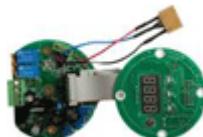# M004 combustible gas module

Introduction:

M004 gas module can change the concentration of combustible gas in the air into digital signal output. It uses three-line system 4-20mA signal output and has the features of long distance transmission and good anti-jamming ability.

Application:

Gas safety detection and alarm for refinery, chemical plant, LPG station, gas boiler room, oil-gas station, spraying-paint room and other industrial fields with combustible gas.

Specification:

Sensor type	Catalytic
Target gas	Alkyl, mellow, alkene , ketone , gasoline and other combustible gas
Detecting range	(0-100%)LEL
Resolution	1%LEL
Detection Error	F.S.+/-5%LEL;Alarming point +/-3%LEL
First level alarm point	20%LEL(factory initial value)
Second level alarm point	50%LEL(factory initial value)
Display mode	4 digit LED digitron for the concentration display
Output	Three-line (4-20)mA
Cable	1.5 mm2X3 shielding cable
Sampling	Natural diffusion
Response time	<60s
Power	DC24V +/-25%
Consumption	2W/Channel
Working condition	Temperature:-20°C-70°C Humidity:<=95%

Installation instruction:

The module takes 3-line system connection to connect the outside. When using it, just need to connect the VC(power), GND(ground), and IOUT(4-20mA signal) to the VC, GND, IOUT of the host.

Maintenance

1.Keep the equipment heatsink hole and the gas heatsink hole of the module clean, so that the air composition inside and outside of the module is consistent.

2.This module is used where   there is no corrosive gas, lampblack, dust and at rain-proof places.
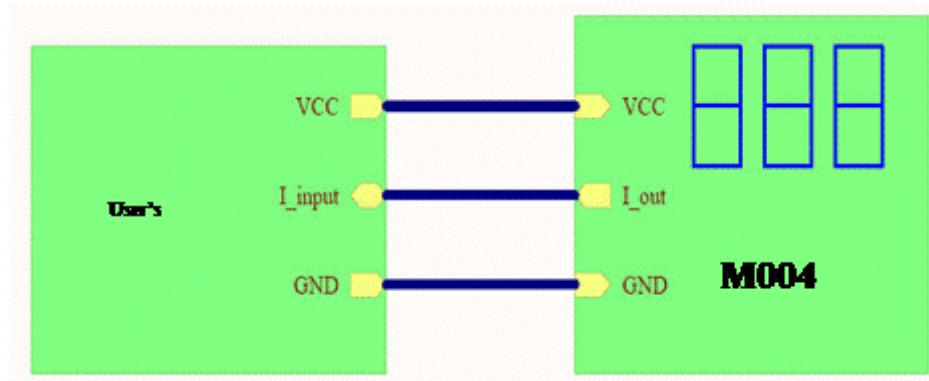
Prevent the module from falling down from high places and serious shock.

3.If need cleaning, shut off the power supply and use a brush to slightly clean the contamination. Please don't clean the module with acid or alkaline detergent.
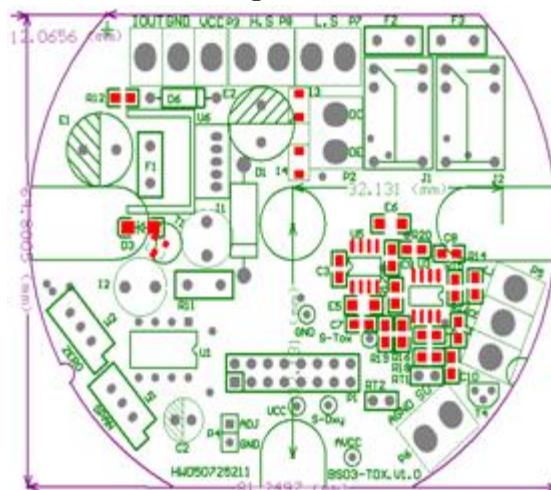
4.If the module exposed to water by carelessness, immediately shut off the power supply and sent it to the distributor specified places to be inspected by the professional personnel. Use it again when it is ensured all the functions are working well.

5.To ensure the detection accuracy, the module should be calibrated termly, normally calibrated once half year, also can be calibrated according to the relevant regulation of the worksite.
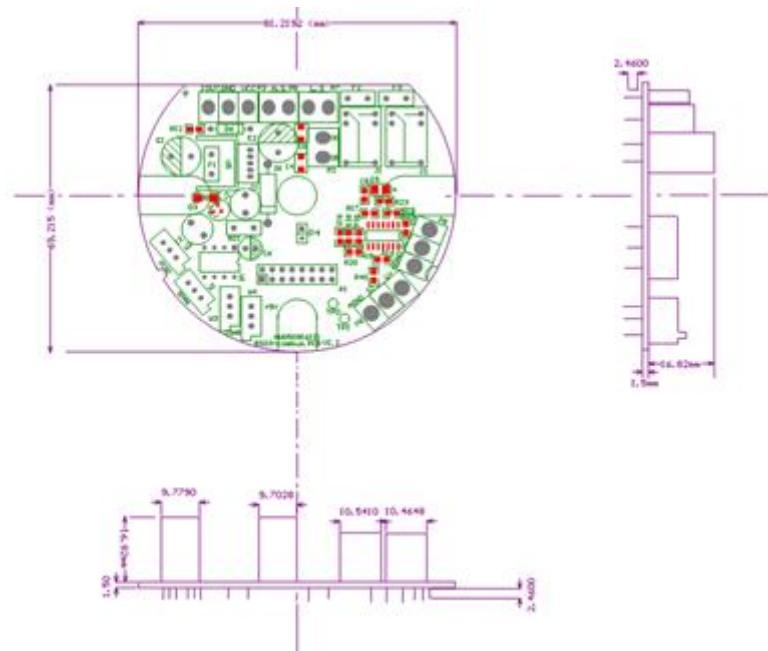
6.Take out the battery if the remote controller is not being used, so as to increase its lifespan and avoid the effect to the remote controller caused by the leakage.

Schematic diagram for the module

Module pin diagram

Module external dimensions diagram

M201 combustible gas module

Introduction:

M201 adopts semi-conductor gas sensor and high performance MPU. It has Uart and I2C digital output and open set switch output. The module is applied to the development of the equipment for air quality detecting and controlling.

Application:

Air purifier, air pollution monitor, automatic vent device

Specification:

Target gas	Hydrogen
Detection range	20-150ppm
Sensor type	Semi-conductor
Response time	< 30s
Recovery time	< 50s
Working voltage	2.8-5.0V
Working current	< 120 mA
Output	Uart: Baud Rate 4800,n,8,1
Reproducibility	<15%(80ppm)
Precision	+/-15%(80ppm)
Expected lifespan	>2 years
Working condition	Temperature:0-55°C
	Humidity:20%-90%RH
Storage condition	Temperature:-20-70°C
	Humidity:20%-90%RH
External dimensions	25X24X18mm(LXWXH)

Pin description:

Pin number	Function group	Function description
power		
Pin8,pin7	VCC-GND	Maximum 4.5V-5.5V,recommending 4.8V-5.2V

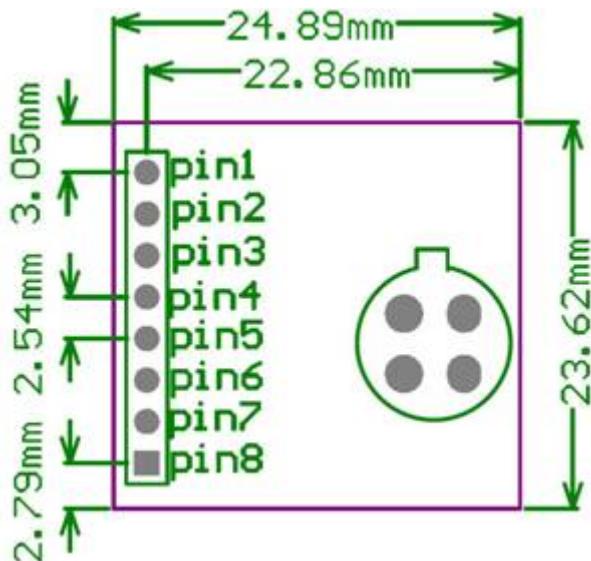|		Without reverse connection protection
	Uart	
Pin1	RXD	Serial communication receives the pin. COMS without protection output
Pin2	TXD	Serial communication sends out the pin. COMS without protection output.
	I2C	
Pin3	SDA	I2C communication data sends out the pin. COMS without protection output. Module with pull-up resistance included.
Pin4	SCL	I2C communication clock sends out pin. COMS without protection output. Module with pull-up resistance included.
	Switching value output	
Pin6	OUT	Switching value signal sends out the pin. Maximum input voltage:18V

Installation instruction:

PH2.5 single row pin structure is applied to this module for outside connection. When using it, just need to insert the module to the pre-set circuit. If the joint strength of the module needs to be enhanced, just directly weld the module to the circuit.

Maintenance
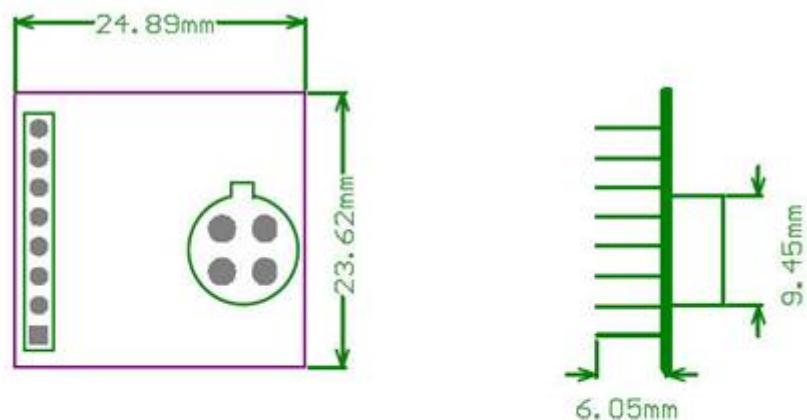
1.The calibration of the module must be operated in the condition without disturbing gas.

2.Don't put the module into high concentration gas for long time, otherwise it will cause fast attenuation of the sensitivity.

3.Although the module has good anti-seismic ability, don't let encounter very heavy shock.

M201 Recommending application schematic diagram

Module pin diagram

Module external dimension diagram
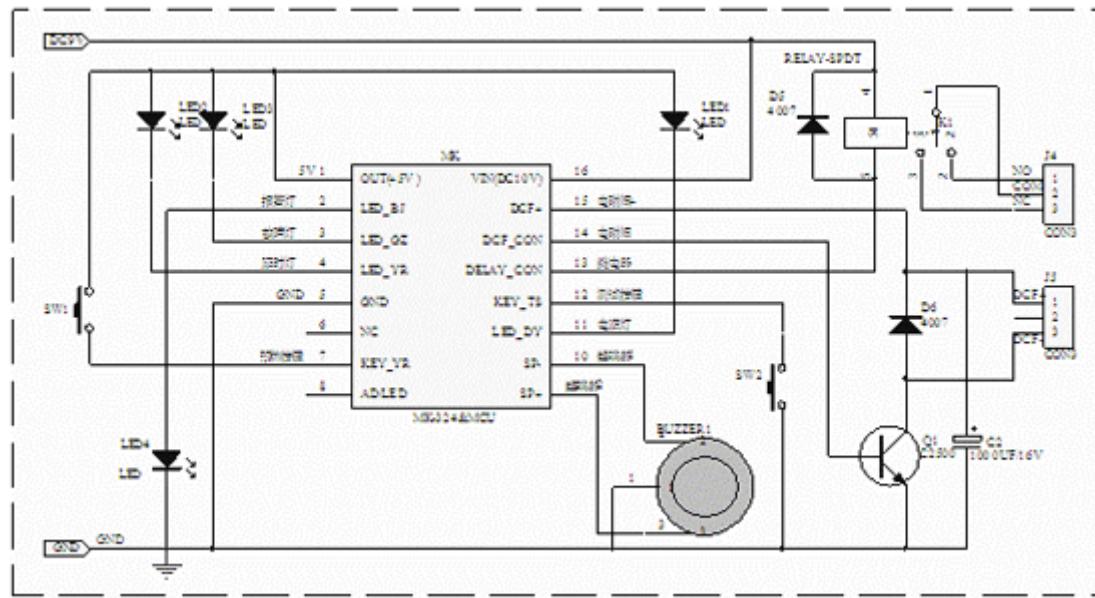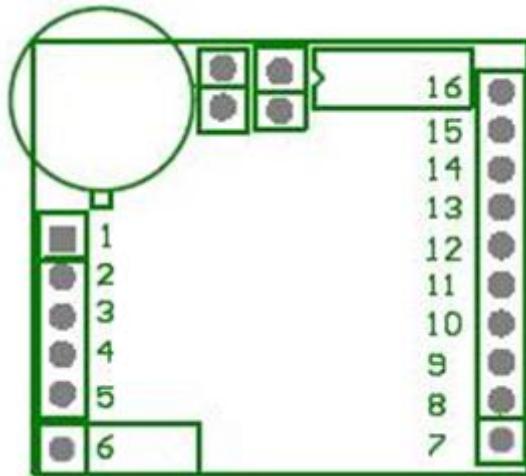
M402 Gas Module

Description:

M402 adopts semiconductor sensor, which has basic functions of household gas leak alarm: electric power light, warm-up light, fault lamp, output signal of alarm lamp; buzzer, relay, output signal of electromagnetic valve; input signal of testing button, canceling warm-up button input. This module can be used for complete device development of household gas leak alarm.

Technical Data:

Detection Range	1-25%LEL
Type of sensor	MQ series
Response time	< 30s
Resume time	< 50s
Working Voltage	5.0 +/-0.3V;8-12V
Working Current	<180mA
Output	To be external connection with 4 LED, 2 buttons,1 buzzer, 1 DC relay and 1 electromagnetic valve
Accuracy	+/-5%LEL(5.0+/-0.1V)
Life Expectancy	>3 year
Standard Working Condition	Temperature:0 -55°C
	Humidity:20%-90%RH
Storage Condition	Temperature:-20-70°C
	Humidity:20%-90%RH
Dimension	26.9X24.2X24.2mm(LXWXH)

Application field:

Household gas leak alarm, gas leak controller, fuel gas leak shutoff valve.

Dimension:

Functional description of pin:

Attn:When VCC=5V, the minimum of high level is 4.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).

Pin Nos.	Function	Functional description
Pin1	DC5V	+5V output
Pin2	Alarm lamp LED drive	To output high level when alarming
Pin3	Fault lamp LED drive	To output low level when it has fault
Pin4	Warm-up lamp LED drive	To output low level during the warm-up course
Pin5	GND	Direct current supply
Pin6	NC	Hang in the air
Pin7	Keystroke	To cancel warm-up by knobbing down this button during the warm-up course

Pin8	NC	Hang in the air
Pin9	Buzzer drive 1	Piezoelectric buzzer (three-terminal)oscillator output
Pin10	Buzzer drive 2	Piezoelectric buzzer (three-terminal)oscillator output
Pin11	Electric Power lamp LED drive	To output low level during normal operating period
Pin12	Keystroke	To detect basic function by knobbing down this button during normal operating period
Pin13	Relay drive	To output high level and connect with relay directly when giving alarm
Pin14	Electromagnetic valve drive	To output high level when giving alarm(specific refer to application circuit)
Pin15	Electromagnetic valve drive	To charge electromagnetic valve in voltage regulation and capacity during normal operating period
Pin16	VCC	Modular power input +9V

Installation instruction:

This module connects with external part by adopting PH2.0 configuration of single-row inserting pin. When using it, you just need insert the module into pre-set circuit. If the joint strength of the module need to be enhanced, you can weld the module on the circuit board directly.

Calibration:

Required equipments: DC12V-adjustable electric power, air box with vent fan, injector, sample gas bag, M402-calibrated fixture.

1.Calibration method of alarm point 1: installing the module on M402-calibrated fixture and being aged by switching on electric power for 3 minutes. Through injecting into the definite concentration of gas and adjusting the comparative-point potentiometer, M402 will be on the state of alarm, and this point is comparative-point alarm.

2.Calibration method of alarm point 2: According to the particularity of sensor, you can work out the value of alarm point. When M402 is welding, the potentiometer will be substituted by the fixed resistance, and this point is comparative-point alarm.

3.Inspection of alarm point: Open the box of calibration, then make module connect up electric power again till the warm-up of module is over. Now make a good seal of the air box, and then inject gas into the air box slowly to inspect whether the alarm point of module is satisfied to requirements. If not, please repeat the above steps.

Precautions:

1.The module should be calibrated in the environment of undisturbed gas.

2.Do not make the module contact with high concentration gas for long time, or the sensitivity will decline rapidly.

3.Although the module has a good capability of anti-seismic, it should not be shocked excessively.

Diagram of application principle BOM:

Nos.	Material label	Material name	Model and specification of material	Quantity

1	MK	Module	M403	1
2	D1,D2	Kenotron tube	1N4007	2
3	LED1	Light emitting diode	Green	1
4	LED2,LED3	Light emitting diode	Yellow	2
5	LED4	Light emitting diode	Red	1
6	K1	Electromagnetic relay	DC9V	1
7	Q1	Dynatron	C2500	1
8	LS1	Buzzer	9V piezoelectric buzzer	1
9	SW1,SW2	Feather-touch switch		2
10	C1	Electrolytic capacitor	1000uF/16V	1

M403 Gas Module

Introduction:

M403 adopts semiconductor sensor, which has basic functions of household gas leak alarm: electric power light, warm-up light, fault lamp, output signal of alarm lamp; buzzer, relay, output signal of electromagnetic valve; input signal of testing button, canceling warm-up button input. This module can be used for complete device development of household gas leak alarm.

Application:

Household gas leak alarm, gas leak controller

Specification:

Target Gas	Natural gas, LPG, Artificial coal Gas
Detection Range	1-25%LEL
Type of sensor	MP series
Response time	< 30s
Resume time	< 50s
Working Voltage	5.0 +/-0.3V
Working Current	< 80mA
Output	To be external connection with 4 LED, 2 buttons,1 buzzer, 1 DC relay and 1 electromagnetic valve
Accuracy	+/-5%LEL(5.0+/-0.1V)
Life Expectancy	>3 years
Standard Working Condition	Temperature:0-55°C Humidity:20%-90%RH
Storage Condition	Temperature:-20-70°C Humidity:20%-90%RH
Dimension	26.9X24.2X24.2mm(LXWXH)

Pin description:

Attn:When VCC=5V, the minimum of high level is 4.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).
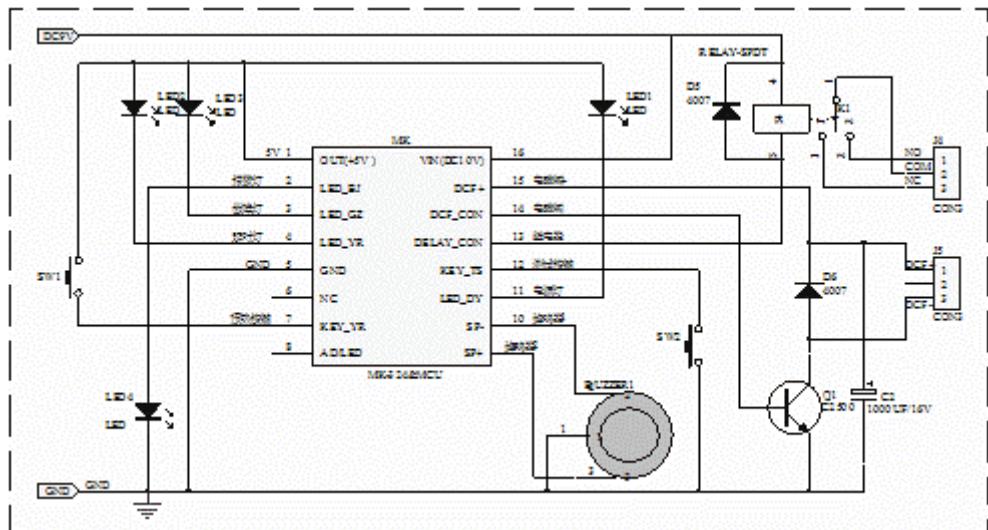
Pin Nos.	Function	Functional description
Pin1	DC5V	+5V output

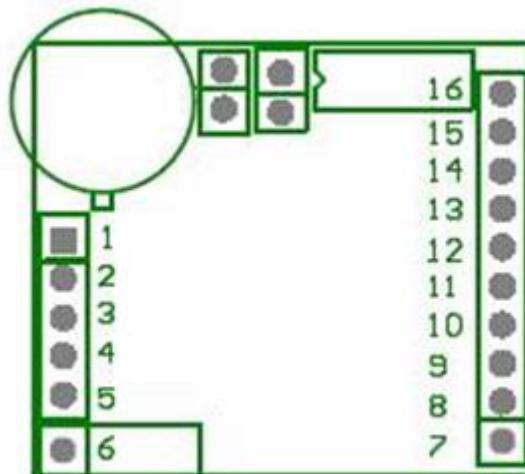| Pin2	Alarm lamp LED drive	Output high level when alarming
Pin3	Fault lamp LED drive	Output low level when it has fault
Pin4	Warm-up lamp LED drive	Output low level during the warm-up course
Pin5	GND	Direct current supply
Pin6	NC	Hang in the air
Pin7	Keystroke	Cancel warm-up by knobbing down this button during the warm-up course
Pin8	NC	Hang in the air
Pin9	Buzzer drive 1	Piezoelectric buzzer (three-terminal)oscillator output
Pin10	Buzzer drive 2	Piezoelectric buzzer (three-terminal)oscillator output
Pin11	Electric Power lamp LED drive	Output low level during normal operating period
Pin12	Keystroke	Detect basic function by knobbing down this button during normal operating period
Pin13	Relay drive	Output high level and connect with relay directly when giving alarm
Pin14	Electromagnetic valve drive	Output high level when giving alarm(specific refer to application circuit)
Pin15	Electromagnetic valve drive	Charge electromagnetic valve in voltage regulation and capacity during normal operating period
Pin16	VCC	Modular power input +9V

Installation instruction:

This module connects with external part by PH2.0 configuration of single-row inserting pin. When using it, you just need insert the module into pre-set circuit. If the joint strength of the module needs to be enhanced, you can weld the module on the circuit board directly.
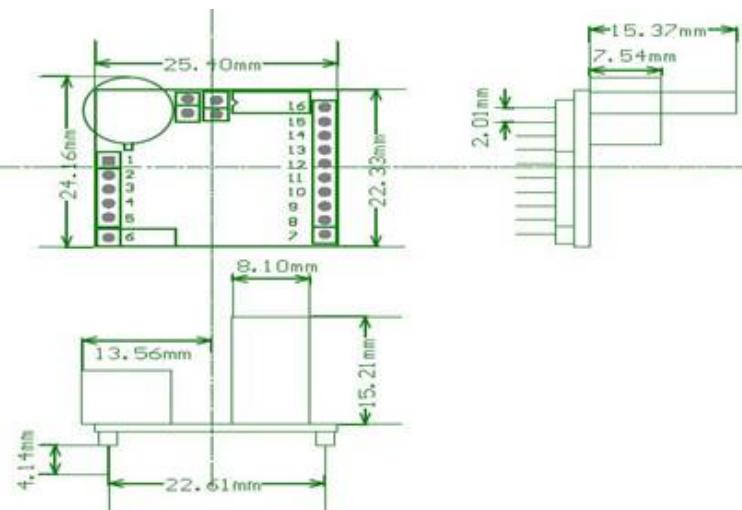
Maintenance

1.The module should be calibrated in the environment without the disturbed gas.

2.Do not make the module expose to high concentration gas for long time, or the sensitivity will decline rapidly.

3.Although the module has a good capability of anti-seismic, it should not be shocked excessively.

M403 diagram of application principle

M403 diagram of pin

M405 Gas Module

Introduction:

M405 adopts electrochemical gas sensor with high accuracy and good stability, external output of which have basic output of household gas alarm: output signal of electronic lamp, fault lamp, alarm lamp, buzzer, etc. This module is designed according to UL2034, and can be used for complete household carbon monoxide alarm development of household gas alarm.

Application:

Household carbon monoxide alarm

Specification:

Target Gas	CO
Detection Range	0-1000ppm
Type of sensor	Electrochemical sensor
Working Voltage	5-12V
Working Current	< 2uA
Sensitivity	0-150ppm(+/-5ppm)
	150-400(+/-10ppm)
Warm-up time	30S
Life Expectancy	>2 years
Standard Working Condition	Temperature:0-55°C
	Humidity:20%-90%RH
Storage Condition	Temperature:-10 -55°C
	Humidity:20%- 90%RH
Dimension	31X24X24mm(LXWXH)
Weight	About 20 grams

Pin description:

Pin Nos.	Functional group	Functional description
Electronic power		
pin1,pin6	VCC,GND	Voltage range:5V-12V,recommending 9V ,Without reverse connection protection
Output		
Pin2-		

Pin5		
Pin7	Sensor fault monitoring	Controlling of sensor fault detecting
Pin8	Button	Testing button input pin,Low level triggering
Pin9	Buzzer	Pin of Alarm buzzer control output COMS unprotected output When VCC=3V, the minimum of high level is 2.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).
Pin10	Alarm lamp	Pin of alarm lamp output COMS unprotected output When VCC=3V, the minimum of high level is 2.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).
Pin11	Alarm lamp	Pin of alarm lamp output COMS unprotected output When VCC=3V, the minimum of high level is 2.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).
Pin12	Fault lamp	Pin of fault lamp output COMS unprotected output When VCC=3V, the minimum of high level is 2.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).
Pin13	Voltage detecting port	Port of battery voltage detecting input Alter the divider resistance R3, R4 according to personal requirement
Pin14	Voltage detecting control	Battery voltage detecting control output-port

Installation instruction:

This module connects with external part by PH2.5 configuration of single-row inserting pin. When using it, you just need insert the module into pre-set circuit. If the joint strength of the module needs to be enhanced, you can weld the module on the circuit board directly.

Maintenance

1. In order to make the air composition keep consistent between the inside and outside of module, please keeping heat output hole and gaseous diffusion hole of module clean.

2. In order to ensure the accuracy of alarm point, please adopting standard gas recommended by coal industrial department to calibrate the module after using one week.

3. If need cleaning, please wipe the surface of module with brush gently after power off. Do not use acidic or alkaline detergent to clean module.

4. If sprinkle water on the module, please cut off the power immediately, and send to the place appointed by dealer. Do not use the module again until it is ensured by professionals all the functions are working well.
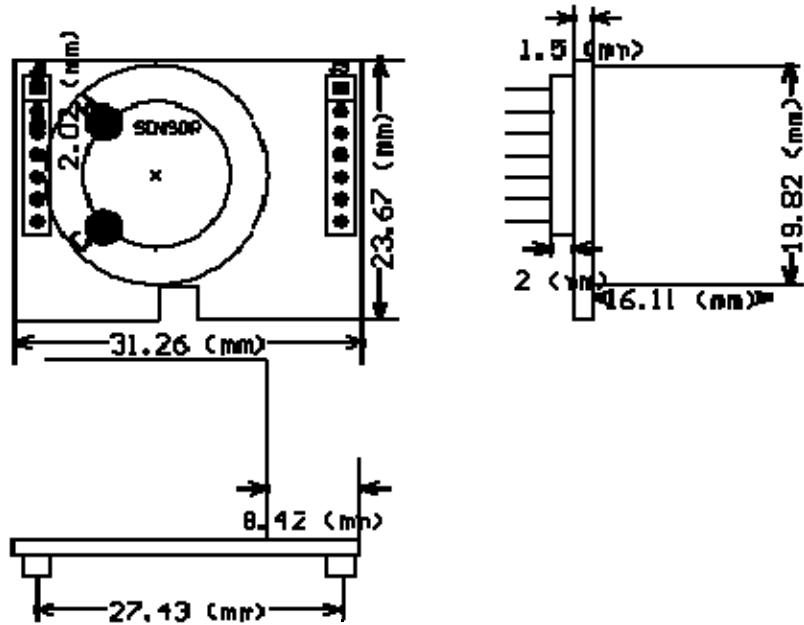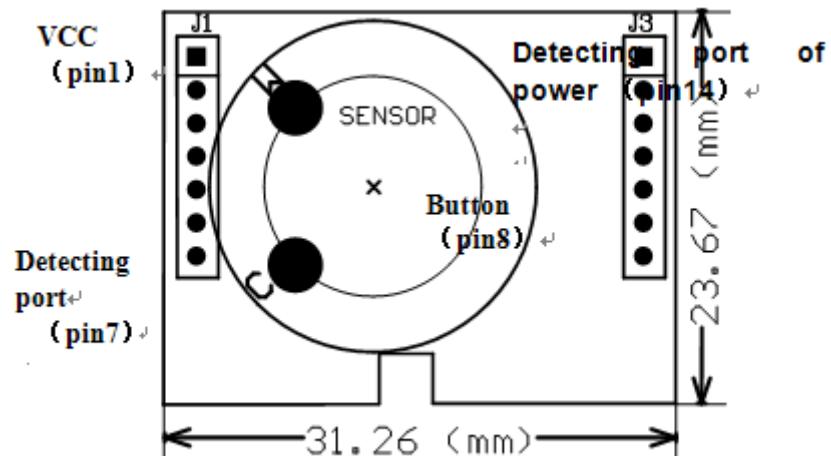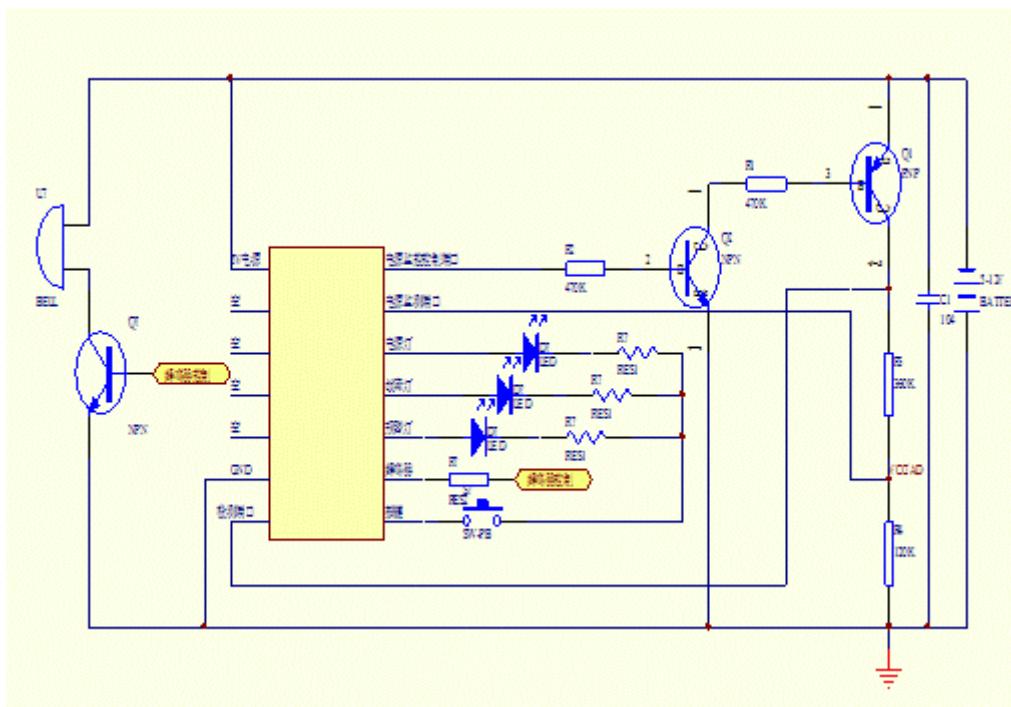

Diagram of application principle

VCC (pin1)

Detecting port of power (pin14)

SENSOR

Button (pin8)

Detecting port (pin7)

23.67 (mm)

31.26 (mm)

M410

Description :

M410 adopts semiconductor sensor, which has basic functions of household gas leak alarm: electric power light, warm-up light, fault lamp, output signal of alarm lamp; buzzer, relay, output signal of electromagnetic valve; input signal of testing button, canceling warm-up button input. This module can be used for complete device development of household gas leak alarm.
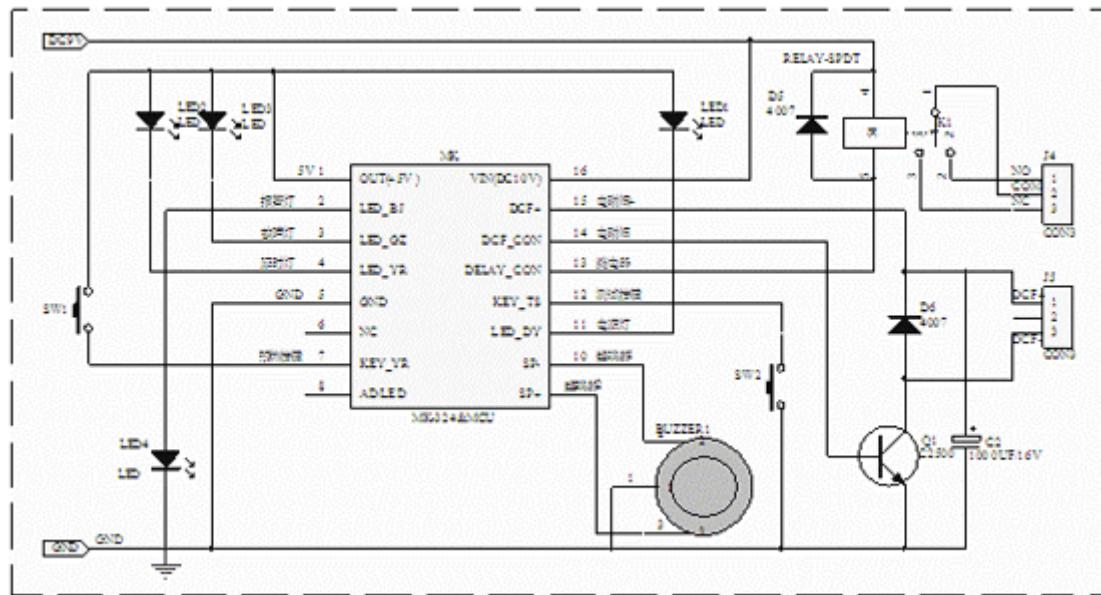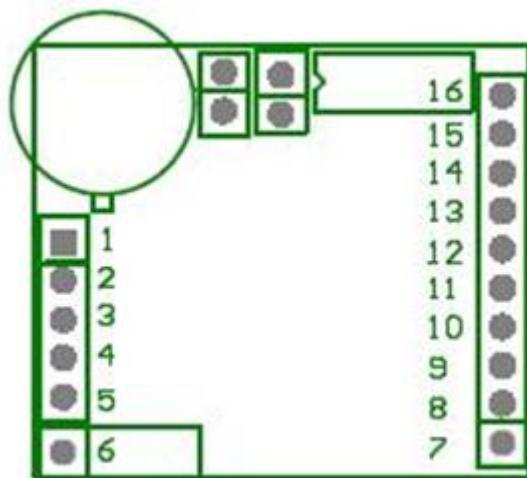

Technical Data:

Target Gas	Natural gas, LPG, Artificial coal Gas
Detection Range	1- 25%LEL
Type of sensor	MP series
Response time	< 30s
Resume time	< 50s
Working Voltage	5.0 +/-0.3V
Working Current	< 80mA
Output	To be external connection with 4 LED, 2 buttons,1 buzzer, 1 DC relay and 1 electromagnetic valve
Accuracy	+/-5%LEL(5.0+/-0.1V)
Life Expectancy	>3 years
Standard Working Condition	Temperature:0-55°C
	Humidity:20%-90%RH
Storage Condition	Temperature:-20-70°C
	Humidity:20%-90%RH
Dimension	26.9X24.2X24.2mm(LXWXH)

Application field:

Household gas leak alarm, gas leak controller, fuel gas leak shutoff valve.

Dimension:

Functional description of pin:

Attn:When VCC=5V, the minimum of high level is 4.2V (10mA Source Current), and the maximum of low level is 0.7V (10mA Sink Current).

Pin Nos.	Function	Functional description
Pin1	DC5V	+5Voutput
Pin2	Alarm lamp LED drive	To output high level when alarming
Pin3	Fault lamp LED drive	To output low level when it has fault
Pin4	Warm-up lamp LED drive	To output low level during the warm-up course
Pin5	GND	Direct current supply
Pin6	NC	Hang in the air
Pin7	Keystroke	To cancel warm-up by knobbing down this button during the warm-up course
Pin8	NC	Hang in the air
Pin9	Buzzer drive 1	Piezoelectric buzzer (three-terminal)oscillator output
Pin10	Buzzer drive 2	Piezoelectric buzzer (three-terminal)oscillator output
Pin11	Electric Power lamp LED drive	To output low level during normal operating period
Pin12	Keystroke	To detect basic function by knobbing down this button during normal operating period
Pin13	Relay drive	To output high level and connect with relay directly when giving alarm
Pin14	Electromagnetic valve drive	To output high level when giving alarm(specific refer to application circuit)
Pin15	Electromagnetic valve drive	To charge electromagnetic valve in voltage regulation and capacity during normal operating period
Pin16	VCC	Modular power input +9V

Installation instruction:

This module connects with external part by adopting PH2.0 configuration of single-row inserting pin.
When using it, you just need insert the module into pre-set circuit. If the joint strength of the module need
to be enhanced, you can weld the module on the circuit board directly.

Calibration:

Required equipments: DC12V-adjustable electric power, air box with vent fan, injector, sample gas bag,
M402-calibrated fixture.

1.Calibration method of alarm point 1: installing the module on M402-calibrated fixture and being aged by switching on electric power for 3 minutes. Through injecting into the definite concentration of gas and adjusting the comparative-point potentiometer, M402 will be on the state of alarm, and this point is comparative-point alarm.

2.Calibration method of alarm point 2: According to the particularity of sensor, you can work out the value of alarm point. When M402 is welding, the potentiometer will be substituted by the fixed resistance, and this point is comparative-point alarm.

3.Inspection of alarm point: Open the box of calibration, then make module connect up electric power again till the warm-up of module is over. Now make a good seal of the air box, and then inject gas into the air box slowly to inspect whether the alarm point of module is satisfied to requirements. If not, please repeat the above steps.

Precautions:

1.The module should be calibrated in the environment of undisturbed gas.

2.Do not make the module contact with high concentration gas for long time, or the sensitivity will decline rapidly.

3.Although the module has a good capability of anti-seismic, it should not be shocked excessively.

Diagram of application principle BOM:

Nos.	Material label	Material name	Model and specification of material	Quantity
1	MK	Module	M402	1
2	D1,D2	Kenotron tube	1N4007	2
3	LED1	Light emitting diode	Green	1
4	LED2,LED3	Light emitting diode	Yellow	2
5	LED4	Light emitting diode	Red	1
6	K1	Electromagnetic relay	DC9V	1
7	Q1	Dynatron	C2500	1
8	LS1	Buzzer	9V piezoelectric buzzer	1
9	SW1,SW2	Feather-touch switch		2
10	C1	Electrolytic capacitor	1000uF/16V	1

M501 multi-point monitor module

Introduction:

M501 model is multi-point monitor module for the gas detection controlling. It is used for detecting the content of combustible gas or liquid steam within LEL and the concentration of toxic gas in the air. This module uses one-on-one controlling. Also it can upload by RS485 for the centralized control.

Application:

Gas safety detection and alarm for factory, oil depot, LPG station, coal gas station, service station, spraying-paint room and other industrial fields need fire and explosion alarming.

Specification:

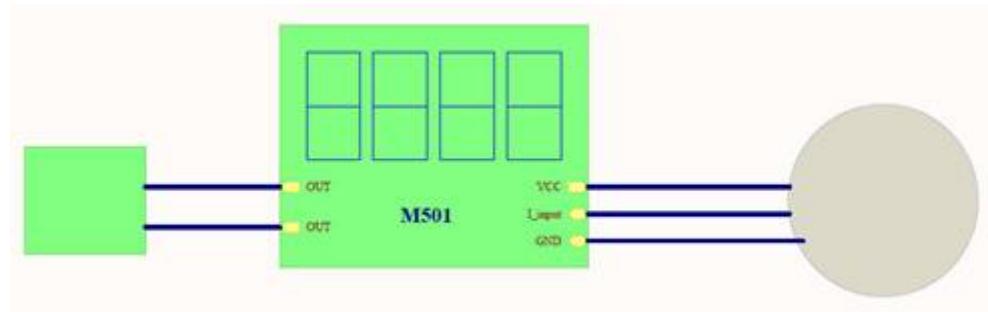|	
Sensor type	Catalytic and electro-chemical sensor
Target gas	Alkyl, mellow, alkene , ketone , gasoline and other combustible gas
Detecting range	(0-100%)LEL
Resolution	1%LEL
Main power	AC220V+/-15%,50Hz +/-1%
Supply voltage of the detector	DC24V +/-25%
Power	<=5W/channel
Display mode	4 digit LED digitron for the concentration display
input	(4-20)mA
cable	1.5 mm2X3 shielding cable
Contact output	Passive contact 2A/AC220V
Working condition	Temperature:-10°C-50°C Humidity:<=95%

Installation instruction:

The module takes 3-line system connection to connect the outside. When using it, just need to connect the signal with the IN terminal. This controlling module can provide 24V power supply for the detector.
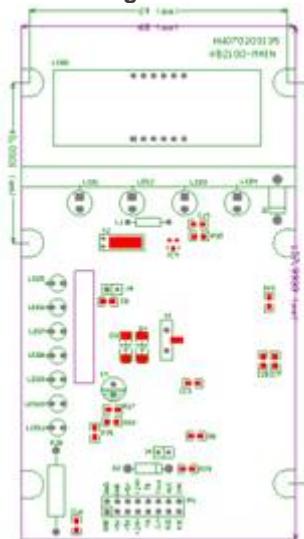
Maintenance:

1.Keep the equipment heat sink hole and the gas heat sink hole of the module clean, so that the air composition inside and outside of the module is consistent.

2.This module is used where there is no corrosive gas, lampblack, dust and at rain-proof places. Prevent the module from falling down from high places and serious shock.

3.If need cleaning, shut off the power supply and use a brush to slightly clean the contamination. Please don't clean the module with acid or alkaline detergent.

4.If the module exposed to water by carelessness, immediately shut off the power supply and sent it to the distributor specified places to be inspected by the professional personnel. Use it again when it is ensured all the functions are working well.
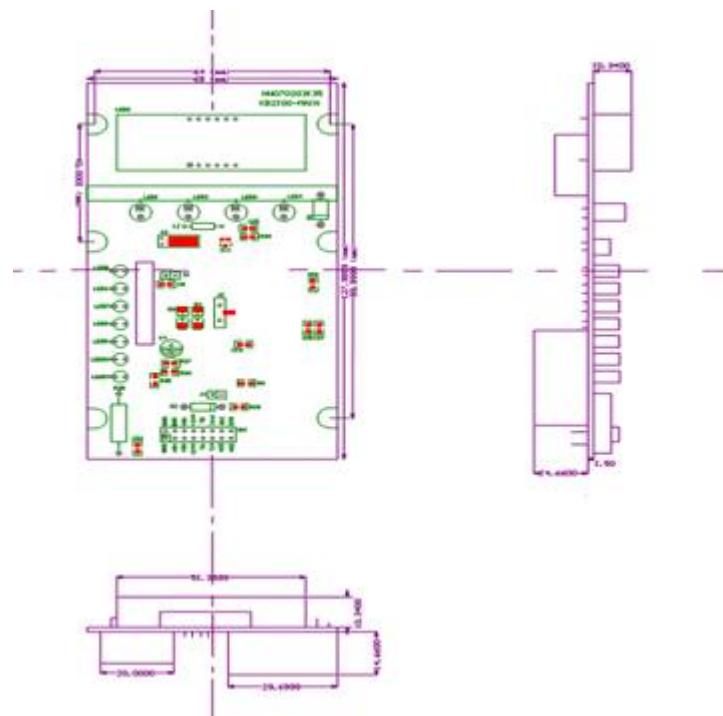
5.To ensure the detection accuracy, the module should be calibrated termly, normally calibrated once half year, also can be calibrated according to the relevant regulation of the worksite.

Schematic diagram for the module

Module pin diagram

Module external dimensions diagram