

SPECIFICATION

Product Name: Air Quality Module

Item No.: AQM-1020

Version: V0.5

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Writer	Audit	Approved
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Revision

No.	Version	Content	Reviser	Date
1	V0.1	Initial revision	Karen Lin	2019-6-12
2	V0.2	Update detection gas type (SO2/NH3), IP5K4 upgrade to IP6K7	He Tao	2021-3-12
3	V0.3	Update Definition of Air quality classification	Zhang Huan	2022-1-22
4	V0.4	Update Description of PWM signal	Zhang Huan	2022-11-24
5	V0.5	Update Description of PWM signal during power-on	Zhang Huan	2023-03-28

Air Quality Module

AQM-1020



Applications

- ◇ Automotive
- ◇ Air purifiers
- ◇ Air conditioners
- ◇ HVAC Equipment
- ◇ IAQ/OAQ monitors

Description

The automotive-grade gas sensor based on the MOX principle and MEMS manufacturing process detects the redox gas in the environment to determine the air quality level of the air-conditioning inlet, and automatically controls the air-conditioning inlet valve to maintain the fresh air in the car through the ECU.

Features

- 1、 Core Advantages of Cubic self-developed MOX gas sensor:
 - ① Multiple gas-sensitive material selection platform (up to 16-channels);
 - ② good gas selectivity;
 - ③ Combination technology of materials and intelligent differential algorithm adopted to realize the accurate identification and measurement on target gases;
 - ④ Fully autonomous and controllable from micro hot plate, chip packaging to sensor paste;
 - ⑤ Stable detection signal excluding the influence of temperature and humidity;
 - ⑥ Auto-baseline zeroing mechanism to ensure accurate measurement.
- 2、 Detect CO/ HC, NO₂(NH₃、 SO₂ and other gases can be customized)
- 3、 More gas options, smaller size
- 4、 High sensitivity, fast response and recovery speed

Working Principle

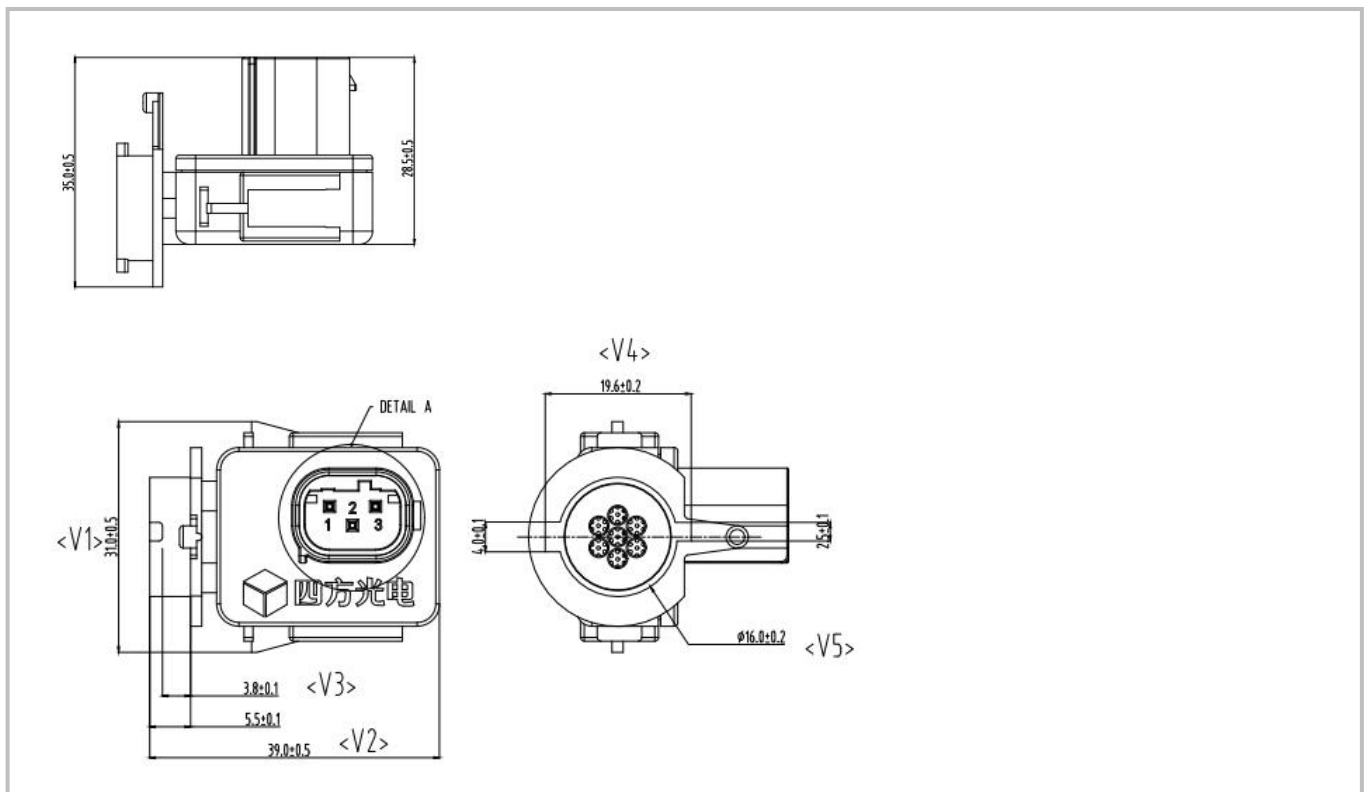
AQM-1020 use the oxidation and reduction of gas on the surface of the semiconductor to cause changes in the resistance of sensitive components, a gas having a tendency to adsorb negative ions such as oxygen is called an oxidizing gas - an electron-accepting gas, a gas having a tendency to adsorb positive ions such as hydrogen, a carbon oxide compound or an alcohol is called a reducing gas-electron supply type gas.

When an oxidized (reduced) type gas is adsorbed onto an N(P) type semiconductor, carriers of the semiconductor are reduced (increased), and resistivity is increased (decreased); when adsorbed onto a P(N) type semiconductor, carriers of the semiconductor are increased. (decreased), the resistivity drops (rises). It can be seen that the

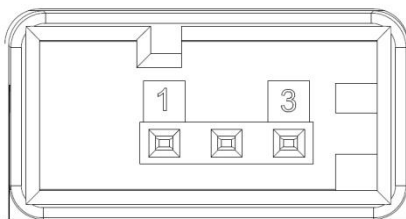
oxidized and reduced semiconductors are diametrically opposed, so that the corresponding gases can be effectively detected from these properties.

Dimensions and Connector

1. Dimensions (Unit mm, 39*31*35mm)



2. Connector Pinout



No.	Pin	Description
1	Supply	Supply Voltage
2	GND	Ground
3	PWM	Output Signal PWM

3. Connector

Item	Part Number	Pitch	Recommendation
Sensor Connector(Integrated with shell injection)	967167-6	1.8mm	TE
对配端连接器/Mating Connector	TE 967642-1 Coding B	1.8mm	TE

Specifications

General Performance	
Operating principle	Oxidation and reduction of semiconductor
Measurement item	CO/HC and NO ₂ (Extensible detection NH ₃ or SO ₂ Gas, needs to be customized)
Measuring range	NO ₂ :0.05~10ppm;CO/HC:1~1000ppm
Air velocity range	≤10 m/s
Digital output	PWM (Extensible to LIN,needs to be customized)
IP rating	IP6K6K
Module weight	12g±1g
Consistency	±1 (Air quality level)
Warm up time	≤60s
Response time (T63)	≤5s
Life	10years (25±10°C、30%~70%RH、without siloxane)
Dimensions	39*31*35 mm
Environmental	
Working temperature	-40~+85°C
Storage temperature (Short term range, max of 2 hours)	-40~+105°C
Relative Humidity	0-99%RH (non-condensing)
Electrical	
DC Supply Voltage	9V ~16V (Normal Supply 12 VDC)
Supply current(normal)	≤60mA

Communication

1.PWM Signal Description

PWM level	Meaning
90%	Clean air level
80%	Level 1:Low increase in pollution
70%	Level 2:Mild increase in pollution
60%	Level 3:Significant increase in pollution
50%	Level 4:High increase in pollution
40%	Level 5:Very high increase in pollution
10%	Error...self diagnostic upon car ignition

Output signal frequency = 50Hz ± 2%

Remarks: The manufacturer's debugging mode signals are reserved for the first 15s after power-on and do not have the air quality class reference significance. The output signals of the air quality sensor begin to have the air quality class reference significance 30s after power-on.

Classification levels

Air quality levels for CO/HC and NOx signals.

PWM signal	Air Quality	CO/HC[ppm]	NO2[ppb]
90%	LEVEL 0(clean air)	0-4	0-200
80%	LEVEL 1	4-8	200-400
70%	LEVEL 2	8-16	400-800
60%	LEVEL 3	16-32	800-1200
50%	LEVEL 4	32-64	1200-1600
40%	LEVEL 5	>64	>1600

Remarks:

- 1、 Can be reclassified according to the specific needs of OEM customers.
- 2、 Based on LIN can be divided into 10 levels at present, PWM can be divided into 5 levels at present, if PWM needs more level division, it needs to be customized

After-Sales Services and Consultancy

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