Bar Graph Indicator

GM-1000

VER 3.2 '06. 01

Instruction Manual

WISE CONTROL, GED

http://www.wisegas.com

Contents

1. Important Remarks

IMPORTANT

▷This document is not a contractually binding document, WISE CONTROL reserves the right to make any changes, without notice, to the technical characteristics of its equipment in order to improve performance levels, in the interest of its customers.

▷Carefully read the instructions before all first use: This instruction manual must be read by any person who is, or will be, responsible for the use, maintenance or repair of this equipment.

▷This equipment will conform with the specified performance levels only if it is used, maintained and repaired in accordance with the directives of WISE CONTROL and by WISE CONTROL personnel or personnel authorized by WISE CONTROL

LIMIT OF RESPONSIBILITY

▷WISE CONTROL hereby reject any and all responsibility with regard to any person for material damage, bodily injury or death resulting in whole or in part from the inappropriate use, installation or storage of its equipment not conforming to the instructions and to warnings and /or not conforming to standards and regulations in force.

▷WISE CONTROL does not allow or authorize any company, person or legal entity to assume such responsibility on the part of WISE CONTROL, even if involved in the sale of the product of WISE CONTROL.

▷WISE CONTROL shall not be liable for any direct or indirect damage, or any direct or indirect legally awarded damages resulting from the sale and use of any of its products, unless those products were specified and chosen by WISE CONTROL for the use made of them.

WARNING

▷Do not open the transmitter enclosure with power applied unless it is verified that no combustible gases or vapors are present. A portable gas detection instrument should be used to ensure that the area is clear of any combustible gases. Calibration or maintenance should not be performed if there is any indication of the presence of combustible gas at the sensor.

▷It is possible for the transmitter output to drop to a low LEL level after going into high alarm and still have a dangerous level of combustible gas present. Therefore, precautions should be taken to ensure that the combustible gas has been cleared before considering the area safe.

▷The sintered metal flame arrestor is an integral part of the combustible gas sensor. DO NOT operate the gas detector if the flame arrestor is damaged or missing, since the exposed element is a potential ignition source.

CAUTION

▷The wiring instructions in this manual will provide safe and proper functioning of the device under normal conditions. However, local variations in wiring codes and regulations exist, and total compliance with these ordinances cannot be guaranteed. Be certain that all wiring complies with all local ordinances. If in doubt, consult the local authority having jurisdiction before wiring the system.

▷The sensor threads should be coated with silicon free grease to ease both the initial installation and future replacement of the sensor. The junction box cover threads should also be lubricated. The use of other lubricants is not recommended, since some materials can cause irreversible damage to the sensing element. Silicon based lubricants must never be used.

2. Introduction

GM-1000 is a digital gas leakage indicator applied with microprocessor application circuit.
It is upgraded product compare with before indicators (easiness of reading indication value and alarm state, confidence, easiness of using)

GM-1000 is installed at the place using gases by raw materials, supplying gases or the place can be leak gas, like industrial areas, gas charging sites, petrochemical plants, chemical plants, etc. And it can protect industrial calamity by detecting gas leakage and notifying in advance. Then it can be applied to detector of combustible gases (methane, ethane, LPG, LNG, etc.) and toxic gases.

It may be used with common alarm unit (AM-2000)

Technical part of Instrument composition, repair method, other common alarm unit manual, sensor properties and sensor install manual are excepted in this manual, and then you may refer other manual.

3. Characteristics

- It has a microprocessor
- Selectable the kinds of Detector by Jumper Pin (combustible gas sensor and toxic transmitter)
- It is easy to operate because it has three color LED bar graph
- Normal: Green / 1st Alarm: Yellow / 2nd Alarm: Red (51 segments)
- Self diagnostics functions
- Linear DC 4 to 20 mA output retransmission
- Easy alarm set point Adjustment
- Two alarm levels (High alarm, High-High alarm)
- Adjust Internal Settings without Power Off
- Plug-in Modularity
- Short Circuit Protection, 0.5A Glass Fuse Protection
- Sensor trouble alarm
- High density construction is possible by using of adoption of 36×144 mm front DIN standard
- You can select between multi case and single case
- Long sensor lifetime
- GM-1000 is a digital gas leakage indicator with microprocessor application circuit.
- It is upgraded product compare with before product (easiness of reading indication value and alarm state, confidence, easiness of using)
- GM-1000 is installed at the place using gases by raw materials, supplying gases or the place can be leak gas, like industrial areas, gas charging sites, petrochemical plants, chemical plants, etc. And it can protect industrial calamity by detecting gas leakage and notifying in advance. Then it can be applied to detector of combustible gases (methane, ethane, LPG, LNG, etc.) and toxic gases.
- It may be used with common alarm unit (AM-2000)

4. Specifications

Items	Specifications	Remarks

Display	51 segment bar graphic Power, Fail, Al1 and Al2	3 Color Changeable Bar graphic
Sensor input	Selectable	
Measuring Range	0 ~ 100% LEL or Depending on the gas	
Alarm Set Point Set Value Output Rating Trouble	Two (High, High-High) 0 to F.S. programmable 3*SPDT AC 250V 3A N.O or N.C.	L, LL available 2% step Contact capacity
Retransmission	DC 4-20mA Linear	Max. 600Ω load impedance
Power	20 – 30 VDC, max. 0.3A	
mounting	Panel flush mounting	
Operating condition	-20 to 50℃	to 122 ºF
Dimension	36(W) × 144(H) × 180(D)	
Weight	670 g	
Installation method	Single rack / Multi unit rack	

5. Installation

The detector is constructed with main instrument and gas sensor.

5.1 Main instrument installation

5.1.1 Notice

You can not use at a place like below.

1) The place where the voltage of instrument power is very fluctuate,

2) The place where dusts or corrosion gases are remained

3) The place where the ambient temperature is above 50℃ or below 0℃

4) The place where the mechanical vibration or the shock are existed

5) The place near the high current circuit or where high induction interference is existed, an instrument and a sensor circuit may keep away above 30 cm from the high current or the high voltage circuit, because it makes induction interference and it would be an indication error and unstableness of indication.

5.1.2 Installation method

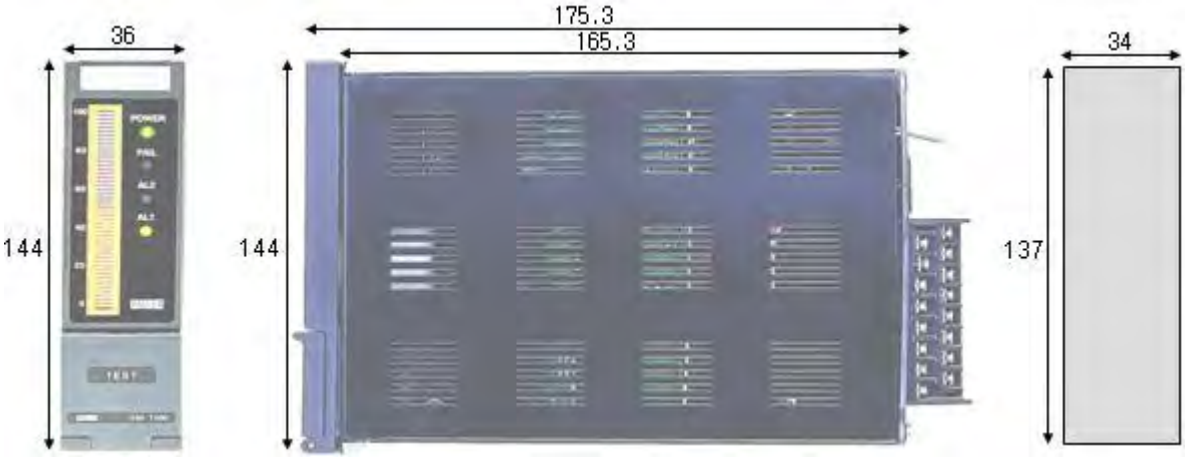
1) You may make a panel cut of 34×137 mm. If you install above two instruments, you may keep the distance between panel cuts. (Refer to fig. 3.1)

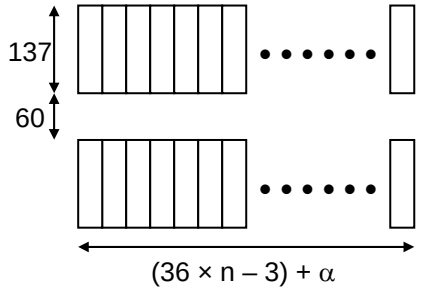
2) You may insert an instrument to panel cut, You may insert a panel for separation of instruments

3) You may insert a mounting bracket at an upper and a lower of instrument, and fix an instrument

4) If you need to stand instruments in a low, you may let the common alarm unit to the very left side.

5) A common alarm unit is used at many detectors commonly.





When you mount this indicator to the panel,

the panel cut size is (36 × n – 3) + α

n= 1～5 : α = 1

n= 6～10 : α = 2

n= 11～15 : α = 3

n: amount of indicator and alarm unit

Fig. 5.1 The shape of GM-1000, Panel cut

6. Wiring

6.1 Power

After certify the power for using is the same as the power that designate in wiring diagram, you may wire. In order to protect a surge, you may separate an instrument power and a power line (operation power of heater, magnet S/W)

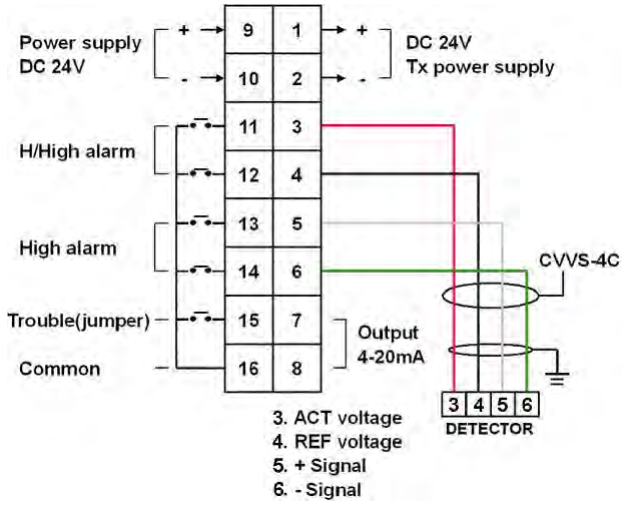
6.2 Single case wiring

Fig. 6.1 shows the function of terminal board at backside when an instrument is used for single case.

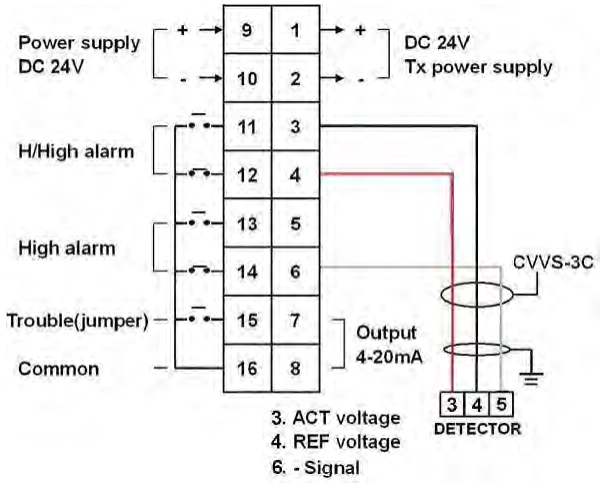
TERMINATION

▶ Non Transmitter type(Sensor type)

CASE1 – 4-wire type sensor

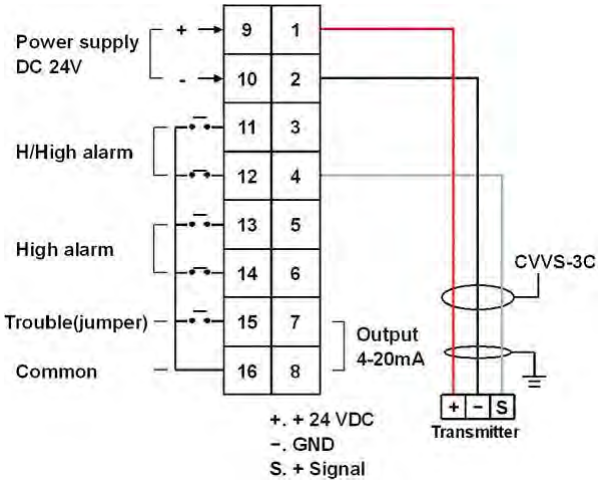


CASE2 – 3-wire type sensor

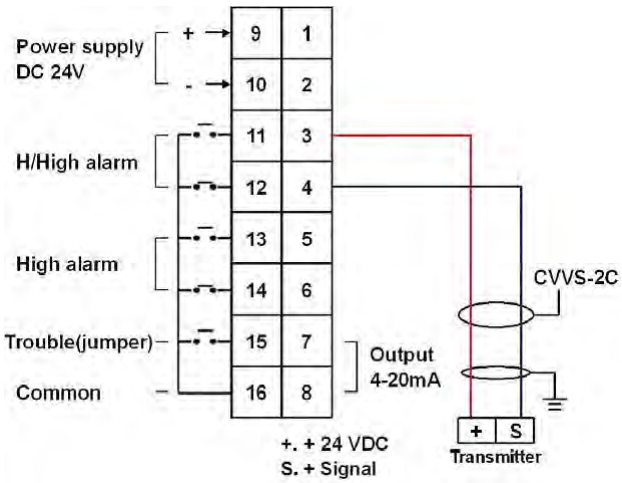


▶ Transmitter type

CASE3 – Transmitter type 3-wire



CASE4 – Transmitter type 2-wire



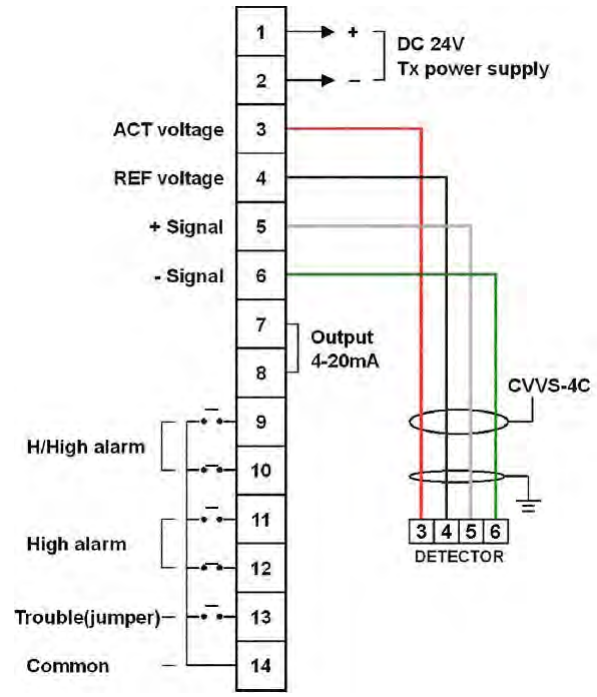
6.3 Multi-unit case wiring

Fig. 6.2 shows the function of terminal board at backside when an instrument is used for multi case.

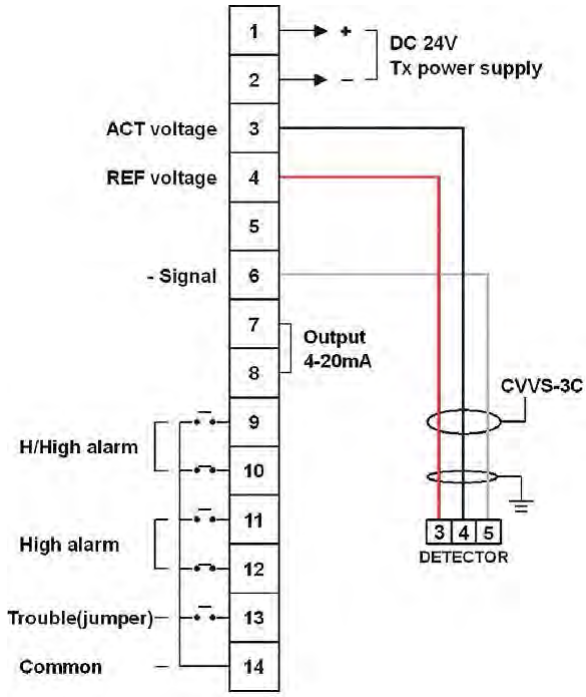
TERMINATION

▶ Non Transmitter type(Sensor type)

CASE1 – 4-wire type sensor

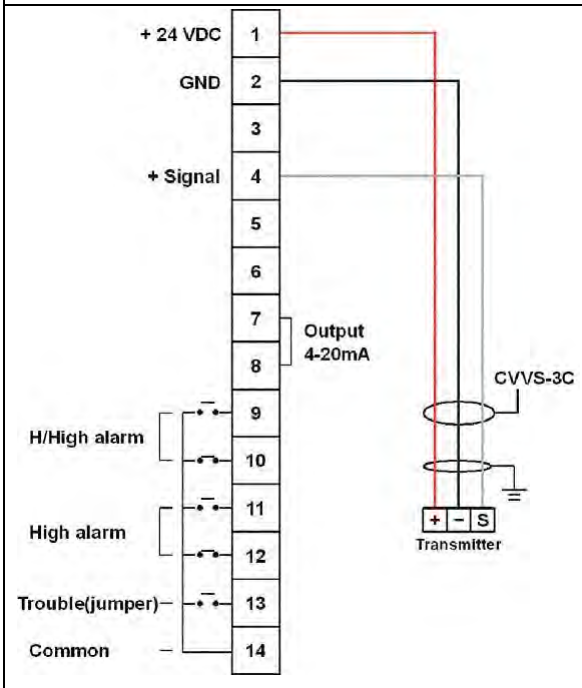


CASE2 – 3-wire type sensor



▶ Transmitter type

CASE3 – Transmitter type 3-wire



CASE4 – Transmitter type 2-wire

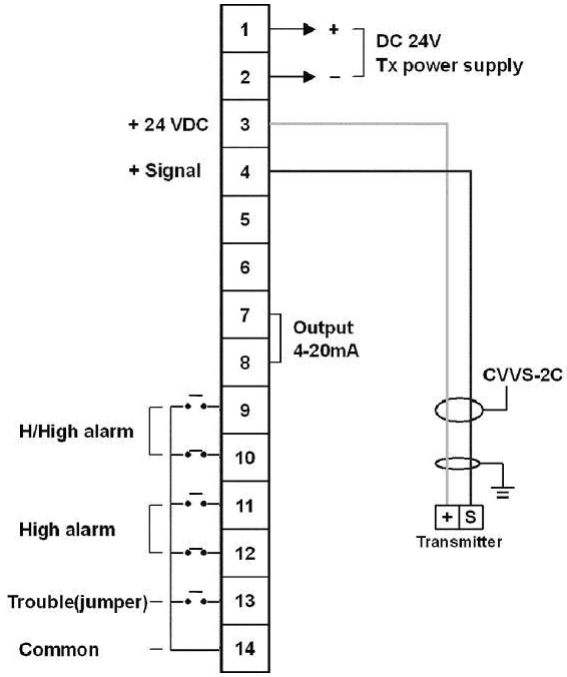


Fig. 6.2 The wiring method of GM-1000 single case and the wiring diagram.

6.4 The connection with a common alarm unit

◎ When a instrument is used for single case, you may connect with flat ribbon cable as shown in Fig. 6.3.

◎ When a instrument is used for multi case, you do not need to wire.

Notice) When you connect a ribbon cable, you may off the power of instrument. If you put on/off the cable when the power is loaded, then the electronic circuit can be destroyed

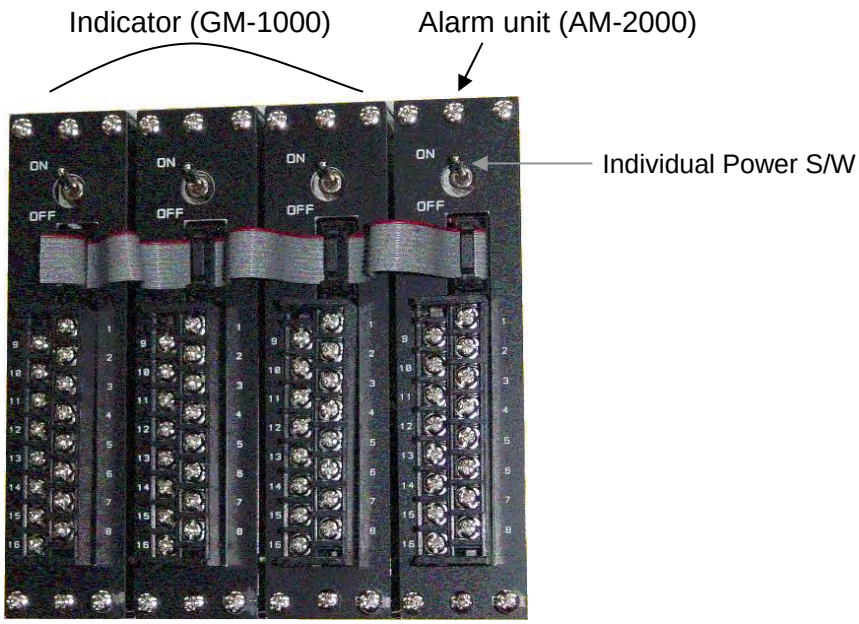


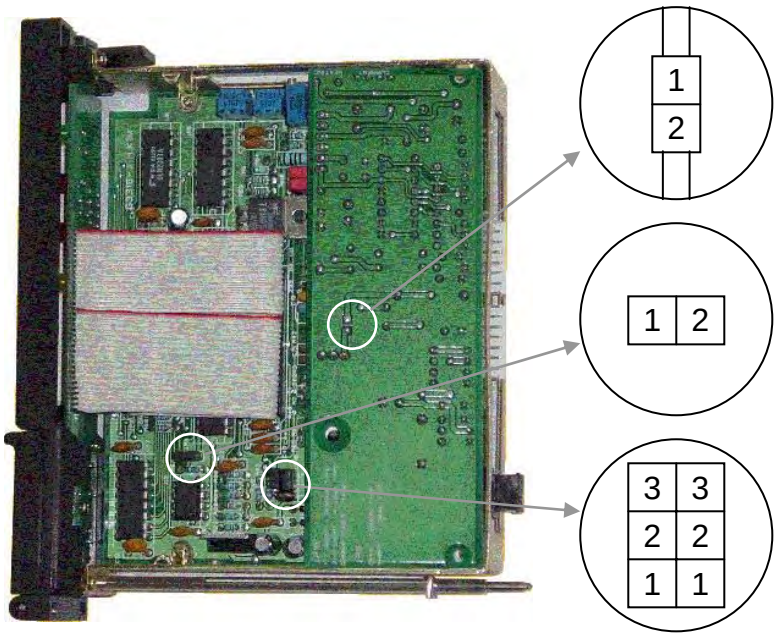
Fig. 6.3 Connection with a common alarm unit

6.5 The select of sensor and signal source

6.5.1 local detector (diffusion type combustible detector)

1) You may release the lock screw of detector and pull out an instrument from the case carefully.
2) After you off the power, you may connect the connector between a detector and a terminal.
3) You may select the input select jumper on a back lower of connector to the connecting point of combustible gas sensor (refer to Fig. 4.4)
4) You may recombine connector between instrument and terminal

Notice 1) You may not connect wrong position of connector when you recombine.
2) Do not combine indicator to connector of common alarm unit.
(You may put a common alarm unit on the very left side of instrument array due to distinguish the position of alarm unit)



Jumper	State	Case
Pattern	SHORT	Sensor type
	OPEN	4-20 mA Transmitter type
JP 6	SHORT	4-20 mA Transmitter type
	OPEN	Detector Sensor type
JP 10	2-3, 2-3 SHORT	4~20 mA Transmitter type
	1-2, 1-2 SHORT	Detector Sensor type

5) You may connect a sensor to the terminal of instrument (in case of Non-transmitter type)
⦿ sensor operation power + (red) : connect to terminal #3
⦿ sensor operation power – (black) : connect to terminal #4
⦿ sensor signal + (white) : connect to terminal #5
⦿ sensor signal – (green) : connect to terminal #6

6) When you extend a lead wire of sensor, you may use the wire with color or put the right tag in order not to confuse a wire.
The permitted maximum length of line from a sensor to a detector depends on cross section

area of wire like below.

⊙ In case of 1.25 mm SQUARE: about 1.2 Km

⊙ In case of 2.0 mm SQUARE: about 2.0 Km

⊙ In case of 3.5 mm SQUARE: about 4.0 Km

Notice) Cross section areas of four sensor extension wire must be same

6.5.2 Local detector (Suction type combustible gas detector)

1) The connection of sensor is the same as diffusion type combustible gas detector.
2) Connection of power for suction pump operation.
   ⊙ Pump operation power + : connect to terminal #1
   ⊙ Pump operation power - : connect to terminal #2

Notice) The power for suction pump operation is supplied through the inner fuse. Then you take care that supply voltage is 18-30VDC and permitted limit of supply current is 1A

6.5.3 Local detector (2-wire transmitter type toxic gas detector)

1) When you connect with 2-wire 4-20mA output type gas leakage transmitter, the power for operation of transmitter is supplied through the current limit circuit in a detector. (Max. 30 mA)
2) You may select the jumper of input select to transmitter connection. (Refer to Fig. 4.4)
3) Connection of signal line
   ⊙ Transmitter signal + : connect to terminal #3
   ⊙ Transmitter signal – : connect to terminal #4

6.5.4 Local detector (3-wire transmitter type combustible and toxic gas detector)

1) The connection of input jumper is the same as 2-wire type transmitter.
2) When you connect with 3-wire type transmitter, operation power is supplied by suction pump operation power.
3) Connection of signal line
   ⊙ Transmitter power + signal : connect to terminal #1
   ⊙ Transmitter power – signal : connect to terminal #2
   ⊙ Transmitter output + signal : connect to terminal #4

Notice) The power for operation is supplied through the inner fuse. Then you take care that supply voltage is 18-30VDC and permitted limit of supply current is 1A

6.6 Alarm output

The three point of alarm contact output are offered.

6.6.1 Connection of danger alarm output (AL2 alarm output)

- ⊙ C (COMMON) of alarm output #2 : connect to terminal #16
- ⊙ NO (NORMAL OPEN) of alarm output #2 : connect to terminal #11
- ⊙ NC (NORMAL CLOSE) of alarm output #2 : connect to terminal #12

6.6.2 Connection of warning alarm output (AL1 alarm output)

- ⊙ C (COMMON) of alarm output #1 : connect to terminal #16
- ⊙ NO (NORMAL OPEN) of alarm output #1 : connect to terminal #13
- ⊙ NC (NORMAL CLOSE) of alarm output #1 : connect to terminal #14

6.6.3 Failure alarm output

You might select output (NC and NO) by jumper on the back PCB because the terminal of fail alarm output is only two.

6.7 Connection of retransmittion signal

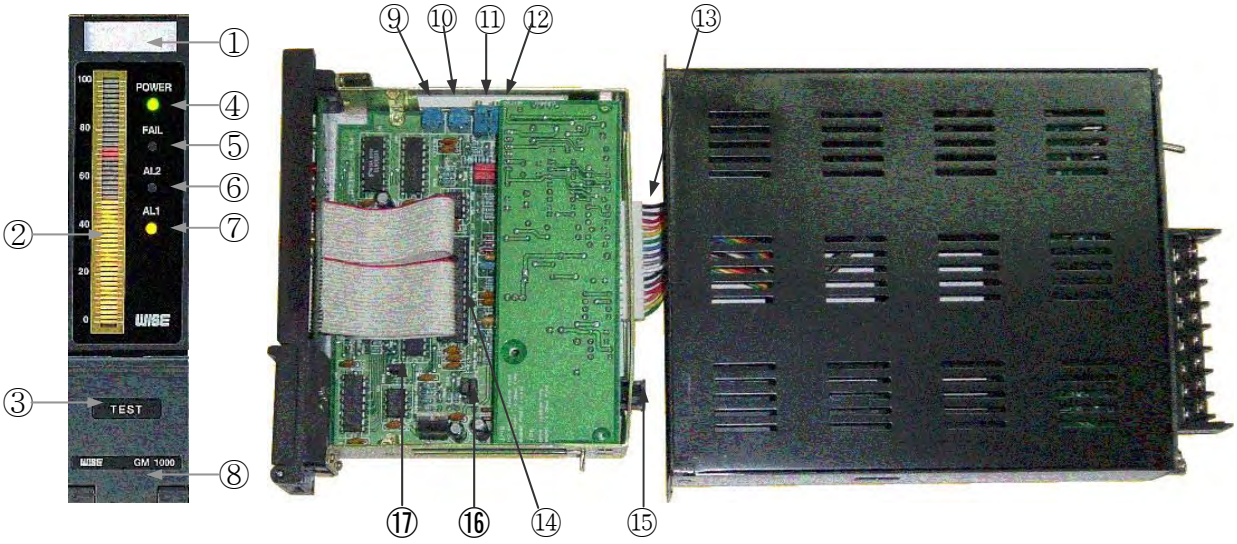
- ⊙ transmitter output + : terminal #7
- ⊙ transmitter output - : Terminal #8

6.8 Earth

You connect terminal at low of case.
You take care of the electric shock by an incomplete earth, the effect of ambient noise and unnecessary emission noise.

7. Operation

7.1 Names and functions of GM-1000



No	Name	Function	No	Name	Function
1	NAME PLATE	Write TAG No.	10	4-20mA ZERO VR	Transmitter type (4-20 mA) input
2	BAR GRAPH	Display a current value	11	DETECTOR SPAN VR	Detector type (3/4 wire sensor) input
3	TEST KEY	It act when you push a key for 3 sec.	12	DETECTOR ZERO VR	Detector type (3/4 wire sensor) input
4	POWER LED	It shows POWER ON	13	FLAT RIBBON CABLE	Connect between back T/B and main board
5	FAIL LED	It shows input signal (sensor/mA) trouble	14	MICRO PROCESSOR	Act by program
6	AL2 LED	HIGH-HIGH ALARM	15	FUSE HOLDER	Rated FUSE is 1A, 250V
7	AL1 LED	HIGH ALARM	16	INPUT SELECTOR JUMPER	Select jumper depend on input
8	LOCK SCREW	Fix of instrument	17	INPUT SELECTOR PIN	PIN SHORT : 4-20 mA pin open : DETECTOR
9	INPUT: 4-20mA SPAN VR	Transmitter type 4-20 mA input			

7.3 Operation mode

7.3.1 Sensor stabilization time (WARMM-UP)

You have to wait for sensor stabilization time because a detector does not act immediately.
At this time, the value from 0 to 100 %LEL are indicated for 30 second. (Sensor stabilization time)

1) Alarm output does not brake out. (Alarm output stop for a while)
2) Transmitter output is 3 mA.

7.3.2 Normal action

1) Sensor stabilization time is end, then instrument act for operation mode. At the operation mode, the measuring value is indicated as a cumulative form on the bar graph.
2) When the measuring value excess the alarm setting point, then instrument output an alarm contact and LED flicker.
3) In case of common unit make an alarm return signal after alarm is acted.
   ⊙ In case of alarm state is held (the measuring value excess the alarm set point) LED for alarm state is changed from flickering to on state.
   ⊙ In case of alarm state is canceled (the measuring value fall below the alarm set point) LED for alarm state is changed from flickering to on state and contact output is off.
4) An instrument generates transmitter output of measuring value with the range 4-20 mA.
   For initial stabilization time, a detector makes 2 mA transmitter output.
   When a fail signal is generated, a detector makes 2 mA transmitter output.
   When a transmitter input is below 2 mA, a detector makes fail signal.

7.3.3 Calibration method

I. Diffusion combustible gas detector (Non-Transmitter)

1) You may confirm the sensor current of connected detector. (Refer to Fig. 7.1)
2) HEATING CURRENT SETTING: You calibrate the corresponded current by HEATING CURRENT VR. At this time, you can confirm the value by a voltmeter. You may set the unit of voltmeter to volt and you connect the probe of voltmeter to current check pin. The unit is volt but you have to read for current because one ohm resistor is inserted.
   (example; 295 mV × 1Ω = 295 mA)
.
3) ZERO SETTING : After calibrate heating current, you have to wait for ten hours, and then you calibrate the zero point. You may set zero by ZERO VR.
4) SPAN SETTING : You inject a standard gas (assume 50 %LEL) to a sensor.

After you saturated point, you may set the indicated value to 50 by SPAN VR.

Ⅱ. Transmitter (2,3-wire type)

1) After 4 mA is supplied by a current source, you set the zero point by the Zero VR.
2) After 12 mA is supplied by a current source, you set the 50 point by the Span VR.
3) You do not need to calibrate the setting because setting points are calibrated when products are shipped.

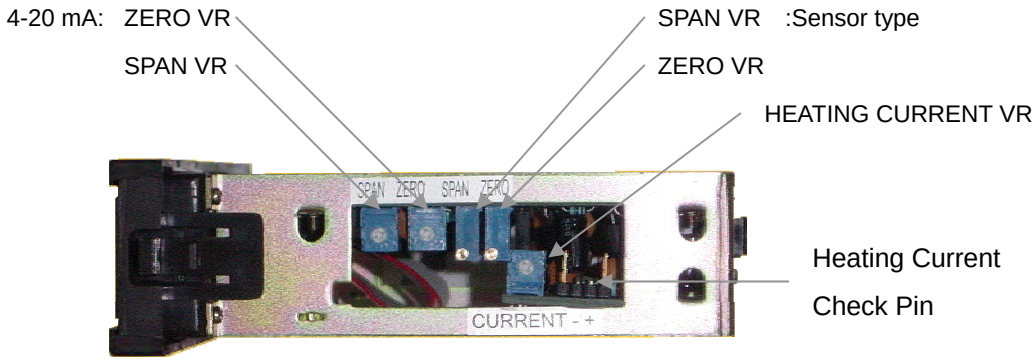


Fig. 7.1 The calibration of HEATING CURRENT and ZERO/SPAN

7.3.4 Alarm setting

1) After you open a front door, you set AL1 (High alarm) set point by AL1 VR.
AL1 is indicated as a LED with orange color.
When the high alarm is generated, then the indication value of gas concentration is changed to orange color.

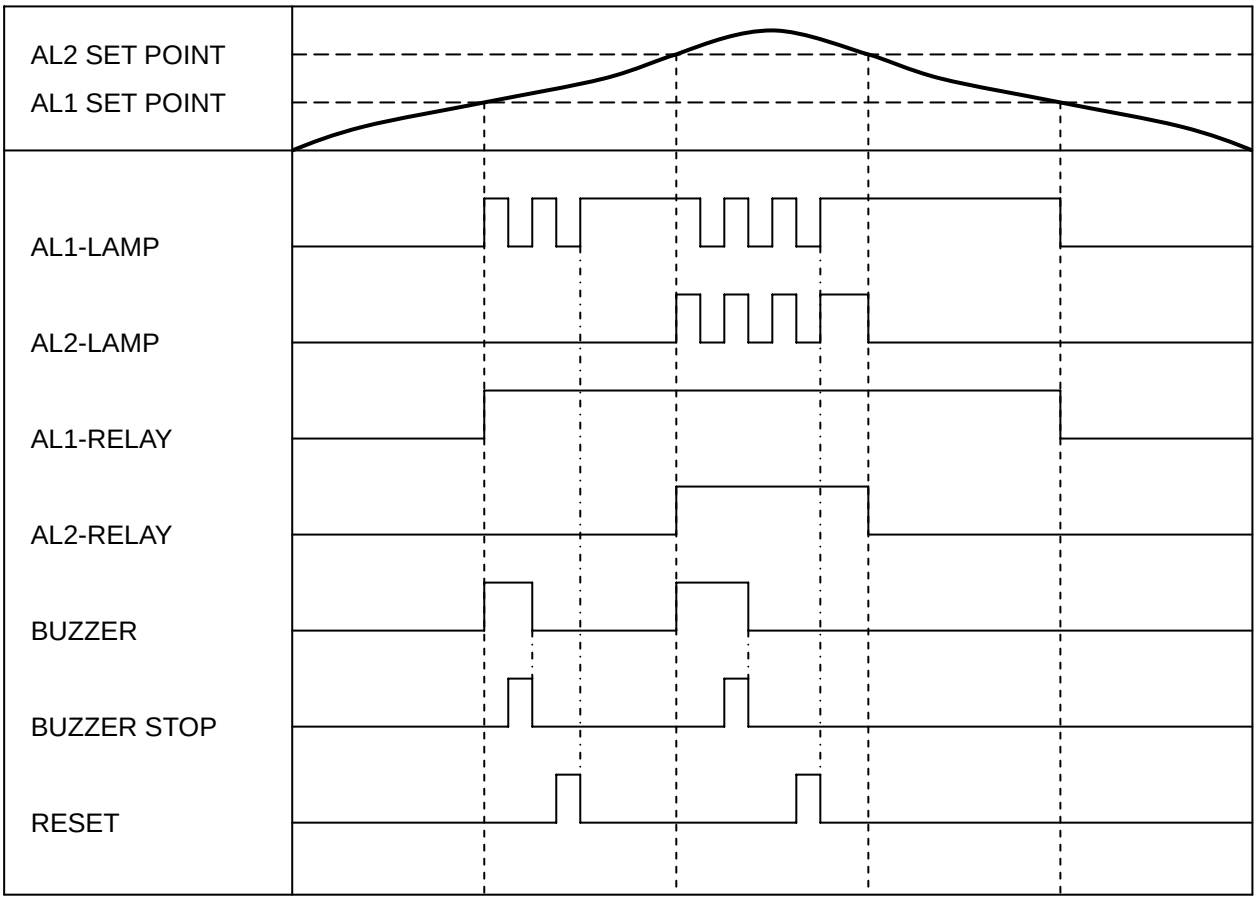
2) After you open a front door, you set AL2 (H-High alarm) set point by AL2 VR.
AL2 is indicated as a LED with red color.
When the H-high alarm is generated, then the indication value of gas concentration is changed to red color.

7.3.5 Test mode

1) When you push the test key for longer than 3 second, then the state is changed to test mode.
2) At the test mode, you can confirm the two states of alarm and sensor trouble.

7.3.6 Alarm acted state

During the normal state, gas leakage alarm state and normal state again, lamp and buzzer of alarm state is like below.



7.3.7 Sensor trouble alarm

In case of that sensor is damaged or lead wire is disconnected by connection of combustible gas sensor.

⦿ FAIL LED flicker

⦿ FAIL alarm contact is generated

7.3.8 Fuse disconnection alarm

1) During operation, a inner fuse is disconnected by trouble of instrument or over load of suction pump, then fail alarm contact is generated and common alarm unit (AM-2000) makes fail LED, alarm sound and fail alarm contact.

2) Fuse replacement method

⦿ You may off the power S/W at the back of alarm unit.

⦿ After you check out the reason of fuse disconnection, you may change the fuse.

⦿ You supply power again, then the instrument is operated normally after sensor stabilization time.

Notice) You may use the standard fuse. The standard of fuse is 1A, 250V.

7.3.9 Power voltage insufficiency

If the power supply voltage is decreased to 18 VDC, then

⦿ detector will be stop.

⦿ all alarm contact output will be off.

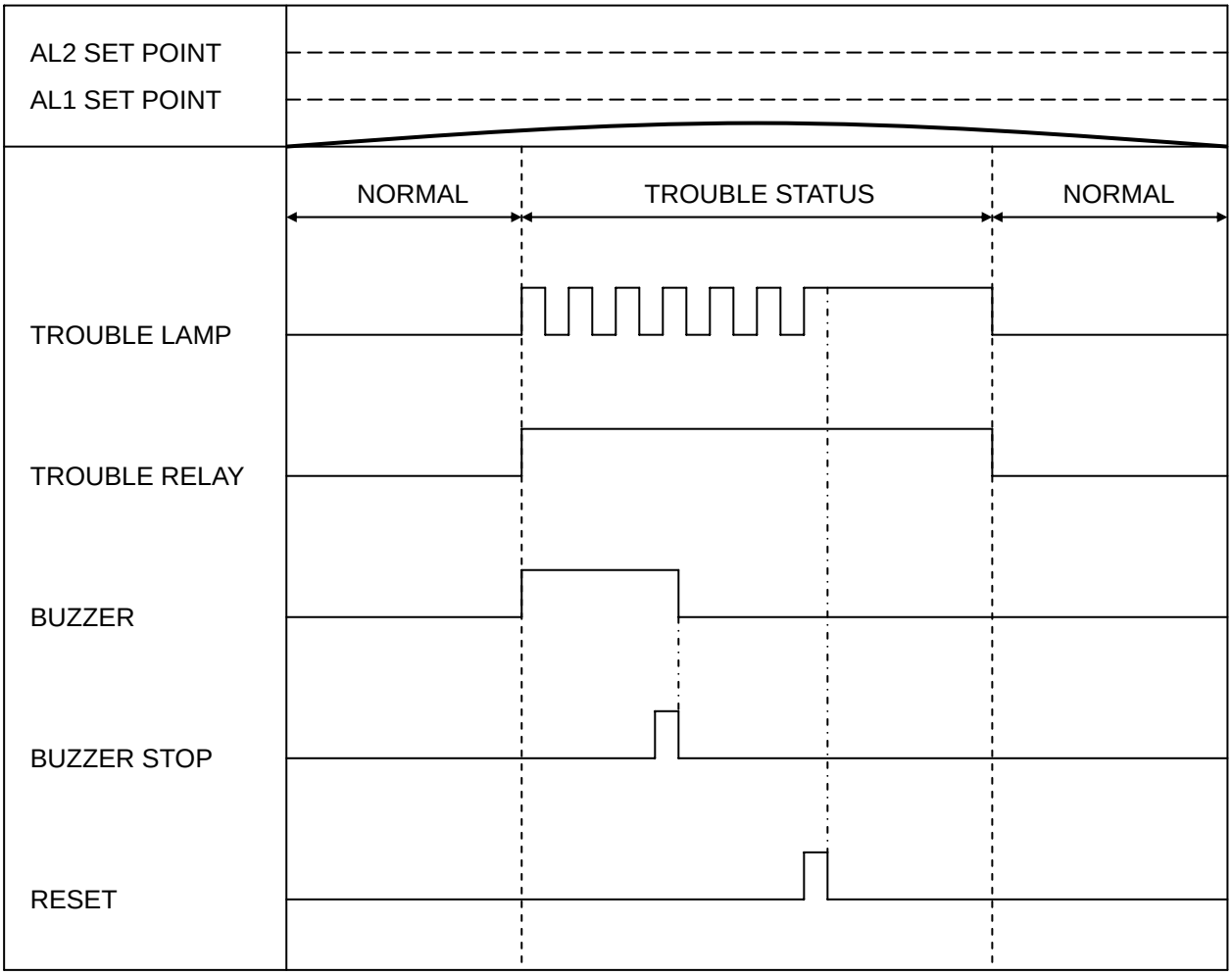
⦿ transmitter output does not tout (0 mA)

⦿ You supply normal power again, then the instrument is operated normally after sensor stabilization time.

7.3.10 Trouble alarm operating state

During the normal state, trouble alarm state and normal state again, lamp, contact and buzzer of alarm state is like below

But, fail contact is generated from the common alarm unit only.



8. Others

8.1 Surge protect

When you use the spare operation device (blocking valve, relay, magnetic S/W and solenoid valve, etc.) to an alarm output, an instrument is possible to stop operation by strong surge from output contact. At this time, you may put the R-C damper or the barrister (TNR, ZNR) onto output contact due to protect surge generation, and you may confirm ground state again.

8.2 Toxic protect

The property of catalyst of catalytic gas sensor is deteriorated by silicon, H2S, Cl2 and HMDS (Hexamethyl disiloxane) gas, and the lifetime of sensor is decreased. If you have to measure a gas leakage in this environment, then you may use the toxic protected sensor.

** In order to improve the product, the above statements can be modified without a previous notice.

WISECONTROL INC & SYSTEM ENGINEERING GED
JAN. 2006 VERSION 3.2

WISE CONTROL INC.

199 Sanggal-dong, Giheung-gu, Yongin-city, Kyunggi-do, Korea (449-905)

TEL : +82-31-283-5030/2 FAX : +82-31-283-2152

Web site: http://www.wisegas.com mailto:webmaster@wisegas.com