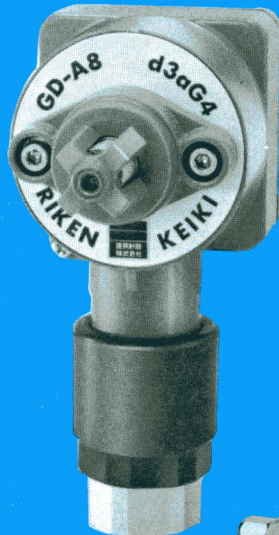


# RIKEN

## GAS DETECTOR HEADS

FOR COMBUSTIBLE GAS ALARM SYSTEM  
<CATALYTIC COMBUSTION METHOD>

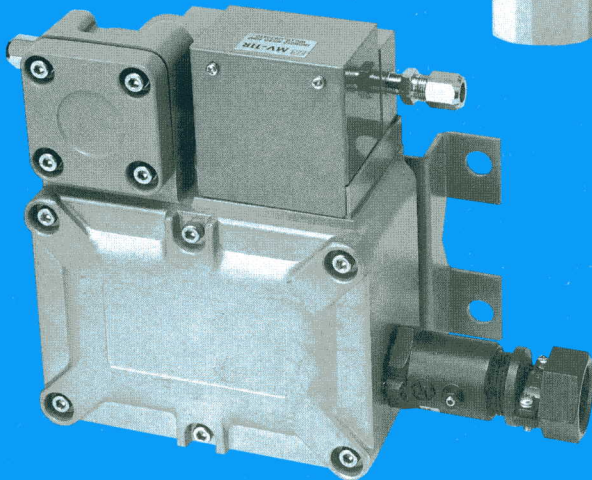
Diffusion sampling type  
GD-A8



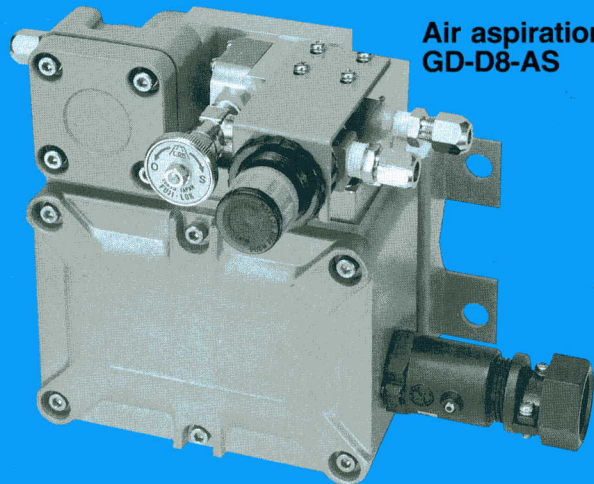
### FEATURES

- Compact & lightweight
- Easy maintenance
- Quick-fit sensor replacement
- Compatible sensor for diffusion sampling and sample drawing detector heads
- Long life sampling pump (GD-D8)
- Explosion proof
- Wide variety of accessories

Sample drawing type  
by built-in pump  
GD-D8/GD-D8DC



Air aspiration type  
GD-D8-AS



### DETECTION PRINCIPLE

#### Catalytic combustion method

The values of LEL concentration of combustible gas vary with the kinds of gases, but the calorific values of combustion of those gases at LEL concentration are almost the same except for some cases.

Ce. Q = const...

(Burgers Wheeler's Law)

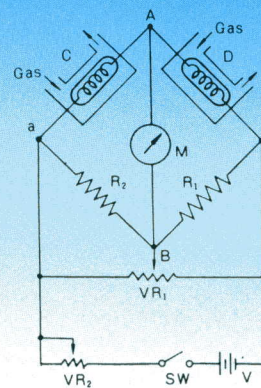
Ce: Concentration at the lower explosive limit (LEL)

Q: Calorific value of combustion per mol (kcal/mol)

As a detection principle of combustible gas detector which is used for prevention of explosion, a method to measure the calorific value of combustion is the most suitable and ideal.

Combustible gas is introduced to the sensor preheated to an appropriate temperature so that its catalytic combustion is caused, and the changes in electric resis-

tance of platinum filament due to the then generated heat of combustion are detected on the wheatstone bridge. This electric output is directly in proportion to the concentration of combustible gas in air.



- D: Detecting element
- C: Compensating element
- R1, R2: Fixed resistor (R1, R2 modulized)
- M: Meter
- VR1: Zero adj. potentiometer
- VR2: Voltage adj. potentiometer



RIKEN KEIKI CO.,LTD.

RIKEN offers the widest selection of remote detector heads available in the industry. They meet the many special sampling conditions that are encountered in different applications and in different environments.

The sample drawing type detector head including air aspiration type is recommended for applications where the diffusion detection technique may not be suitable such as;

- a) Enclosed spaces that may not be accessible
- b) Samples area which are excessively dirty or heavy laden with moisture.
- c) Atmospheres containing low oxygen
- d) Elevated temperature conditions, etc.

They are installed in hazardous area where combustible gases or vapours may be released and connected with central monitoring station by 4-core or 6-core (GD-D8 only) multi-conductor cable.

## SPECIFICATIONS

Model	GD-A8	GD-A8-18	GD-D8	GD-D8DC	GD-D8-AS
Gas sample method	Static diffusion		Magnetic-driven pump suction		Air aspiration
Gases to be detected	Hydrogen, general combustible gas	Acetylene	General combustible gas		
Detectable range <sup>1)</sup>	0 ~ 100% LEL (LFL) or 0 ~ 50% LEL (LFL)				
Response time <sup>2)</sup>	Within 20 sec.		Within 20 sec with 1 m length of piping		
Structure	Explosion proof				
Approval No.	43642	43644	38169	C10395	38169
Kind of explosion class & ignition group of objective gases	d3aG4 <sup>3)</sup>	d3a·cG4 <sup>3)</sup>	d2G4 <sup>3)</sup>		
Operating conditions	-10°C ~ +40°C, below 95% R.H.				
Applicable cable and cable leading method	4-core cable permitted for explosion proof construction		6-core cable permitted for explosion proof construction		Same as for GD-A8
	Pressure-proof packing method. Acceptable outer diameter of cable: 10.5 ~ 13φ		Pressure-proof packing method or pressure-proof steel conduit method. Acceptable outer diameter of cable: 13 ~ 15φ		
Utility required	—		For pump: • GD-D8 AC100V, 4VA • GD-D8DC DC24V, 5W		Instrumentation air: 1 ~ 7.5kgf/cm <sup>2</sup> G Air consumption: 0.18 Nm <sup>3</sup> /hr
Weight & Painting color	Approx 0.9kg, Munsel N5		Approx. 3.5kg, Munsel N5		
Others	Material of packing gland for GD-A8-18 is stainless steel (GD-A8 is bronze casting)		In case of corrosive gas detection, inner tubings are teflon-coated and piping union is of stainless steel make Sample flowrate: 0.8 l / min and above		
Applicable piping for outer connections	—		Outer diameter: 8φ Inner diameter: 6φ Copper or stainless		

1) 0 ~ 10% LEL range may be available on request.

2) Time to get an alarm when introducing 1.6 times thick gas of preset alarm level.

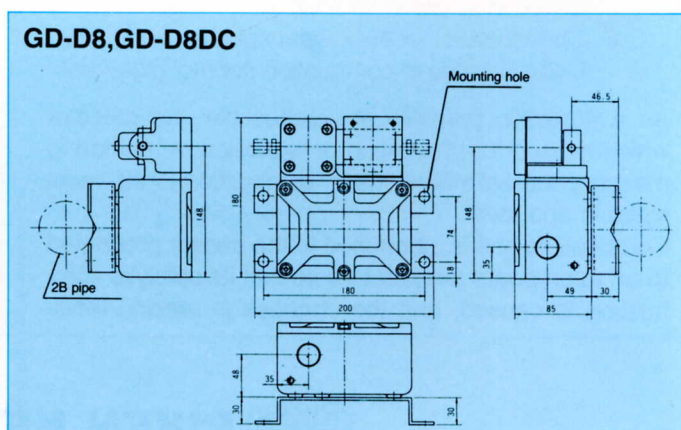
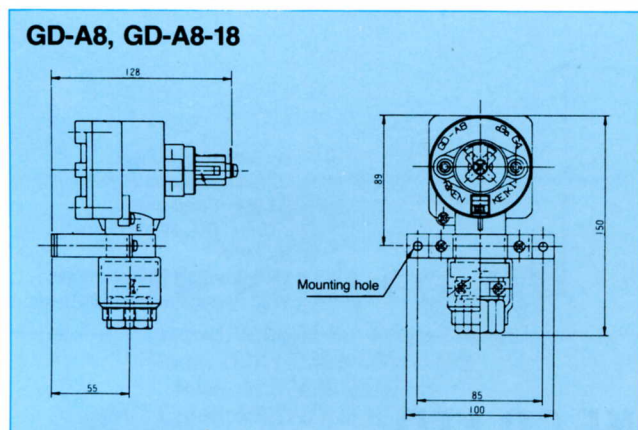
3) d3aG4 and d3a·cG4 conform to IEC IIC T4,

d2G4 conforms to IEC IIB T4.

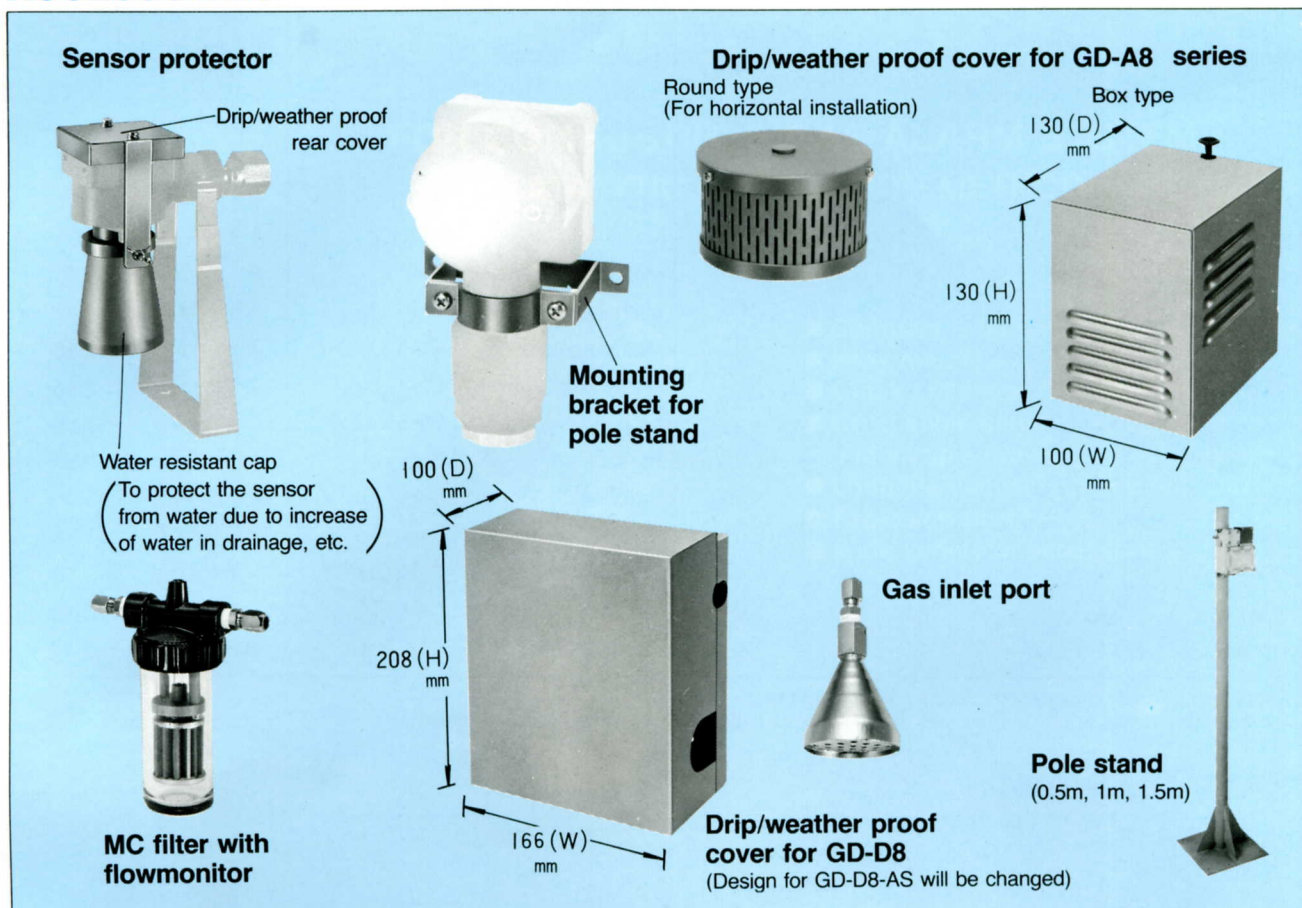
4) Special sample preconditioning device available on request for the measurement under special conditions.

5) Sample drawing method is available with GD-A8/GD-A8-18 by adding exclusive adaptor and external pump or aspirator unit.

## OUTER DIMENSIONS



# ACCESSORIES

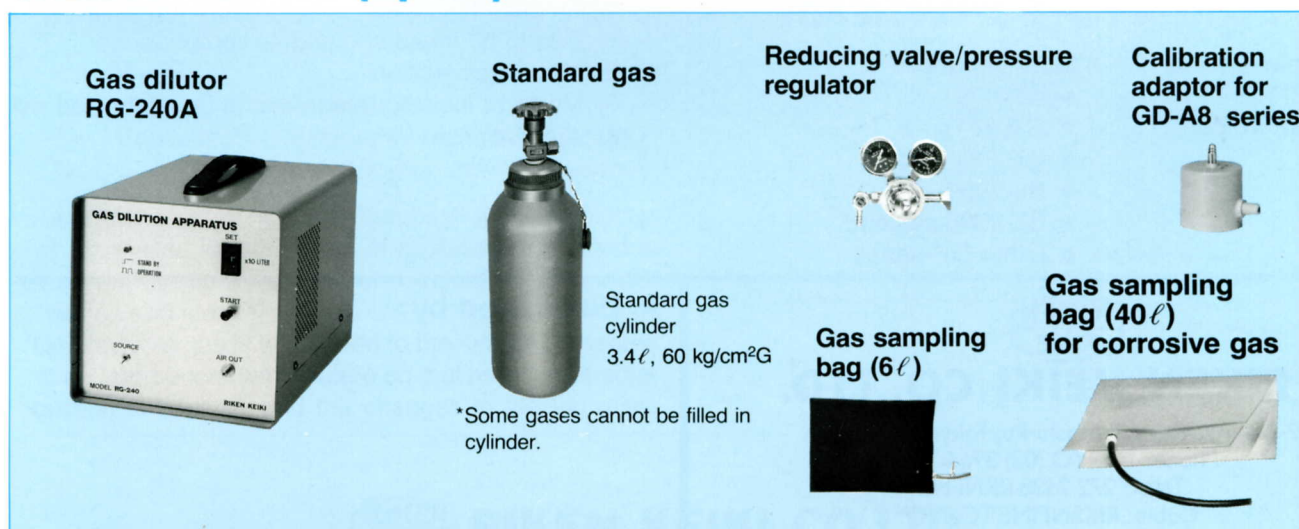


## LIST OF ACCESSORIES

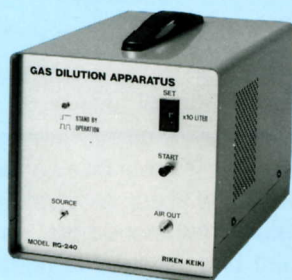
◎ Standard accessories    ○ Optional accessories.

Description	Model	GD-A8	GD-A8-18	GD-D8/D8DC	GD-D8-AS
Gas inlet port		—	—	◎	◎
MC filter with flowmonitor		—	—	◎	◎
Pressure proof packing gland		◎	◎	◎	◎
Drip/weather proof cover		○	○	◎	◎
Sensor protector		○	○	—	—
Pole stand		○	○	○	○
Mounting bracket for pole stand		○	○	—	—

## CALIBRATION KIT (Option)



Gas dilutor  
RG-240A



Standard gas



Standard gas  
cylinder  
3.4ℓ, 60 kg/cm<sup>2</sup>G

\*Some gases cannot be filled in  
cylinder.

Reducing valve/pressure  
regulator



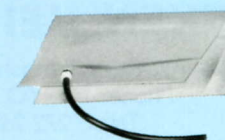
Calibration  
adaptor for  
GD-A8 series



Gas sampling  
bag (6ℓ)



Gas sampling  
bag (40ℓ)  
for corrosive gas



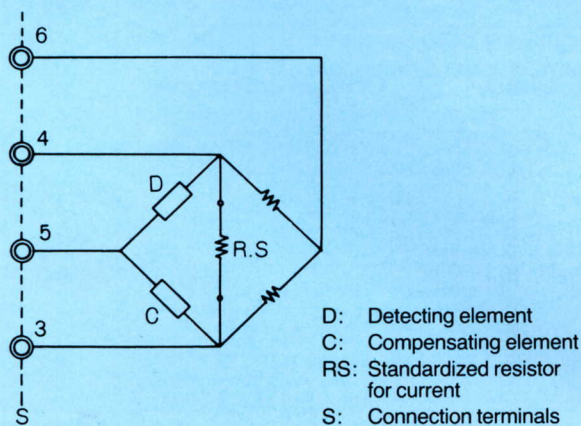
# LIST OF COMBUSTIBLE GASES & VAPOURS

Name of gas	Chemical formula	Explosive range	Molecular weight (Air = 1)	Name of gas	Chemical formula	Explosive range	Molecular weight (Air = 1)
Acetylene	C <sub>2</sub> H <sub>2</sub>	1.5 ~ 100	0.90	Gasoline		1.4 ~ 7.6	3 ~ 4
Acetone	(CH <sub>3</sub> ) <sub>2</sub> CO	2.15 ~ 13	2.00	Hexane	C <sub>6</sub> H <sub>14</sub>	1.2 ~ 7.4	2.79
Benzene	C <sub>6</sub> H <sub>6</sub>	1.2 ~ 8.0	2.70	Hydrogen	H <sub>2</sub>	4.0 ~ 75.6	0.07
Butadiene	C <sub>4</sub> H <sub>6</sub>	1.1 ~ 12.5	1.87	i-butane	i-C <sub>4</sub> H <sub>10</sub>	1.8 ~ 8.5	2.01
Butane	C <sub>4</sub> H <sub>10</sub>	1.5 ~ 8.5	2.05	Methane	CH <sub>4</sub>	5.0 ~ 15.0	0.55
Butanol	C <sub>4</sub> H <sub>9</sub> OH	1.4 ~ 11.3	2.55	Methanol	CH <sub>3</sub> OH	5.5 ~ 44	1.11
Buthyl acetate	CH <sub>3</sub> CO <sub>2</sub> C <sub>4</sub> H <sub>9</sub>	1.4 ~ 8.0	4.01	Methyl acetate	CH <sub>3</sub> CO <sub>2</sub> CH <sub>3</sub>	3.1 ~ 16	2.56
Buthylene	C <sub>4</sub> H <sub>8</sub>	2.0 ~ 9.6	1.93	Methyl ethyl ketone	CH <sub>2</sub> C <sub>2</sub> H <sub>5</sub> CO	1.8 ~ 11.5	2.48
Cyclohexane	C <sub>6</sub> H <sub>12</sub>	1.3 ~ 8.3	2.90	o-xylene	C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub>	1.0 ~ 7.6	3.66
Ethane	C <sub>2</sub> H <sub>6</sub>	3.0 ~ 15.5	1.04	Pentane	C <sub>5</sub> H <sub>12</sub>	1.5 ~ 7.8	2.50
Ethanol	C <sub>2</sub> H <sub>5</sub> OH	3.3 ~ 19	1.59	Propane	C <sub>3</sub> H <sub>8</sub>	2.0 ~ 9.5	1.56
Ethyl acetate	CH <sub>3</sub> CO <sub>2</sub> C <sub>2</sub> H <sub>5</sub>	2.1 ~ 11.5	3.04	Propylene	C <sub>3</sub> H <sub>6</sub>	2.0 ~ 11.7	1.49
Ethylene	C <sub>2</sub> H <sub>4</sub>	2.7 ~ 34	0.97	Stylene	C <sub>6</sub> H <sub>5</sub> CHCH <sub>2</sub>	1.1 ~ 8.0	3.59
Ethylene oxide	C <sub>2</sub> H <sub>4</sub> O	3.0 ~ 100	1.52	Toluene	C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>	1.2 ~ 7.0	3.18
Ethyl ether	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> O	1.7 ~ 36	2.55	Vinyl chloride	CH <sub>2</sub> CHCl	3.8 ~ 29.3	2.16

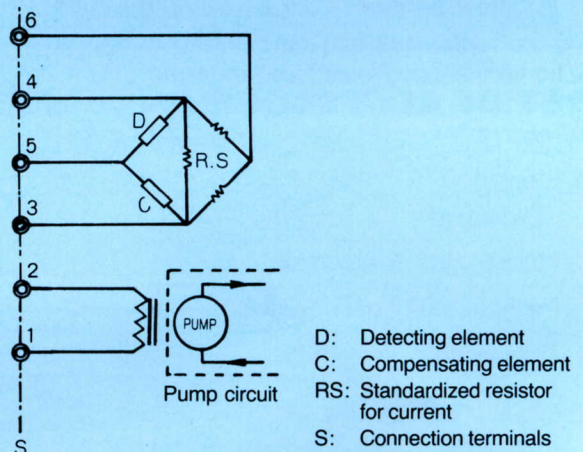
\* The above list shows the typical combustible gases & vapours.  
Other combustible gases & vapours are also detectable (For further details, please consult with us).

## CIRCUIT DIAGRAM

GD-A8/GD-A8-18



GD-D8/GD-D8DC



## INDICATOR/ALARM UNIT (CONTROL MODULE) SUITABLE FOR THESE DETECTOR HEADS

### Single channel

- GP-631
- GP-107Z

### Multi-channel

- GP-171
- GP-571A
- GP-581
- BL-7000
- BL-2300 system
- Other GP-series

## ORDERING INFORMATION

When ordering, please specify about the following:

- 1) Gas to be measured and its compositions
- 2) Model designation
- 3) Model of indicator/alarm unit to be connected with
- 4) Applications



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