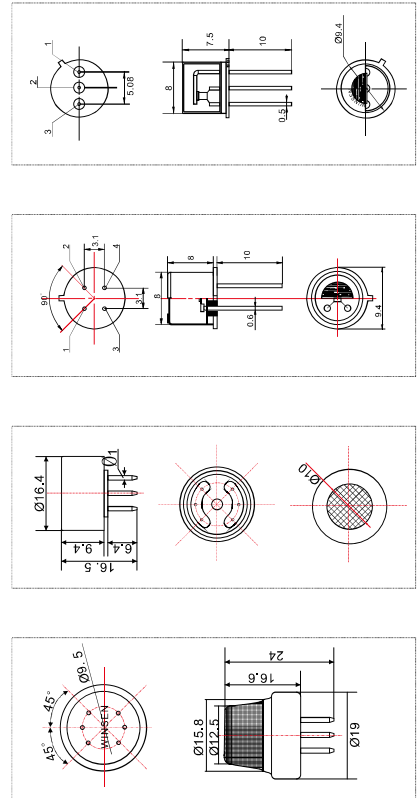
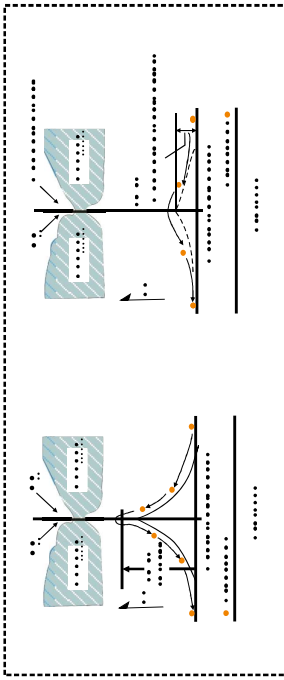


## Semiconductor Gas Sensor

MQ series gas sensor's sensitized material is metal oxide with very high activity, usually  $S_nO_2$ . When MOS is heated to definite temperature in air, oxygen atom is adsorbed on the surface of semiconductor carried negative electric charge, the electron on the surface of semiconductor shall be transfer to adsorbed oxygen, and oxygen atom is changed to oxygen negative ion, at the same time, form a plus space charge on the semiconductor's surface, and result in potential barrier rised, thereby block electron flow (as Fig 1 ).

In the sensitized material inside, free electron must drill through MOS crystallite 's binding site(crystal boundary) to form current. The potential barrier procreant by adsorbed oxygen consist in the surface of crystal boundary and that block electron's free flow, resistance of sensor comes from this potential barrier. In work condition, when sensor meets with reductive gas, oxygen negative ion results in concentration reduced because of reductive gas occurred redox reaction, along with potential barrier reduced. (as Fig 2). And result in sensors' resistance value is reduced.



## Semiconductor Sensor for Flammable Gas

### Application

- Gas leak detection for houses/workshops/commercial building, fire/safety detection system
- Gas leak alarm, gas detector.



MQ-2/MQ-4/MQ-5/MQ-6/MQ-8

### Feature

- High sensitivity
- Fast response
- Stable and long life
- Simple drive circuit

### Specification

Model	MQ-2	MQ-4	MQ-5	MQ-6	MQ-8
Target Gas	Flammable Gas, Smoke	Methane	LPG, Methane	LPG	Hydrogen
Detection Range	300~10000ppm (flammable gas)	300~10000ppm (CH <sub>4</sub> )	300~10000ppm (CH <sub>4</sub> , C <sub>3</sub> H <sub>8</sub> )	300~10000ppm (C <sub>3</sub> H <sub>8</sub> )	100~1000ppm (H <sub>2</sub> )
Standard Circuit Conditions	V <sub>c</sub> (Loop Voltage) ≤24V DC V <sub>H</sub> (Heater Voltage) 5.0V±0.1V AC or DC R <sub>L</sub> (Load Resistance) Adjustable				
P <sub>H</sub> (Heater Consumption)	≤950mW				
S(Sensitivity)	Rs(In air)/Rs(2000ppm C <sub>3</sub> H <sub>8</sub> )≥5	Rs(In air)/Rs(In 5000ppm CH <sub>4</sub> )≥5	Rs(In air)/Rs(In 2000ppm C <sub>3</sub> H <sub>8</sub> )≥5	Rs(In air)/Rs(In 2000ppm C <sub>3</sub> H <sub>8</sub> )≥5	Rs(In air)/Rs(In 1000ppm H <sub>2</sub> )≥5
V <sub>s</sub> (Output Voltage)	2.5V~4.0V (In 2000ppm C <sub>3</sub> H <sub>8</sub> )	2.5V~4.0V (In 5000ppm CH <sub>4</sub> )	2.5V~4.0V (In 2000ppm C <sub>3</sub> H <sub>8</sub> )	2.5V~4.0V (In 2000ppm C <sub>3</sub> H <sub>8</sub> )	2.5V~4.0V (In 1000ppm H <sub>2</sub> )
Standard Test Conditions	20°C ±2°C ; 55%±5%RH				
Preheat Time	No less than 48 hours				

## Semiconductor Sensor for Carbon Monoxide Gas

### Application

- Coal gas, CO etc gas detection for houses/workshops/commercial building



MQ-7B / MQ-9B MP-7

### Feature

- High sensitivity to CO
- Good selectivity
- Stable and long life
- Simple drive circuit

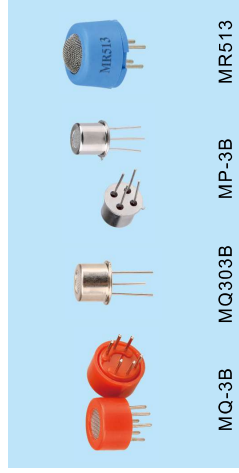
### Specification

Model	MQ-7B	MQ-9B	MP-7
Target Gas	Carbon Monoxide(CO)	Carbon Monoxide(CO), Methane(CH <sub>4</sub> )	Carbon Monoxide(CO)
Detection Range	10~500ppm CO	10~500ppm CO, 300~10000ppm CH <sub>4</sub>	50~1000ppm CO
V <sub>c</sub> (Loop Voltage)	≤10V DC	≤10V DC	≤10V DC
V <sub>H</sub> (Heater Voltage)	5.0V±0.1V AC or DC(High temp.); 1.5V±0.1V AC or DC(Low temp.)	Adjustable	5.0V±0.1V AC or DC(High temp.) 1.5V±0.1V AC or DC(Low temp.)
RH (Load Resistance)	Adjustable	Adjustable	Adjustable
T <sub>H</sub> (Heater Time)	60 S±1S (High temp.) 90 S±1S (Low temp.)	Adjustable	60 S±1S (High temp.) 90 S±1S (Low temp.)
P <sub>H</sub> (Heater consumption)	≤900mW	≤900mW	≤240mW
S(Sensitivity)	R <sub>S</sub> (in air)/R <sub>S</sub> (in 150ppm CO) ≥5	R <sub>S</sub> (in air)/R <sub>S</sub> (in 150ppm CO) ≥5 R <sub>S</sub> (in air)/R <sub>S</sub> (in 5000ppm CH <sub>4</sub> ) ≥3	R <sub>S</sub> (in air)/R <sub>S</sub> (in 100ppm CO) ≥3
V <sub>S</sub> (Output Voltage)	2.5V~4.3V (in 150ppm CO)	2.5V~4.3V (in 150ppm CO) 2.0V~4.0V (in 5000ppm CH <sub>4</sub> )	2.5V~4.3V (in 100ppm CO)
Standard test conditions	20°C±2°C ; 55%±5%RH	20°C±2°C ; 55%±5%RH	20°C±2°C ; 55%±5%RH
Standard test circuit	V <sub>c</sub> : 5.0V±0.1V V <sub>H</sub> (High temp.): 5.0V±0.1V V <sub>H</sub> (Low temp.): 1.5V±0.1V	V <sub>c</sub> : 5.0V±0.1V V <sub>H</sub> (High temp.): 5.0V±0.1V V <sub>H</sub> (Low temp.): 1.5V±0.1V	V <sub>c</sub> ≤ 10V DC
Preheat time	Over 48 hours	Over 48 hours	Over 48 hours
Configuration	"B" means plastic shell	"B" means plastic shell	Flat surfaced semiconductor type

## Alcohol Gas Sensor

### Application

- Suitable for alcohol testers aimed to dangerous intoxicated drivers and others after drinking, also it can sense alcohol vapors in other places.



MQ-3B MQ303B MP-3B MR513

### Feature

- High sensitivity
- Fast response
- Stable and long life
- Simple drive circuit
- Good selectivity

### Specification

Model	MQ-3B	MQ-303B	MP-3B
Working Principle	Semiconductor	Semiconductor	Semiconductor
Target Gas	Alcohol(C <sub>2</sub> H <sub>5</sub> OH)	Alcohol(C <sub>2</sub> H <sub>5</sub> OH)	Alcohol(C <sub>2</sub> H <sub>5</sub> OH)
Detection Range	25~500ppm	20~500ppm alcohol	0~500ppm alcohol
Standard Circuit Conditions	V <sub>c</sub> (Loop Voltage) ≤ 24V DC V <sub>H</sub> (Heater Voltage): 5.0V±0.1V AC or DC R <sub>L</sub> (Load Resistance)/Adjustable R <sub>L</sub> (Load Resistance)	V <sub>c</sub> (Loop Voltage) ≤ 6V DC V <sub>H</sub> (Heater Voltage): 0.9V±0.1V AC or DC R <sub>L</sub> (Load Resistance)/Adjustable R <sub>L</sub> (Load Resistance)	V <sub>c</sub> (Loop Voltage) ≤ 24V DC V <sub>H</sub> (Heater Voltage): 2.5V±0.1V AC or DC R <sub>L</sub> (Load Resistance)/Adjustable R <sub>L</sub> (Load Resistance)
P <sub>H</sub> (Heater Consumption)	≤900mW	≤140mW	≤350mW
S(Sensitivity)	R <sub>S</sub> (in air)/R <sub>S</sub> (125ppm C <sub>2</sub> H <sub>5</sub> OH) ≥ 5	R <sub>S</sub> (in air)/R <sub>S</sub> (125ppm C <sub>2</sub> H <sub>5</sub> OH) ≥ 3	R <sub>S</sub> (in air)/R <sub>S</sub> (50ppm C <sub>2</sub> H <sub>5</sub> OH) ≥ 3
Standard Test Conditions	20°C±2°C ; 55%±5%RH		
Preheat Time	No less than 48 hours		
Configuration	Plastic Shell	Metal Shell	Metal Shell

## Semiconductor Sensor for Toxic Gas

### Application

- Suitable for polluted gas detection in home and other environment, auto-ventilation equipment
- Gas leak detection for toxic gas in houses/workshops/commercial building



MQ131 (ppb)  
MQ138 (ppm)  
MQ135/  
MQ136/  
MQ137/  
MQ138

### Feature

- High sensitivity
- Good selectivity
- Stable and long life
- Simple drive circuit
- Fast response

### Specification

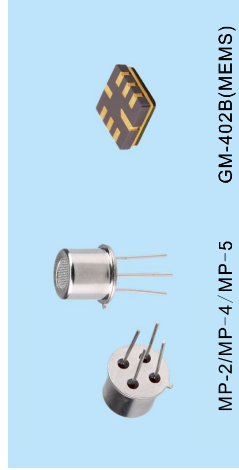
Model	MQ131	MQ135	MQ136	MQ137	MQ138
Target Gas	Ozone	Ammonia, Sulfide, Benzene series steam	Hydrogen Sulfide	Ammonia	Toluene, Acetone, Alcohol, Hydrogen
Detection Range	10~1000ppm(O <sub>2</sub> )	10~1000ppm (NH <sub>3</sub> , C <sub>2</sub> H <sub>6</sub> , H <sub>2</sub> , Smoke)	1~200ppm(H <sub>2</sub> S)	5~500ppm(NH <sub>3</sub> )	5~500ppm
Standard Circuit Conditions	$V_c$ (Loop Voltage) $\leq 24V$ DC $V_H$ (Heater Voltage) $5.0V \pm 0.1V$ AC or DC $R_L$ (Load Resistance) Adjustable				
$P_H$ (Heater Consumption)	$\leq 900mW$	$\leq 950mW$	$\leq 900mW$	$\leq 900mW$	$\leq 900mW$
S(Sensitivity)	$R_s$ (in 200ppm O <sub>2</sub> )/ $R_s$ (in air) $\geq 2$	$R_s$ (in air)/ $R_s$ (in 400ppm H <sub>2</sub> S) $\geq 5$	$R_s$ (in air)/ $R_s$ (50ppm H <sub>2</sub> S) $\geq 3$	$R_s$ (in air)/ $R_s$ (50ppm NH <sub>3</sub> ) $\geq 2$	$R_s$ (in air)/ $R_s$ (in 50ppm C <sub>2</sub> H <sub>6</sub> ) $\geq 2$
$V_s$ (Output Voltage)	$\geq 1.0V$ (in 200ppm O <sub>2</sub> )	$2.0V \sim 4.0V$ (in 400ppm H <sub>2</sub> )	$\geq 0.5V$ (in 50ppm H <sub>2</sub> S)	$> 0.5V$ (in 50ppm NH <sub>3</sub> )	0.5V (in 50ppm C <sub>2</sub> H <sub>6</sub> )
Standard Test Conditions	20°C $\pm$ 2°C ; 55% $\pm$ 5%RH				
Preheat Time	No less than 48 hours				
Configuration	Metal shell	Plastic shell	Metal shell	Metal shell	Metal shell

## Semiconductor Gas Sensor

## Flat Surfaced Semiconductor Flammable Gas Sensor

### Application

- Gas leak detection for houses/workshops/commercial building, fire/safety detection system
- Gas leak alarm, gas detector.



MP-2/MP-4 / MP-5 GM-402B(MEMS)

### Feature

- High sensitivity
- Fast response
- Stable and long life
- Simple drive circuit
- Good shock resistance

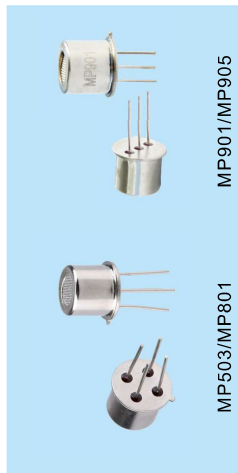
### Specification

Model	MP-2	MP-4	MP-5	GM-402B
Target Gas	C <sub>2</sub> H <sub>6</sub> , smoke	Natural Gas(CH <sub>4</sub> )	LPG(C <sub>3</sub> H <sub>8</sub> )	Methane (CH <sub>4</sub> ), Propane (C <sub>3</sub> H <sub>8</sub> )
Detection Range	300~1000ppm C <sub>2</sub> H <sub>6</sub>	300~1000ppm	300~1000ppm	Methane (CH <sub>4</sub> ) : 1 ~ 1000ppm Propane (C <sub>3</sub> H <sub>8</sub> ) : 1~500ppm
Standard Circuit Conditions	$V_c$ (Loop Voltage) $\leq 10V$ DC $V_H$ (Heater Voltage) $5.0V/4.0, 1V$ AC or DC $R_L$ (Load Resistance): Adjustable			
RH(Heater Resistance)	105 $\Omega$ $\pm$ 10 $\Omega$ (room tem.)	85 $\Omega$ $\pm$ 15 $\Omega$ (room tem.)		77 $\Omega$ ~90 $\Omega$ (room tem.)
$P_H$ (Heater consumption)	$\leq 240mW$	$\leq 350mW$	$\leq 300mW$	80mW
S(Sensitivity)	$R_o$ (in air)/ $R_s$ (200ppm C <sub>2</sub> H <sub>6</sub> ) $\geq 3$		$R_o$ (in air)/ $R_s$ (500ppm C <sub>3</sub> H <sub>8</sub> ) $\geq 4$	$R_o$ (in air)/ $R_s$ (300ppm C <sub>3</sub> H <sub>8</sub> )/ $R_o$ (in air) : 1.2~5.0
Standard Test Conditions	20°C $\pm$ 2°C ; 55% $\pm$ 5%RH			
Preheat Time	Over 48 hours	Over 48 hours	Over 48 hours	Over 48 hours

## Flat Surfaced Semiconductor Air Quality Gas Sensor

### Application

- It is usually used in occasions such as household and office for harmful gas detection, automatic exhaust device, air cleaner,&c.



### Feature

- High sensitivity
- Fast response
- Stable and long life
- Simple drive circuit
- Good shock resistance

## Flat Surfaced Gas Sensor

## Catalytic Gas Sensor

When sensors meet flammable gas, due to catalytic activity, flammable gas is burning on the sensors' surface without flame to release a lot of heat which leads to the resistance change of detecting elements. The gas concentration can be known through detecting the resistance change of detecting elements. (Please see Fig1 and 2 for detection process). When the temperature, humidity and pressure altered in sensors' ambience, the resistance of detecting element and compensating element almost altered at the same time, which counteracts impact by environment factor available. Comparing with semiconductor gas sensor, the reason that catalytic gas sensor can realize to the flammable gas concentration mainly based on direct ratio of gas concentration and heat produced when combustible gas burning. The resistance change for detecting elements made of high-purity platinum and the temperature change is proportional and the catalytic detecting element has the compensatory function working pattern.

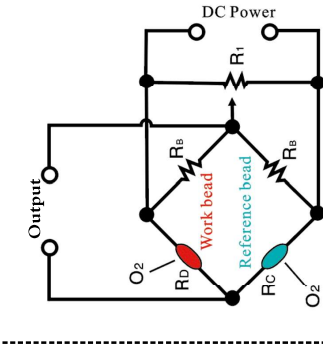


Fig 1

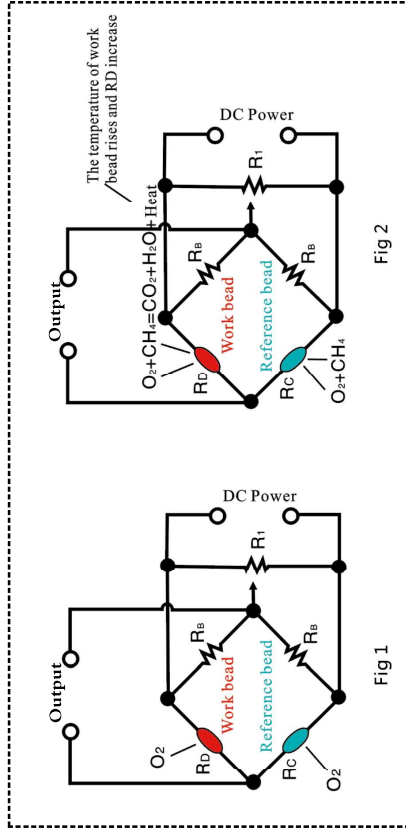
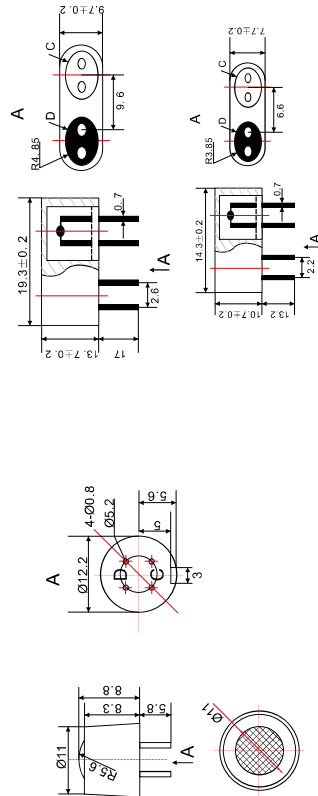


Fig 2



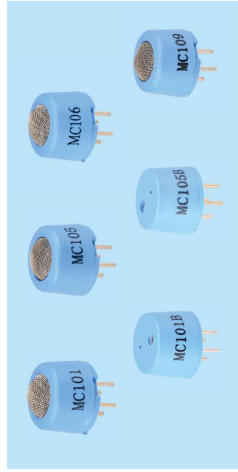
### Specification

Model	MP503	MP801	MP901	MP905
Target Gas	Alcohol, Smoke, Iso-butane, Methanal.	Benzene, Toluene, Methanal, Alcohol, Smoke	Alcohol, Smoke, Formaldehyde, Toluene, Acetone, Benzene, Lighter gas, Paint &c.	Benzene, Toluene, Formaldehyd e, Alcohol, Smoke, Lighter gas, Paint s
Detection Range	10~1000ppm C2H5OH	0.5~1000ppm (alcohol)	1~50ppm	0.5~1000ppm
Standard Circuit Conditions	Vc(Loop Voltage) ≤24V DC Vh(Heater Voltage) 5.0V±0.1V AC or DC RL (Load Resistance) Adjustable	Vc/VH:5.0V/40.1V RL (Load Resistance) Adjustable	Vc(Loop Voltage)/Vh(Heater Voltage) 5.0V/40.1V AC or DC RL (Load Resistance) Adjustable	Vc/VH:5.0V/40.1V RL (Load Resistance) Adjustable
RH(Heater Resistance)	95Ω±10Ω(Room Tem.)	95Ω±10Ω(Room Tem.)	95Ω±10Ω(Room Tem.)	95Ω±10Ω(Room Tem.)
Ph(Heater consumption)	≤300mW	≤300mW	≤300mW	≤300mW
S(Sensitivity)	1KΩ~30KΩ(in 50ppm alcohol)	1KΩ~15KΩ(in 10ppm alcohol)	1KΩ~60KΩ(in 10ppm alcohol)	1KΩ~15KΩ(in 10ppm alcohol)
Rs (Sensitive resistance)	Rs(in air)/Rs(in 50ppm alcohol) ≥5	Rs(in air)/Rs(in 10ppm alcohol) ≥2	Rs(in air)/Rs(in 10ppm alcohol) ≥3	Rs(in air)/Rs(in 10ppm alcohol) ≥2
Standard Test Conditions	20℃±2℃ : 65%±5%RH			
Preheat Time	More than 48 hours	More than 48 hours	More than 48 hours	More than 48 hours

## Catalytic Sensor for Combustible Gas

### Application

- Combustible gas leak detection in houses/workshops/commercial building, fire safety detection system
- Gas leak alarm, gas detector

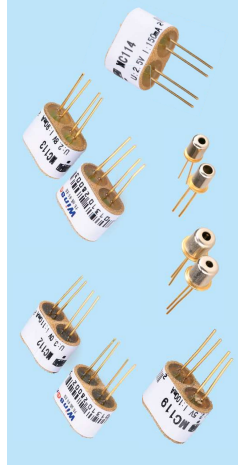


### Feature

- Linear output signal for gas concentration
- Hardly affected by temp. and humidity
- Stable and reliable performance
- Fast response and resume

### Application

- Domestic and industrial gas detection for combustible gas, natural gas, LPG, coal gas, alkane etc and ganic solvent steam like gasoline, alcohol, ketone, benzene and so on.
- Combustible gas leak alarm, combustible gas detector.



### Feature

- Linear output signal for gas concentration
- Hardly affected by the temp. and humidity
- Stable and reliable performance
- Fast response and resume

## Catalytic Gas Sensor

### Specification

Model	MC101/ MC101B	MC105/ MC105B/ MC106	MC107	MC109
Detection Gas	Combustible Gas (Methane, LPG, Propane etc)			
Measuring Range	0~100% LEL			
Sensitivity (mV)	1% CH <sub>4</sub>	25~50mV	20~50mV	20~50mV
	1% C <sub>3</sub> H <sub>8</sub>	30~70mV	30~70mV	40~90mV
Working Voltage(V)	3.0±0.1	2.5±0.1		2.5±0.1
Working Current(mA)	110±10	150±10		100±10
Linearity	≤5%			
Response Time (90%)	≤10s			
Recovery Time (90%)	≤30s			
Working Environment	Temperature -40~70°C, Humidity <95%RH			
Storage Environment	Temperature -20~70°C, Humidity <95%RH			

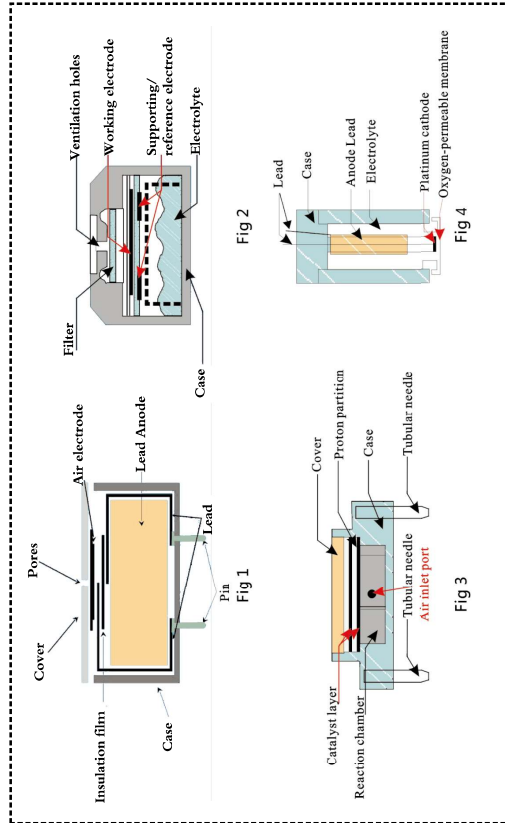
### Specification

Model	MC112/ MC112C	MC113/ MC113C	MC114/ MC114C	MC115	MC116	MC119
Detection Gas	Combustible Gas (Methane, LPG, Propane etc)					
Measuring Range	0~100% LEL					
Sensitivity (mV)	1% CH <sub>4</sub>	20~40mV/ 15~35mV	20~40mV/ 16~35mV	20~40mV	20~40mV	20~40mV at 1%H <sub>2</sub>
	1% C <sub>3</sub> H <sub>8</sub>	30~60mV/ 30~55mV	30~60mV/ 25~55mV	20~50mV	/	40~90mV at 1%C <sub>2</sub> H <sub>2</sub>
Working Voltage(V)	3.0±0.1	2.8±0.1	2.5±0.1	3.0±0.1	2.5±0.1	2.5±0.1
Working Current(mA)	105±10/ 100±10	90±10/ 95±10	150±10/ 90±10	105±10	150±10	100±10
Linearity	≤5%					
Response Time (90%)	≤10s					
Recovery Time (90%)	≤30s					
Working Environment	Temperature -40~70°C, Humidity <95%RH					
Storage Environment	Temperature -20~70°C, Humidity <95%RH					



## Electrochemical Gas Sensor

A complete electrochemical gas sensor consists of two or three electrodes for electrochemical catalytic and conductive electrolyte. In working condition, the target gas diffuses to the electrode reaction interface and takes place redox reaction on the sensor electrode to release the signal. The signal size has a direct ratio to the target gas concentration, so the target gas concentration can be known through detecting the signal released by gas detection of electrochemical gas sensors. The gas sensing process takes place on the three interface of gas, solid and liquid in the electrochemical catalytic electrode and it is decided by gas, the conductivity process of electric medium, electrochemical reaction procedure. The gas sensing process follows the law of Faraday. The common electrochemical gas sensors include: the electrolysis gas sensor in permanent electric (Fig 1), Galvanic cell O<sub>2</sub> sensor (Fig2), fuel cell breath alcohol sensor (Fig 3), dissolved oxygen sensor (Fig 4).



- For residential use: ME2-CO, ME2-CO-Ø14, ME2-CH<sub>2</sub>O-Ø16, ME2-CH<sub>2</sub>O-16x15, ME3M-O<sub>3</sub>.
- For industrial use: ME2-O<sub>2</sub>-Ø20, ME2-O<sub>2</sub>-Ø32, ME3 series, ME4 series.

## Electrochemical Sensor for Toxic Gas

### Application

- Toxic gas detection for residential and industrial application.



### Feature

- High sensitivity
- Excellent stability
- Steady performance
- Excellent selectivity
- Good sensitivity
- Linear signal output

### Specification

Model	ME2-CO	ME2-CO-Ø14*14	ME2-CH <sub>2</sub> O-Ø16	ME2-CH <sub>2</sub> O-16x15	ME3M-O <sub>3</sub>
Detection Gas	CO	CO	CH <sub>2</sub> O	CH <sub>2</sub> O	O <sub>3</sub>
Measurement Range	0~1000ppm	0~1000ppm	0~10ppm	0~5ppm	0~20ppm
Max Range	2000ppm	2000ppm	50ppm	20ppm	100ppm
Sensitivity	(0.023±0.008)µA/ppm	(4~10)mA/ppm	(0.55±0.25)µA/ppm	(0.45±0.15)µA/ppm	(0.60±0.15)µA/ppm
Resolution	0.5ppm	1ppm	0.02ppm	≤0.02ppm	0.02ppm
Response Time(T90)	≤50S	≤30S	≤60S	≤60S	≤120S
R. (Recommended)	200Ω	1000Ω	100Ω	100Ω	100Ω
Repeatability	<3%output value	<3%output value	<2%output value	<2%output value	<5%output value
Stability/(Month)	<10%	<10%	-	-	<2%
Output Linearity	linear	linear	linear	linear	linear
Zero Drift(-20~40°C)	≤10ppm	≤10ppm	≤0.2ppm	≤0.2ppm	≤0.2ppm
Storage Humidity	15-90%RH (no condensation)				
Storage Temperature	-20~50°C				
Pressure Range(kPa)	Standard Atmospheric Pressure±10%				
Lifespan	5 years	3 years	2 years (in air)	2 years (in air)	2 years (in air)

Electrochemical Gas Sensor

Model	ME2-O <sub>2</sub> -Φ20	ME2-O <sub>2</sub> -Φ32	ME3-CO	ME4-CO
Detection Gas	O <sub>2</sub>	O <sub>2</sub>	CO	CO
Measurement Range	0~25%/Vol	0~25%/Vol	0~1000ppm	0~1000ppm
Max Range	30%/Vol	30%/Vol	2000ppm	1500ppm
Sensitivity	0.1~0.3mA (in air)	0.1~0.3mA (in air)	0.07±0.015(μA/ppm)	0.08±0.02(μA/ppm)
Resolution	-	0.5ppm	1ppm	1ppm
Response Time(T90)	≤15S	≤15S	<25S	<25S
RL(recommended)	100Q	100Q	100	100
Repeatability	<2%output value	<2%output value	<2% output value	<2% output value
Stability(month)	<2%	<5%	<5%	<5%
Zero Drift(-20~40°C)	≤0.1%VOL	≤0.1%VOL	10ppm	9ppm
Storage Humidity	0-95%RH (no condensation)	0-95%RH (no condensation)	15-90%RH (no condensation)	15-90%RH (no condensation)
Storage Temperature	-20~50°C	-20~50°C	-20~50°C	-20~50°C
Pressure Range(kPa)	Standard Atmospheric Pressure±10%			
Lifespan	2 years	2 years	3 years(in air)	2 years(in air)
Size	Φ20mm	Φ20mm	Φ20mm	Φ20mm



Model	ME3-CL <sub>2</sub>	ME4-CL <sub>2</sub>	ME3-NO <sub>2</sub>	ME4-NO <sub>2</sub>
Detection Gas	CL <sub>2</sub>	CL <sub>2</sub>	NO <sub>2</sub>	NO <sub>2</sub>
Measurement Range	0~10ppm	0~20ppm	0~20ppm	0~20ppm
Max Measurement Range	100ppm	250ppm	150ppm	150ppm
Sensitivity(μA/ppm)	0.8±0.15	1.4±0.25	0.78±0.42	1.2±0.3
Resolution	0.1ppm	0.1ppm	0.1ppm	0.1ppm
Response Time(T90)	<60S	<60S	<25S	<30S
RL(recommended)	10Q	10Q	10Q	10Q
Repeatability	<2% output value	<2% output value	<2% output value	<2% output value
Stability(month)	<2%	<2%	<2%	<2%
Zero Drift(-20~40°C)	≤0.2ppm	≤0.2ppm	0.2ppm	0.2ppm
Storage Humidity	15-90%RH, no condensation	15-90%RH, no condensation	15-90%RH, no condensation	15-90%RH, no condensation
Storage Temperature	-20~50°C	-20~50°C	-20~50°C	-20~50°C
Pressure Range(kPa)	Standard Atmospheric Pressure±10%			
Lifespan	2 years	2 years	2 years(in air)	2 years(in air)
Size	Φ20mm	Φ32mm	Φ20mm	Φ32mm



Model	ME4-H <sub>2</sub> S	ME3-NH <sub>3</sub>	ME4-NH <sub>3</sub>
Detection Gas	H <sub>2</sub> S	NH <sub>3</sub>	NH <sub>3</sub>
Measurement Range	0~100ppm	0~50/100ppm	0~50ppm
Max Range	500ppm	200ppm	200ppm
Sensitivity(μA/ppm)	0.8±0.15	0.19±0.05	0.12±0.03
Resolution	0.1ppm	0.5ppm	0.1ppm
Response Time(T90)	<30S	≤90S	≤90S
RL(recommended)	10Q	10Q	10Q
Repeatability	<2% output value	<10% output value	<10% output value
Stability(Month)	<2%	<10%	<10%
Zero Drift(-20~40°C)	≤0.2ppm	-3~10ppm	-3~10ppm
Storage Humidity	15-90%RH (no condensation)	15-90%RH (no condensation)	15-90%RH (no condensation)
Storage Temperature	-20~50°C	-20~50°C	-20~50°C
Pressure Range(kPa)	Standard Atmospheric Pressure±10%		
Lifespan	2 years(in air)	2 years(in 2ppm NH <sub>3</sub> )	2 years(in 2ppm NH <sub>3</sub> )
Size	Φ20mm	Φ20mm	Φ32mm



Model	ME3-CH <sub>4</sub> O	ME3-CH <sub>4</sub>	ME3-O <sub>3</sub>	ME2-C <sub>2</sub> H <sub>5</sub> OH-Φ16
Detection Gas	CH <sub>4</sub> O	CH <sub>4</sub>	O <sub>3</sub>	C <sub>2</sub> H <sub>5</sub> OH
Measurement Range	0~10ppm	0~100ppm	0~20ppm	0~1.0mg/L
Max Measurement Range	100ppm	200ppm	100ppm	2.0 mg/L
Sensitivity(μA/ppm)	11.8±6	0.94±0.012	0.60±0.15	6±2(μA/(mg/L))
Resolution	0.1ppm	0.5ppm	0.02ppm	-
Response Time(T90)	≤90S	≤30S	≤120S	≤20S
RL(recommended)	300Q	-	10Q	10Q
Repeatability	<2% output value	1% output value	<5% output value	±0.006mg/L
Stability(month)	<2%	-	<2%	<2%
Zero Drift(-20~40°C)	-0.03~0.03ppm	-	≤0.2ppm	-0.01 mV~0.01mV
Storage Humidity	15-90%RH, no condensation	15-90%RH, no condensation	15-90%RH, no condensation	-
Storage Temperature	-20~50°C	-20~50°C	-20~50°C	-
Pressure Range(kPa)	Standard Atmospheric Pressure±10%			
Lifespan	2 years(in air)	3 years(in air)	2 years(in air)	2 years(in air)
Size	Φ20mm	Φ20mm	Φ20mm	Φ32mm



Model	ME3-SO <sub>2</sub>	ME4-SO <sub>2</sub>	ME3-H <sub>2</sub>	ME4-H <sub>2</sub>
Detection Gas	SO <sub>2</sub>	SO <sub>2</sub>	H <sub>2</sub>	H <sub>2</sub>
Measurement Range	0~20ppm	0~20ppm	0~1000ppm	0~1000ppm
Max Range	150ppm	200ppm	2000ppm	2000ppm
Sensitivity(μA/ppm)	0.55±0.15	0.8±0.2	0.010±0.005	0.03±0.01
Resolution	0.1ppm	0.1ppm	2ppm	1ppm
Response Time(T90)	<30S	<30S	≤90S	≤90S
RL(recommended)	10Q	10Q	10Q	10Q
Repeatability	<2% output value	<2% output value	<2% output value	<2% output value
Stability(Month)	<2%	<2%	<2%	<2%
Zero Drift(-20~40°C)	≤0.2ppm	≤0.2ppm	≤20ppm	≤10ppm
Storage Humidity	15-90%RH (no condensation)	15-90%RH (no condensation)	15-90%RH (no condensation)	15-90%RH (no condensation)
Storage Temperature	-20~50°C	-20~50°C	-20~50°C	-20~50°C
Pressure Range(kPa)	Standard Atmospheric Pressure±10%			
Lifespan	2 years(in air)	2 years(in air)	2 years(in air)	2 years
Size	Φ20mm	Φ32mm	Φ20mm	Φ32mm



Model	ME3-ETO	ME4-ETO	ME3-HCl	ME3-HF
Detection Gas	ETO	ETO	HCL	HF
Measurement Range	0~20ppm	0~20ppm	0~20ppm	0~10ppm
Max Measurement Range	100ppm	100ppm	200ppm	100ppm
Sensitivity(μA/ppm)	1.8±0.3	1.8±0.3	0.8±0.4	0.4±0.15
Resolution	0.1ppm	0.1ppm	0.1ppm	0.1ppm
Response Time(T90)	<120S	<120S	≤30S	≤90S
RL(recommended)	10Q	10Q	10Q	10Q
Repeatability	<2% output value	<2% output value	<2% output value	<2% output value
Stability(month)	<2%	<2%	<2%	<2%
Zero Drift(-20~40°C)	4ppm	4ppm	≤0.2ppm	≤0.2ppm
Storage Humidity	15-90%RH, no condensation	15-90%RH, no condensation	15-90%RH, no condensation	15-90%RH, no condensation
Storage Temperature	-20~50°C	-20~50°C	-20~50°C	-20~50°C
Pressure Range(kPa)	Standard Atmospheric Pressure±10%			
Lifespan	2 years	2 years	2 years(in air)	2 years(in air)
Size	Φ20mm	Φ32mm	Φ20mm	Φ20mm







## NDIR CO<sub>2</sub>/CH<sub>4</sub> Gas Sensor

### Application

- Industrial instruments, industrial-process control, safety protection monitor, explosive atmosphere occasions.



### Feature

- High sensitivity and high resolution
- Low power consumption
- Temperature compensation
- Excellent linear output
- Good stability
- Anti-water vapor interference
- No poisoning
- Long lifespan

### Specification

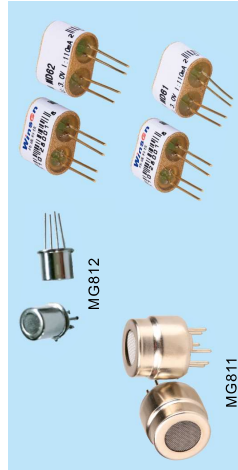
Model	MH-410D	MH-711A	MH-440D	MH-741A
Detection Gas	CO <sub>2</sub>		CH <sub>4</sub>	
Optional Range	0~5%VOL (optional)	0~5%VOL (optional)	0~10%VOL (optional)	0~100%VOL (optional)
Accuracy	±(50ppm+5% reading)	±(50ppm+5% reading)	0.05%VOL at 0~5%VOL 0.1%VOL at 0~100%VOL	±(50ppm+5% reading)
Working Voltage	3.6~5V DC	4.5~5.5V DC	3.6~5V DC	4.5~5.5V DC
Working Current	<85mA	<100mA	<85mA	<100mA
Output Signal	UART 0.4~2V	IIC 0.4~2V	UART 0.4~2V	IIC 0.4~2V
Preheat Time	3min			
Response Time	T90 <30s			
Operating Conditions	0~50°C 0~95% RH	-40~70°C 0~95% RH	0~50°C 0~95% RH	-40~70°C 0~95% RH
Dimension (L*W*H)	Dia20*21.4mm	Dia44*61mm	Dia20*21.4mm	Dia44*61mm

## Solid Electrolyte and Thermal Conductor

## Solid Electrolyte and Thermal Conductor Gas Sensors

### Application

- Air quality control, ferment process control, also low concentration detection in green house.
- Domestic, industrial spot for natural gas, LPG, coal gas, alkyl etc and gasoline, pure, ketone, benzene and other organic solvent detection.



### Feature

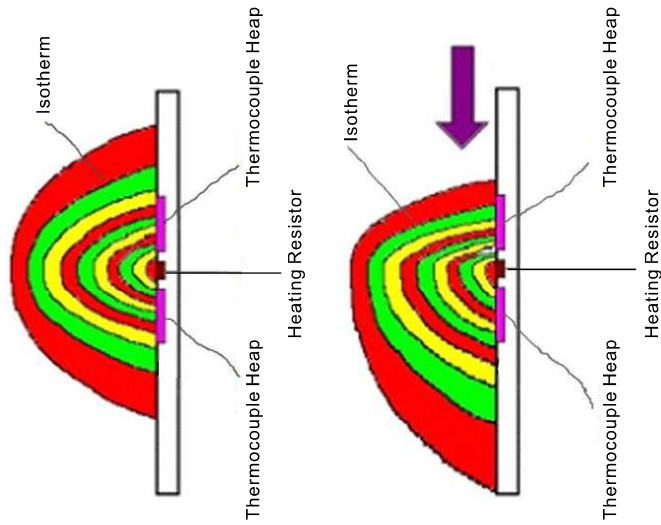
- MG811**
- High sensitivity
  - Steady performance and low cost
  - Good selectivity
- MD61 and MD62**
- Wide detection range(0 - 100%VOL)
  - Linear output voltage of bridge
  - Good reproducibility and reliable performance
  - Detecting without oxygen or oxygen-poor

### Specification

Model	MG811	MG812	MD61	MD62
Target Gas	CO <sub>2</sub>		CH <sub>4</sub> , H <sub>2</sub> , Inert Gas	CO <sub>2</sub>
Detection Range	0-10000ppm Co <sub>2</sub>		0-100%VOL	0-100%VOL
Sensitivity	1000ppmCO <sub>2</sub> :≥20mV	1000ppmCO <sub>2</sub> :≥25mV	10%CH <sub>4</sub> : ≥ 15mV	10%CO <sub>2</sub> : ≥5mV
Response Time	< 60s		≤15s	≤15s
Resume Time	< 90s		≤30s	≤30s
Rh(Heater Resistance)	35±3Ω	60±5Ω	/	/
Hc(Heater Current)	140±20mA	85±10mA	≤120mA	≤120mA
Vh(Heater Voltage)	6.0±0.1V	5.0±0.1V	3.0±0.1V	3.0±0.1V DC
Ph(Heater Consumption)	≤1000mW	420±50mW	≤360mW	≤360mW
Standard Working Condition	-20~50°C under 95%RH			
Storage Condition	-20~70°C under 70%RH			

## Micro Flow Sensor

The chip consists of two thermopiles and one heating resistance. The thermopiles are asymmetrically positioned up and down on the heating resistor. The thermopile hot junction and heating resistance are based on a heat-shielding pedestal. The heating resistance is supposed to heat the hot junction of thermopiles. The temperature gradient between hot junction and cold junction results in voltage output, which is the Seebeck effect. Refer to the right chart: there is the isotherm on both sides of heating resistance. When the flow is static, the isotherms are symmetrical distributed along the middle of heating resistance. When the flow moves from right to left, the isotherm will incline to the left. The temperatures in the symmetric position are no longer the same. The temperature difference can be measured by the thermopile. As the heat exchange is related to quantity and heat capacity of the flow, so the sensor can measure the quantity of the flow directly.



## Micro Flow Sensor

## Micro Flow Sensor

### Application

- Industrial process control
- Air and environment protection
- Portable detector



### Feature

- Latest MEMS sensor chip technology
- High accuracy
- Quick response
- Good repeatability
- Detection micro flow accurately
- Calibrated completely
- Temperature compensated

### Specification

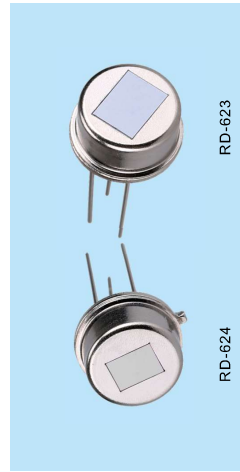
Model	Measuring Range		
F1012 / F1013	20, 30, 50, 100, 200, 500, 1000, 1200, 2000sccm		
F1022	2, 5, 6, 10, 12, 15, 20 SLM		
F1031	20, 35, 50, 100, 150, 200 SLM		
Parameters	Min	Typical	Max
Full Scale Output(V)	4.9	5	5.1
Zero Output(V)	0.96	1	1.04
Output Impedance(Ω)	-	200	-
Working Voltage(V)	7	10	14
Working Current(mA)	15	25	30
Accuracy(%F.S)	-	±1.5	±2.5
Repeatability(%F.S)	-	±0.3	±0.5
Annual Drift(%F.S)	-	±0.1	±0.5
Pressure Range(kPa)	-	-	200
Response Time(ms)	5	10	15
Working Temp.(°C)	-25	-	65
Storage Temp.(°C)	-40	-	90
NOTE	sccm = mL/min, SLM = L/min.		

## Pyroelectric Infrared Sensor

### Application

- Safety alarm
- Electricity lighting

- Industrial automatic controlling
- Body induction toys elamps



### Feature

- High sensitivity and excellent signal to noise ratio
- High temperature-dependent stability
- Strong anti-jamming ability (e.g. vibration, radio-frequency interference etc.)
- High value with competitive price

### Specification

Model No.	RD-624	RD-623
Standard Encapsulation	TO-5	TO-5
Infrared Receiving Electrode	2×1mm, 2 sensitive elements	2×1mm, 2 sensitive elements
Window Size	3×4mm	3.8×5mm
Receiving Wavelength	5~14μm	5~14μm
Transmittance	>75%	>75%
Output Signal Peak[Vp-p]	3500mV	3500mV
Sensitivity	3200V/W	3200V/W
Detection Rate (D*)	1.4 × 10 <sup>8</sup> cmHz <sup>1/2</sup> /W	1.4 × 10 <sup>8</sup> cmHz <sup>1/2</sup> /W
Noise Peak[Vp-p]	<70mV	<70mV
Output Balance Degree	<10%	<10%
Source Voltage	0.3~1.1V	0.3~1.1V
Working Voltage	3~15V	3~15V
Working Temperature	-30~70°C	-30~70°C
Storage Temperature	-40~80°C	-40~80°C
Incidence Angle Map	138° X X Y Y	150° X X Y Y

## Pyroelectric Infrared Sensor

## Air Quality Detection Module



Model	ZP01-MP503	ZP07-MP901
Sensor	Air quality sensor MP503	Air quality sensor MP901
Target Gas	Formaldehyde, Benzene, Carbon Monoxide, Hydrogen, Alcohol, Ammonia, Smoke of Cigarette, Essence &etc.	Formaldehyde, Benzene, Carbon Monoxide, Hydrogen, Alcohol, Ammonia, Smoke of cigarette, Essence &etc.
Physical Interface	XH2.54-4P terminal sockets	XH2.54-4P terminal sockets
Output Data	0-3 grade pollution signal	0-10 grade pollution signal
Working Voltage	5.0±0.2V DC	5.0±0.2V DC
Output Data	TTL level (200ohm protected resistance inside)	TTL level (200ohm protected resistance inside)
Working Current	≤60mA	≤60mA
Warm Up Time	≤3 min	≤3 min
Response Time	≤20s	≤20s
Recovery Time	≤60s	≤60s
Operating Temperature	0~50°C	0~50°C
Operating Humidity	≤95%RH	≤95%RH
Storage Temperature	-20~60°C	-20~60°C
Storage Humidity	≤60%RH	≤60%RH
Size	24*20*15mm (L*W*H)	24*20*15mm (L*W*H)
Weight	≤20g	≤20g
Sensitivity Attenuator	≤1%/year	≤1%/year
Life Span	≥5 years	≥10 years

## Formaldehyde Gas Detection Module



## Gas Detection Module

## Air Quality & Particle Detection Module



Mode	ZE07-CH <sub>2</sub> O	ZE08-CH <sub>2</sub> O
Target Gas	Formaldehyde (CH <sub>2</sub> O)	
Interference Gas	Alcohol, Carbon Monoxide & etc.	
Output Data	DAC(0.4~2V standard voltage output) UART Output (3V Electrical Level)	
Working Voltage	3.7V~9V	
Warm Up Time	≤3 minutes	
Response Time	≤60s	
Recovery Time	≤60s	
Detection Range	0~5ppm	
Resolution	0.01ppm	
Operating Temp.	0℃~50℃	
Operating Hum.	15%RH-90%RH (No condensation)	
Storage Temp.	0℃~50℃	
Working Life	2 years (in air)	

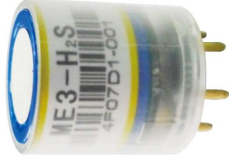
Model	ZPH01	ZH03A	ZPHS01
Detection Gas	Formaldehyde, benzene, carbon monoxide, hydrogen, alcohol, ammonia, cigarette smoke, essence & etc.	PM1.0 PM2.5 PM10	CO <sub>2</sub> , PM <sub>2.5</sub> , CH <sub>2</sub> O, TVOC, temperature, humidity
Output	PWM	PWM	IIC
	UART	UART(3V TTI)	UART
Working Voltage	/	DAC(0~2V is corresponding to 0~1000)	/
	5±0.2 V DC	5V±0.1V	5V (DC)
Working Current	≤150mA	<10mA	<200 mA
Detection Range for particles	15000 particles /283ml	/	CO <sub>2</sub> :0~5000ppm PM <sub>2.5</sub> :0~1000ug/m <sup>3</sup> CH <sub>2</sub> O:0~2000ug/m <sup>3</sup>
Dormancy current	/	70mA	/
Response Time	≤90s	≤90s	/
Working Humidity	≤90%RH	15%~80%RH(No condensation)	0~100% RH
Working Temperature	-20~50℃	-20~40℃	-10~50℃
Storage Temperature	0~50℃	-40~60℃	/
Dimension	59.47*44.5*20mm	50*32.4*21mm	72*61mm

## Flammable Gas Detection Module



Model	ZP04	ZP05	ZP06
Detection Gas	Natural gas	Natural gas	Natural Gas
Detection Range		1~25%LEL	
Sensor Type	Flat Surfaced Semiconductor		
Response time		< 30s	
Resume time		< 30s	
Working Voltage	9~12V	DC 9~32V	DC 9~32V
Working Current	< 80mA	< 80mA	< 80mA
Output	To be external connection with 4 LED, 2 buttons, 1 buzzer, 1 DC relay and 1 electromagnetic valve	To be external connection with 3 LED, 1 buzzer, 1 signal output	1 signal output
Accuracy	±3%LEL (At 25°C)	±4%LEL (At room temp.)	±4%LEL (At 25°C)
Operating Temperature	-10~55°C	-40~85°C	-40~85°C
Operating Humidity	0-95%RH	20~90%RH	20~90%RH
Storage Temperature	-20~70°C	-20~105°C	
Storage Humidity	20~95%RH	20~90%RH	20~90%RH
Dimension(L*W*H)	25.4*21.7*22.6mm	25.4*21.7*11mm	33*17.5mm
Expected Lifespan	>2 years	>2 years	>2 years

## Electrochemical Gas Module for Toxic Gas



Model	ZE03-ME3 series	ZE12-ME4 series
Detection gas	CO, NO <sub>2</sub> , SO <sub>2</sub> , O <sub>2</sub> , NH <sub>3</sub> , O <sub>2</sub> , H <sub>2</sub> S, CH <sub>4</sub> O	CO, NO <sub>2</sub> , SO <sub>2</sub> , O <sub>2</sub>
Detection range	refer to ME3 series sensors	refer to ME4 series sensors
Sensor type	ME3 series electrochemical sensor	ME4 series electrochemical sensor
Working voltage	DC 5±0.1V	DC 5.0V±0.1V
Working current		<5mA
Output Data	UART/Analogue	DAC(0.4~2V) /UART/PWM
Operating temperature		0~50°C
Operating humidity		15%~90%RH (no condensation)
Storage temperature		0~60°C
Storage humidity		20~90%RH
Dimension(L*W*H)		23.3*23.3*24.7mm
Expected lifespan		2 years