



INSTRUMENTS

Gas Detection For Life

RKI INSTRUMENTS, INC. INSTRUCTION MANUAL

For

INDICATOR / ALARM UNIT GP-581

The accompanying instrument is sold and serviced in USA by RKI Instruments Inc. Please contact RKI Instruments for any follow up service needs, including questions, warranty issues, repairs, and spare parts and sensors. Thank you for selecting this fine instrument for your use. With proper care and maintenance, it will provide you with many years of reliable service.

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1. GENERAL

1-1. System outline

The RM-580 series is a gas indicator/alarm system which receives gas concentration signals from catalytic combustion type detector heads and has other various features as follows.

a) Color gas density indicator

The gas concentration signals from detector heads are indicated by the electronic multicolor (green, orange and red) bargraph.

b) Alarm operation

When the gas concentration value gets higher than the preset level, the alarm lamp flashes and the alarm contact turns on simultaneously, and it stays in the alarm condition. By reset operation with an external signal, the alarm lamp keeps on and the alarm contact turns to the non-latched mode condition.

c) 2 alarm method

This instrument applies a 2-level alarm system that enables step-by-step gas control. (1-level alarm control is also available by setting both alarm levels to the same value.)

d) Sensor and detector head cables disconnection alarm

This instrument detects disconnection of a connector cable between an indicator/alarm unit and a detector head as well as disconnection of a sensor wire, and gives a trouble alarm.

e) Alarm buzzer and general alarm contact

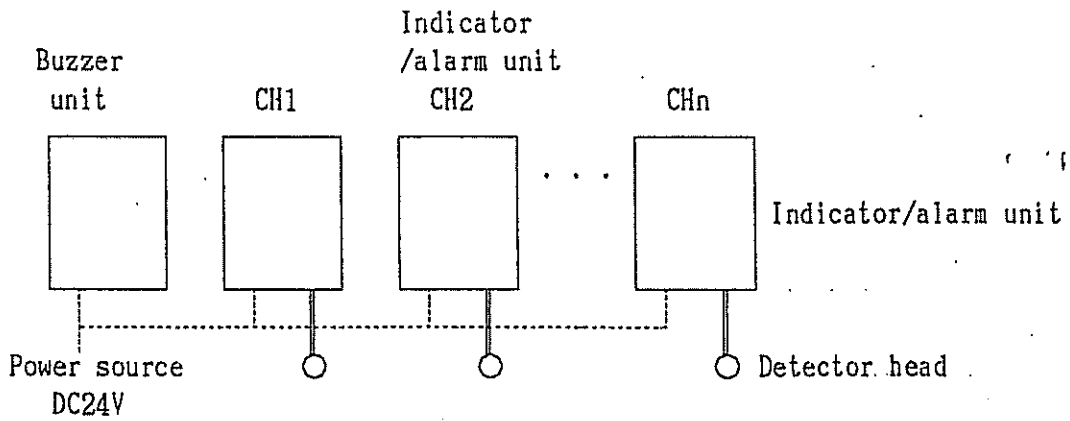
By connecting an additional buzzer unit with the general alarm contact, a buzzer alarm and general multipoint alarm are available.

1-2. System configuration

There are 2 types of basic system configuration.

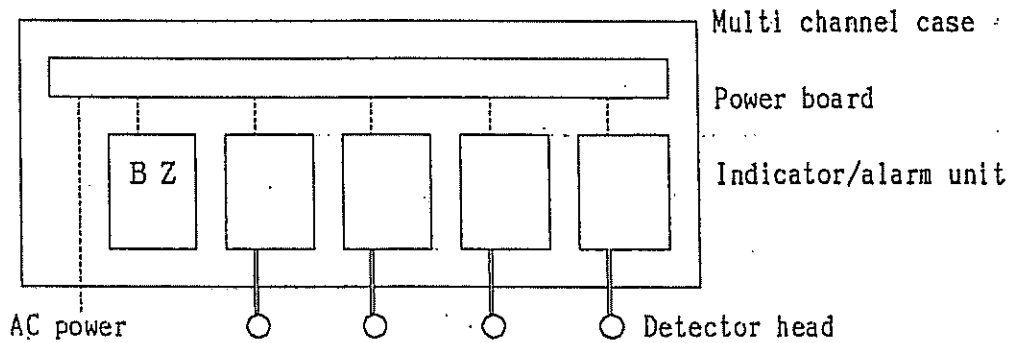
○ Single-unit case

An external power source (DC24V) is required.



○ Multi-unit case

Several (4, 6, 9 or 12 points) indicator/alarm units are mounted into a standard case. An AC power source is required.



2. BLOCK DIAGRAM

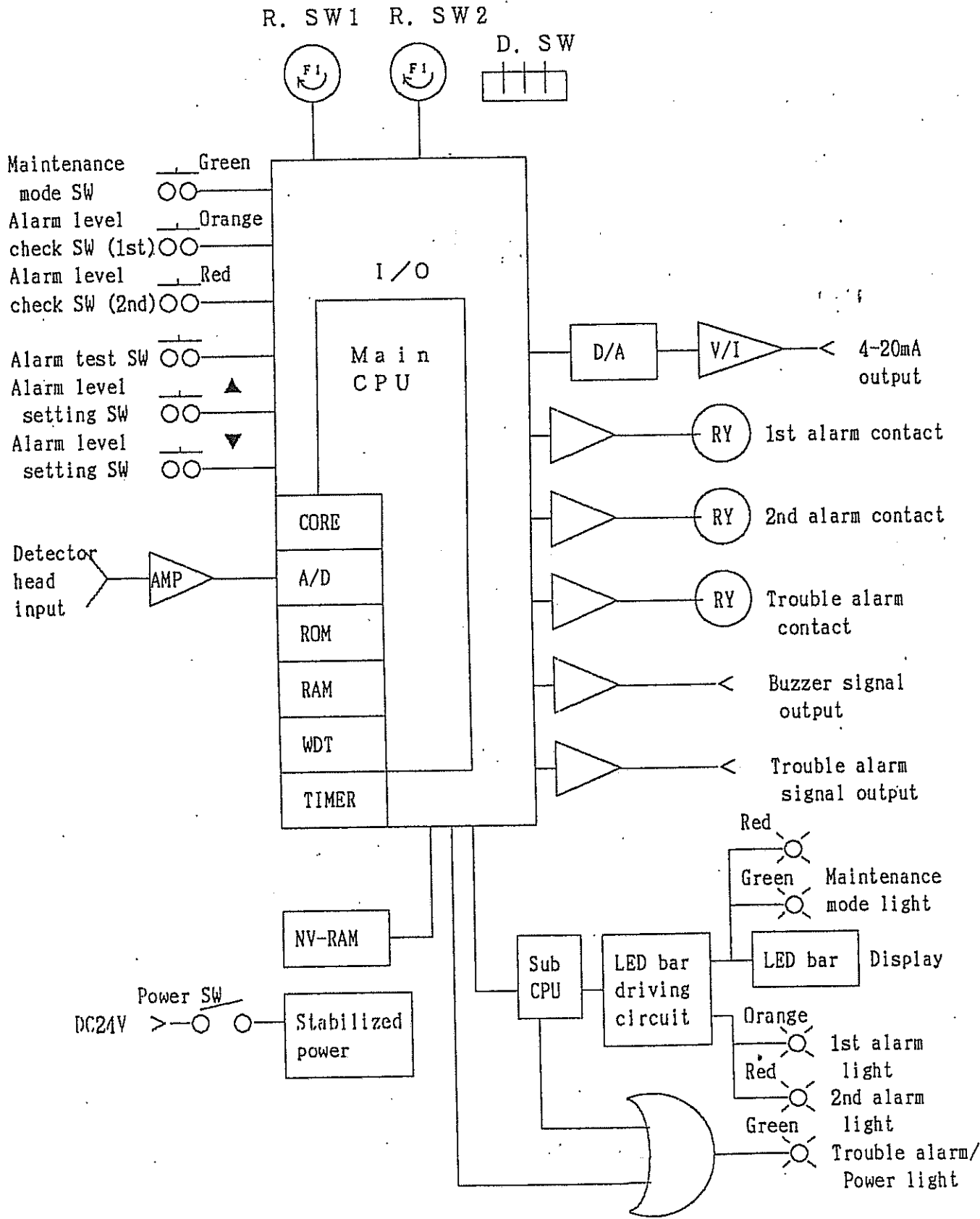


Fig. : Block diagram

2-5, Designation of each part

2-5-1. Appearance

- ① LED bar meter (Gas read-out)
- ② Power light (Green) "PL"
/ Maintenance mode switch
- ③ 1st alarm light (Orange) "AL1"
/ 1st alarm setting confirmation switch
- ④ 2nd alarm light (Red) "AL2"
/ 2nd alarm setting confirmation switch
- ⑤ Maintenance mode light
/ Range selection light (for dual range)
- ⑥ Operation cover
- ⑦ Alarm test switch
- ⑧ Alarm setting switch
- ⑨ Zero adjusting VR (ZERO)
- ⑩ Span V.R. (SPAN)

NP : Name of plate

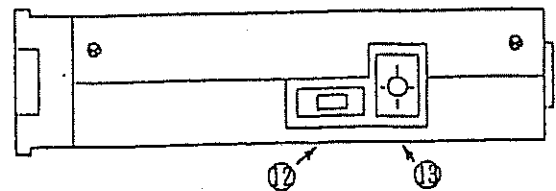
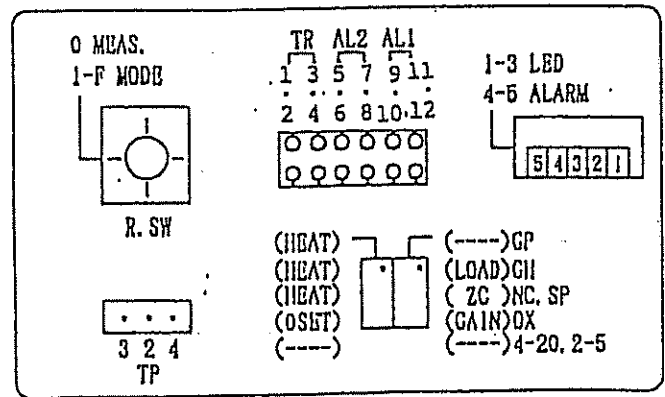
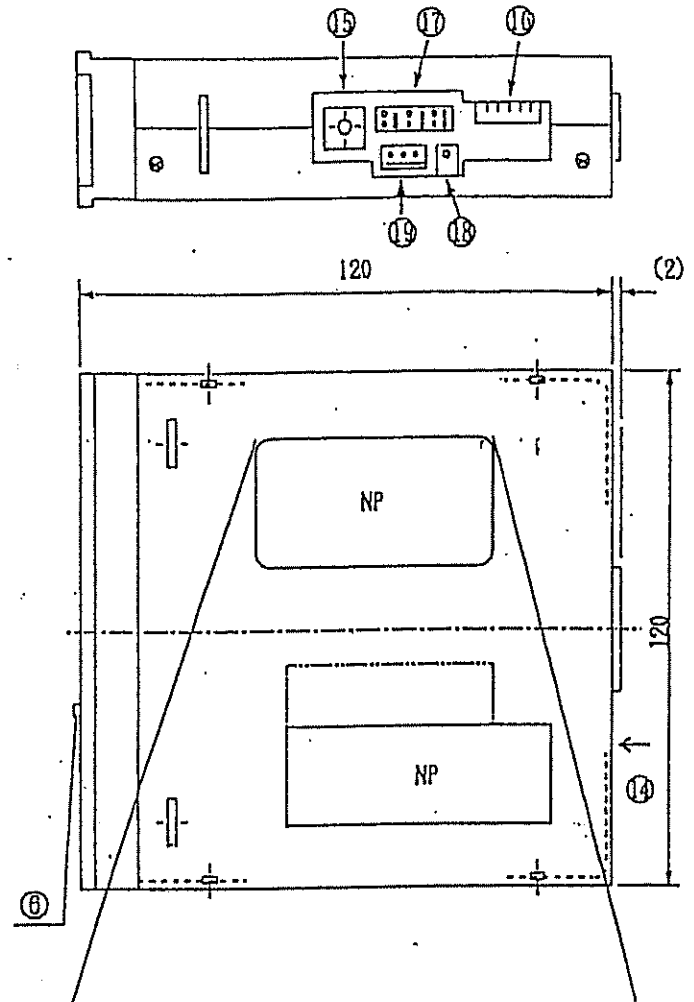
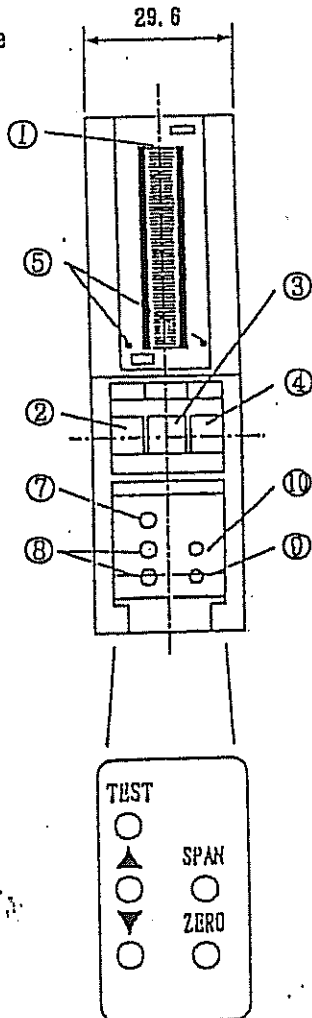




Fig. Appearance of indicator/alarm unit and name of each part

2-5-2. Designation of each component and function

	Name	Contents
①	52-dot LED bar meter	<ul style="list-style-type: none"> • Gas concentration is displayed by LED bar meter. • At peak hold mode, the gas concentration and also the peak value exceeding alarm point will be displayed. • All LED will flicker when exceed the measuring range.
②	Display function/green light <ul style="list-style-type: none"> • Power light • Trouble light 	<ul style="list-style-type: none"> • Lit on when work normally. • Green lamp will flicker when the sensor is in trouble and at alarm by the instrument trouble.
	Switch function <ul style="list-style-type: none"> • Maintenance mode SW (ZERO) 	<ul style="list-style-type: none"> • By holding pressing it for about 3 sec, this turns to maintenance mode. While the maintenance mode is on, the external alarm action will be shut off. True value for bar meter display and 4-20mA output will be shown by cancelling the zero suppression temporarily and can be checked. When return to normal mode, press it for about 3 sec again.
③	1st alarm light (Orange) (AL1)	<ul style="list-style-type: none"> • This light flickers at the first alarm and lights continuously by reset signal, after then automatically returns to the non-latched mode.
	<ul style="list-style-type: none"> • First alarm setting confirmation switch (SP1) 	<ul style="list-style-type: none"> • By pushing this switch the first alarm setting level is indicated on the LED bar meter in orange. The alarm setting level can be changed by pushing up/down switch (▲▼).
④	2nd alarm light (Red) (AL2)	<ul style="list-style-type: none"> • This light flickers at the second alarm and lights continuously by reset signal, after then automatically returns to the non-latched mode.
	<ul style="list-style-type: none"> • 2nd alarm setting confirmation switch (SP2) 	<ul style="list-style-type: none"> • By pushing this switch the second alarm setting level is indicated on the LED bar meter in red. The alarm setting level can be changed by pushing up/down switch (▲▼).

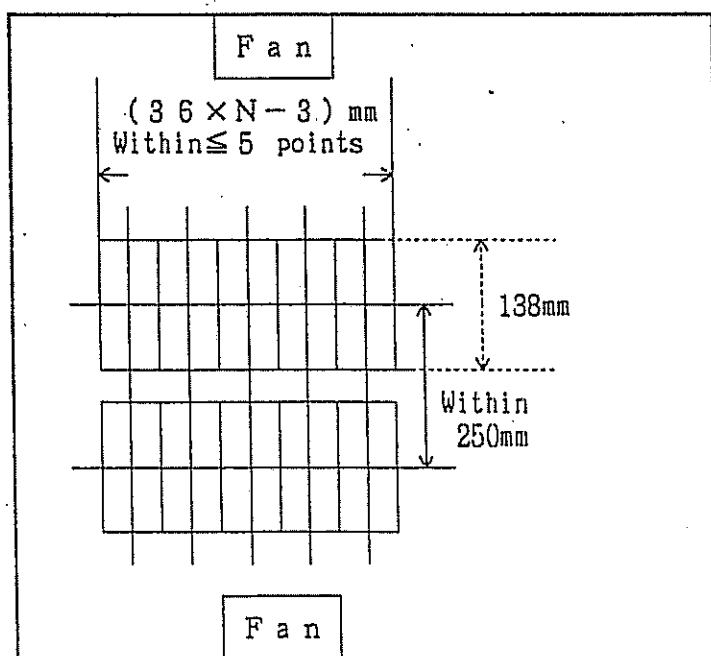
	Name	Contents
⑤	Maintenance mode light	<ul style="list-style-type: none"> The green and red LEDs at the both sides of the bar meter flicker when the maintenance mode is active.
⑥	Operation cover	<ul style="list-style-type: none"> By pulling and sliding the cover to the front, adjustment with switches ⑦ and ⑧ will be available.
⑦	Alarm test switch (TEST)	<ul style="list-style-type: none"> This switch is used for testing the alarm operation <div data-bbox="797 793 1409 982" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;"> CAUTION</p> <p>Please arrange properly to eliminate the effects against the alarm which may be given during the test.</p> </div>
⑧	Alarm setting switch (▲▼)	<ul style="list-style-type: none"> To change an alarm level, push the alarm setting switches (▲▼) with pushing SPI (③) or SP2 (④).
⑨	Zero adjusting V.R. (ZERO)	<ul style="list-style-type: none"> Usually the zero adjustment operation is made by this potentiometer. Do the adjustment in the maintenance mode.
⑩	SPAN, V.R. (SPAN)	<ul style="list-style-type: none"> In the calibration, adjust the indication value by using this potentiometer. Do the adjustment in the maintenance mode.
⑪	Power switch	<ul style="list-style-type: none"> Power supply for indicator/alarm units is turned on/off by this switch.
⑫	Rotary switch for calibration curve (R. SW)	<ul style="list-style-type: none"> This is used to call up the calibration curve registered inside the unit. <div data-bbox="818 1709 1425 1898" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;"> WARRANTY</p> <p>This is set at factory before shipping. Cannot indicate the correct value if the number is changed.</p> </div>
⑬	Fuse	<ul style="list-style-type: none"> 2A, standard fusing type.

	Name	Contents
⑮	Rotary switch (R.SW)	<ul style="list-style-type: none"> This switch is used for checking the function setting mode. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">⚠ CAUTION</p> <p>This is set of factory before shipping. Normal action may not be performed if changed.</p> </div>
⑯	Dip switch (D.SW)	<ul style="list-style-type: none"> The switch is used for setting an operation pattern. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;">⚠ WARNING</p> <p>The function is set at factory before shipping. Do not change the switch position. Cannot indicate the correct value if the number is changed.</p> </div>
⑰	Alarm contact changing pin	<ul style="list-style-type: none"> This is used for setting the alarm contact operation. The standard setting is a non-exciting normally open contact. Please see 「4-4-3 change of alarm contact」 if it is required to change.
⑱	Internal adjustment potentiometer Heater voltage adjustment (HEAT)	<ul style="list-style-type: none"> If the voltage at the check connectors goes beyond permitted range, adjust it by using this potentiometer.
⑲	Check-connector	<ul style="list-style-type: none"> This connector is used for checking the heater voltage. Measure it between TP3(+) and PT4(-).

4. INSTALLATION

4-1. Precautions for installation

- a. Keep the system from direct sunlight or where the temperature might drastically change.
- b. This system consists of delicate electronics parts. Install it in a stable place so it does not crash or fall down.
- c. Keep the system away from other equipment which may give a high frequency in the surroundings and install it.
 - * Do not put the system jointly each.
 - * Do not wire the cables in parallel nor take access.
- d. When using this system (single case) side by side, operate it according to the following conditions in order to avoid the influence of the heat of the system.
 - * Make space for one point every 5 units when put side in side.
 - * When put vertically, make space for at least 250mm between units. Do not clog the openings between up and down.
 - * When fixed to a closed instrumentation panel etc., put a ventilation fan in the upper and lower part.



e. Power for indicator/alarm unit
For this system, supply the following power source.

- * Power voltage : DC 24V $\pm 10\%$
- * Standby battery : Approx. 10m.sec.
tolerance time (In case of over 10m sec. power failure, it will re-start.)

To assure action or continuous operation, a standby battery etc. is installed.

Others: Do not jointly use power with a high power load or high frequency noise. Use it by separating from the noise source with line filter etc. as required.

f. Precautions for use of alarm contacts

- * Alarm contact shall be used only for the external buzzer and alarm lamp.

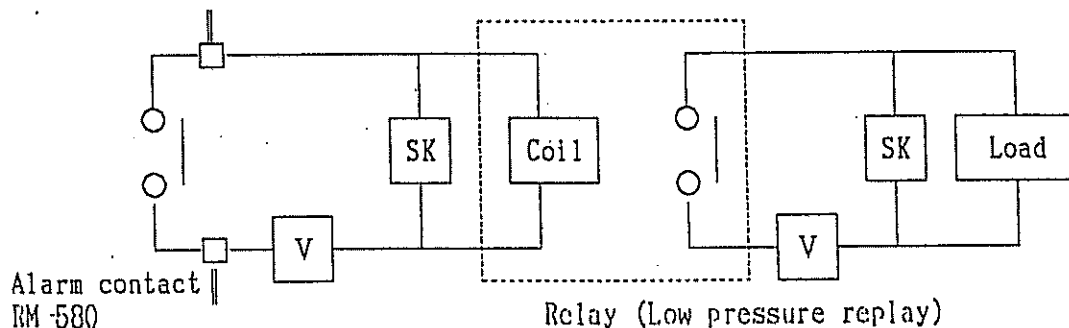
When controlling the external load, a negative influence may be given to the system according to the load characteristics.
In such a case, the following countermeasures shall be taken to stabilize the action and protect the contacts.

- * Relay by a low voltage relay and operate by connecting a CR circuit (spark killer: SK) (Diode etc. for DC) suitable for a relay coil directly to the relay.

- * Add the CR circuit to the load side of the relay relayed on request.

Reference : According to the conditions of the load, CR circuit may be better installed on the contact side, but is must be put in after checking the action of thte load.

SK = Surge absorption filter



How to consider alarm contacts against inductive load

The spec. for the alarm point of the RM-580 is described by the conditions of the resistance load.

When using an inductive load for alarm contacts, a very high reverse electromotive voltage may be generated and the following trouble tends to occur:

- The contact part of the relay is melted adhesively and the contacts can not work.
- A high voltage is put inside the indicator/alarm unit and electrical parts may be damaged.
- As it makes a big noise, trouble may be caused by the reckless driving of the CPU.

(* Irrespective of inductive load, there is the possibility of unforeseeable noise intrusion for contacts. The above trouble may be generated.)

To nip in the bud such an obstacle, the following preventive measures are required.

- An inductive load shall not be used in principle (Do not use a fluorescent lamp.).
- When using an inductive load, make the contact amplification outside, but the outside relay coil belongs to the inductive load. Use the relay driven by the low voltage (within AC100V) and protect it with an appropriate surge killer.
- When controlling the light inductive load directly, always protect the contacts with an appropriate surge killer.
At this time, the contact rating spec. shall be a load of 50% of the resistance load.

AC100V less than 0.25A
DC 30V less than 0.75A

As inductive loads, there are the following samples.

- Patlight
- External relay
- Buzzer
- siren
- Fan
- Fluorescent lamp
- motor etc.

g. Lightning protection for power cables and signal cables, and countermeasures for protection from lightning.

(1) Lightning surge

Lightning countermeasures must be considered in the following cases ;

a) The cable is connected outdoors in the factory plants etc.

b) Even indoors, parallel cable distribution is made in the same duct with the cable pulled in from outdoors.

If the lightning is a big source, the cable will be its receiver and both apparatus connected to the cable may possibly be damaged.

Even if the cables are put into a pipe or underground, the lightning surge might not be prevented completely.

(2) Lightning measures

There is no complete countermeasure for it but the following method can be considered. Carry out the suitable treatment accordingly.

a) The transmission signal route is arranged for connection by an optical fiber cable etc.

b) Countermeasure by a lightning arrester (Cable safety retainer)

A lightning arrester can be installed just before the field apparatus and the central control station. The position of lightning arrester installation is at each point of the cable laid out from the outdoor to the indoor.

The lightning arrester is built into the circuit to remove the surge voltage which is the source of the damage to field apparatus (protection resistor, zero diode etc.) and is designed to protect the apparatus. But as the signal may be attenuated due to the lightning arrester, check the action required for use.

h. Earth treatment

Surge noise may be generated by lightning, etc.

It is therefore necessary to ground the apparatus to protect it.

For the RM-580 series, there are cases for single unit case use and for multi-unit case use, but it is necessary to ground with an earth terminal "E" for each grounding.

4-2. External signal terminals
a. Table of terminals

<Single-unit case>

Name of signal	Terminal No.		Name of signal
Power input + (DC 24V) -	⑪ ⑫	① ②	Alarm relay output (1st)
Reset signal	⑬	③ ④ ⑤ ⑥	Detector head
Alarm signal output	⑭		
Trouble alarm relay output	⑮ ⑯		
Open	⑰	⑦ ⑧	Alarm relay output (2nd)
Trouble signal output	⑱		
Test input	⑲	⑨ ⑩	+ Signal output - (DC 4-20mA)
COM-⑬⑭⑮⑱	⑳		
		E	Ground terminal

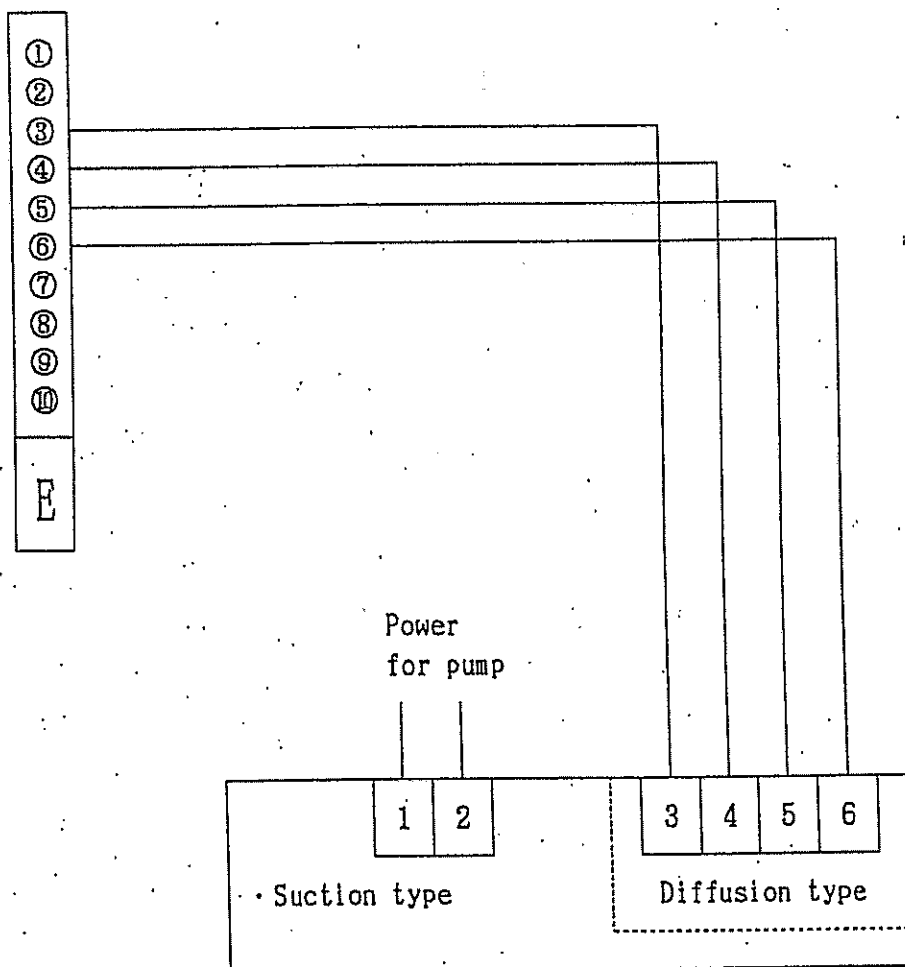
<Multi-unit case>

Name of signal	Terminal No.		Name of signal
AC power for pump	① ②	⑦ ⑧	Alarm relay output (1st)
Detector head sensor input	③ ④ ⑤ ⑥	⑨	Alarm relay output (2nd)
		⑩	
		⑪ ⑫	Trouble alarm relay output
Ground terminal	E	⑬ ⑭	+ Signal output - (DC 4-20mA)

b. Connections with detector head

Indicator/alarm unit (example: single-unit case)

Terminal



Applicable cables: Diffusion type CVV-4C (1.25sq ~ 3.5sq)
Suction type CVV-6C (1.25sq or 3.5sq)

5. PRECAUTIONS FOR OPERATION

- 1) Any electric noise generated by a walky-talky, etc. may affect the indication of this instrument; if it is used near a GP-581 or detection signal cable(s). Please avoid using such equipment near a GP-581 system.
- 2) Wait for 5 seconds or more after turning the power off before turning the power on again.
- 3) The alarm operation remains unavailable when stabilizing after turning the power on due to the initial clear function.
- 4) Always turn the power off whenever installing or removing any socket or case from the main body.

6. MAINTENANCE AND CHECKS

This instrument is essential for hazard prevention and safe control.

We would appreciate it if you would carry out periodical maintenance and inspection tests on this instrument to improve its reliability for hazard prevention and safety control, and to maintain the completely reliable performance of this instrument.

6-1. Daily checks

The following operations should be performed by the customer.

a. Power lamp check


- In normal condition : The green lamp lights.
- In trouble condition : The green lamp flashes.

b. Indication check

Make sure that no gases remain around the detector head (sensor) and confirm the indication value.

Check and make adjustments with the calibration gas once or more every 3 ~ 6 months.

c. Confirmation of performance of alarm circuit

 Warning: Please arrange properly to eliminate any effects on the alarm during this operation.

Press the alarm test switch "TEST" for 5 seconds or more to confirm the performance of the alarm circuit. (See Chapter 7-4.f).

6-2. Periodical inspection

- a. Carry out a daily check
- b. Clean equipment
- c. Carry out gas sensor calibration (with detector heads)
- d. Check the system operation and performance

6-3. Replacement of parts

a. Fuse change

In case of a fuse break, find the cause of the trouble, remove it and replace with a new one.

6-4. Maintenance contract

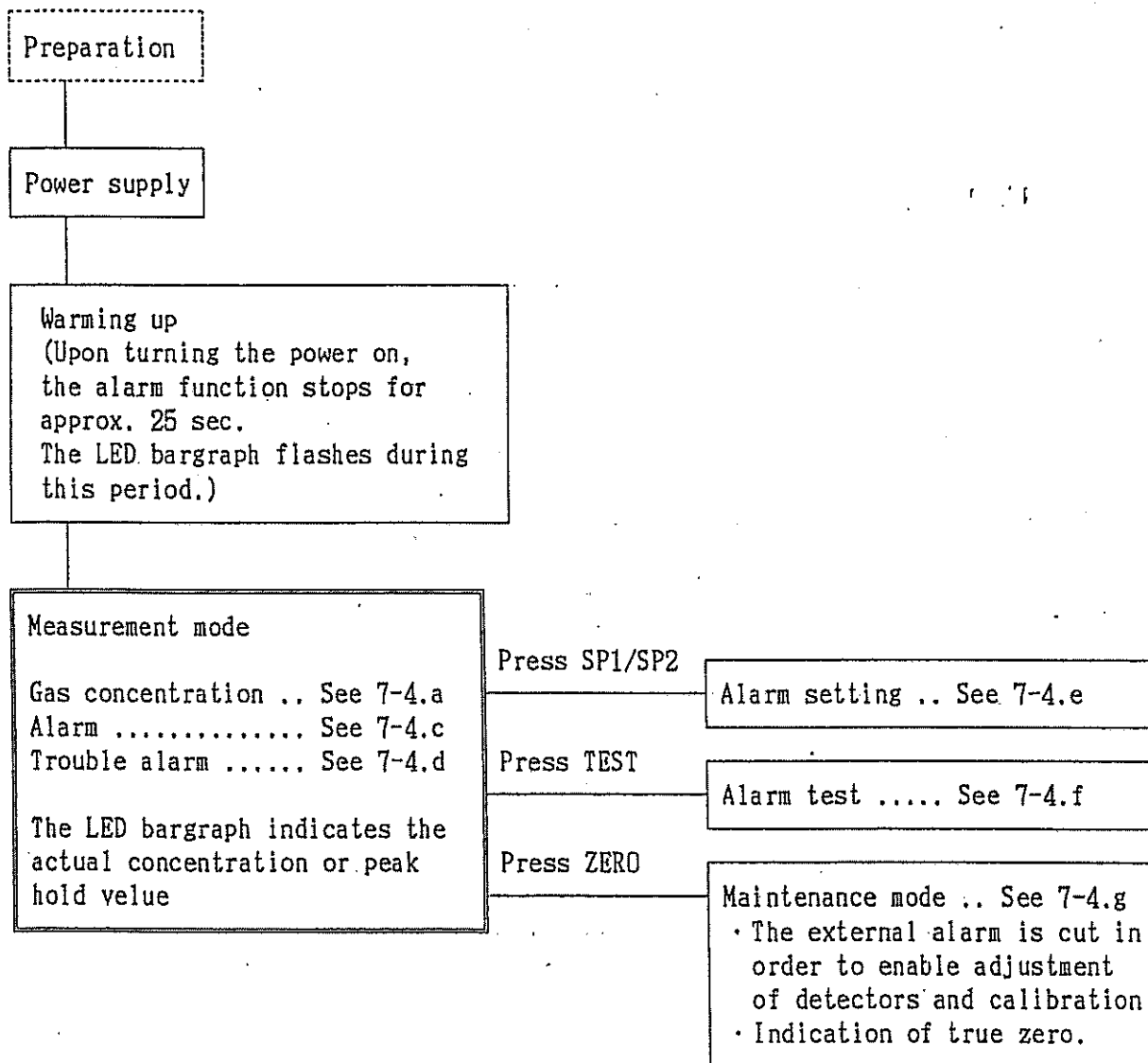
You are recommended to make a maintenance contract for this gas monitor with Riken's nearest service company or the nearest service agent overseas.

7. OPERATION

7-1. General

This instrument is used with a single unit case or multi unit case.

7-2. Basic operation flow



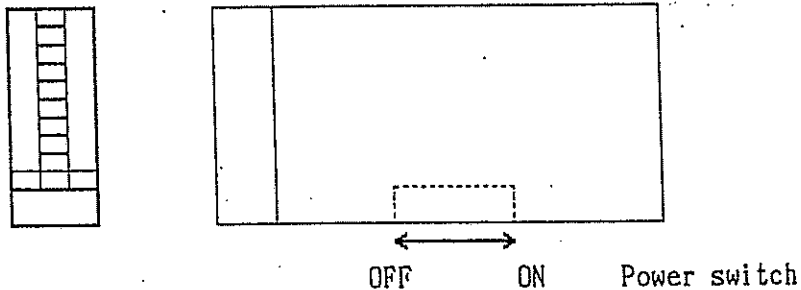
7-3. Preparation and initial power supply

a. Preparation

- (1) Please confirm the wiring to external equipment is correct.
- (2) Please confirm the voltage of power supply meets the specifications.
- (3) Please arrange properly to eliminate any possible effects on the alarm during adjustment.

b. Initial power supply

- (1) The power is supplied by turning on the power switch located at the bottom of the indicator/alarm unit.
- (2) After turning the power on, the alarm function will stop for approx. 25 sec. During this period, the following operation is performed.
 - LED bargraph flashes.
 - Alarm operation is suspended.
 - The external output is fixed at 4mA.

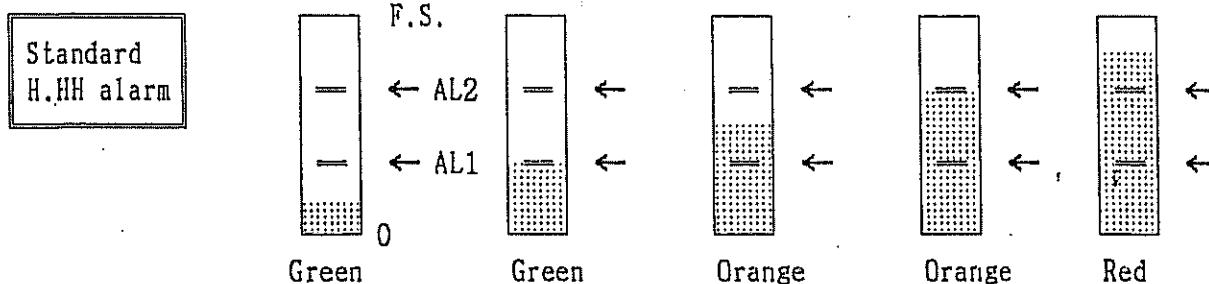


7-4. Measurement (Operation mode)

After warming up, the following operations are performed in "Operation mode".

a. Measurement of gas concentration

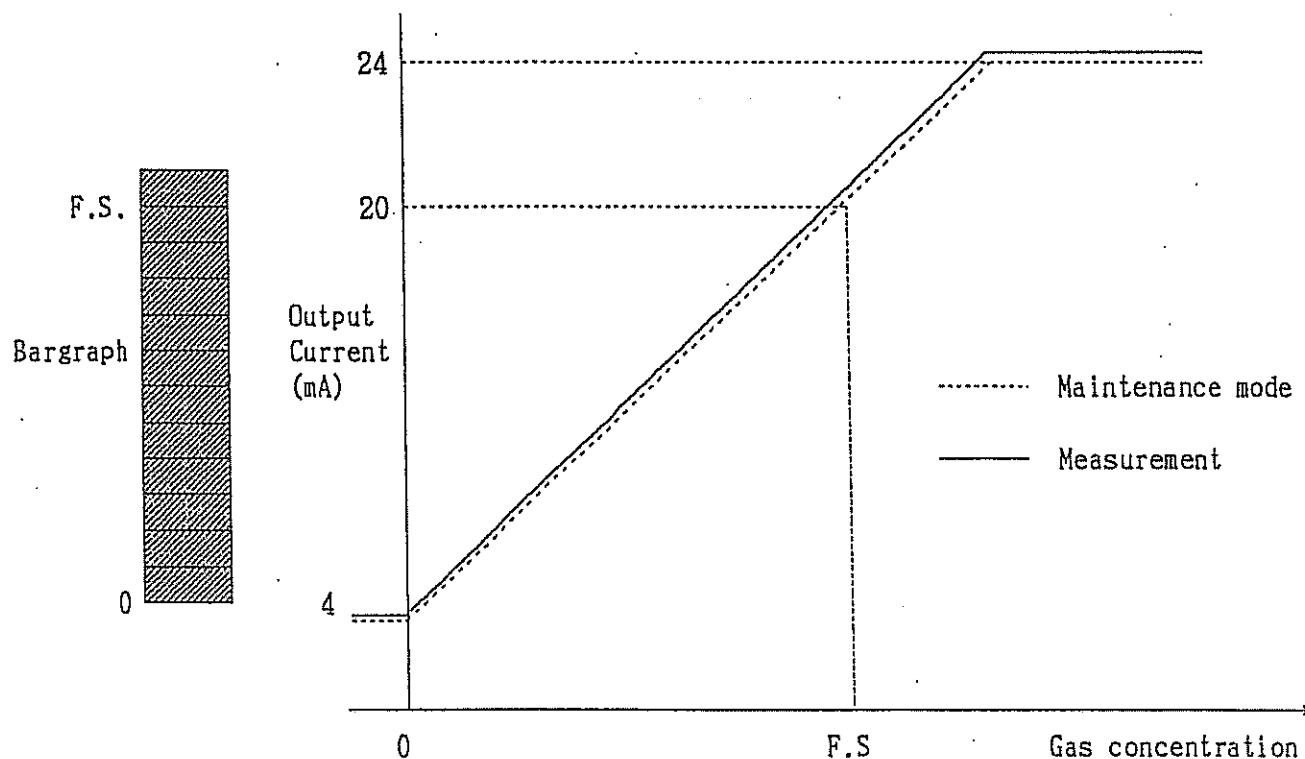
The gas concentration detected by the sensor in the detector head is indicated on the 50 digit LED bargraph in each alarm level color.



If a reading is off the scale, the whole LED bargraph flashes.

b. External output (4-20mA)

The output current corresponds to the LED bargraph indication.
(Some products from the first lot do not have the Zero suppression function.)



c. Gas alarm

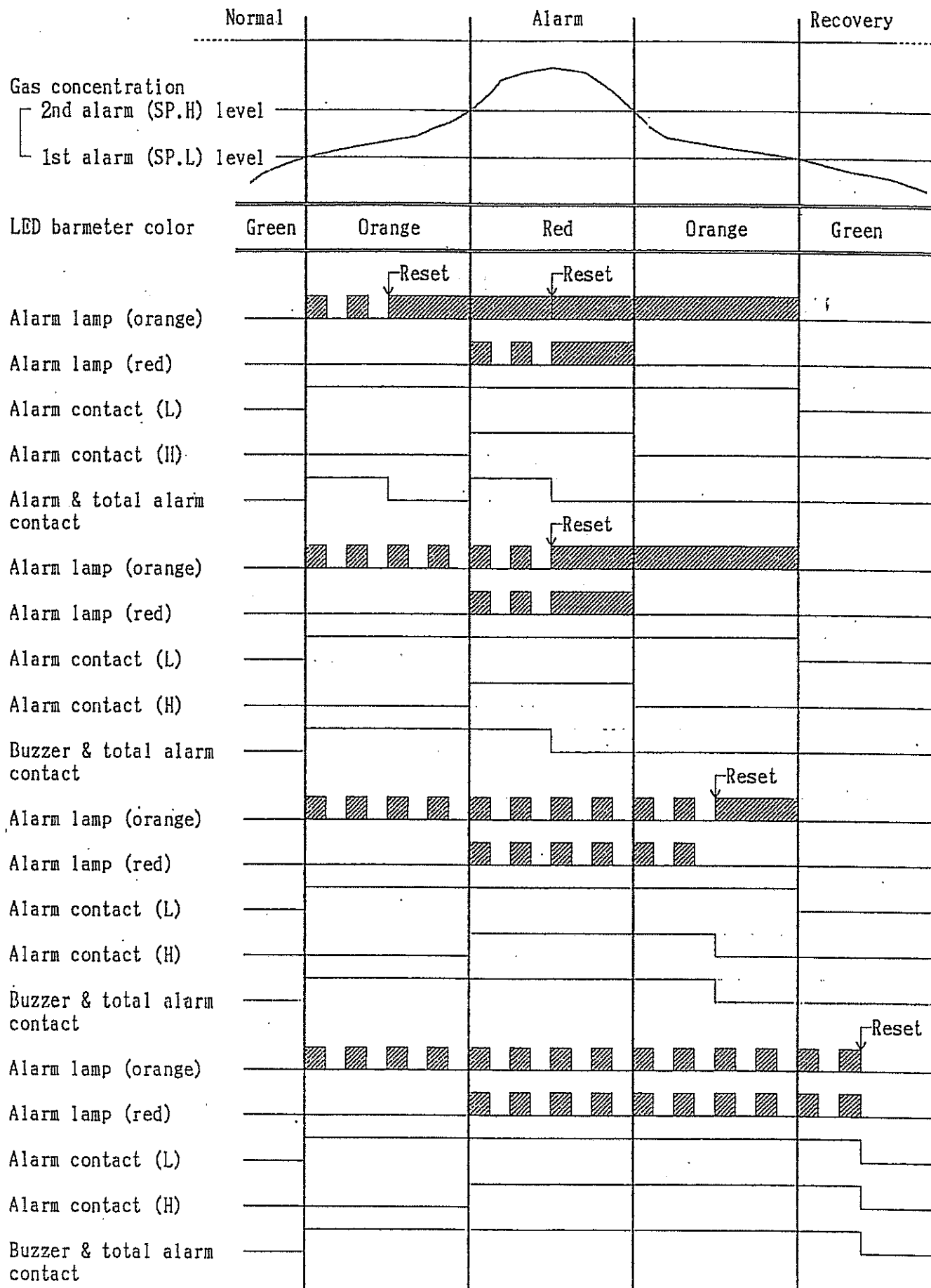
Function : When the gas concentration exceeds preset alarm levels (SP1, SP2), the following alarms are activated.

Operation : The alarm condition recovers automatically after the reset operation (buzzer stop).

* Remarks

- 1) The buzzer, Total alarm contact and Trouble alarm contact show the connection will the buzzer unit.
- 2) In maintenance mode, all the external alarm contacts are not shut off.

Alarm pattern (II/HH)



d. Trouble alarm

This alarm is given in the following conditions.

- ① When a signal transmission cable between an indicator/alarm unit and a detector head or a sensor cable is disconnected.

In this case, the indicator/alarm unit is in non-latched mode.

Stop the alarm by pushing the reset switch because the buzzer and the general alarm contact of the buzzer unit are latched mode type. The external output is as follows.

- The trouble alarm contact operates.
- The power lamp flashes.
- The trouble signal (to be received by the buzzer unit) is output.
- The 4-20mA signal falls to 1mA.
- The LED bargraph indicates zero.

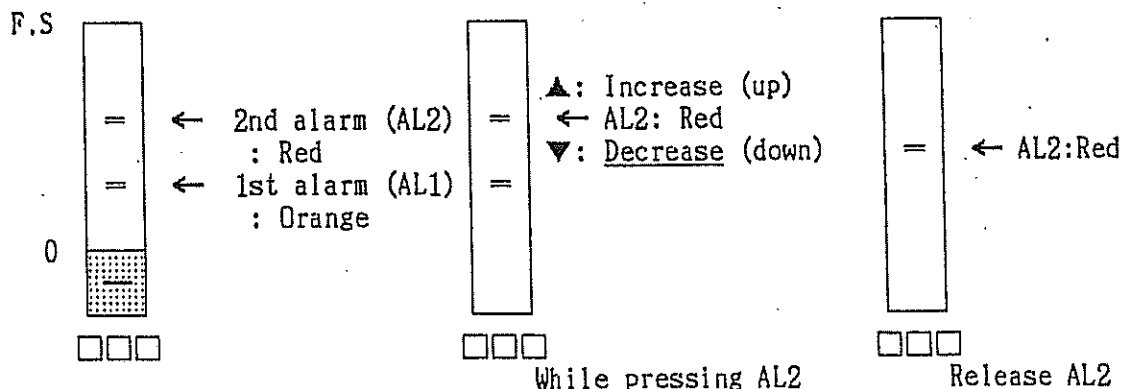
- ② When any trouble occurs with the CPU.

e. Setting of alarm levels

• Operation

- (1) Press down the alarm level confirmation switch (SP1 or SP2).
- (2) Push the "▲" or "▼" switch on the operation panel.
- (3) Set the indicator on the LED bargraph to the required alarm level.
- (4) Release the alarm level confirmation switch (SP1 or SP2).
- (5) The maintenance mode lamp flashes for a few seconds after the above operation. At this time, the alarm points are set to the memory NVRAM and it enters the operation mode.

Gas concentration measurement ⇒ Adjusting to alarm level ⇒ Setting alarm level



Example: Setting of the second alarm (H-HH)

f. Alarm test

- Function : In this procedure, check the function of the alarm circuit.
There are 2 types of alarm test : A (standard) and B.
- * Warning : If the external alarm is set to "OFF" in the maintenance or function setting mode, the alarm contact is not effective in spite of B-type. (See remarks (3).)
- Operation : 1) Push and hold the TEST switch for more than 5 sec. to enter the testing state.
2) By releasing the switch, it automatically returns to operation.
- * Warning : The alarm test procedure may activate the gas alarm.
Please arrange properly to eliminate any effect on the alarm, or cut the external alarm by pushing the maintenance mode switch before the alarm test.

<Standard>

	Testing of alarm	Type A	Type B	Maintenance mode
Indicator/ alarm unit	LED bar graph Alarm lamps (AL1/AL2) Alarm contacts (AL1/AL2) 4-20mA output	Flash Flash No function 20mA	Flash Flash Function 20mA	Flash Flash No function 20mA
Buzzer unit	Buzzer Total alarm contact	Alarm Function	Alarm Function	No alarm No function

* Remarks

- (1) The function of the buzzer and the total alarm contact is effective when connected with a buzzer unit.
- (2) In order to cut the alarm contact and eliminate the function of the alarm contact of the buzzer unit, the following procedure is required.
 - When using the TAN-580 as a buzzer unit, turn on the main switch of the buzzer unit. (In this case, an alarm will be given, but the total alarm contact will not function.)
 - Set to cut the external alarm output in the function setting mode.
(The buzzer and the total alarm contact will not function.)
- (3) The alarm test in the maintenance mode is not defined in some products from the first lot. In this case, the alarm test performed in the maintenance mode is performed according to one of the set conditions: A or B type.
In order to cut the external contact, refer to the above (2).

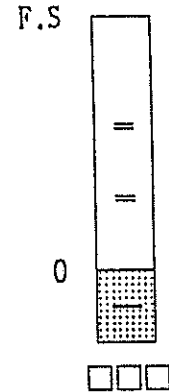
g. Maintenance mode

• Purpose : During the adjustment or gas calibration of a detector head, this function enables the elimination of the alarm if the indication value exceeds the alarm level.

• Operation : 1) Push the maintenance mode switch for 5 seconds to enter the maintenance mode.

2) The maintenance mode lamp flashes in this mode.

3) By pushing the maintenance mode switch for 5 seconds again, the instrument automatically returns to operation mode.



• Function : All the alarm contacts are cut in the maintenance mode. The zero suppression function is cancelled in this mode. The buzzer and the total alarm contact of the buzzer unit do not function in this mode (except at the alarm test).

7-5. Adjustment and calibration of detector head

The adjustment and calibration method depends on the type of the detector head.
For details please refer to the instruction manual of the required detector head.

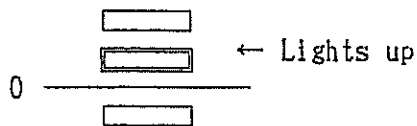
- ⚠ Warning : The alarm test procedure may activate the gas alarm.
Please arrange properly to eliminate any effects on the alarm,
or cut the external alarm by pushing the maintenance mode switch
before the alarm test. (See 7-4. g).

© Adjustment procedure

- a. After the preparation work and turning the power on, set the operation mode.
(See 7-3. "Preparation and initial power supply".)
- b. Push the ZERO switch for approx. 5 seconds to enter the maintenance mode.
(See 7-4. g "Maintenance mode".)
- c. Adjustment of the detector head voltage
 - ① Allow fresh air around the detector head to make sure that no gas exists around it.
 - ② Make sure that the voltage between the the check connectors TP3 (+) and TP4 (-) stays within the permitted range mentioned on the sticker on the main body.
 - ③ If the voltage appears beyond the permitted range, adjust it by turning the heater voltage adjustment potentiometer "HEAT".
- d. ZERO adjustment
 - ① Allow fresh air around the detector head to make sure that no gas exists around it.
 - ② If only the lowest bar lights up as shown below, it is to be understood as an indication of a minus (-) value.



- ③ Slowly turn the ZERO adjustment potentiometer clockwise. Then the lowest bar goes out at some point and instead the "zero" bar comes on.



e. Calibration

- ① Allow the calibration gas with a known concentration around the detector head
- ② When the color bargraph indication is stabilized, adjust by turning the SPAN potentiometer so that the indicated value corresponds to that of the calibration gas.

f. Push the ZERO switch to return to the operation mode.

8. FUNCTION OF EACH PART (FUNCTION SETTING MODE)

The following three modes are available as standard.
Please consult with the service agent if any additional mode is required.

Standard mode

- Selection of peak-hold function
- Setting the alarm delay time
- Setting the zero suppression level

8-1. Peak-hold function

a. Function

There are two kinds of gas leakage : Usual and sudden.

This function can hold the maximum indication of leaked gas and can be effective when the indication falls after the gas alarm.

The peak-hold value can be reset by pushing the RESET switch of the buzzer unit and the current value is held.

- The peak value is indicated by a green bar on the LED bargraph.
- If the indication is off the scale, the top LED flashes.
- If the peak value and the alarm setting value are the same, the LED bar flashes by turns.

b. Standard setting : Non peak-hold.

8-2. Alarm delay time

a. Function

In some areas of the system installation, an external noise may affect the measurement. The alarm delay time setting function can be used to eliminate malfunction caused by such noise. Noises that are shorter than the sensor reaction and large noises are ignored by this function in order to avoid malfunction of the system.

The following alarm functions can be delayed.

- Alarm lamp (AL1/AL2)
- Gas alarm contact (AL1/AL2)
- Buzzer pulse

b. Setting time

- 0 to 12.5 seconds

(Standard setting: 2 sec., LED bargraph indication : 0.5 sec./digit)

8-3. Zero suppression

a. Function

The zero suppression function is to minimize the effects of external noises and gives a stable zero level indication.

This function is applicable to the following items.

- LED bargraph indication
- 4-20mA output

(Some units from the first lot are not equipped with this function.)

b. Available setting level

0 to the full scale.

(Preset before delivery depending on the model.)

9. SPECIFICATIONS

Detection principle : Catalytic combustion (Detector head)
Object gases : Combustible gases
Indication type : Multicolor LED bargraph (with peak-hold indication)
Detector signal : Direct transfer of the sensor output
transfer method
Signal transfer : Within 2 km by CVV (2sq)
distance (For a multicase with 6 or 12 points: 3.5sq)
Output : (4 - 20) \pm 1 mA / (0 - F.S.) : adjustable
Load resistance : 300 Ω max. (non-insulated)
Alarm operation : Self-holding, Auto-recover after reset (Standard)
Indication : 1st alarm - Orange LED flashes and stays on after reset
2nd alarm - Red LED flashes and stays on after reset
Contacts : 1a or 1b (to be specified by the customer.)
Capacity of the contact : resistance load (Attention !)
AC100V/0.5A, DC30V/1.5A
Initial clearing : Approx. 25 sec.
Zero suppression : Adjustable within the range of 0 to F.S.
Working temperature : 0 - 40°C
Working humidity : 10 - 90%RH (No condensation allowed.)
Power supply : DC24V \pm 10%
Power consumption : 13W Max. (DC)
Mounting method : To be mounted a single case or a multicase.

Remarks:

- 1) Please refer to precautions:
4.1 "Precautions for installation" and 5. "Precautions for operation".
- 2) The above specifications may be modified for improvement without notice.



Product Warranty

1/1/2006

RKI Instruments, Inc. warrants gas alarm equipment sold by us to be free from defects in materials, workmanship, and performance for a period of one year* from the date of shipment from RKI Instruments, Inc. Any parts found defective within that period will be repaired or replaced, at our option, free of charge. Parts must be returned to RKI Instruments, Inc. for repair or replacement. 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.

Examples of such items are:

- a) Pump diaphragms and valves
- b) Fuses
- c) Batteries
- d) Filter elements

Warranty is voided by abuse including mechanical damage, alteration, rough handling, 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 RKI INSTRUMENTS, INC. INCLUDING BUT NOT LIMITED TO, THE WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL RKI INSTRUMENTS, INC. BE LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGE OF ANY KIND CONNECTED WITH THE USE OF ITS PRODUCTS OR FAILURE OF ITS PRODUCTS TO FUNCTION OR OPERATE PROPERLY.

This warranty covers instruments and parts sold to users only by authorized distributors, dealers and representatives as appointed by RKI Instruments, Inc.

We do not assume 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. Warranty covers parts and labor performed at RKI Instruments, Inc. only, and does not cover field labor or shipment of parts back to RKI Instruments, Inc.

* The Models GX-2001, GX-2003, GasWatch 2, and 01 Series carry a two year warranty. The two year warranty applies to the instrument including original sensors. Replacement parts and sensors have a standard one year warranty.