circuit by photocoupler. Not Isolated between each digital input and output.]

Analog Output Signal: 1, 2, or 4

Digital output signal: 10
[Transistor open collector 1V max. at ON, 10μA max at OFF. Isolated from the internal circuit by photo-coupler. Not isolated between each digital input and output.]

- **Four cascade controls are available**
- **Control and computation fuction dependent**
- **High Reliability for Demanding Process Use**

  Control, display and I/O functions are managed by independent CPUs for enhanced security and reliability.

  Peer-to-peer communication to expand number of I/Os
- **New Generation of Programmable PID Controller**

  Large Fine color graphic LCD

  DCS in instruments format -Advanced computation and sequential control functions

  Ample I/O numbers with a wide selection of signal types

  Easy setting of various engineering functions
- **Fully Programmable Multi-function**
- **Auxiliary Panel Insruments**

Bargraph Indicating Alarm

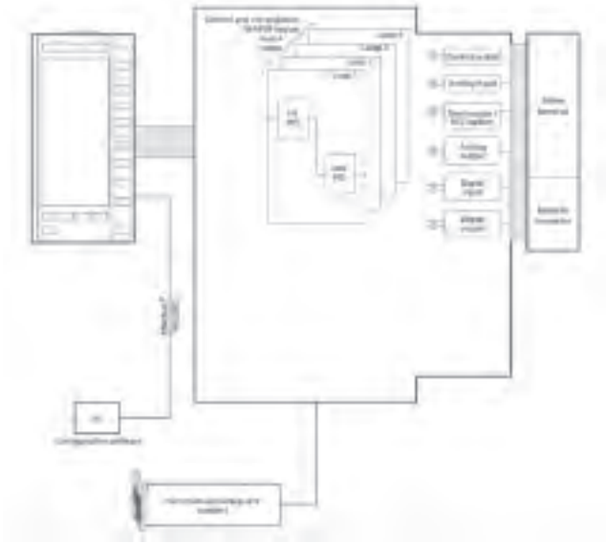
Independent bargraph for four analog inputs. Four alarm trip indication and outputs.

- **Powerful Engineering Tools to Help You Explore the Full Capability of the Controller**
- **Independent hardware buttons for manual control operation**
- **Manual Loader optional**
- **Ideal for Replacing Existing Instruments**

  IEC/DIN format*1 panel cutout size (W72 X H144mm)

  Fully compatible in functions with existing PID controllers
- **PC Configuration Software SCCFG**
  Used to configure display setting, PV and network parameters.Used to program advanced computation and sequential control function setting.

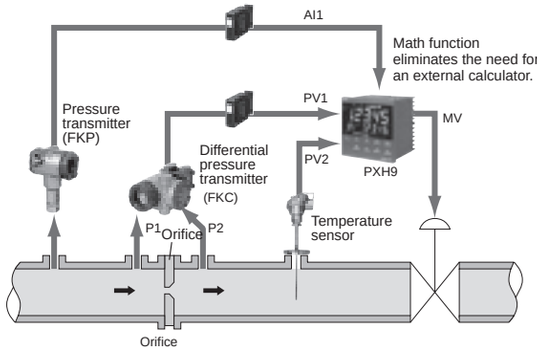
Functional Diagram:



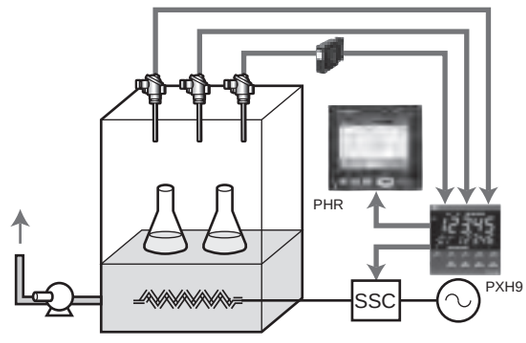
■ Application Examples of Temperature Controllers

PXH

Controlling the flow rate of dry gas

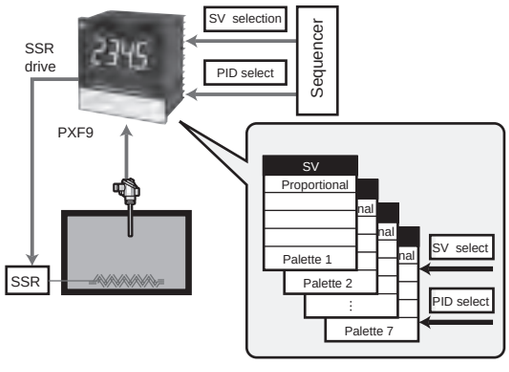


Low selection control

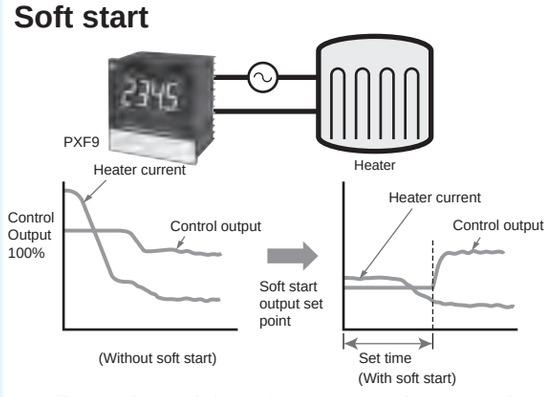


PXF

PID Palette and SV select

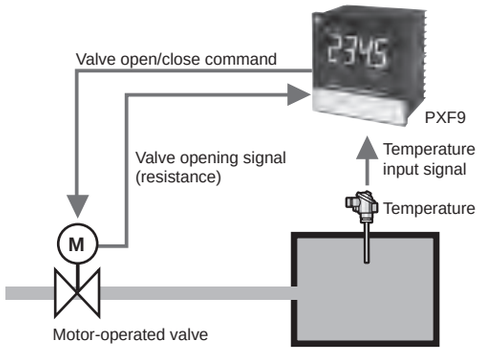


Soft start

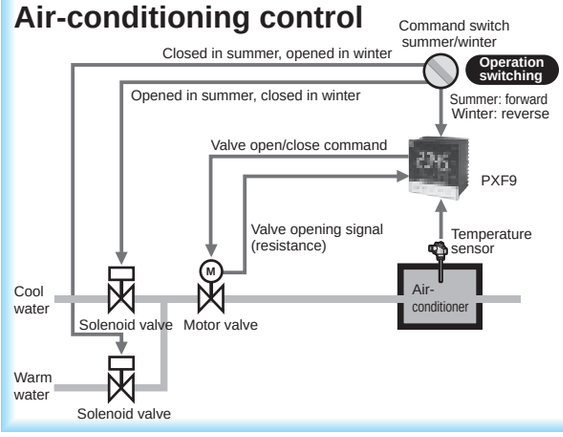


The control output during equipment startup can be suppressed.

Position feedback control



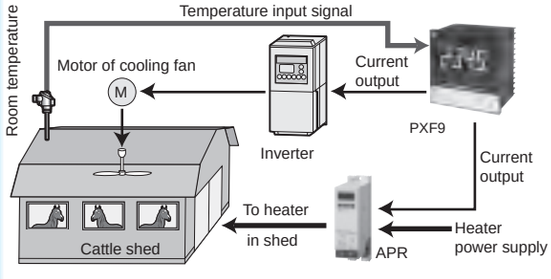
Air-conditioning control



PXF PXR

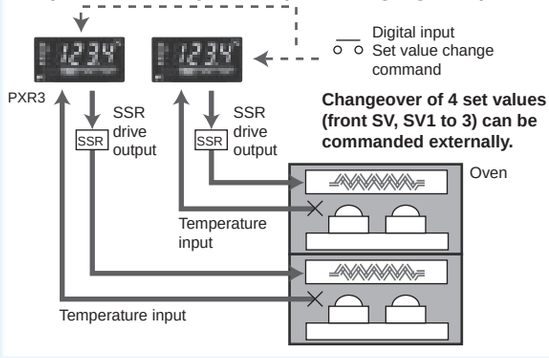
Energy saving in cattle shed

- **Both heating and cooling are controlled with only one temperature controller utilizing its 2 control outputs.**
- **Power consumption can be curbed by controlling a cooling fan motor with inverter.**



Temperature control of oven

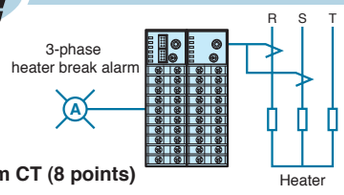
Operators can adjust a setpoint using digital inputs.



Module type Temperature Controllers

- Designed to be easily built into your equipment
- High-performance combined with detachable terminal structure, various control functions, and high-speed data communication
- Dedicated PC loader software facilitates parameter setting and checking control status.

Smart!

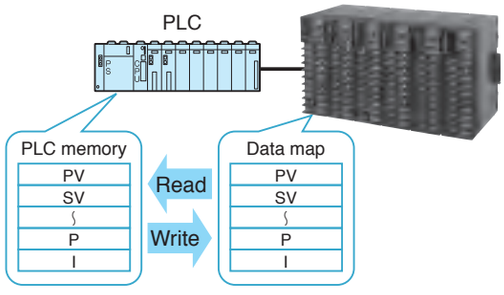


Heater break alarm CT (8 points)

A break in a three-phase heater can be detected by using 2 points CT per channel.

Programless communication with upper device

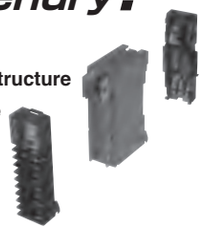
High-speed communication is possible because it is only assigned important data.



User friendry!

Detachable terminal structure

The terminal is attachable and detachable without using a screw driver. Wiring time for maintenance is reduced substantially.



Simple loader

Simple loader is available to change all module parameter setting without changing each loader connection.
With "favorite function," the frequently-used parameters can be edited preferentially.

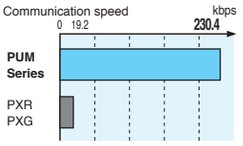
Easy to attach to DIN rail

Locking tabs on rear side enable DIN rail mount and inter-module connection

Fast!

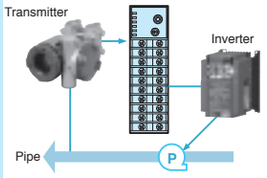
Programless communication with upper device

You can rest easy with the multi-loop controller thanks to hi-speed communication of 230.4kbps with no time-lag.

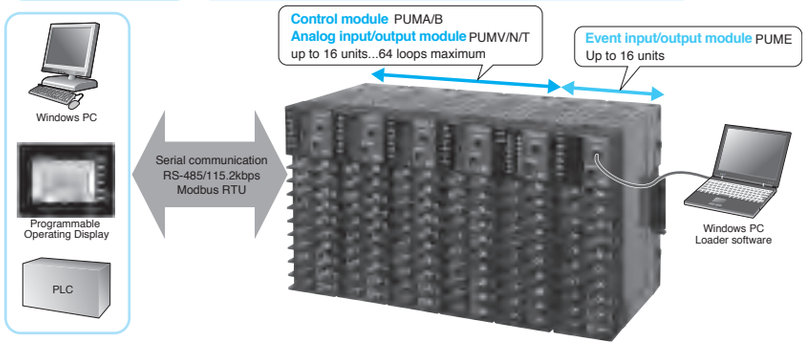


High-speed sampling time

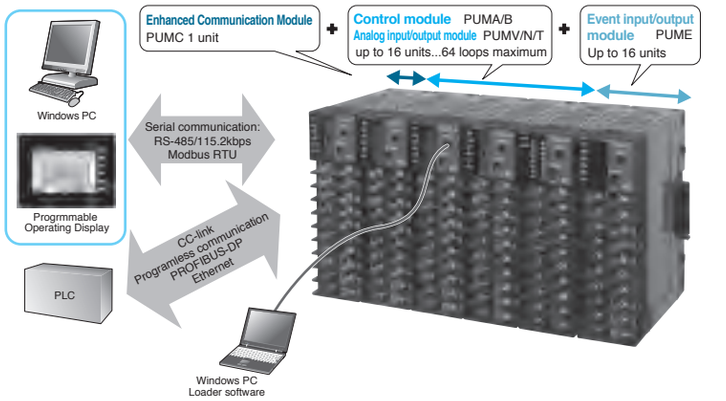
200msec sampling time enable it to apply to not only temperature measurement but also process measurement such as pressure control, flow control, etc.



Basic system — Control module + Event/Analog input/output module



Extended system — Basic system + Enhanced communication module



Control Module (PUMA/B)
2 or 4 loop

Enhanced Communication Module (PUMCP)
PROFIBUS

Enhanced Communication Module (PUMCL)
CC-link

Event Input/ Output Module (PUME)
8 DI & 8DO

Enhanced Communication Module (PUMCM)
Programless communication with Mitsubishi PLC

Analog Input/ Output Module (PUMV/N/T)
4 AI & 4AO

Ethernet Communication module (PUMCE)

■ Functions

		Set point control type				
Type		PXF4, 5, 9	PXR3	PXR4 socket	PXE4	PXH
Front size mm	48×24		○			
	48×48	○		○	○	
	48×96	○				
	72×72					
	96×96	○				○
Indication accuracy		±0.2%	±0.5%	±0.5%	±0.5%	±0.1%
Control cycle		0.05 sec.	0.5 sec.	0.5 sec.	0.2 sec.	0.05 sec.
External terminal structure		M3 screw terminal	Plug-in terminal	Socket	M3 screw terminal	M3 screw terminal
24V DC power supply		○	○	○		
Fuzzy control		○	○	○	○	
Heating/cooling control		○	○			
Self tuning		○	○	○		
Auto/manual switchover		○				○
Remote SV input		○				○
Re-transmission output		○	○			○
Communication		○	○		○	○
Motorized valve control		○				○
Transmitter power supply						○
Remote set point		○	○			○
Ramp/soak		64 steps	8 steps	8 steps		64 steps
LCD display		○				
Heater burnout alarm		○				
Front water-proof structure		○	○	○	○	○

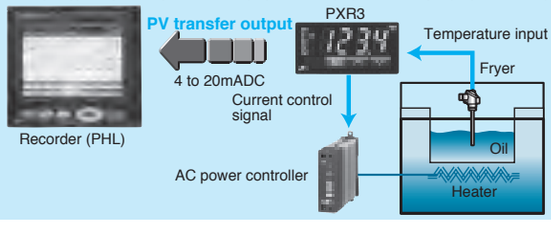
■ Common functions (some are not applicable for all models)

- Auto-tuning PID
- Input signal (thermocouple, resistance thermometer, DC voltage/ current)
- Control output (relay contact output, SSR/SSC drive output, 4 to 20mADC current output)
- Heating/cooling control (excluding some models)
- Alarm relay output (optional)

■ Re-transmission output (optional)

A cost corresponding to one temperature sensor can be reduced just by connecting a PV transfer signal to a recorder.

● Output type: any one of process value (PV), set value (SV), control output (MV) and PV-SV (DV).



■ Communication function (optional)

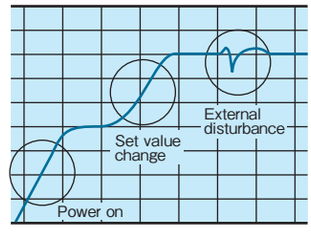
Communication with PC, programmable operation display, and PLC is available via an RS-485 interface.

■ PID + self-tuning, PID + fuzzy control

Auto-tuning and self-tuning functions enable calculation of optimal PID parameters. In addition, fuzzy control function is offered as standard to prevent overshoot and suppress undershoot due to disturbance. These functions ensure optimal control for various application.

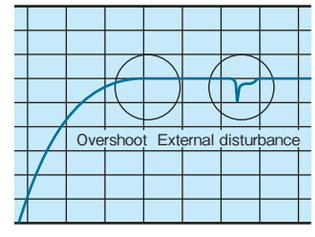
● Self-tuning

Tuning is made automatically to re-optimize PID parameters at the following situation: at power on, when set value is changed, or during external disturbance.



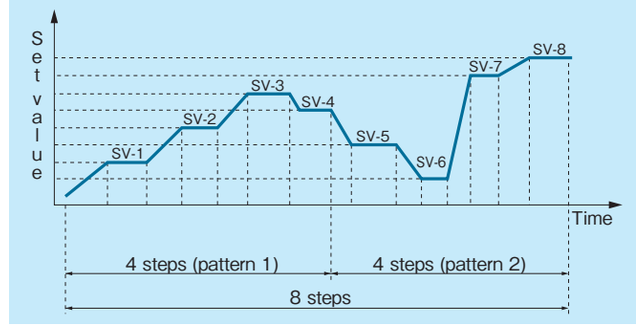
● Fuzzy control

Suppress overshoot without wasting start-up time.
Also, quickly reverts to set points at the event of external disturbances.



■ Ramp/soak function (optional)

Temperature rise/fall pattern is controlled by setting a heat pattern having a gradient. (8-step for PXR, 64-step for PXF and PXH)



Gas Analyzers

What is your measuring task?
We offer solutions to meet your gas analysis needs - environmental monitoring, energy-saving, and process control.

Gas Analyzers

Fuji Electric developed the first infrared gas analyzer in Japan using mass-flow sensors. Since then, we have supplied customers with various types of gas analyzers to support environmental preservation and control efforts. These efforts include measurement of atmospheric pollution and detection of low-density SOx and NOx, generated by incinerating facilities and boilers. Fuji Electric gas analyzers are commonly used to monitor the atmosphere to help maintain a clean natural environment.

Gas Analyzers

The 5-component analyzer capable of simultaneously measuring concentration of NOx, SO_2, CO, CO_2, and O_2 contained in flue gas is housed in space-saving enclosure and can be maintained from front side.

Our new product, insertion type laser gas analyzer for stack gas is the first analyzer in Japan which can measure HCℓ, NH_3, O_2, H_2O, CO, CO_2, and CH_4.

■ Typical Applications

	Application Fields and Plants	Target Gases	Applicable Model Types
Atmospheric pollution	Waste incinerators	SO_2, NOx, CO, CO_2, O_2	ZSQ, ZSU, ZSJ
	Desulfurization and denitration of exhaust gas	SO_2, NOx, O_2, HCl, NH_3	ZSU, ZSS, ZSJ
	General incinerator (including boilers)	SO_2, NOx, O_2, HCl	ZSU, ZSS, ZSJ
	Diesel power generation	SO_2, NOx, O_2	ZSU, ZSV, ZSJ
	Vehicle exhaust gas	CO, HC, CO_2, O_2	ZKE
Biochemistry (microbes)	Fermentation	Methanol, CO_2	ZSV, ZPA
	Incubator	CO_2, O_2	ZFP9, ZKM, ZSV, ZPA
Fruit and vegetable storage and ripening		CO_2, O_2	ZFP9, ZKM, ZSV
Enzyme lab	gas separation	CO_2, Ar, He, CO, O_2	ZAV, ZAJ, ZAF, ZPB, ZPG
Steel/Thermal treatment	Shaft furnaces, converters	CO, CO_2, H_2, O_2	ZAF, ZAJ, ZPB
	Heating furnace	CO, CO_2, O_2	ZKM, ZFG
	Gas generator	CO_2	ZFG, ZSV, ZPA
	Carburizing furnace, annealing furnace	CO, CO_2, O_2	ZFG, ZSV, ZPA
	Nitrogenation ovens	NH_3	ZSS
Energy saving	Boiler and Furnaces	O_2, CO_2, CO	ZKM, ZSV, ZPA ZSU, ZSB, ZSV, ZSJ
Ceramic industry	Tunnel kiln	CO, O_2	ZAJ, ZSV, ZPA
	Coal calcining	CO	ZPA
	Cement	CO, CO_2, O_2	ZKG, ZAJ, ZPA
Water and sewerages	sewer systems sludge incinerators (exhaust gas)	SO_2, NOx, CO, N_2O, O_2	ZSU
Agriculture/horticulture	Facility gardening	CO_2	ZFP9, ZSV
	Photosynthesis studies	CO_2	ZFP9, ZSV, ZPA
Environment	Concentration in tunnel	CO	ZSA
	Parking lot	CO, CO_2	ZSA, ZFP9, ZPB, ZPG
	Building management, air conditioning	CO_2	ZFP9

CO/O_2 Gas Analyzer for stack gas
(Type: ZSQ)

- **Applications**
  Incinerators
- **Measurable components and ranges**
  CO (0 to 200...2000 ppm)
  O_2 (0 to 25%)
- **Measuring principle**
  Infrared, zirconia
- **Display**
  LCD with back light
- **Japanese pattern approval No.**
  SAC984, SE981
- **Outer dimensions**
  1550×730×650mm
- **Structure**
  For outdoor/indoor applications
- **Mass**
  Approx. 140kg

Gas analyzer for stack gas (1 to 5-Component Analyzer)
(Type: ZSU)

- **Applications**
  Boilers, incinerators, etc.
- **Measurable components**
  SO_2, NO_x, CO, CO_2, O_2
  Simultaneous measurement (N_2O + CH_4 possible)
- **Measuring principle**
  Double-beam infrared, zirconia, paramagnetic
- **Display**
  LCD with back light
- **Japanese pattern approval No.**
  SAS992-1 SE981 SF011
  SAC992-1 SAN991-1
- **Outer dimensions**
  1710×800×615mm
- **Structure**
  For outdoor/indoor applications
- **Mass**
  Approx. 300kg

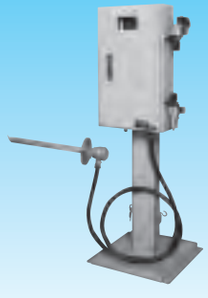
Gas analyzer for stack gas (7-component analyzer)
(Type: ZSU-7)

- **Applications**
  Boilers, incinerators, etc.
- **Measurable component**
  NOx, SO_2, CO, CO_2, O_2, HCl, Dust
- **Measuring principle**
  Infrared, zirconia, laser, electrostatic induction
- **Display**
  LCD with back light
- **Japanese pattern approval**
  NOx, SO_2, CO, O_2
- **Outer dimensions**
  1780×1215×700mm
- **Structure**
  For outdoor/indoor applications

Gas analyzer for stack gas (1 to 5-component analyzer)
(Type: ZSJ)

- **Applications**
  Boilers, incinerators, etc.
- **Measurable components**
  NOx, SO_2, CO, CO_2, O_2
- **Measuring principle**
  Single-beam infrared, zirconia, paramagnetic
- **Display**
  LCD with back light
- **Japanese pattern approval**
  NOx, SO_2, CO, O_2
- **Outer dimensions**
  1710×800×615mm
- **Mass**
  300kg

In-situ Zirconia Oxygen Analyzer
(Type: ZSB)

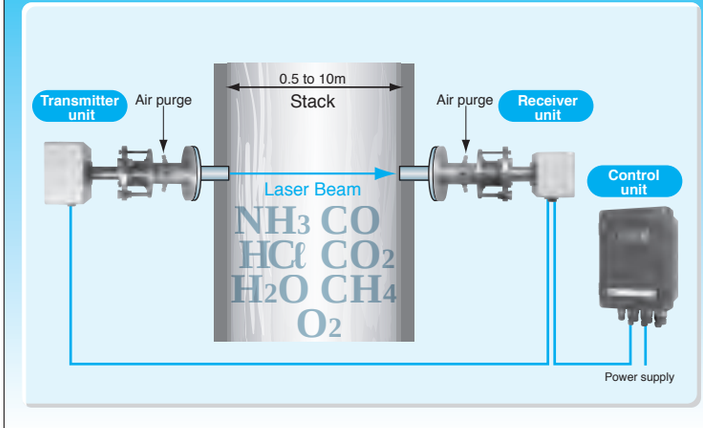


- **Applications**
  Industrial boilers and furnaces, etc.
- **Measurable component and range**
  O_2 (0 to 2…50vol% manual configuration)
- **Reproducibility**
  ±0.5% FS
- **Response time**
  10 sec. for 90%
- **Automatic calibration and manual/auto blow-down functions**
- **Outer dimensions**
  1500×530×550mm (self-standing)
  700×400×180mm (wall-mounting)

Compact Type Infrared Gas Analyzer
(Type: ZSVF)

- **Applications**
  Heat-treatment furnaces, research facilities on biogas or plant cultivation, etc.
- **Measurable components with minimum ranges**
  NO_x: 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
- **Number of measurable components**
  up to 5

Direct Insertion Laser Gas Analyzer
(Type: ZSS)



NH_3, HCl, H_2O, O_2, CO, CO_2, and CH_4 gas concentrations can be measured at high speed by directly installing transmitter unit and receiver unit in the stack.

- **Applications**
  Incinerators, denitration facilities, heat-treatment furnace
- **Measurable components and ranges**

Target gas	Minimum range
HCl	10 ppm
HCl+H_2O (*1)	50 ppm (HCl)
NH_3	15 ppm
NH_3+H_2O (*1)	50 ppm (NH_3)
O_2	4 vol%
CO	2.0 vol%
CO_2	2.0 vol%
CO+CO_2	2.5 vol%
CH_4	100 ppm
CO+O_2	CO: 200ppm O_2: 5vol%

- **Measuring method**
  Cross-stack system (path system)
- **Laser class**
  CLASS 1M
- **Display**
  LCD with back light
- **Output signal**
  4 to 20mADC or 0 to 1VDC
- **Response speed**
  1 to 5 sec. or 1 to 2 sec.
- **Zero drift**
  ±2.0%FS for 6 months

Features:

1) Range for H_2O is fixed at 50vol%.
2) ppm CaO + O2(high-temperature)
3) vol% CO + O2
4) ppm CO + O2 (instrument air purge)
5) CO + CO2
6) No sampling involved
7) No preconditioning
8) No filter
9) No catalyst

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 ease of maintenance
- Built-in magnetic or galvanic O_2 sensor (optional)

Minimum measurement range

Components	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	

Environmental Instruments

Double-beam system Infrared Gas Analyzer
<5-Component Analyzer>
(Type: ZKJ)

Applications
Boilers and industrial furnaces

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%

- **Repeatability**
  ±0.5%FS
- **Number of measurable components**
  up to 5
- **Mass**
  Approx. 22kg
- **Option** RS232C communication

Replacement for ZRJ Infrared Gas Analyzer
(Type: ZPAJ)

- **Applications**
  Emission Monitoring, Boiler
- **Measurable component and range**

Component	Minimum range	Maximum range
NO	0 … 500 ppm	0 … 5000 ppm
SO_2	0 … 500 ppm	0 … 5000 ppm
CO_2	0 … 500 ppm	0 … 100 vol%
CO	0 … 200 ppm	0 … 100 vol%
CH_4	0 … 1000 ppm	0 … 100 vol%
O_2 (Gakvanic fuel cell)	0 … 10 vol%	0 … 25 vol%
O_2 (paramagnetic)	0 … 5 vol%	0 … 100 vol%
O_2 (zirconia)	0 … 5 vol%	0 … 25 vol%

- **Repeatability**
  ±0.5% FS
- **Response time**
  10 to 30 sec. (depending on measuring range)
- **Output signal**
  4 to 20mADC or 0 to 1VDC
- **Power supply voltage**
  100 to 120VAC or 200 to 240VAC
- **Mass**
  Approx. 10 Kg.

Biomass Gas Analyser
Single beam InfraRed Gas Analyser
(Type: ZPAF)

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

- **Repeatability**
  ±0.5% FS (H_2S: ±2.0% FS)
- **Response time (for 90%)**
  10-30s (H_2S: 180s)
- **Power supply voltage**
  100-240 V AC, 50/60 Hz
- **Mass**
  Approx. 9kg
- **Outer dimensions**
  483 (W) × 133 (H) × 382 (D) mm

Flameproof Type Zirconia Oxygen Analyzer
(Type: ZFKE, ZKME)


ZKME


ZFKE

- **Applications**
  Combustion control in boilers and heating furnaces with explosive atmosphere
- **Measurable component and range**
  O_2 (0 to 2…50% [2 ranges configurable])
- **Repeatability**
  ±0.5% FS
- **Response time**
  4 to 7 sec. for 90%
- **Output signal**
  4 to 20mADC or 0 to 1VDC
- **Power supply voltage**
  100 to 120VAC or 200 to 240VAC
- **Explosion-proof standards**
  TIIS, NEPSI
- **Others**
  Sensor recovery function, replaceable zirconia sensor, Auto-calibration, RS232C/ RS485 communication

Single-beam system Infrared Gas Analyzer
<for heat treatment furnaces>
(Type: ZFG)

- **Applications**
  CO, CO_2, and CH_4 concentration measurement in heat-treatment furnaces
- **Measurable components and ranges**
  CO_2: 0 … 0.5 … 100%
  CO: 0 … 0.5 … 100%
  CH_4: 0 … 1 … 10%
- **Repeatability**
  ±0.5%FS
- **Number of measurable components**
  up to 2
- **Mass**
  Approx. 5kg
- **Outer dimensions**
  211×218×257mm
- **Option**
  CP (Carbon Potential) calculation

Infrared CO_2 Controller
(Type: ZFP9)

- **Applications**
  Green houses, ventilation systems for building and parking lot, CA (Controlled Atmosphare) storage facilities
- **Measurable component and range**
  CO_2 (0 to 0.2 ... 20%)
- **Mass flow sensor equipped**
- **Repeatability**
  ±0.5% FS
- **Zero drift**
  ±10%FS/6 months
- **Outer dimensions**
  257×220×85mm
- **Mass**
  Approx. 3kg

Thermal Conductivity Gas Analyzer
(Type: ZAF)

- **Applications**
  Air separation plants, semiconductor equipment, baking furnace
- **Measurable components and ranges**
  H_2 (0 to 3……100%) He (0 to 5……100%)
  Ar (0 to 10……100%) CH_4 (0 to 20……100%)
  CO_2 (0 to 10.....100%)
- **Repeatability**
  ±1% FS
- **Outer dimensions**
  240×192×192mm
- **Mass**
  Approx. 5kg
- **Option**
  RS232C communication, auto-calibration, linearized output, concentration alarm output

Flameproof Type Thermal Conductivity Gas Analyzer
(Type: ZAFE)

- **Applications**
  Air separation plants, semiconductor equipment, baking furnace
- **Measurable components and ranges**
  H_2 (0 to 3……100%) He (0 to 5……100%)
  Ar (0 to 10……100%) CH_4 (0 to 20……100%)
  CO_2 (0 to 10.....100%)
- **Repeatability**
  ±1% FS
- **Outer dimensions**
  470 x 354 x 211mm
- **Mass**
  Approx. 22kg
- **Option**
  RS232C communication, auto-calibration, linearized output, concentration alarm output
- **Explosion-proof standards**
  NEPSI

Portable Type Infrared Gas Analyzer
(Type: ZSVS)

- **Applications**
  Heat treatment furnaces
- **Measurable components and ranges**
  CO_2 (0 to 200ppm…100%)
  CO (0 to 200ppm…100%)
  CH_4 (0 to 1000ppm…100%)
  O_2 (0 to 5%……25%)
- **Repeatability**
  ±0.5% FS
- **Output signal**
  4 to 20mADC, 0 to 1VDC, RS232C communication
- **Outer dimensions and mass**
  365×211×527mm / Approx. 12kg
- **Option**
  CP (Carbon Potential) calculation

Paramagnetic Oxygen Analyzer
(Type: ZKG)

- **Applications**
  Process control, environmental monitoring
- **Measurable component and range**
  O_2 (0 to 10, 25, 50, 100%)
- **Repeatability**
  ±0.5% FS
- **Response time**
  15 sec. for 90%
- **Output signal**
  4 to 20mADC or 0 to1VDC
- **Power supply voltage**
  85 to 264VAC 50/60Hz
- **Outer dimensions**
  190 (W) × 240 (H) × 234 (D) mm

Gas Analyzers

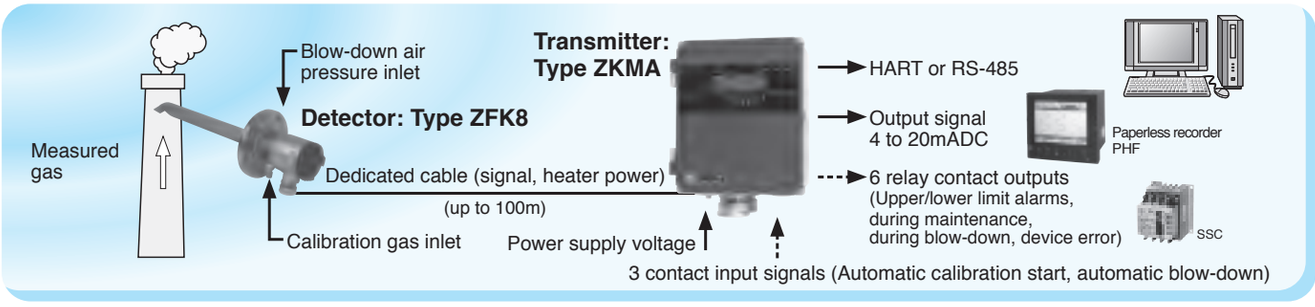
Paramagnetic Oxygen Analyzer
(Type: ZAJ)

- **Applications**
  Process control, environmental monitoring
- **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)**
- **Mass**
  Approx. 16kg
- **Repeatability** ±1% FS
  Measurement Range
  When reference gas is air: 21 … 23 … 100% O_2
  When reference gas is 100% O_2: 100 … 98 … 0% O_2
  (configurable)

Direct Insertion Type Zirconia Oxygen Analyzer
(Type: ZFK8, ZKM)

- **Applications**
  Combustion control in boilers, heating furnaces
- **Measurable components and ranges**
  0_2 (0 to 2…50% (user configurable))
- **Repeatability**
  ±0.5% FS
- **Response time**
  4 to 7 sec. for 90%
- **Output signal**
  4 to 20mADC or 0 to1VDC
- **Converter structure**
  IP66 or IP67
- **Others**
  Replaceable zirconia element
  Auto-calibration, HART/ RS485 communication

■ System diagram of Zirconia Oxygen Analyzer



■ Gas Sampling Devices

Gas Extractor
(Type: ZBA)

- **For flue gas extraction**
- **Electric heating system, with built-in SUS mesh filter**
- **upto 1300°C**

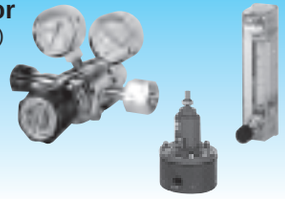
Gas Filter
(Type: ZBB)

- **For elimination of dust and SO_3 mist from sample gas**
- **Mist filter, membrane filter, gas filter**
- **Component eliminator**

Gas Cooler
(Type: ZBC)

- **Dehumidification of sample gas**
- **Electronic type**
- **Outlet gas dew point: 1 to 3°C**
- **Sample flow rate: 1.5L/min**

Flowmeter and Regulator
(Type: ZBD)

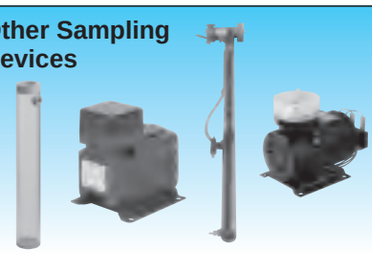


- **Gas pressure and flow rate adjustment**
- **Needle Valve (ZBD2)**
- **Flowmeter (ZBD4, 5)**
- **Pressure Regulator for standard gas (ZBD6)**

Gas Converter
(Type: ZDL)

- **Conversion of gas components**
- **NO_2—NO** Conversion
- **CO—CO_2** Conversion

Other Sampling Devices

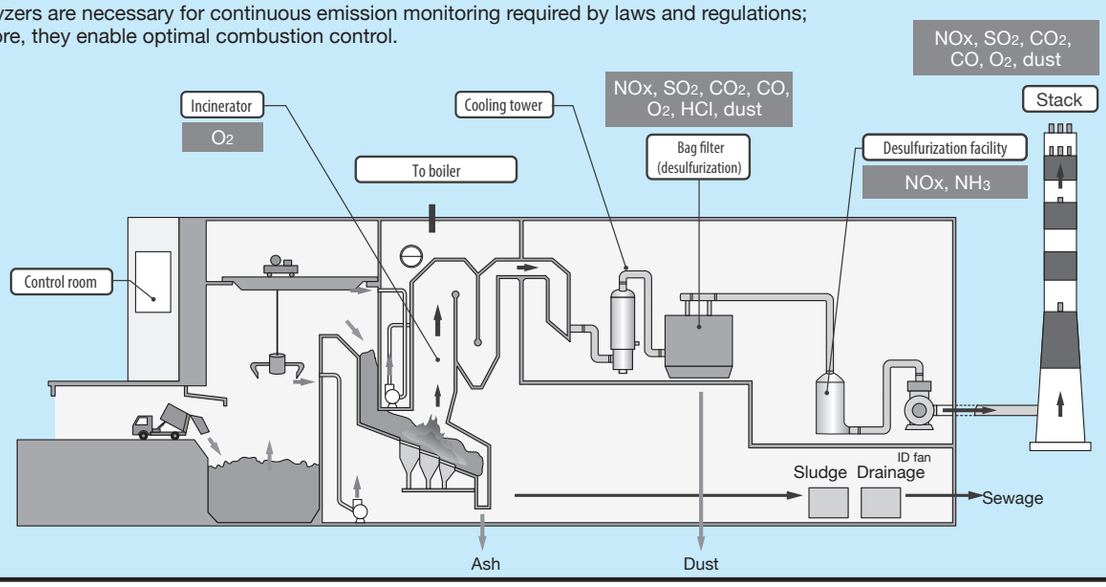


- **Gas Drier (ZBJ)**
- **Flow Path Switching Valve (ZBF)**
- **Drain Pot, Trap (ZBH)**
- **Gas Aspirator (ZBG)**

■Application Examples

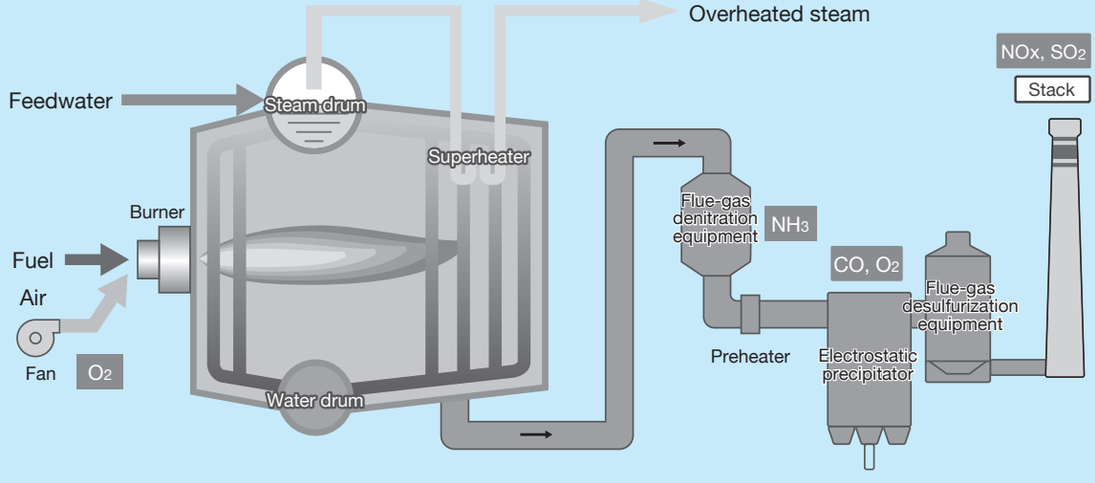
Refuse Incineration Plants

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



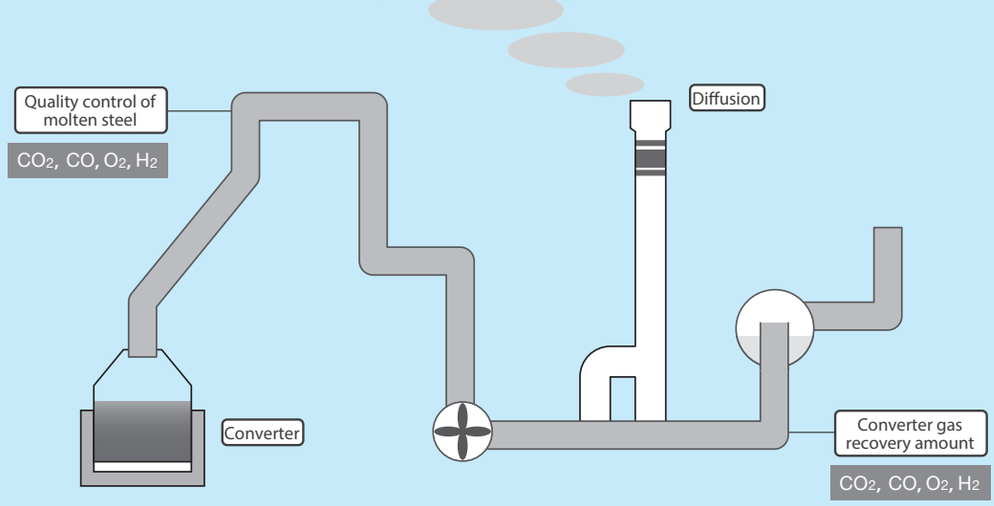
Large Industrial Boilers

Gas analysis enables optimal combustion control of boilers, which leads to reduction of both the fuel cost and pollutant.



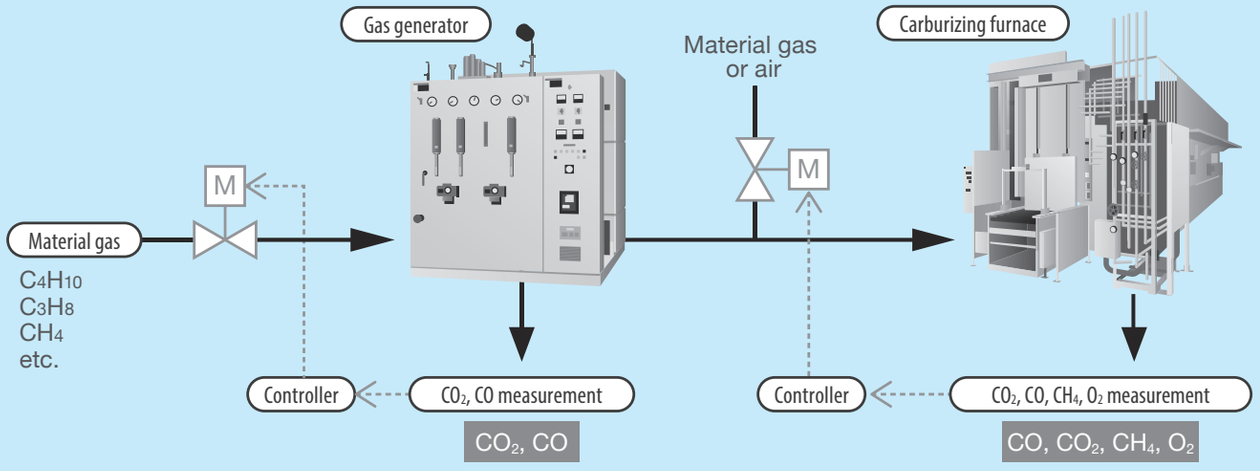
Converter Furnaces in Steelmaking Process

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.



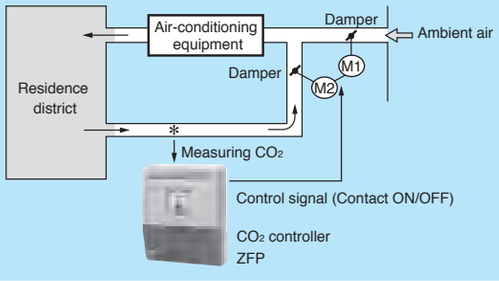
Heat Treatment Furnaces

Gas analyzers monitor the components relate to CP (carbon potential), such as CO_2, CO, CH_4, NH_3, H_2, and O_2, through which reliable quality control is achieved.



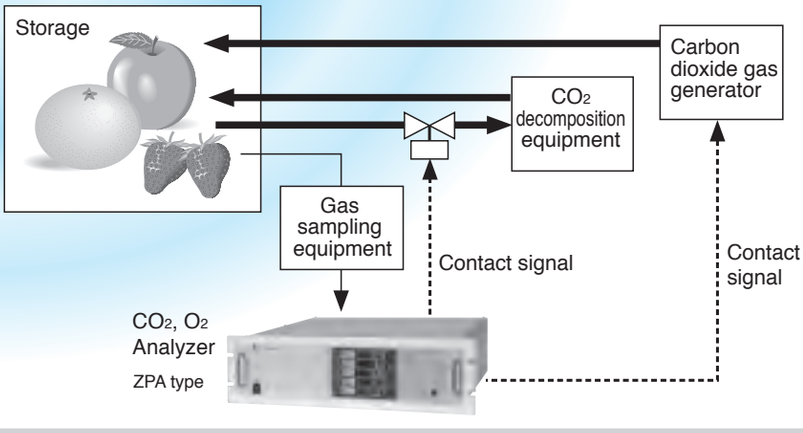
Most recommended for energy saving in air-conditioning of buildings is a CO_2 controller !

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.

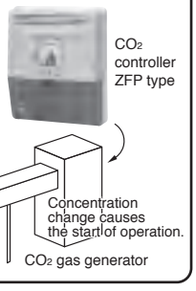


Infrared CO_2 and O_2 gas analyzer for storage of foodstuffs such as vegetable and fruit

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



To grow vegetables 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.



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