目　录

1 概述

KB-501X/KB-501SG 点型气体探测器是我公司生产的新型气体检测仪器，本机采用高性能催化燃烧 (可燃气体)、电化学（氧气、有毒气体）、红外（二氧化碳、甲烷）和 PID（VOC）气敏元器件和微控制器技术，结合精良 SMD 工艺制造而成，具有良好的重复性和温湿度特性、使用寿命长、操作方便等优点。适应于工业环境中检测气体浓度。

KB-501X/KB-501SG 点型气体探测器将空气中指定测量气体浓度信号转化为数字信号显示，采用三线制 4～20mA 的电流信号输出和四线制 RS485 总线输出方式，具有传输距离远、抗干扰性能好等特点。并具有二级声光报警功能。

KB-501X/KB-501SG 点型气体探测器适用于炼油、化工、液化气站、燃气、钢铁、锅炉房、加油加气站、喷漆房等使用或产生易燃易爆气体和有毒有害气体的工业现场，进行气体安全检测报警。

1.1 本产品设计、制造、检定遵守以下国家标准：

GB15322.2-2003 《可燃气体探测器 第 2 部分：测量范围为 0~100%LEL 的独立式可燃气体探测器》

GB3836.1-2000 《爆炸性气体环境用电气设备 第 1 部分： 通用要求》

GB3836.2-2000 《爆炸性气体环境用电气设备 第 2 部分： 隔爆型“d”》

GB16808-1997 《可燃气体报警控制器技术要求和试验方法》

GB4208-93 《外壳防护等级（IP 代码）》

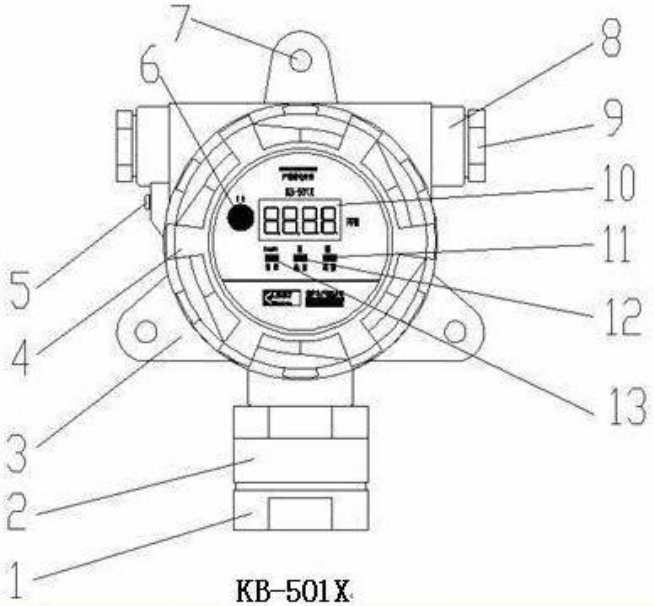
GB/T13384-92《机电产品包装应用技术条件》

2 主要技术指标

检测原理：催化燃烧式（可燃气体）
电化学（氧气/有毒气体）
NDIR 红外式（二氧化碳/甲烷）
PID 光离子（VOC 有机挥发物）
检测气体：可燃气体（烷类、醇类、烯类、酮类、汽油等）、氧气、
有毒气体（一氧化碳、氢气、氨气、氯气、硫化氢等）
采样方式：自然扩散；
测量范围：见第 11 页附表
分 辨 率：可燃气体 1%LEL；氧气：0.1%VOL；有毒气体 0.1ppm / 1ppm；
测量误差：满量程±5%；报警点±3%；
显示方式：4 位 LED 数码管显示测量值；
状态指示：3 个 LED 指示故障、一级报警、
二级报警；
调试方式：红外遥控；
报警方式：LED 指示报警、继电器输出、
声光报警（KB-501SG）；
响应时间：＜30s（可燃气体），＜60s（有毒气体）；
恢复时间：＜30s；
环境温度：－40℃～70℃；
相对湿度：＜95%；
防爆方式：隔爆型；
防爆等级：ExdⅡCT6；
电　　源：DC24V±25%；
输出信号：电　流：4～20mA
总　线：RS485
开关量：2 个
功　　耗：≤3W；

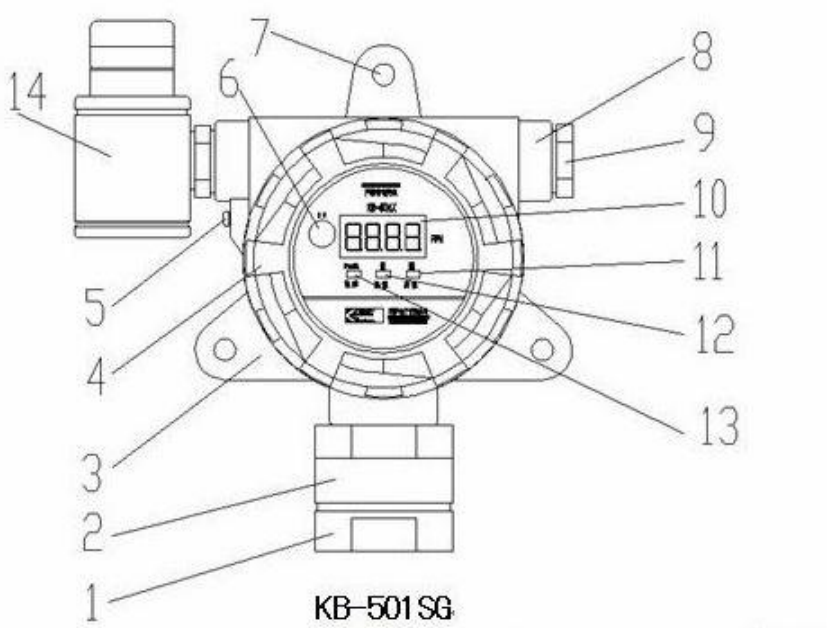
安装锣纹：G1/2；
使用电缆：≥RVVP3×1.5mm²；
探测器与主机间最大距离：≤1000m；
整机重量：≤2000g；
压力限制：86kPa～106kPa；
执行标准：GB15322.2-2003、GB50493-2009。

3 外壳结构及各部件结构示意图



KB-501X

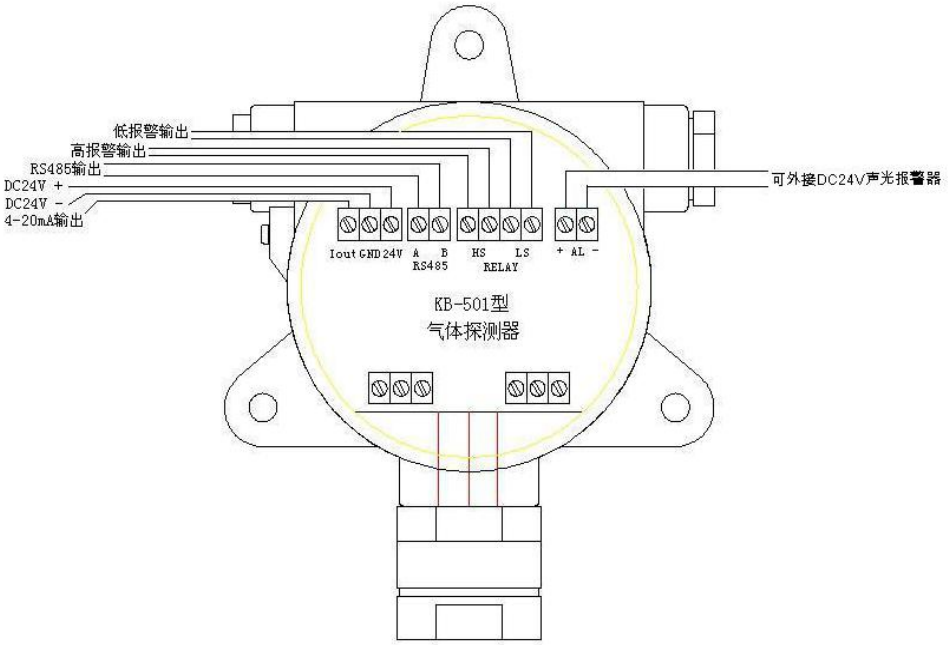
序号	名称	序号	名称
1	防护罩	8	接线孔
2	传感器腔体	9	接线螺母
3	下壳	10	示值窗口
4	上壳	11	高报警指示灯
5	接地螺丝	12	低报警指示灯
6	红外接收窗	13	故障指示灯
7	安装孔		



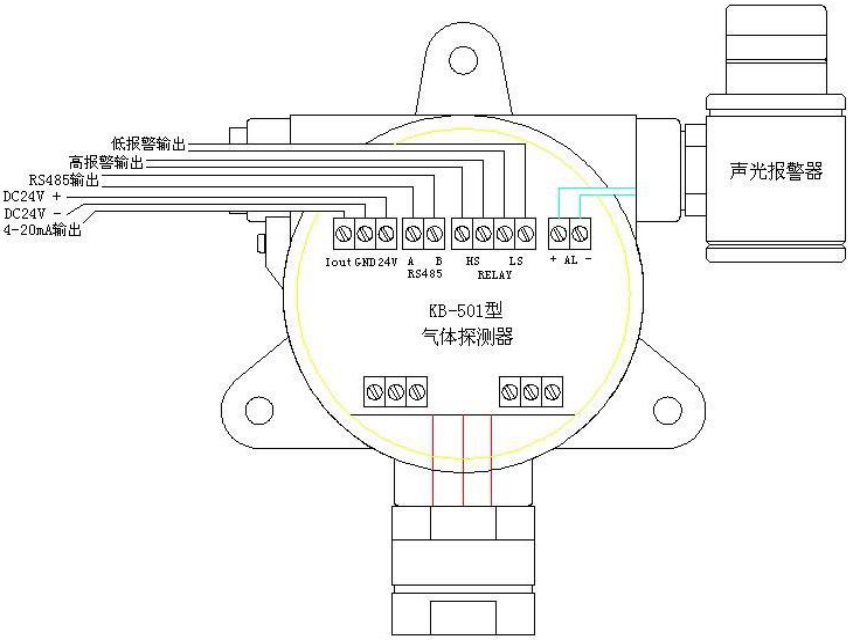
KB-501SG

序号	名称	序号	名称
1	防护罩	8	接线孔
2	传感器腔体	9	接线螺母
3	下壳	10	示值窗口
4	上壳	11	高报警指示灯
5	接地螺丝	12	低报警指示灯
6	红外接收窗	13	故障指示灯
7	安装孔	14	声光报警器

4 接线说明



KB-501X 型气体探测器



KB-501SG 型气体探测器

接线注意事项：

探测器如上 5.1 安装位置和 5.2 安装方法固定牢固后，将探测器的前盖旋下，拧开接线螺母，取出接线孔中的防爆垫片，然后将四芯传输电缆依次穿上接线螺母、垫圈、橡胶密封圈，并从接线孔穿入至壳体内。根据防爆要求，未使用到的接线孔请勿将其中的防爆垫片取出，探测器壳体及内部电路板上的所有部件请勿随意丢弃。

将导线按标记分别接到壳体内对应的接线端子上，检查接线正确无误后，再将壳体内多余的电缆线抽出，最后将压紧螺母拧紧，压紧橡胶密封圈，抱紧电缆线（隔爆设计要求）。使用防爆软管时也可与本探测器直接连接。

控制器和探测器之间，用线径不小于 RVVP3×1.5mm^2（≤1000m）三芯电缆连接。

各环节连接检查无误后，将前盖旋紧。根据用户现场条件，也可先把电缆接好，再将探测器固定。

5 操作说明

仪器开机后会进入 30 秒预热倒计时，然后依次显示以下信息

软件版本
低报值
高报值
满量程
浓度单位
遥控器按键由确认、设置、取消、+、-、辅助 4（左移位）、辅助 6（右移位）7 个按键组成。
注意:“设置”键，“确认”键，“取消”键都是单次触发按键，即使一直按键也只能触发一次，两次按键之间要有 1s 以上间隔;“＋”键，“－”键为连续触发键，一直按键可重复触发。功能设置必须按“确认”键以后才会生效,设置完毕后需按“取消”键退出设置才能回到正常状态。有效设置内容可断电保持，直到下次更改生效为止。
显示状态说明：
1 正常：数码管显示“XXXX”%LEL(XXXX 为正常值)，指示灯不亮;
2 故障指示：数码管显示“FAUL”，故障灯（黄色）亮;
3 一级报警：数码管显示“XXXX”%LEL(XXXX 为大于等于一级报警　值小于二级报警值)，一级报警灯（红色）亮（回落时需低于一级报警值再减回差值才能取消一级报警）;
4 二级报警：数码管显示“XXXX”%LEL(XXXX 为大于等于二级报警值)，一级报警灯（红色）和二级报警灯（红色）亮（回落时需低于二级报警值再减回差值才能取消二级报警）;
5 一级报警设置：数码管显示“P--1”，由此可进入一级报警设置;
6 二级报警设置：数码管显示“P--2”，由此可进入二级报警设置;

7 零点校正：需要密码进入（参照 5.3）；
8 单点标定：需要密码进入（参照 5.4）；

5.1 一级报警点设置

由正常状态按“设置”键一次，显示“----”，按“确认”键，显示“P1”闪烁再次按“确认”键即显示默认一级报警值（低报警值），需要改动此值时可按“＋”键或“－”键增加或减少一级报警点值（可燃气体：范围在 10～25；有毒气体：根据不同气体报警值设置不同），然后按“确认”键即记忆当前设置的一级报警值。退出后立即生效。此时显示“P1”，可按“＋”键或“－”键继续其他设置，也可按“取消”键退出，回到正常状态。

5.2 二级报警点设置

由正常状态按“设置”键一次，显示“----”，按“确认”键，显示“P1”闪烁,按“+”键显示“P2”闪烁，再次按“确认”键即显示默认二级报警值（高报警值），需要改动此值时可按“＋”键或“－”键增加或减少二级报警点值（可燃气体：范围在 30～50；有毒气体：根据不同气体报警值设置不同），然后按“确认”键即记忆当前设置的一级报警值。退出后立即生效。此时显示“P2”，可按“设置”键继续其他设置，也可按“取消”键退出，回到正常状态。

5.3 零点校正

1、将气体探测器置于洁净空气中；
2、按说明书给探测器接入 DC24V 电源；
3、按“设置”键一次，屏幕显示“---”，通过“移位”键和“+”、“-”键输入“SOE”,按“确认”键即进入零点标定状态，待采样值稳定后，按“确认”键保存，仪器自动退出标定状态。

注意一定要放在洁净空气环境中，不可在正常工作时进行此项设置。

5.4 单点标定

传感器使用一定时间后，将由于飘移而导致测量结果产生误差，为了方便用户自行校正，KB-501X\KB-501SG 具有单点校正功能。

1、按说明书给探测器接入 DC24V 电源；

2、按“设置”键一次，屏幕显示“---”，通过“移位”键和“+”、“-”键输入“CAE”,按 “确认”键 即进入高点标定状态；

3、通入指定浓度的标准气体，待采样值稳定后，按“确认”键后进入浓度值调整状态，将此数值调整为与通入标准气体的浓度值一致后，再按“确认键”保存，仪器自动退出标定状态。

注意正确操作，不可在正常工作时进行此项设置。

6 常见故障及解决办法

故障现象	故障原因	处理方式
显示“FAUL”故障	接线错误断线或传感器坏	重新接线或更换传感器
对检测气体无反应	传感器坏	更换传感器
	电路故障	厂家维修
与控制器连接异常	布线故障	检查线路
	电路故障	厂家维修

7 注意事项

a) 本机需在无腐蚀性气体、油烟、尘埃并防雨的场所使用，防止从高处跌落或受剧烈震动。

b) 探头处不得有快速流动气体直接吹过，否则会影响测试结果。

c) 勿使本机经常接触浓度高于检测范围以上的高浓度气样，否则会损失传感器工作寿命。

d) 对于混合性可燃气体或液体蒸气等监测气样与标定气样不同的环

境，本机检测结果会与实际气体浓度有一定误差。

e) 本机出厂前均经严密检查测试，为保证测量精度，应定期进行校准标定，一般半年校准一次，也可根据现场有关规定进行。

f) 推荐催化燃烧式传感器使用寿命为三年，电化学传感器使用寿命为二年。

g) 红外遥控器不使用时请将电池取出，以增长使用寿命和避免泄露对遥控器的影响。

8 保修与维护

- 本产品保修期一年，正常使用情况出现故障，可享受免费工厂维修、维护服务。对于人为及自然灾害、非正常使用所造成的损害不属保修范围。
- 若传感器寿命到期，请与我公司联系，以便更换新的传感器。
- 若用户不能排除故障，可将仪器寄回我公司维修，我们将以最快的速度排除故障并交回用户。

9 配件

整机配件：

KB-501X/KB-501SG 点型气体探测器	1 台
产品使用说明书	1 份
合格证	1 份
包装盒	1 个

附表

检测气体及量程

气体	量程范围	气体	量程范围
甲烷	0-100%LEL	丙醛（液体）	0-100%LEL
乙烷	0-100%LEL	乙酸甲酯	0-100%LEL
丙烷	0-100%LEL	乙酸	0-100%LEL
丁烷	0-100%LEL	氧气	0-30%VOL
乙烯	0-100%LEL	一氧化碳	0-500,0-2000ppm
丙烯	0-100%LEL	环氧乙烷	0-100，0-1000ppm
丁烯	0-100%LEL	氟化氢	0-10ppm
丁二烯	0-100%LEL	氰化氢	0-50ppm
乙炔	0-100%LEL	氯气	0-50ppm
环丙烷	0-100%LEL	氯化氢	0-30ppm
丙酮	0-100%LEL	氨气	0-100ppm
丁酮	0-100%LEL	硫化氢	0-100，0-1000ppm
液化石油气	0-100%LEL	磷化氢	0-20,0-2000ppm
汽油（液体）	0-100%LEL	二氧化硫	0-20,0-2000ppm
乙醛	0-100%LEL	二氧化碳	0-2000， 0-5000ppm
苯（液体）	0-100%LEL	二氧化氮	0-20,0-2000ppm
甲苯	0-100%LEL	臭氧	0-20ppm
氯乙烷	0-100%LEL	VOC	0-200,0-2000ppm

因气体种类繁多，未尽气体类型及特殊量程要求，请联系厂商。

Content

1. Description

Gas detector KB-501X / KB-501SG is a new type gas detection device which used high performance gas sensors (catalytic combustion sensor for combustible gas, electrochemical sensor for oxygen and toxic gas, NDIR infrared sensor for carbon dioxide and methane, PID sensor for VOCs) and microcontroller, employed sophisticated SMD technology. It has following advantages: good repeatability， high resistance to humidity-temperature jamming, long performance life and simple operation. It is applied to inspection for appointed gas concentration in industrial environments.

KB-501X / KB-501SG can translate the appointed gas concentration signals into digital signals for display. Three-wire system 4~20mA electric current signals and four-wire system RS485 bus output, with long transmission distance and good anti-inference capacity. In addition, it has two-stage alarm function with acoustic and visual signals.

KB-501X / KB-501SG is applied to gas safety inspection and alert

for industrial scene, such as petroleum refinery, chemical plants, LPG stations, boiler rooms, gas stations, paint spray booths, etc.

1.1 The design, manufacture and calibration complies the following national standards:

GB3836.1-2000 <Electrical equipment for explosive gas atmospheres Part 1: General requirements>

GB3836.2-2000 <Electrical equipment for explosive gas atmospheres Part 2: Explosion insulating type “d”>

GB16808-1997 <Technology requirements and testing methods for combustible gas alarm controller>

GB4208-93 <Enclosure protection class（IP code）>

GB/T13384-92 <Technical conditions for mechanical and electrical products packaging applications>

2. Technical parameter

Detection Principle:

Catalytic combustion (for combustible gas);

Electrochemical (for O2 and toxic gas);

NDIR infrared (for CO2 and CH4);

PID photoionization (for VOCs)

Applicable Gas:

Combustible gas (alkanes, alcohol, vinyl, ketone, gasoline, etc), oxygen, toxic gas (CO, H_2, NH_3, Cl, H_2S, etc)

Sampling Method: Natural diffusion

Detecting Range: Referring to the gas parameter list on page 14.

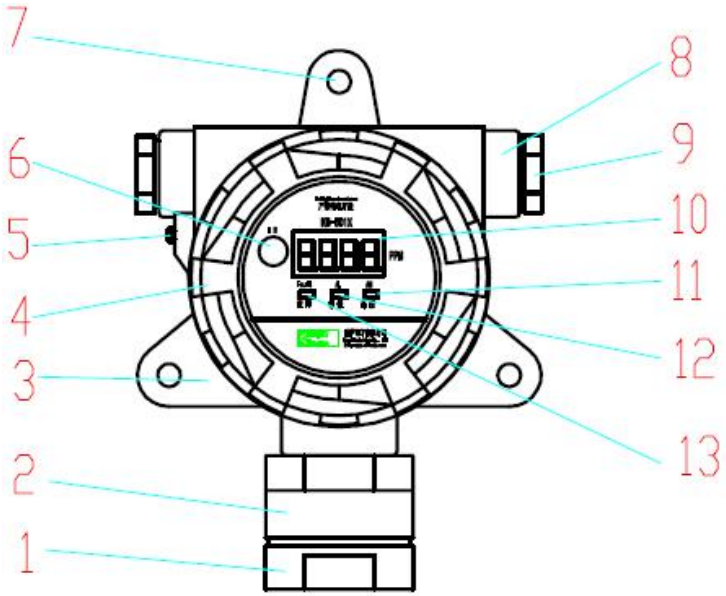
Resolution: Combustible gas: 1%LEL; O2: 0.1%VOL;
Toxic gas: 0.1ppm / 1 ppm
Accuracy: ±5% F.S; ±3% alarm threshold point
Display: Four-digit LED nixietubes display
Status Indication: Three LED indicate the failure, Grade-1 alarm, Grade-2 alarm
Controlling: Infrared remote control
Alarming Method:
LED indication；Relay output;
Acoustic-optical signal (only for KB-501SG)
Response Time: ＜30s (＜60s for some toxic gas)
Resume Time: ＜30s
Operating Temperature: -40℃~70℃
Relative Humidity: ＜95%
Explosion-proof Type: Explosion insulating
Explosion-proof Grade: Ex d IIC T6
Power Supply: DC 24V±25%
Output Signal:
Electric Current: 4~20mA
Bus: RS485
Frequency: 200~1000Hz (optional)
Switching Value: 2-way
Power Consumption: ≤3W
Screw Thread for Installation: G1/2
Used Cable: ≥RVVP3×1.5mm^2
Max. Distance between Detector and Host: ≤1000m

Total Weight: ≤2000g

Pressure: 86kPa～106kPa

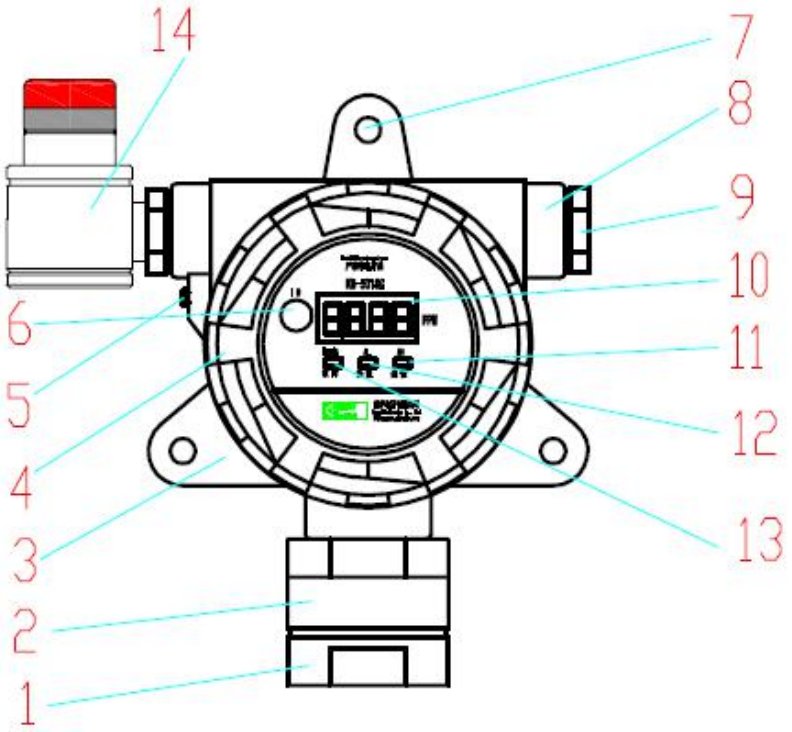
Operating Standard: GB15322-2-003、GB50493-2009

3. Structural Representation



KB-501X

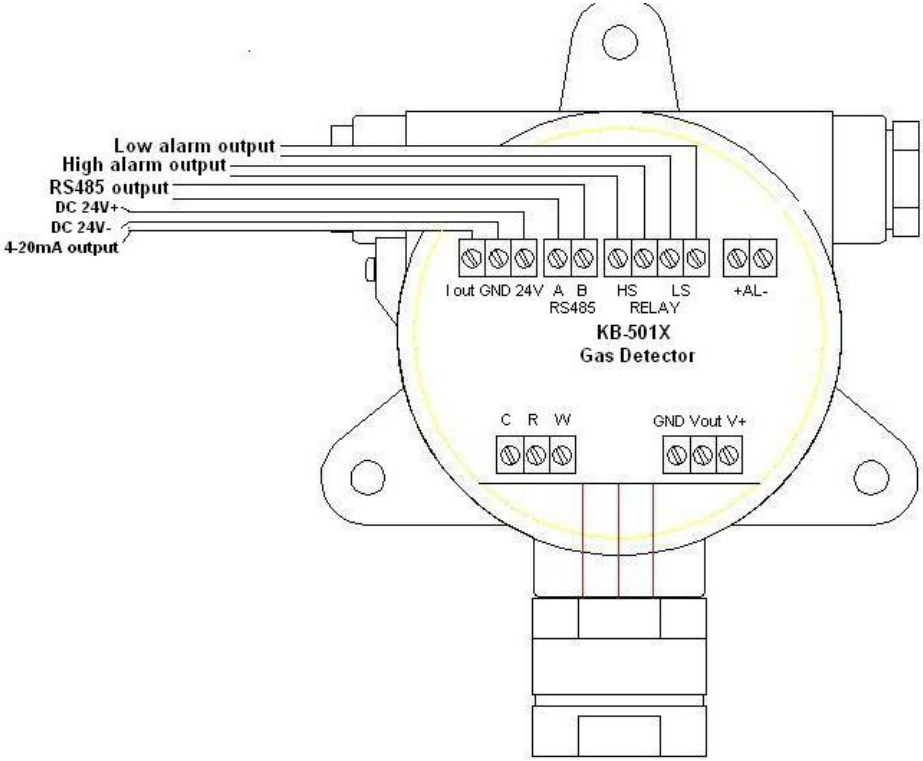
1	**Shield**	**8**	**Wiring Hole**
2	**Sensor Chamber**	**9**	**Connecting Nut**
3	**Under Shell**	**10**	**Indication Window**
4	**Upper Cover**	**11**	**High Alarm Indicator Light**
5	**Grounding Screw**	**12**	**Low Alarm Indicator Light**
6	**Infrared Receiver Window**	**13**	**Fault Light**
7	**Mounting Hole**		



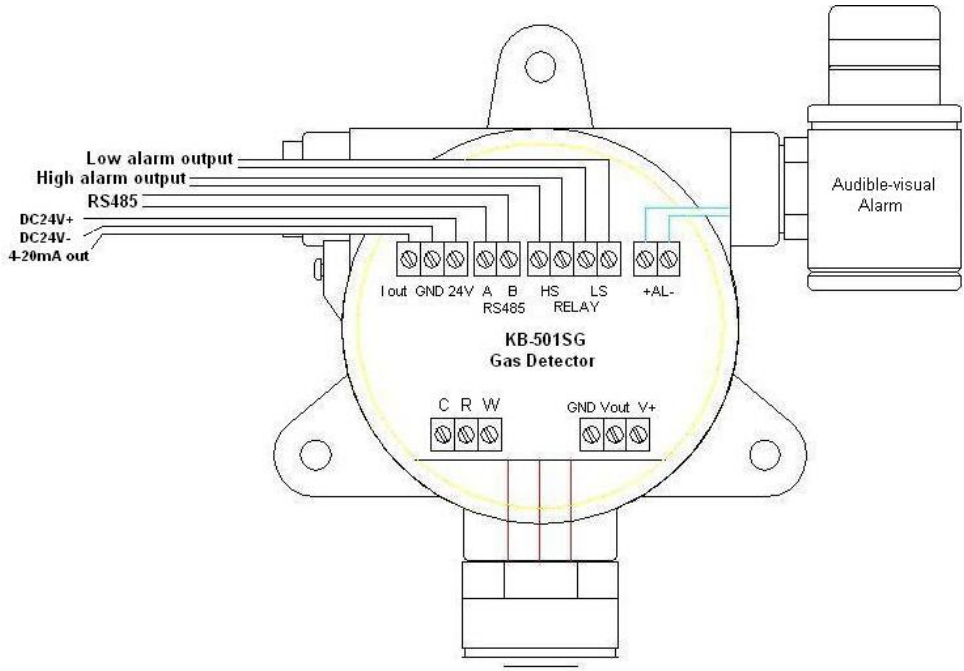
KB-501SG

1	**Shield**	**8**	**Wiring Hole**
2	**Sensor Chamber**	**9**	**Connecting Nut**
3	**Under Shell**	**10**	**Indication Window**
4	**Upper Cover**	**11**	**High Alarm Indicator Light**
5	**Grounding Screw**	**12**	**Low Alarm Indicator Light**
6	**Infrared Receiver Window**	**13**	**Fault Light**
7	**Mounting Hole**	**14**	**Audible-visual Annunciator**

4. Connection Directions



Wire connecting diagram of KB-501X



Wire connecting diagram of KB-501SG

Caution:

After fixed the detector, please open the upper cover, unscrew the connecting nut and take out the explosion-proof gasket from the wiring hole. Then, let the four-wired transmission cable bore through the connecting nut, washer and rubber obturating ring orderly, finally through the wiring hole into the shell inner. Based on the request of explosion-proof, please do not take out the explosion-proof gaskets in unused wiring holes. In addition, please do not discard the parts in the detector or on the inner circuit board.

Connect the wire to the terminals in the shell inner according to the

marks. Ensure the connection correct, then, extract the spare cable from the shell. Finally tighten the nut and rubber obturating ring to muffle the cable tightly (based on the request of explosion-proof design). Also, the explosion-proof hose can be connected to the detector directly.

Connect the detector and controller with a three-core cable which has a wire diameter of RVVP3×1.5mm^2 (≤1000m) at least.

After checked the link connection, please tighten the upper cover. Based on the field conditions, it is also all right if you fix the detector after connected the cables.

5. Operation Instructions

After switched on, there will be a 30-second countdown for preheat. Then, below information will be displayed gradually:

Software version; Low alarm value; High alarm value; Full scale; concentration unit.

There are seven keys of “set”, “enter”, “exit”, “+” , “－”, “←”and “→”on the remote controller.

Remark: The keys of set, enter and exit are single trigger button which will only trigger one time even if you keep pressing the key. Please keep a second’s interval between two keystrokes.

The keys of ‘+’ and ‘－’ are continuous trigger button which will be continuous trigger under you keep pressing. Function setting will be

saved only after the key of “enter” pressed. After the setting, please press the key of “exit” to return to the normal status. The saved data will be maintained even after power down, until next update data be saved.

Description of the display:

1. Normal status：Digital displays “XXXX”%LEL (XXXX is the normal value) with indicator light black out.
2. Fault indication: Digital displays “FAUL” with the fault light on (yellow).
3. Grade-1 alarm: Digital displays “XXXX”%LEL (XXXX is the value which is not lower than Grade-1 alarm threshold value but lower than Grade-2 alarm threshold value) with the low alarm indicator light on (red). If the value fell, only when it is lower than the Grade-1 alarm value you can subtract the difference value to cancel the Grade-1 alarm setting.
4. Grade-1 alarm: Digital displays “XXXX”%LEL (XXXX is the value which is not lower than Grade-2 alarm threshold value) with the low alarm indicator light and high alarm indicator light on (both red). If the value fell, only when it is lower than the Grade-2 alarm value you can subtract the difference value to cancel the Grade-2 alarm setting.
5. Grade-1 alarm setting: When digital displays “P—1”, you can go into the mode of Grade-1 alarm setting.
6. Grade-2 alarm setting: When digital displays “P—2”, you can go into the mode of Grade-2 alarm setting.
7. Zero calibration: this menu can only be entered by using the

password (referring to 5.3).

8. Single point calibration: this menu can only be entered by using the password (referring to 5.4).

5.1 Grade-1 alarm setting

Under the normal status press the key of “set”, “_ _ _” will be displayed. Press the key of “enter”， “P 1” will blinking display. Press “enter” key again, the default value of Grad-1 alarm (low alarm value) will be displayed. Users can press ‘+’ or ‘－’ to adjust the Grade-1 alarm value (for combustible gas, the range is 10~25; for toxic gas, the value will be set in different ranges which depending on the gas types). Then, press “enter” to memory the current value which will be effective immediately after exit. Now, “P 1” will be displayed on the screen. User can press ‘+’ or ‘－’ to set other parameters, or press “exit” to go back to normal work status.

5.2 Grade-2 alarm setting

Under the normal status press the key of “set”, “_ _ _” will be displayed. Press the key of “enter”， “P 1” will blinking display. Press “+” key, “P 2” will blinking display. Tnen, press “enter” key again, the default value of Grad-2 alarm (low alarm value) will be displayed. Users can press ‘+’ or ‘－’ to adjust the Grade-2 alarm value (for combustible gas, the range is 30~50; for toxic gas, the value will be set in different ranges which depending on the gas types). Then, press “enter” to memory the current value which will

be effective immediately after exit. Now, “P 2” will be displayed on the screen. User can press ‘+’ or ‘ — ’ to set other parameters, or press “exit” to return to normal work status.

5.3 Zero calibration

1. Put the gas detector in clear air environment.
2. Access power of DC 24V according to the direction in operating manual.
3. Press the key of “set”, “_ _ _” will be displayed. Input “SOE” by pressing keys of “+”, “—”, “←”, “→” and enter zero calibration menu by pressing “enter” key. After the displayed sampling value be stable, press “enter” key to save the current value and exit.

Caution: Zero calibration must be operated in clear air, do not operate it in the normal working environment.

5.4 Single-point calibration

After a period of usage, there may be errors caused by dift. In order to facilitate user of correction, KB-501X/SG has the function of single-point calibration.

1.Access power of DC 24V according to the direction in operating manual.
2.Press the key of “set”, “_ _ _” will be displayed. Input “CAE” by pressing keys of “+”, “—”, “←”, “→” and enter single-point calibration menu by pressing “enter” key.
3.Inlet the calibration gas (known concentration), wait until the displayed sampling value be stable. Press “enter” key to enter

concentration value adjustment menu. Adjust the data to the same value as calibration gas concentration, press “enter” key to save and exit.

Caution: Please operate in accordance with proper procedures. Single-point setting can not be operated under the normal work condition.

6. Common problems and solutions

Symptoms	Source of Trouble	Troubleshooting
“FAUL” displaying	Connection error or broken; Sensor damage	Rewiring or replace the sensor
No response to the detected gas	Sensor damage	Replace the sensor
	Circuit fault	Factory maintenance
Abnormal connection with the controller	Wiring fault	Check the connected wire
	Circuit fault	Factory maintenance

7. Notes

1) Keep the device away from corrosive gas, lampblack, dust and rain when it working. Avoid dropping from height or severe vibrations.

2) There should be no rapid flow of gas near the probe, or it will impact the detecting result.

3) Do not regular contact the device with high concentration gas which has higher concentration than the detecting range, or the

sensor life will reduce.

4) For mixed combustible gas or liquid vapor, there may be errors in the detecting result, due to the operating environment is different from the calibration environment.

5) All devices have to pass strict inspection before they go out. In order to maintain the accuracy, please calibrate it regularly. The suggested period is semiannual, or determined according to the site specific conditions.

6) Recommended sensor life: catalytic combustion sensor is 3 years; electrochemical sensor is 2 years.

7) If unused for long periods, please remove the battery of the infrared remote controller to maintain the performance life and avoid battery leakage.

8. Warranty and Maintenance

1) KB-501X/SG online gas detector is sold with a twelve-month warranty (from the day receiving the device). During this period, Kesa will be responsible for giving free maintain to the quality problems of breakdown under normal usage.

2) Kesa disclaims all responsibility for the damage caused by misuse, man-made sabotage or natural disasters.

3) If the sensor's life is end, please contact us for replacement.

4) For the failures which can not be solved, please return the device to Kesa for maintenance. We will send you back after the service.

9. Standard Delivery

KB-501X/SG online gas detector	1
Operating manual	1
Calibration report	1
Package case	1

Gas Parameter List

Gas Type	Detecting Range	Gas Type	Detecting Range
CH_4	0-100%LEL	NH_3	0-100 PPM
C_3H_8	0-100%LEL	Cl_2	0-50 PPM
H_2	0-100%LEL	H_2	0-1000 PPM
NH_3	0-100%LEL	CH_20	0-100 PPM
CH_3CH_3	0-100%LEL	O_2	0-30%vol
C_2H_4	0-100%LEL	H_2S	0-100 PPM
C_4H_{10}	0-100%LEL	HCl	0-30 PPM
C_4H_8	0-100%LEL	HCN	0-50 PPM
C_7H_8	0-100%LEL	PH_3	0-20 PPM
C_2H_7N	0-100%LEL	HF	0-10 PPM
C_8H_{10}	0-100%LEL	NO	0-250 PPM
CH_4O	0-100%LEL	CO	0-500 PPM
C_2H_6O	0-100%LEL	SO_2	0-20 PPM
C_2H_4O	0-100 PPM	ClO_2	0-50 PPM
O_3	0-20 PPM	NO_2	0-20 PPM

Remark: Some gas types are not listed, please contact factory.