# Odor Detection Module

## （Model： ZP150）

# User’s Manual

Version:1. 0

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Zhengzhou Winsen Electronics Technology Co., Ltd

# Statement



Thanks for purchasing our product. In order to let customers use it better and reduce the faults caused by misuse, please read the manual carefully and operate it correctly in accordance with the instructions. If users disobey the terms or remove, disassemble, change the components inside of the sensor, we shall not be responsible for the loss.

The specific such as color, appearance, sizes &etc., please in kind prevail.

We are devoting ourselves to products development and technical innovation, so we reserve the right to improve the products without notice. Please confirm it is the valid version before using this manual. At the same time, users' comments on optimized using way are welcome.

Please keep the manual properly, in order to get help if you have questions during the usage in the future.

**Zhengzhou Winsen Electronics Technology CO., LTD.**

# Odor Detection Module

**Product Description**

ZP150 module is an odor detection module developed for pet odor detection application environment. ZP150 module adopts flat surface semiconductor gas sensor. The module has good sensitivity to volatile organic gases such as hydrogen sulfide, ammonia, alcohol，smoke of cigarette, formaldehyde, benzene, carbon monoxide, hydrogen, and essence &etc. The module has been aging, debugged, adjusted and calibrated. So it has good consistency and high sensitivity. And with UART digital output function, communication is simple and easy to use.


**Features**

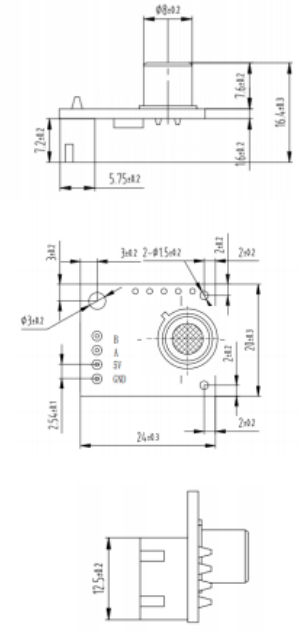
High sensitivity
Excellent long-term stability
Calibrated before shipment
long life
High cost-effective

**Application**

Air cleaner, air quality monitor, smart cat litter box, smart pet house, pet deodorizer, etc

**Technical Index** **Table 1**

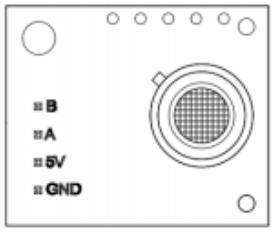
| | |
|---|---|
| Model No. | ZP150 |
| Detection Gas | hydrogen sulfide , ammonia, alcohol, smoke of cigarette, formaldehyde, benzene, carbon monoxide, hydrogen, , essence &etc. |
| Physical Interface | XH2.54-4P terminal sockets |
| Measurement range | 0-5ppm |
| Resolution | 0.05ppm |
| Working Voltage | 5.0±0.2V DC (No voltage reverse connect protection) |
| Output | UART(5V) |
| Working Current | ≤70mA |
| Warm-up Time | ≤3 min |
| Operating Temperature | 0～50℃ |
| Operating Humidity | ≤95％RH |
| Storage Temperature | －20～60℃ |
| Storage Humidity | ≤60％RH |



**Picture 1:Module structure diagram**

## Pin definition Table 2

| Name | Function |
|---|---|
| GND | Input power - |
| 5V | Input power + |
| A | UART (TX) 0-5V Output |
| B | UART (RX) 0-5V Input |




## Communication Protocol

1. Serial communication settings

**Table 3**

| | |
|---|---|
| Baud rate | 9600 |
| Date byte | 8 bytes |
| Stop byte | 1 byte |
| Check byte | no |

2. communication command

The default communication mode is active upload mode, module sends the concentration value every 1s interval.

If user switches to Q&A mode, and needs to switch from Q&A to initiative upload mode, send command as below:

**Table 4**

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Reserved | Switch Command | active upload | Reserved | Reserved | Reserved | Reserved | Checksum |
| 0xFF | 0x00 | 0x78 | 0x40 | 0x00 | 0x00 | 0x00 | 0x00 | 0x48 |

Data format under active upload mode is as following

**Table 5**

| Byte0 | Byte 1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Gas type odor | Unit (PPB) | Reserved | High byte of gas concentration | Low byte of gas concentration | High byte of full scale | Low byte of full scale | Checksum |
| 0xFF | 0x03 | 0x04 | 0x00 | 0x05 | 0xDC | 0x13 | 0x88 | 0x7D |

Note:
Gas concentration = HIGH byte of gas concentration* 256 + LOW byte of gas concentration,
For example: FF 03 04 00 05 DC 13 88 7D
Full scale gas concentration = HIGH byte of full scale* 256 + LOW byte of full scale
Gas concentration= 5*256+220=1500 PPB
Full scale gas concentration= 19*256+136= 5000PPB

When the user needs to switch to the Q&A mode, the active upload mode can be turned off by sending the following command. The format of the command line for closing the active upload is as follows:

**Table 6**

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Reserved | Switch Command | Q&A | Reserved | Reserved | Reserved | Reserved | Checksum |
| 0xFF | 0x00 | 0x78 | 0x41 | 0x00 | 0x00 | 0x00 | 0x00 | 0x47 |

Command format of reading concentration, under Q&A mode is as following

**Table 7**

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Reserved | Command | Q&A | Reserved | Reserved | Reserved | Reserved | Checksum |
| 0xFF | 0x00 | 0x86 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x7A |

Return value as below

**Table 8**

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 |
|---|---|---|---|---|---|---|---|---|
| Start Byte | Command | High byte of gas concentration (PPB) | Low byte of gas concentration (PPB) | Reserved | Reserved | High byte of full scale | Low byte of full scale | Checksum |
| 0xFF | 0x86 | 0x05 | 0xDC | 0x00 | 0x00 | 0x13 | 0x88 | 0xFE |

**Note:**

Gas concentration = HIGH byte of gas concentration* 256 + LOW byte of gas concentration,

For example: FF 86 05 DC 00 00 13 88 FE

Full scale gas concentration = HIGH byte of full scale* 256 + LOW byte of full scale

Gas concentration= 5*256+220=1500 PPB

Full scale gas concentration= 19*256+136= 5000PPB

**3. Checksum calculation**

Checksum = (Negative (Byte1+Byte2+Byte3+Byte4+Byte5+Byte6+Byte7))+1

```
unsigned char FucCheckSum(unsigned char *i,unsigned char ln)
{
unsigned char j,tempq=0;
i+=1;
for(j=0;j<(ln-2);j++)
{
   tempq+=*i;
   i++;
}
tempq=(~tempq)+1;
return(tempq);
}
```

## Cautions

1. Avoid exposure to volatile silica vapors
   Sensor must avoid exposing to silicon bond, fixature, silicon latex, putty or plastic contain silicon environment. If the surface of the sensor absorbs silicon compound vapor, the sensitive material of the sensor will be coated with silicon dioxide formed by the decomposition of silicon compounds, which inhibits the sensitivity of the sensor and cannot be recovered.
2. Avoid exposure to highly corrosive environments
   If the sensors are exposed to high concentration corrosive gas (such as H2S, SOX, Cl2, HCL etc.), it will not only result in corrosion of sensors structure, also it cause sincere sensitivity attenuation, which will affect the performance and accuracy of the module.
3. Avoid alkali, alkali metal salt, halogen pollution
   Contamination of the sensor with alkali metals, especially saline spray, or exposure to halogens such as freon can also cause deterioration in performance.
4. Avoid Touch water
   Sensitivity of the sensors will be reduced when spattered or dipped in water.
5. Avoid Water Condensation
   Indoor conditions, slight water condensation will influence sensors' performance lightly. However, if water condensation on sensing material surface and keep a certain period, sensors' sensitive will decrease.
6. Avoid water freezing on the sensor surface
   Water icing on the surface of the sensor sensitive material will cause the sensitive layer to break and lose the sensitive properties.
7. Avoid applying high voltage
   Power the module strictly according to the power supply voltage of the module. If the voltage exceeds 5.5V, the module may be irreversibly damaged.
8. Try to avoid long-term storage
   When the sensor is stored for a long time without power, its resistance will produce reversible drift, which is related to the storage environment close. The sensor should be stored in a sealed bag free of volatile silicon compounds. Sensors that have been stored for a long time need to be energized for a longer period of time before use to achieve stability.
9. Avoid long-term exposure to extreme environments
   Whether the sensor is energized or not, long-term exposure to extreme conditions such as high humidity, high temperature or high pollution, Sensor performance will be severely affected.
10. avoid being in high concentration of gas for a long time
    Whether the sensor is energized or not, long-term placement in high concentration gas will affect the sensor characteristics. If using lighter gas Direct spray to the sensor will cause great damage to the sensor.
11. Avoid frequent and excessive vibration
    Frequent and excessive vibration will cause the internal leads of the sensor to resonate and break. The use of pneumatic screwdriver/ultrasonic welders in transit and on assembly lines can produce such vibrations.
12. Avoid strong shocks
    If the sensor is strongly impacted or dropped, its lead will break.
13. Do not install the module in a strong air convection environment.

14. Do not use the module in systems involving personal safety.
15. The module is in the preheating stage 2 minutes before power-on, and the output is 0 continuously. After the preheating is completed, gas detection can be carried out.
16. Module built-in environment adaptive algorithm, power-on state, the module length of time in a fixed concentration environment will be automatically corrected, the module output concentration will be adjusted to the state of clean air.

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