

INSTRUCTION MANUAL

FOR

RIKEN SAMPLE DRAWING TYPE  
DETECTOR HEAD MODEL GD-D8

( CATALYTIC COMBUSTION METHOD )

## GD-D8

Before operation, read this instruction manual correctly and you are kindly requested to operate it with correct operation method. When this was operated wrongly in a way that is not described in this manual or modified without any permission, we-Riken Keiki cannot assume any responsibility caused by it.

## CAUTION AT INSTALLATION

- (1) When install the detector head in dangerous zone (Below zone 1), to make explosion proof wiring works shall be required.
- (2) When make the installation, consider the maintenance to replace the gas sensor etc and make the gas sensitivity adjustment at the place likely to be leaked and deposited.
- (3) When install it at the outdoor site or the place with plenty of dust and mist, the mounting of weather proof cover (playing the role of dust cover) shall be required (This weather-proof cover is an option).
- (4) At construction, the much care must be taken not only for the seam part on the explosion protection goods, but make the screw up of each part perfectly.
- (5) Consider that the piping distance of gas sampling shall be as short as possible (to prevent the delay of gas detection).
- (6) When the gas sampling port is installed at the place outdoor or rain water near from the ground, see to it that water shall not be absorbed into it by the splash of rain water.
- (7) Though this detector head (catalytic combustion type sensor) is less influenced from the external noise, make the wirings apart from the big noise generating source and high tension cable line.
- (8) Install it at the place free of vibration as possible as can be.
- (9) For the wiring connection (6-core) to the terminal block of the detector head, make the wirings correctly by seeing the instrument wiring diagram attached to the approval drawings or complete drawings etc.
- (10) Do not use at all the painting color etc including the silicone around the installation place of the weather-proof cover of detector head and detector head itself. Because the silicone vapors will drop the sensor sensitivity.
- (11) As this is a safety instrument, the daily check for it shall be required. If any trouble for it could be found, contact our nearest agent or us.
- (12) To obtain the safety, make "the maintenance check regulated by law" or if it is not regulated by a law, the check for over every 6 months shall be required.

Please read this instruction manual carefully when operate RIKEN SAMPLE DRAWING TYPE DETECTOR HEAD MODEL GD-D8 correctly.

## 1. Specifications

This detector head is installed in combination of 1 versus 1 with an indicator/ alarm unit usually. Generally, this gas detector head is installed in the hazardous area and the indicator/alarm unit is installed in the non-hazardous area. 6 - core cable (Sensor : 4-core and power source for pump suction : 2-core) is used for the cable connection between the detector head and the indicator/alarm unit. This detector head GD-D8 is based on the detection principle of catalytic combustion. And the values of LEL (Lower Explosive Limit) concentration are almost the same except for some cases.

Ce.  $Q = \text{const...}$

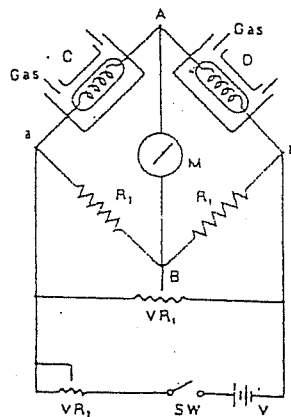
(Burgers Wheeler's Law)

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 resistance 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 sensor

C: Compensating sensor

R1, R2: Fixed resistor

(R1, R2 modulized)

M: Meter

VR1: Zero adj. potentiometer

VR2: Voltage adj. potentiometer

## 1-1. Specifications

Model	Model GD-D8 : GD-D8 is omitted in combination of the indicator/alarm unit and also, this detector head may be expressed as just D8.
Detecting gas	General combustible gas (standard) or Methane in the air.
Detection principle	Catalytic combustion method.
Explosion proof	Conform to flame-proof d2G4, JIS C-0903. Approval No.38169 by the Ministry of Labour in Japan. Note) ※ This detector head does not apply to the measurement of Hydrogen, Acetylene and Carbon disulfide (CS <sub>2</sub> ). ※ Please consult us when the sample drawing type detector head for the measurement of Hydrogen or Acetylene is necessary.
Sample flow rate	More than 0.8 ℓ / min (-10°C)
Operating temperature and humidity	-10°C to +40°C, Less than 95% RH.
Connecting cable	6 - core cable The thickness (mm <sup>2</sup> ) of cable is selected by distance between the indicator/alarm unit and detector head and also by the kind of combustible gas sensor
Applicable piping	Outlet diameter : 8 Φ Inner diameter : 6 Φ      Copper or stainless
Power supply for pump suction	AC100V, 50/60 Hz
Painting color (body)	Munsel N-5, half-mat
Others	<p>※ When the detector head is used at outdoors, the drip/weather proof cover (option) is necessary.</p> <p>※ MC filter with flow monitor is included as standard accessories. But, it is necessary to apply an suitable gas sampling system depending upon measuring conditions such as kind of gas, dust, mist and temperature etc.</p> <p>※ MC filter with flow monitor is used at the indoors and the outdoors usually.</p>

Descriptions	Quantity/detector head	Remarks
MC filter with flow monitor	1 pce	This is used for gas sampling line.
Gas inlet port	1 pce	This is used for gas sampling inlet.
Pressure-proof packing gland	1 pce	This is used for the connection to the cable inlet. The cable is drawn in through this part.
Installation plate for detector head	1 pce (This is packed into the detector head )	The detector head is installed to the wall or 2B pipe by using the installation plate.
Explosion-proof blind plug for cable inlet	1 pce (This is packed into the detector head )	The cable inlet either bottom or right side should be closed depending upon the installation place.

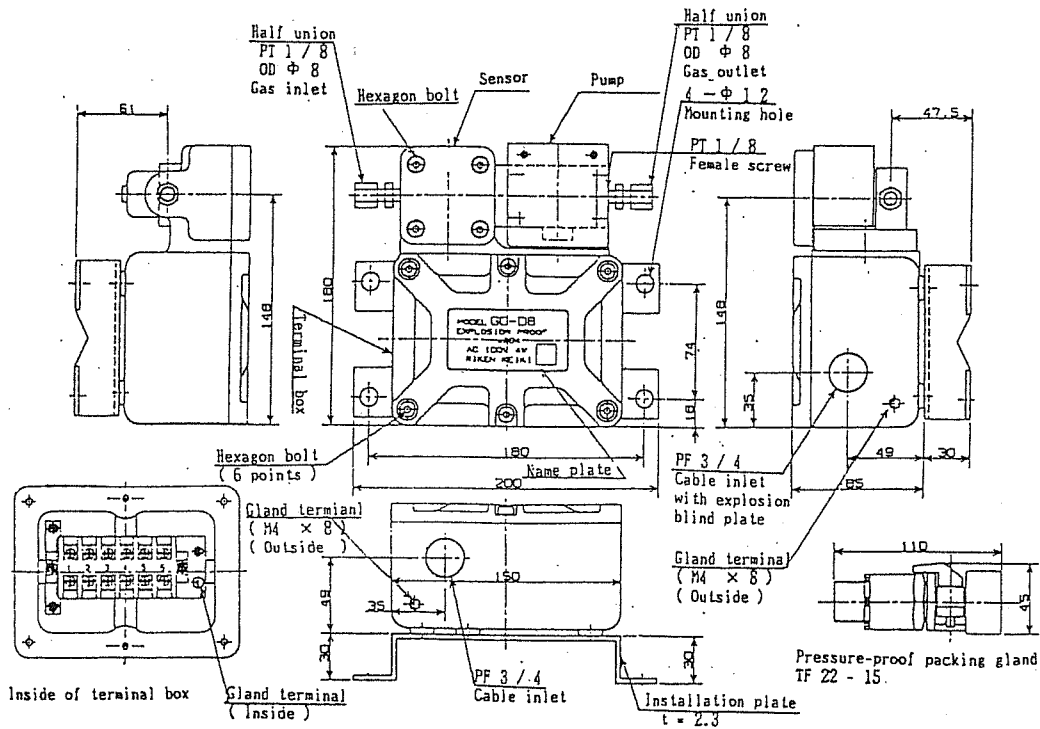


Fig. 1. External drawing of sample drawing type detector head model GD-D8

Dimension of pipe : Outer diameter  $8\Phi$  and inner diameter  $6\Phi$

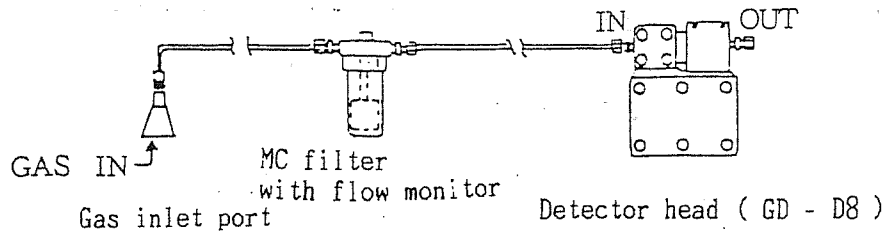


Fig. 2. Flow sheet of standard gas sampling

2. How to install the detector head and how to make explosion-proof cable connection work

※ Take care of the following item (1) ~ (10) when make this work.

2-1. Caution of installation work

- (1) Make the cable connection working for explosion-proof connection when detector head is installed in a hazardous area.
- (2) When the detector head is installed, consider easy maintenance for gas sensitivity calibration for the replacement of sensor and MC filter with flow monitor etc.
- (3) When the detector head is installed at the outdoors or at much dust/mist place, install the drip/weather proof cover on the detector head certainly. (Drip/weather proof cover is option.)
- (4) Take care of the crack and flaw on the joint of explosion-proof construction in working and make tighten each screws and bolts fully.
- (5) Connect the gas sampling pipe to the detector head at the distance as short as possible.  
( To prevent the delayed response of gas detection )
- (6) When the gas inlet of detector head is closed with the surface of ground at outdoors such as splashy place of rain water, take care of the installation method so that the gas inlet is not splashed with rain water and mud etc.
- (7) This detector head ( catalytic combustion type sensor ) may be influenced by some unexpected outside large noise. ( But, usually, this is not caused by normal voltage.) Then, make cable connection apart from large generated source of noise or electrical wire line of high voltage.
- (8) Install the detector head at the place where a vibration is not caused.
- (9) The cable connection ( 6 wire ) method to the terminal plate of detector head is described into the approval drawing or complete drawing. Make the cable connection in accordance with the drawing of cable connection between the indicator/alarm unit and the detector head.
- (10) Don't use the paints including the silicone around the drip/weather proof cover or the detector head. If the silicone vapour should exist around the detector head, the sensor may be exposed to the damage.

3. How to install the detector head

3-1. For installation of the detector head without using the drip/weather proof cover

(1) For installation to the wall

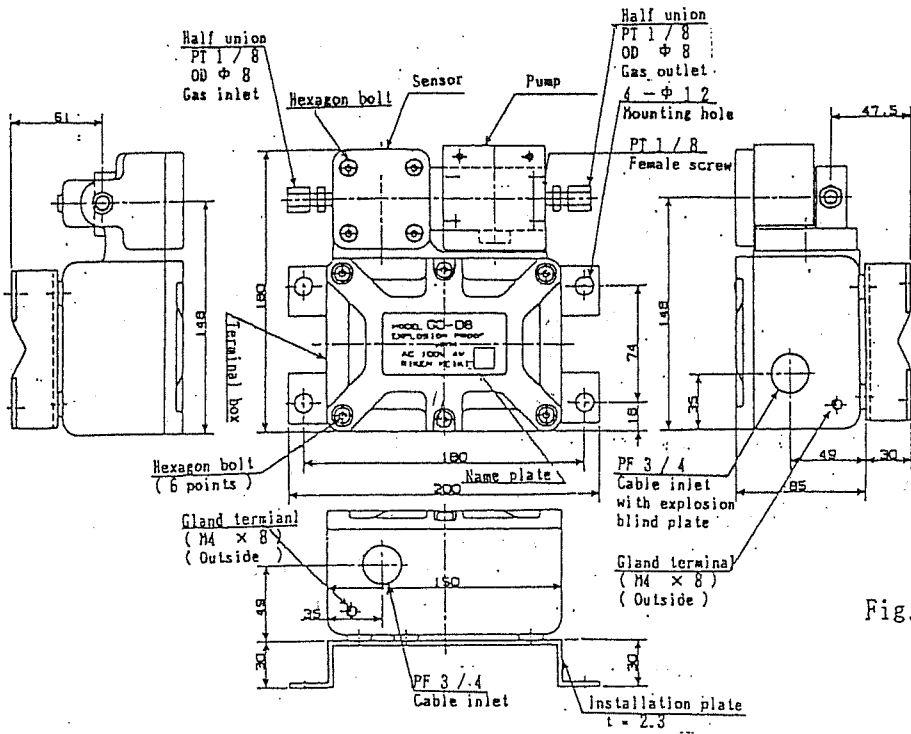


Fig. 3

(2) For installation to 2B pipe

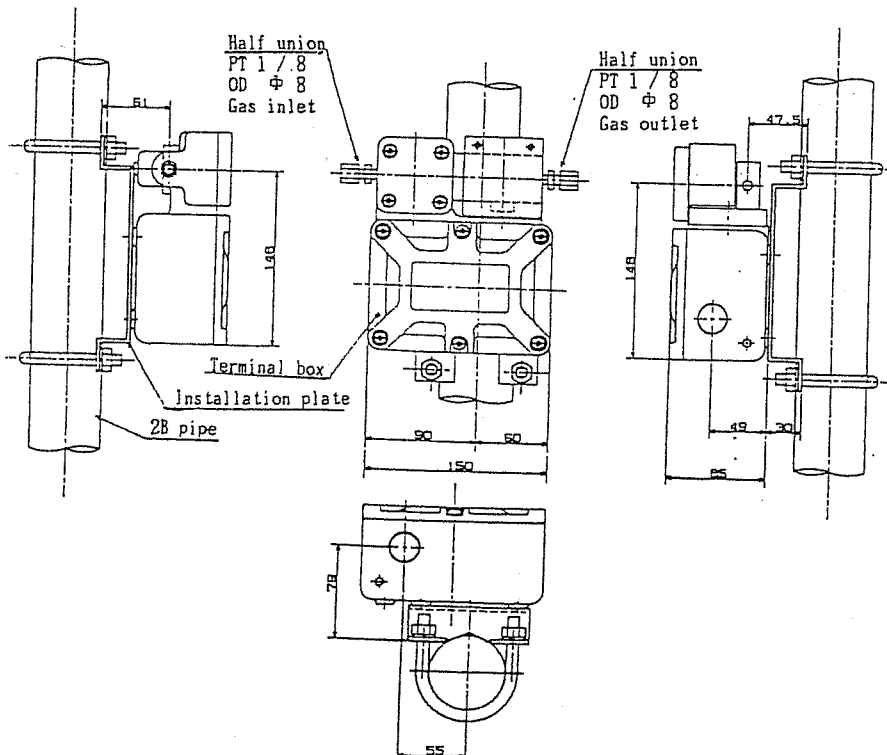


Fig. 4

3-2. For the use of drip/weather proof cover (Option)

(1) For installation to the wall

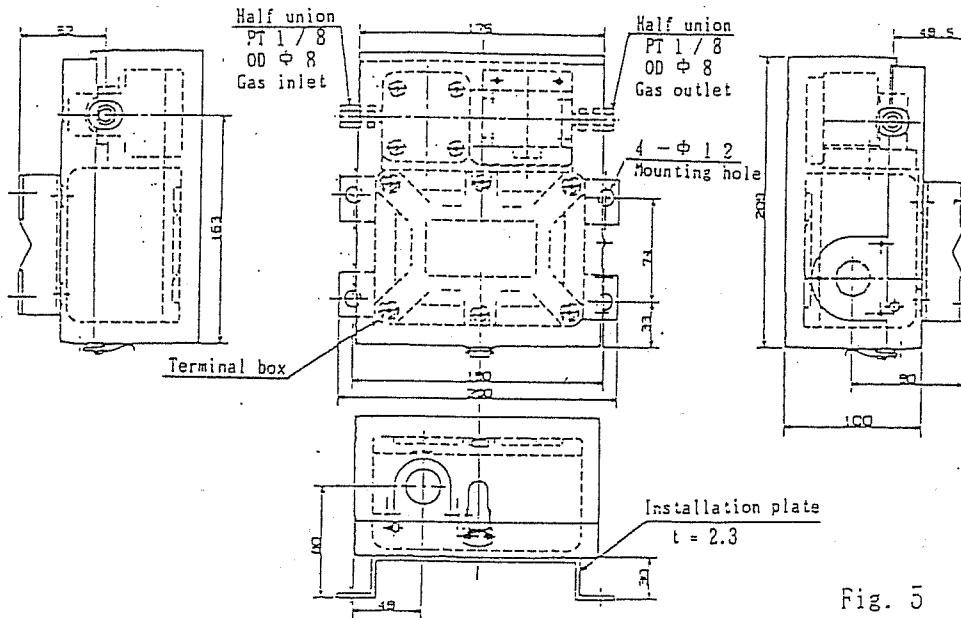


Fig. 5

(2) For installation to 2B pipe

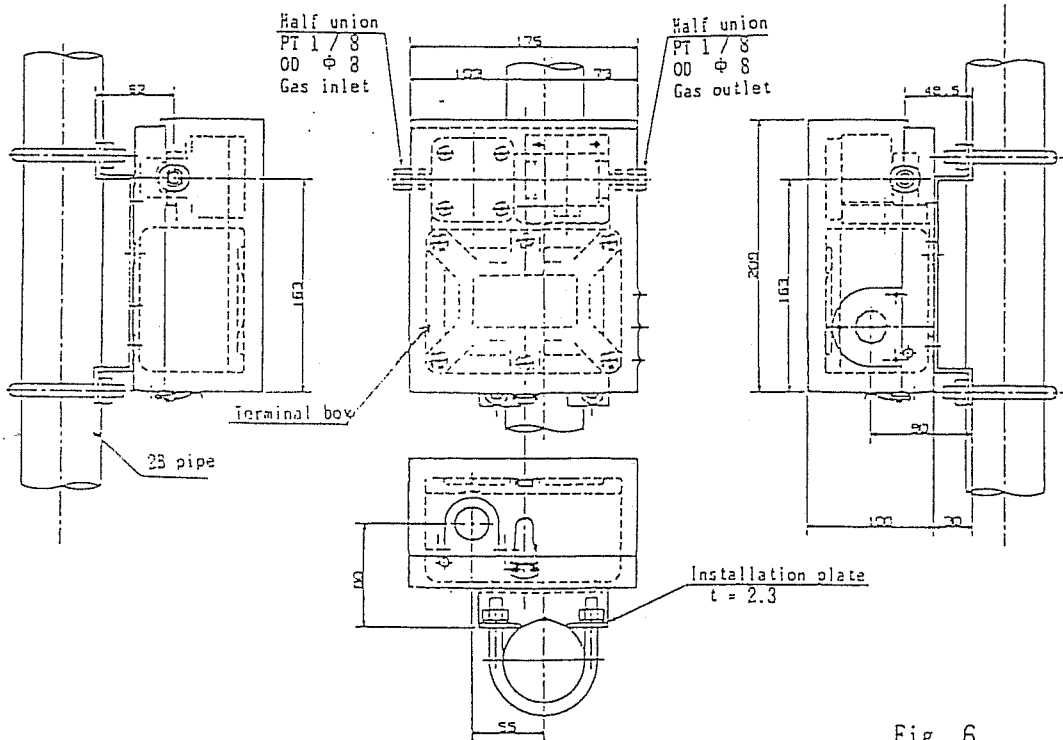


Fig. 6



4. The cable connection working for explosion-proof construction  
( For example )

4-1. For the cable connection working

There are two cable inlets located on bottom side and right side in the terminal box of detector head. Select one of cable inlets of either bottom side or right side depending upon the installation condition for easy working. An explosion-proof blind plug for cable inlet is installed to the cable inlet of right side at delivery time from factory.

When the pressure-proof packing gland with cable clamp is necessary to install on the cable inlet of right side, replace the explosion-proof blind plug from cable inlet of right side to cable inlet of bottom side.

After the finishment of cable connection, make tighten the cable clamp of the pressure-proof packing gland certainly.

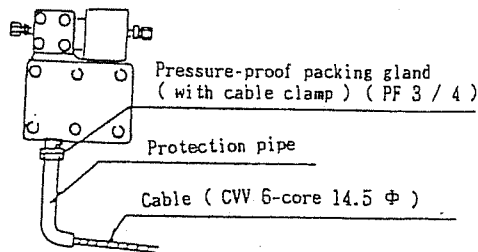


Fig. 7

4-2. For piping for metal connection working

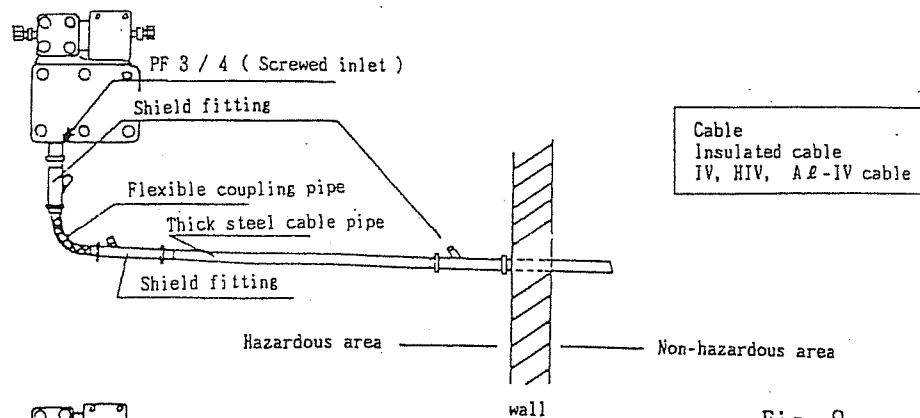


Fig. 8

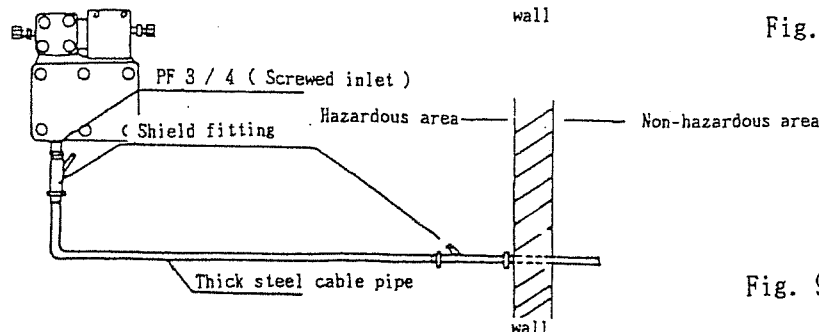


Fig. 9

☆ Connect the appropriate cable between the indicator/alarm unit and the detector head with security method on explosion-proof structure

## 5. Cable connection to the outer terminal plate of the detector head

Remove the cover by loosening 6 pcs of bolts for the terminal box of detector head.

The terminal plate for outer connection is placed as following fig. 10.

The number 1, 2, 3, 4, 5, 6 are marked on the terminal plate (6P) of detector head as following fig. 10.

The number 1, 2 are used for pump power operated by AC 100V and the number 3, 4, 5, 6 are used for input and output of the sensor. (Refer to fig. 11)

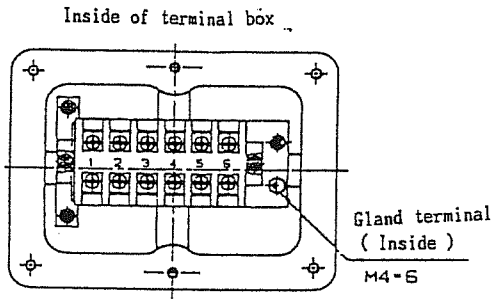


Fig. 10

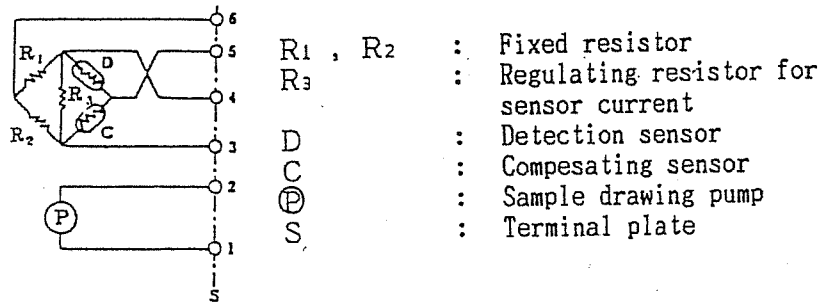


Fig. 11

The screw of the terminal plate is 4 mm. Then, use the terminal lug for 4 mm  $\phi$ .

Make the terminal connection certainly without misconnection and looseness.

## 6. Maintenance and check

### 6-1. How to calibrate the gas sensitivity calibration

※ Carry out the gas sensitivity adjustment with the calibration gas in accordance with following method every 3 to 6 months' interval usually.

- (1) Prepare the known gas concentration of calibration (around 1 / 2 of LEL = 50 % LEL) to the gas sampling bag.
- (2) Turn and loosen the nut of half union in the outlet side of MC filter with flow monitor to counterclockwise with spanner (wrench) etc and remove the pipe.
- (3) Connect the tip of tube for gas sampling bag to the pipe removed in item (2).

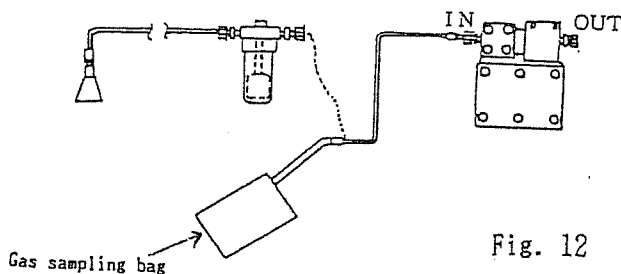


Fig. 12

- (4) When the calibration gas is being introduced into the detector head, the indication of the indicator/alarm unit goes up and gets stable after some decade seconds.  
When the reading does not coincide with the reading of calibration gas, adjust the reading of the indicator/alarm unit to the reading of calibration gas by turning the VOL ( CAL ) for calibration of gas sensitivity.
- (5) As the result of check for the gas sensitivity adjustment in item (4), when the sensitivity can't be obtained by turning the potentiometer for calibration at maximum ( clockwise fully ), the sensor life is terminated. Then, replace the sensor with new one after the power switch " OFF ". Refer to item 6 - 2 for the replacement of the sensor.
- (6) When the sensor is replaced with new one, carry out the gas sensitivity calibration in accordance with item (1) ~ (4) after the confirmation of voltage ( bridge voltage ) and electrical current given to the sensor in the indicator/alarm unit.

※ Note ) (a) Calibration gas ( standard gas ) (b) gas sampling bag  
(c) gas check adaptor. These item (a), (b) and (c) are option.  
Consult to us or our nearest agent if required.

#### 6 - 2. How to replace the sensor with new one

※ Carry out the replacement of sensor in accordance with the following procedure.

- (1) Turn the power switch of the indicator/alarm unit to " OFF ".  
( The power is not supplied to the detector head. )
- (2) Remove the cover by loosening 4 pcs of hexagon bolts for sensor cover of the detector head.  
( Hexagon bolt for sensor cover is not dropped even if it is loosened. )
- (3) Then, make loosen 3 pcs of round screws for sensor holder. Pinch the upper of connector cap for protection of black resin with finger and pull out it to front side and then, draw out the defective sensor with holder.  
( 3 pcs of round screws are not dropped from the sensor holder even if they are loosened. )
- (4) Remove the sensor from sensor holder by turning the sensor hold metal.

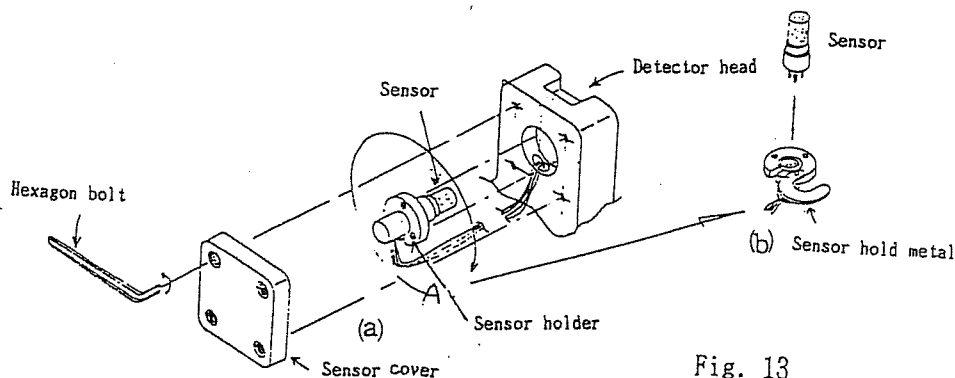


Fig. 13

- (5) Prepare new sensor and confirm that one pin of five pins located on bottom side of sensor is longer than four pins. Insert slightly (shortly) this long pin to the socket of sensor holder after the confirmation of hole position of socket as following fig.

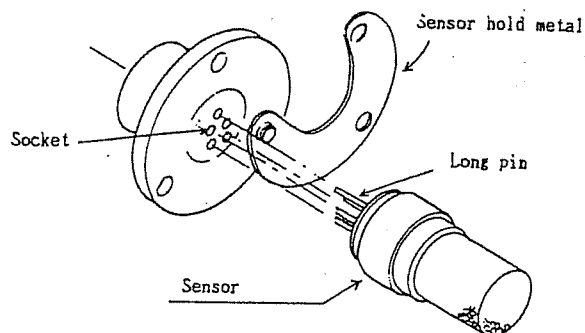


Fig. 14

- (6) Install the sensor hold metal to the sensor removed at item 4 and make tighten the sensor with 3 pcs of round screws.
- (7) Put sensor cover to detector head and make tighten 4 pcs of hexagon bolts certainly.
- \* Note ) When the sensor cover is placed on the detector head, take care of lead wire from connector cap so that this wire is not pinched between the sensor cover and detector head.
- (8) After the finishment of replacement of the sensor, make the power switch of the indicator/alarm unit to " ON " and make the check of sensor voltage ( sensor bridge voltage ) or electrical current in the indicator/alarm unit. ( Refer to the instruction manual for the indicator/alarm unit )
- (9) After the power switch " ON ", make the adjustment of gas sensitivity after approx. 10 minutes in accordance with item 6 - 1.

### 6 - 3. How to replace the pump

- ※ Carry out the replacement of pump in accordance with the following procedure.
- (1) Turn the power switch of the indicator/alarm unit to " OFF ". When the power for pump is separated from line, turn the power for pump to "OFF".
- (2) Make loosen @ 2 pcs of round screws ( M3 × 8 ) of pump cover and remove the pump cover.

- (3) Make loosen ④ 4 pcs of round screws ( M4 × 8 ) of pump unit and move from the holder by pulling the installation plate of pump to front side.

In this time, remove the packing, too. ( When the packing is not transformed or damaged, it is recycled. So, do not lose it. )

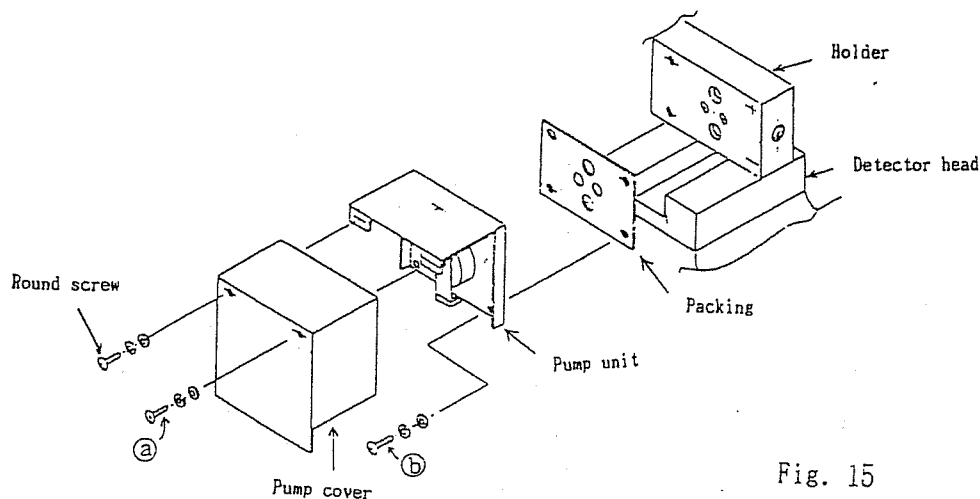


Fig. 15

- (4) Prepare the new pump and install the installation plate of pump to the holder after the installation of packing. In this time, make tighten the round screws ( M4 × 8 pcs ) for installation certainly.
- (5) Install the pump cover with 2 pcs of the round screws ( M3 × 8 ).
- (6) After the finishment of replacement of pump, turn the power switch of indicator/alarm unit to " ON ".  
When the power for pump is separated from line, turn the power for pump to " ON " .

#### 6 - 4. How to replace the filter etc

Replace the filter ( cartridge type ) of MC filter with flow monitor and the filter used on gas sampling system under special condition depending upon the clog or dirty.

## RIKEN KEIKI STANDARD WARRANTY

### GAS DETECTION INSTRUMENTS

RIKEN KEIKI CO., LTD. warrants gas alarm equipment manufactured and sold by us to be free from defects in materials and workmanship for a period of one year from date of shipment from RIKEN KEIKI CO., LTD. Any parts found defective within that period will be repaired or replaced, at our option, free of charge, F.O.B. base. This warranty does not apply to those items which by their nature are subject to deterioration or consumption in normal service, and which must be cleaned, repaired or replaced on a routine basis. Such items may include :

- g) Lamp bulbs and fuses
- h) Pump diaphragms and valves
- i) Absorbent cartridges
- j) Filter elements
- k) Batteries
- l) Most catalytic and electrochemical sensors are covered by a separate warranty of 12 months.

Warranty is voided by abuse including rough handling, mechanical damage, operation, alteration or repair procedures not in accordance with instruction manual. This warranty indicates the full extent of our liability, and we are not responsible for removal or replacement costs, local repair costs, transportation costs, or contingent expenses incurred without our prior approval.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY AND ALL OTHER WARRANTIES AND REPRESENTATIONS, EXPRESSED OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF RIKEN KEIKI CO., LTD. INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RIKEN KEIKI CO., LTD. BE LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCT TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold (to users) only by authorized distributors, dealers and representatives as appointed by RIKEN KEIKI CO., LTD.

We do not assume the indemnification for any accident or damage caused by the operation of this gas monitor and our warranty is limited to the replacement of parts or our complete goods.