TECHNICAL DATA

MQ-135 GAS SENSOR

FEATURES
- Wide detecting scope
- Fast response and High sensitivity
- Stable and long life
- Simple drive circuit

APPLICATION
- They are used in air quality control equipments for buildings/offices, suitable for detecting NH3, NOx, alcohol, Benzene, smoke, CO2, etc.

SPECIFICATIONS

A. Standard work condition

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter name</th>
<th>Technical condition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vc</td>
<td>Circuit voltage</td>
<td>5V±0.1 AC OR DC</td>
<td></td>
</tr>
<tr>
<td>Vh</td>
<td>Heating voltage</td>
<td>5V±0.1 ACOR DC</td>
<td></td>
</tr>
<tr>
<td>Rl</td>
<td>Load resistance</td>
<td>can adjust</td>
<td></td>
</tr>
<tr>
<td>Rh</td>
<td>Heater resistance</td>
<td>33Ω±5% Room Tem</td>
<td></td>
</tr>
<tr>
<td>Ph</td>
<td>Heating consumption</td>
<td>less than 800mw</td>
<td></td>
</tr>
</tbody>
</table>

B. Environment condition

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter name</th>
<th>Technical condition</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tao</td>
<td>Using Tem</td>
<td>-10℃-45℃</td>
<td></td>
</tr>
<tr>
<td>Tas</td>
<td>Storage Tem</td>
<td>-20℃-70℃</td>
<td></td>
</tr>
<tr>
<td>Rrh</td>
<td>Related humidity</td>
<td>less than 95%Rh</td>
<td></td>
</tr>
<tr>
<td>O2</td>
<td>Oxygen concentration</td>
<td>21%(standard condition)/Oxygen concentration can affect sensitivity</td>
<td>minimum value is over 2%</td>
</tr>
</tbody>
</table>

C. Sensitivity characteristic

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Parameter name</th>
<th>Technical parameter</th>
<th>Remark 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rs</td>
<td>Sensing Resistance</td>
<td>30K Ω-200K Ω (100ppm NH3)</td>
<td>Detecting concentration scope: 10ppm-300ppm NH3, 10ppm-1000ppm Benzene, 10ppm-300ppm Alcohol</td>
</tr>
<tr>
<td>α0</td>
<td>Concentration Slope rate</td>
<td>≤0.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(200/50) NH3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Detecting Condition</td>
<td>Temp: 20℃±2℃ Vc:5V±0.1 Humid: 65%±5% Vh: 5V±0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preheat time</td>
<td>Over 24 hour</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D. Structure and configuration, basic measuring circuit

Structure and configuration of MQ-135 gas sensor is shown as Fig. 1 (Configuration A or B), sensor composed by micro Al2O3 ceramic tube, Tin Dioxide (SnO2) sensitive layer, measuring electrode and heater are fixed into a crust made by plastic and stainless steel net. The heater provides necessary work conditions for work of...
The MQ-135 has 6 pins, 4 of which are used to fetch signals, and the other 2 are used for providing heating current.

Electric parameter measurement circuit is shown as Fig.2.

### E. Sensitivity characteristic curve

Fig.2 sensitivity characteristics of the MQ-135

![Fig.2](image-url)

Fig.3 is shows the typical sensitivity characteristics of the MQ-135 for several gases.

- Temperature: 20°C
- Humidity: 65%
- Oxygen concentration: 21%
- \( R_L = 20k\,\Omega \)

- \( R_0 \): Sensor resistance at 100ppm of \( NH_3 \) in the clean air.
- \( R_s \): Sensor resistance at various concentrations of gases.

![Fig.3](image-url)

### Sensitivity Adjustment

Resistance value of MQ-135 is different to various kinds and various concentration gases. So, when using this component, sensitivity adjustment is very necessary. We recommend that you calibrate the detector for 100ppm \( NH_3 \) or 50ppm alcohol concentration in air and use value of Load resistance \( R_L \) about 20 K\(\Omega \) (10K\(\Omega \) to 47 K\(\Omega \)).

When accurately measuring, the proper alarm point for the gas detector should be determined after considering the temperature and humidity influence.
Notification

1 Following conditions must be prohibited
1.1 Exposed to organic silicon steam
    Organic silicon steam cause sensors invalid, sensors must be avoid exposing to silicon bond, fixature, silicon latex, putty or plastic contain silicon environment
1.2 High Corrosive gas
    If the sensors exposed to high concentration corrosive gas (such as H₂Sz, SOₓ, Cl₂, HCl etc), it will not only result in corrosion of sensors structure, also it cause sincere sensitivity attenuation.
1.3 Alkali, Alkali metals salt, halogen pollution
    The sensors performance will be changed badly if sensors be sprayed polluted by alkali metals salt especially brine, or be exposed to halogen such as fluorin.
1.4 Touch water
    Sensitivity of the sensors will be reduced when spattered or dipped in water.
1.5 Freezing
    Do avoid icing on sensor surface, otherwise sensor would lose sensitivity.
1.6 Applied voltage higher
    Applied voltage on sensor should not be higher than stipulated value, otherwise it cause down-line or heater damaged, and bring on sensors sensitivity characteristic changed badly.
1.7 Voltage on wrong pins
    For 6 pins sensor, if apply voltage on 1, 3 pins or 4, 6 pins, it will make lead broken, and without signal when apply on 2, 4 pins

2 Following conditions must be avoided
2.1 Water Condensation
    Indoor conditions, slight water condensation will effect sensors performance lightly. However, if water condensation on sensors surface and keep a certain period, sensor’s sensitivity will be decreased.
2.2 Used in high gas concentration
    No matter the sensor is electrified or not, if long time placed in high gas concentration, if will affect sensors characteristic.
2.3 Long time storage
    The sensors resistance produce reversible drift if it’s stored for long time without electrify, this drift is related with storage conditions. Sensors should be stored in airproof without silicon gel bag with clean air. For the sensors with long time storage but no electrify, they need long aging time for stability before using.
2.4 Long time exposed to adverse environment
    No matter the sensors electrified or not, if exposed to adverse environment for long time, such as high humidity, high temperature, or high pollution etc, it will effect the sensors performance badly.
2.5 Vibration
    Continual vibration will result in sensors down-lead response then rupture. In transportation or assembling line, pneumatic screwdriver/ultrasonic welding machine can lead this vibration.
2.6 Concussion
    If sensors meet strong concussion, it may lead its lead wire disconnected.

2.7 Usage
    For sensor, handmade welding is optimal way. If use wave crest welding should meet the following conditions:
    2.7.1 Soldering flux: Rosin soldering flux contains least chlorine
    2.7.2 Speed: 1-2 Meter/ Minute
    2.7.3 Warm-up temperature: 100±20℃
    2.7.4 Welding temperature: 250±10℃
    2.7.5 1 time pass wave crest welding machine
    If disobey the above using terms, sensors sensitivity will be reduced.