

THERMAL CONDUCTIVITY GAS ANALYZER THERMOMAT

DATA SHEET

ZAF

In modern industries, it is indispensable to analyze components and measure concentrations of mixture gases and combustion gases for strict quality control and to file data for establishing production schedules which will allow proper management of industrial processes.

Of the various analytical methods and measuring principles available for analyzing process gases, this gas analyzer utilizes the fact that electric resistance of a heated platinum wire changes depending on kind and concentration of gas.

Kind of Gas	Relative thermal conductivity (at 0°C) expressed taking that of air (5.572×10^{-5} cal/cm.sec. deg.) as 1
Sulfur dioxide SO ₂	0.2
Carbon dioxide CO ₂	0.3
Argon Ar	0.4
Carbon monoxide CO	0.5
Water vapor (100°C) H ₂ O	0.6
Air	1.0
Nitrogen N ₂	1.2
Oxygen O ₂	1.3
Methane CH ₄	1.5
Hydrogen H ₂	2.0



FEATURES

1. Continuous measurement possible.
2. Quick response.
3. Integral unit incorporating detector, current regulator and indicator.
4. Simple and robust mechanism assuring high maintainability.
5. Minimum influence due to external and operating conditions.
6. Stable accuracy.

SPECIFICATIONS

Measuring principle:

Measurement of thermal conductivity

Measuring component:

Two-component gases (from viewpoint of thermal conductivity) such as CO₂, H₂, Ar, CH₄, He, SF₆

Measuring mode:

1 range or 2 ranges (for measuring the same sample gas components with the same measuring system)

Measuring range:

CO ₂	0 to 10 100
	100 to 90 0
H ₂	0 to 3 100
	100 to 95 0
Ar	0 to 10 100
	100 to 90 0
CH ₄	0 to 20 100
	100 to 80 0
He	0 to 5 100
	100 to 90 0

Output signal:

DC 4 to 20 mA
(load resistance less than 400Ω)
DC 0 to 10mV
(output resistance 100Ω)

} Simultaneously available

[0 to 100μA (load resistance 100Ω) is further available for special specification.]

Repeatability:

±1% of F.S.

Drift:

Within zero point ±2.5% of full scale/week
Within span ±2% of full scale/week

Response speed:

Within 30 sec for 90% response (for 20% CO₂)
 Within 60 sec for 90% response (for 0 to 10% H₂)
 (varies with kind of gas and range)

Sample gas flow rate:

0.4 ± 0.05 /min, constant

Standard requirements for sample gas:

Temperature 0 to 50°C
 Dust 0.3µm or less
 Pressure 10kPa or less
 (flow rate 0.4L/min)

Materials of gas-contacting parts:

Lead, stainless steel JIS SUS316, platinum, platinum iridium, epoxy resin, silver, fluororubber

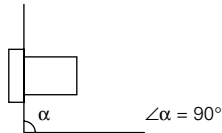
Power supply: AC 100V ± 10%, 50/60 Hz

110V, 200V, or 220V usable for special specification

Power consumption:

Approx. 10VA

Mounting: Indoor panel plug-in



Warmup time: At least 30 min.

Ambient temperature:

-5 to 45°C

Ambient humidity:

Less than 90% RH

Weight: Approx. 5kg

External dimensions (H x W x D):

240x197x 212 mm

Finish color: Munsell 7.5BG 3.2/0.8

CODE SYMBOLS

Z	A	F	P	2	Description																																																						
					<table border="1"> <thead> <tr> <th>Reference gas</th> <th>Sample gas</th> <th>Measuring range</th> </tr> </thead> <tr> <td>3A</td> <td>N₂</td> <td>CO₂</td> <td>0 to 20%</td> </tr> <tr> <td>4A</td> <td>N₂</td> <td>CO₂</td> <td rowspan="4">Others than 0 to 20%</td> </tr> <tr> <td>4B</td> <td></td> <td>H₂</td> </tr> <tr> <td>4C</td> <td></td> <td>Ar</td> </tr> <tr> <td>4D</td> <td></td> <td>CH₄</td> </tr> <tr> <td>4E</td> <td></td> <td>He</td> <td rowspan="2">As specified by customer (See the table below)</td> </tr> <tr> <td>4F</td> <td></td> <td>SF₆</td> </tr> <tr> <td>4Z</td> <td></td> <td>Others</td> <td></td> </tr> <tr> <td>6A</td> <td>Others than N₂ gas</td> <td>CO₂</td> <td rowspan="6">As specified by customer (See the table below)</td> </tr> <tr> <td>6B</td> <td></td> <td>H₂</td> </tr> <tr> <td>6C</td> <td></td> <td>Ar</td> </tr> <tr> <td>6D</td> <td></td> <td>CH₄</td> </tr> <tr> <td>6E</td> <td></td> <td>He</td> </tr> <tr> <td>6F</td> <td></td> <td>SF₆</td> </tr> <tr> <td>6Z</td> <td></td> <td>Others</td> <td></td> </tr> </table>	Reference gas	Sample gas	Measuring range	3A	N ₂	CO ₂	0 to 20%	4A	N ₂	CO ₂	Others than 0 to 20%	4B		H ₂	4C		Ar	4D		CH ₄	4E		He	As specified by customer (See the table below)	4F		SF ₆	4Z		Others		6A	Others than N ₂ gas	CO ₂	As specified by customer (See the table below)	6B		H ₂	6C		Ar	6D		CH ₄	6E		He	6F		SF ₆	6Z		Others	
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| | | | | | | Power supply | | |--------------|-----------------| | 1 | AC 100V 50/60Hz | | 2 | AC 110V 50/60Hz | | 3 | AC 200V 50/60Hz | | 4 | AC 220V 50/60Hz | |
| | | | | | | Measuring | | |-----------|---| | 1 | 1 range | | 2 | 2 ranges (available only for measuring the same sample gas) | |

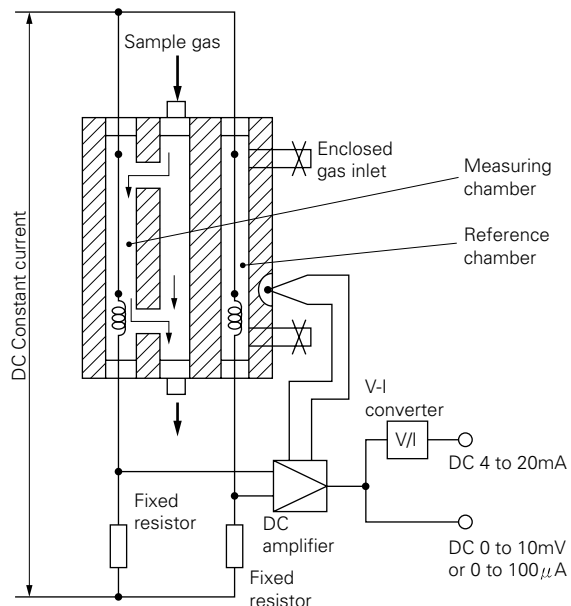
(Note 1) Reference gas components are as listed in the table below.
 (Note 2) Sample gas, hereby, means a gas components to be measured, and reference gas stands for each component other than the sample gas (remaining gas component).

STANDARD MEASURING

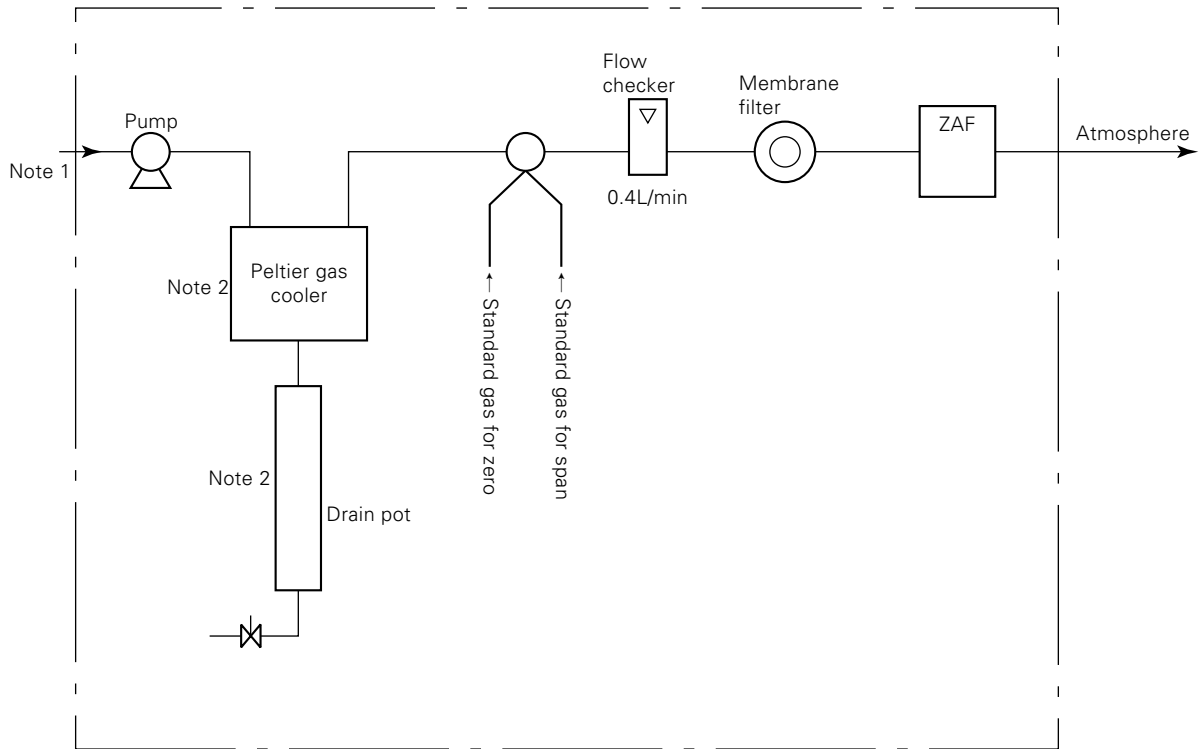
Measuring gas	Comparison gas component	Measuring range	Range ratio	Output characteristic
CO ₂	N ₂ , O ₂ , Air, He	0-10, 20, 50, 100% 100-90%, 100-80%	1 : max. 5	0-10, 20% : Linear Others : non-linear
	Ar	Impossible		
H ₂	N ₂ , CO ₂ , Ar	0-3, 5, 10, 20, 50, 80, 100% 100-90%, 100-80%	1 : max. 10	100-90% : Linear Others : non-linear
	Air, O ₂	Impossible		
Ar	N ₂ , O ₂ , Air, He	0-10, 20, 50, 80, 100% 100-90%, 100-80%	1 : max. 5	0-10, 20%, 100-90% : Linear Others : non-linear
	CO ₂	Impossible		
CH ₄	N ₂ , CO ₂ , Ar, He	0-20, 40, 50, 60, 80, 100% 100-80%	1 : max. 5	Non-linear
	Air, O ₂	Impossible		
He	N ₂ , CO ₂ , Ar, O ₂ , Air	0-5, 10, 20, 30, 40, 50, 80, 100% 100-90%, 100-80%	1 : max. 10	100-90% : Linear Others : non-linear

(Note 1) Linear output is ±2.5% FS or less.
 (Note 2) On 2-range type, the zero point is used in common.
 (Note 3) When sample gas consists of more than 3 components, contact our office with a table of gas components submitted for confirmation of whether or not applicable analyzers are available.

MEASURING PRINCIPLE

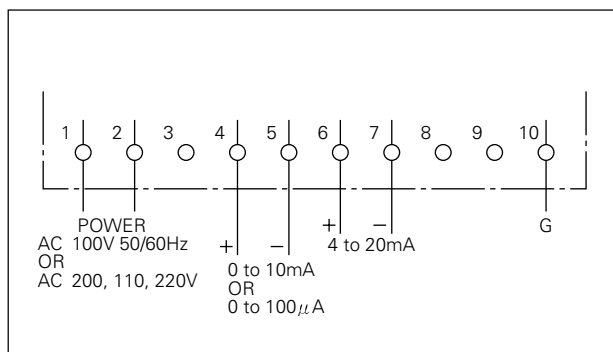


GAS SAMPLING SYSTEM DIAGRAM (EXAMPLE)



(Note 1) Dust must be purged adequately (for protection of the pump, flowmeter, etc.).
 (Note 2) Unnecessary when sample gas is dry.

CONNECTION DIAGRAM



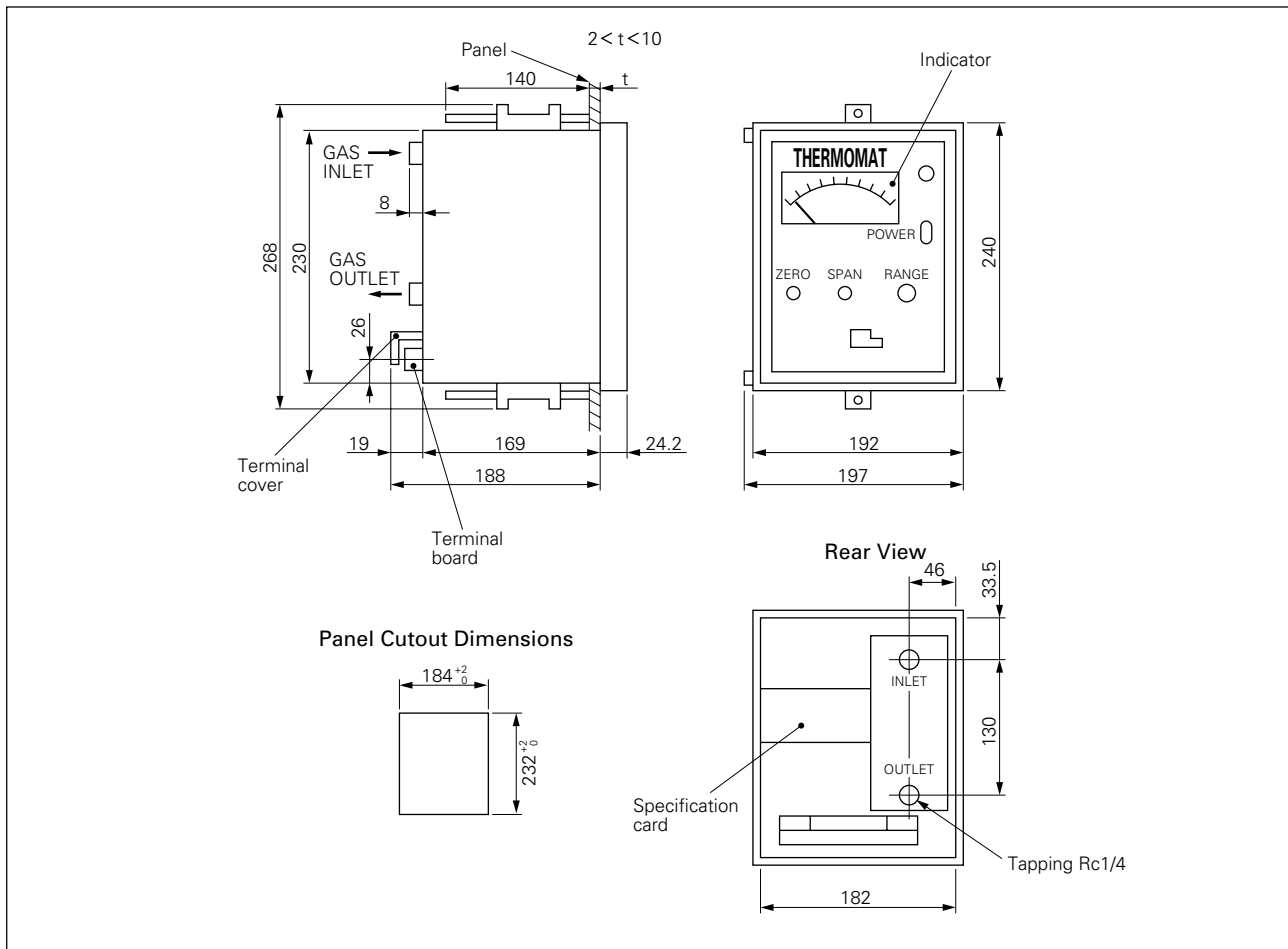
SCOPE OF DELIVERY

- Analyzer main unit
- Panel mounting brackets
- Fuse 2 pieces

Items to be prepared separately

- Sampling equipment
- Receiving instrument

OUTLINE DIAGRAM (Unit:mm)



Asterisked * items: Non-standard

⚠ Caution on Safety

*Before using this product, be sure to read its instruction manual in advance.

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