

PARAMAGNETIC OXYGEN ANALYZER

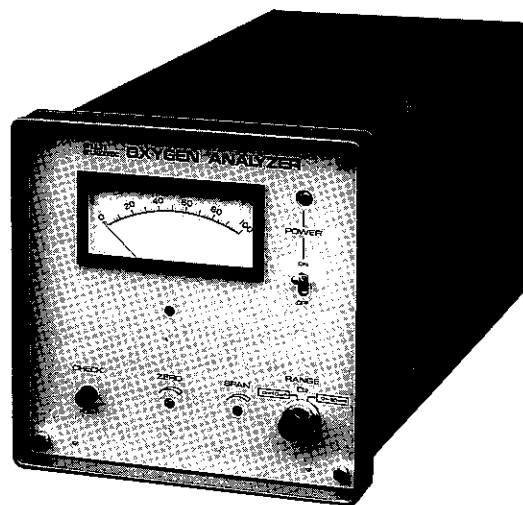
DATA SHEET
ZAJ

The paramagnetic (pressure detection type) oxygen analyzer measures oxygen content in sample gases by converting oxygen concentration into a pressure, depending on the magnetic property of oxygen. As compared with the conventional magnetic oxygen analyzer, the model ZAJ is excellent in performance such as selectivity and response. Nowadays, it is necessary to measure oxygen concentration more quickly and accurately over a broad range. Features of this analyzer ensure exact process control and will provide great effects in energy saving, etc.

This product has passed a type approval test specified by the Japanese authority: Certificate No.: SF816

FEATURES

1. Because of a pressure detection type, response is quick. 90% response can be reached within 3sec with the standard type, and within 1.5sec with the high speed type.
2. Measurements are scarcely affected by coexisting gases (H₂, CO₂ etc).
3. Stability is high with almost no drift.
4. Suppression is possible for measurements on a narrow scale range (for example, 100 to 95% O₂).
5. Normal measurements are possible even when the instrument is installed at a tilt.
6. A linearizer is not necessary since concentrations are linearly converted into electrical signals.
7. Combustible gases do not affect measurements.
8. Parts which are brought in contact with gases are made of anticorrosive materials such as stainless steel and teflon.



SPECIFICATIONS

Measuring range:	0 to 2/25, 5/25, 10/25, 20/25, 25/50, 25/100 %O ₂ 21 to 23/100, 26/100, 31/100, 41/100, 61/100, 19/0, 16/0, 11/0 %O ₂ 100 to 98/0, 95/0, 90/0, 75/0, 50/0 %O ₂
Measuring system:	Paramagnetic type
Output signal:	0 to 1V DC (load 500Ω min.) 4 to 20mA DC (load 550Ω max.)
Repeatability:	± 0.5% max. of full scale (in 10% or higher ranges) ± 1% max. of full scale (in ranges below 10%)
Zero drift:	± 1% (max.) of full scale/week (in 10% or higher ranges) ± 1.5% (max.) of full scale/week (in ranges below 10%)
Span drift:	± 2% (max.) of full scale/week
Response time:	3 sec max. (standard type) 1.5 sec max. (high speed type) (for indication of 90%)

Power supply: 100V ± 10V AC, 50/60Hz

Power consumption:

Approx. 75W

Ambient temperature:

-5 to +45°C

Allowable (max.) external vibration:

1.0m/s²(0.1G)(0 to 30Hz)

0.5m/s²(0.05G)(30 to 100Hz)

Ambient humidity:

Less than 90% RH

Sample gas temperature:

0 to 40°C

Sample gas flow rate

0.5ℓ ± 0.2ℓ/min (standard type)

1ℓ ± 0.2ℓ/min (high speed type)

Pressure loss: About 1.3kPa (about 130mmH₂O)(at sample gas flow rate 0.5ℓ/min)

About 2.8kPa(about 280mmH₂O)(at sample gas flow rate 1 ℓ/min)

Auxiliary gas: N₂, O₂ gas or air

Auxiliary gas pressure:

98kPa(1.0kgf/cm²)

(flow rate; 5 to 15ml/min)

Purging gas (dry air or N₂) flow rate:

1ℓ/min

(flowed for purging corrosive ambient gas)

Warmup time: 2 hours

Materials of gas-contacting parts:

Teflon and 304 stainless steel

Temperature characteristic:

1.5% of full scale/10°C

Interference due to coexisting gas:

(Deviation in O₂ % of zero point caused by flowing interfering gas component at 100%)

Interfering gas	Deviation in O ₂ %	Interfering gas	Deviation in O ₂ %
NO	+43	C ₃ H ₄	-0.44
NO ₂	+28	H ₂ S	-0.39
He	+0.30	HCl	-0.30
H ₂	+0.24	CO ₂	-0.27
Ne	+0.13	NH ₃	-0.26
HF	+0.10	C ₂ H ₂	-0.24
CO	+0.01	Ar	-0.22
n-C ₂ H ₁₆	-2.10	SO ₂	-0.22
Xe	-0.95	N ₂ O	-0.20
C ₃ H ₈	-0.86	CH ₄	-0.20
C ₃ H ₆	-0.55	H ₂ O	-0.02
C ₂ H ₆	-0.46		

External dimensions (HxWxD):

222x222x546mm

Mass(weight): Approx. 20kg

Finish color: Munsell N3

Installation conditions:

- The instrument must be protected from direct sunlight and heat radiation from objects at high temperature.
- For installing the instrument outdoors, it must be protected from the elements with a suitable casing or cover.
- The instrument must be installed in a clean atmosphere free from corrosive or combustible gas.
- The instrument must be free from severe external vibrations.

Mounting method:

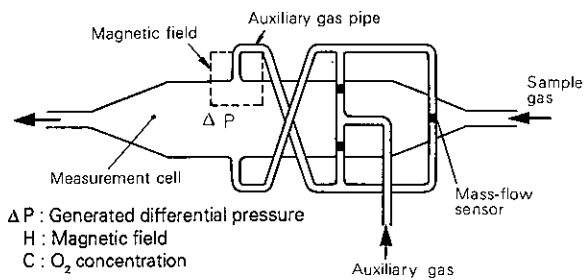
Panel mount with the instrument rear supported

CODE SYMBOLS

1 2 3 4 5 6 7 8 9									Description		
Z	A	J						3			
	1	A								Auxiliary gas	Measuring range
	1	B								N ₂	0 to 2/ 25%O ₂
	1	C									0 to 5/ 25%O ₂
	1	D									0 to 10/ 25%O ₂
	1	E									0 to 20/ 25%O ₂
	1	F									0 to 25/ 50%O ₂
	*	1	Z								0 to 25/100%O ₂
											Other
	2	A								Air	21 to 23/100%O ₂
	2	B									21 to 26/100%O ₂
	2	C									21 to 31/100%O ₂
	2	D									21 to 41/100%O ₂
	2	H									21 to 61/100%O ₂
	2	L									21 to 19/0%O ₂
	2	M								21 to 16/0%O ₂	
	2	N								21 to 11/0%O ₂	
	*	2	Z								Other
	3	L								O ₂	100 to 98/0%O ₂
	3	M									100 to 95/0%O ₂
	3	N									100 to 90/0%O ₂
	3	P									100 to 75/0%O ₂
	3	Q									100 to 50/0%O ₂
	*	3	Z								Other
										Note: 2 ranges selectable	
										Response time	
	0									Standard type (3 sec/90% of full scale)	
	1									High speed type (1.5 sec/90% of full scale) (5% or more O ₂ of full scale)	
										Power supply	
	5									100V AC 50Hz	
	6									100V AC 60Hz	
	0									For general service	
	1									For approval test by Japanese authority (allowed only with 1 at 4th digit)	

• Asterisked (*) items: Non-standard.

PRINCIPLE OF MEASUREMENT



ΔP : Generated differential pressure
 H : Magnetic field
 C : O₂ concentration

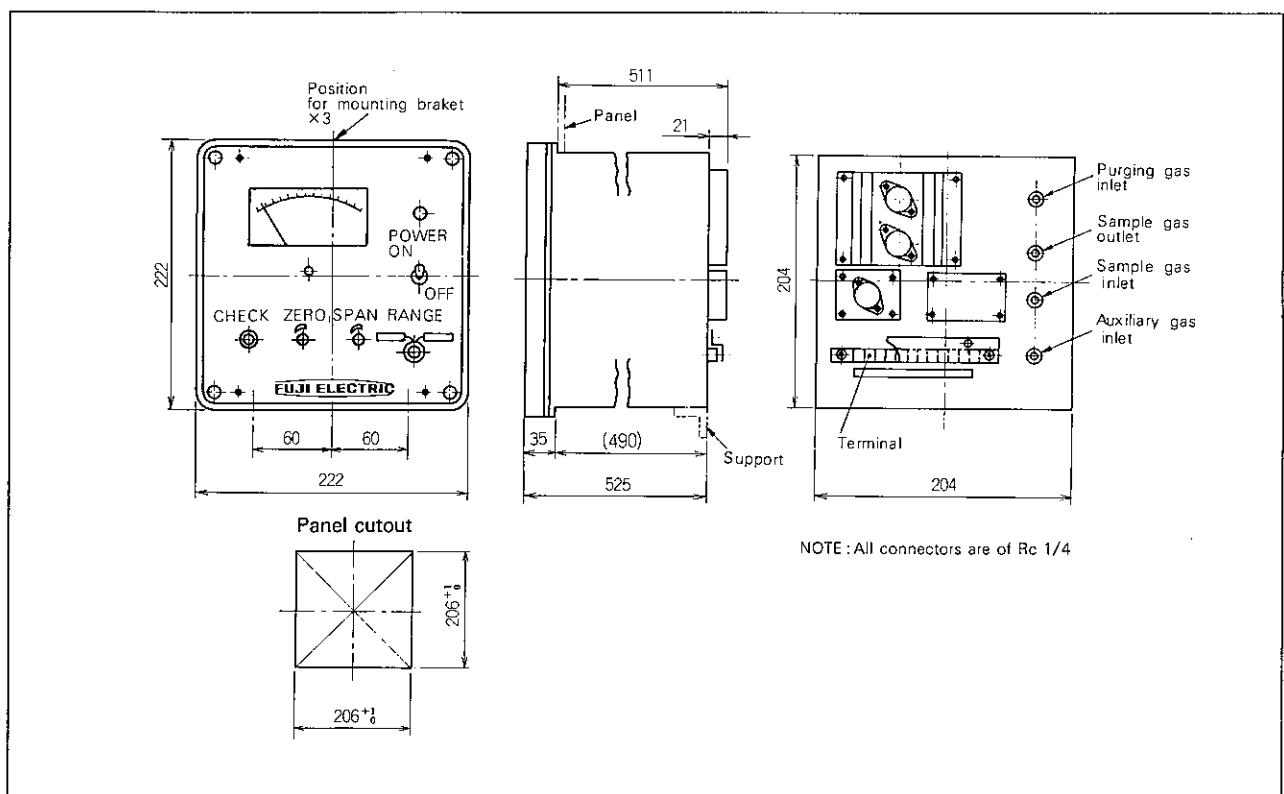
$$\Delta P = \frac{1}{2} H^2 C$$

The detection block consists of a measurement cell, auxiliary gas pipe and mass-flow detector. An intermittent magnetic field due to an electromagnet is generated in the magnetic field area enclosed by dashed line. Sample gas is now flowed through the measurement cell and trace-volume auxiliary gas N₂ is flowed through the auxiliary gas pipe. As soon as a magnetic field is generated in one of the joints between the auxiliary gas pipe and measurement cell (indicated by dashed line), oxygen in the measurement cell is attracted toward the center of magnetic field. At this time, N₂ in the auxiliary gas pipe is unaffected by the magnetic force. Therefore, a pressure ΔP toward the auxiliary gas pipe is built up. The pressure reaches the sensor instantaneously through the pipe, where it is converted into an electric signal. The electric signal is proportional to oxygen concentration. In case the auxiliary gas is air or oxygen, a pressure is generated in proportion to a concentration difference between the oxygen contained in auxiliary gas and that in sample gas. Therefore, output become zero when flowing air in case the auxiliary gas is air, and when flowing oxygen in case the auxiliary gas is oxygen. Scale begins with 21% O₂ and 100% O₂, respectively.

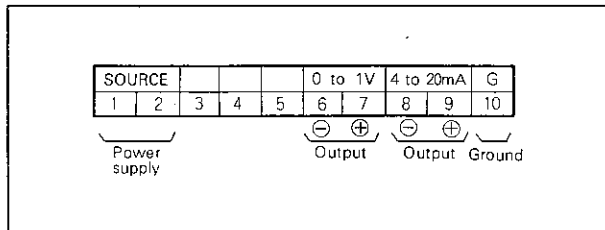
Note

- (1) When using this analyzer, be sure to provide a buffer tank in the exhaust path immediately after the analyzer. This is required for preventing output fluctuation due to disturbances such as large noise and strong wind.
- (2) In case of air-standard range, span gas concentration should be ordered by specifying 80 to 100% of the full scale. At this time, clearly describe "manufacture according to Japanese law for weighing and accuracy within O₂ concentration corresponding to $\pm 1\%$ of full scale." Otherwise, concentration error will increase.
 [Example] In case of 21 to 19% O₂ range:
 Span gas concentration
 19.0 to 19.4% O₂/N₂, manufacture according to Japanese law for weighing, accuracy within $\pm 0.02\%$ O₂.
 The specification of 19.0 to 19.4 % O₂/N₂ is for designating a concentration range of 80 to 100% of the full scale. Because of special gas, order should be placed via Fuji Electric.
- (3) In case of oxygen-standard range, use O₂ gas of purity 99.99% or more for zero gas in ranges of 10% or less O₂ full scale, and that of purity 99.9% or more in other ranges.
- (4) The quick type can be manufactured 5% O₂ or more of full scale.
- (5) Type approval range according to the Japanese laws for measurement and weighing.
 0 to 5%, 0 to 10%, 0 to 20%, 0 to 25% O₂

OUTLINE DIAGRAM (Unit: mm)



CONNECTION DIAGRAM



SCOPE OF DELIVERY

Analyzer unit
 2 of fuses
 Accessory for auxiliary gas (6 of packings, 1 of restrictor, 2 of filters)
 Panel mounting bracket
 2 of wrenches

Items to be prepared separately

Sampling device
 Auxiliary gas cylinder
 Gas cylinder for zero/span calibration
 Pressure regulation valve
 Pressure switch
 Buffer tank

ORDERING INFORMATION

1. Component of sample gas and scale range
2. Type of auxiliary gas
3. Maximum, normal and minimum concentrations of sample gas as well as types and content (% by volume) of coexisting gases at each concentration of sample gas.
4. Temperatures (maximum, normal and minimum), pressure and humidity and dust conditions (mg/Nm³, particle size, nature, etc.) of sample gas.
5. Ambient conditions at the installation site.
6. Corrosive gas component contained in sample gas (should be mentioned even when contained in a trace amount).
7. Standard calibration gases (zero gas and span gas).
8. Other details should be filled in the specification inquiry sheet for paramagnetic oxygen analyzer.

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