Datasheet AO-02

Oxygen sensor

- Linear output
- No external power supply
- Temperature compensation
- Fast response
- Accurate and reliable
- Anti-interference

Summary

AO-02 is an electrochemical oxygen sensor for oxygen concentration measurement. AO-02 oxygen sensor interface model is a Molex 3-pin connector The sensor adopts molded body design, provides fast response and has long lifetime.

Application

No external power supply is needed for the operation of AO-02. Temperature compensation is conducted in sensors to avoid the influence of temperature change. It is applicable to instruments related to oxygen concentration detection, and can be widely used in automotive, environmental protection, coal mining, petrochemical and other fields, such as motor vehicle exhaust gas detection instrument, exhaust gas environmental protection detection instrument, oxygen index test instrument, oxygen alarm, etc. All sensors have been calibrated before delivery.

Figure 1. AO-02 oxygen sensor

1. Sensor specification

Table 1. Technical indicators of AO-02

MEASUREMENT[1]	
Principle	Partial pressure electrochemical
Output voltage	9 ~ 13 mV (in ambient air)
Measurement range	0 ~ 100%
Response time (T_{90})	< 15 s
Linearity	Linear 0% to 100% O_2
ELECTRICAL	
Temperature compensation	< 2% O_2 equivalent (0 ~ 40 °C）
External load resistor	≥ 10 kΩ
Connector	3 Pin Molex header (2.54 mm) (MOLEX 22-29-2031)
Recommended Mating Part	Molex 3-Way Housing (MOLEX 22-01-2035) Molex Crimp Terminals (MOLEX 08-45-0110)
MECHANICAL	
Housing material	Red ABS
Weight	40 g (nominal)
ENVIRONMENTAL	
Operating temperature range	0 ~ 50 °C
Operating pressure range	0.5 ~ 2.0 bar
Operating humidity range	0 ~ 99% RH (non-condensing)
OTHER INDICATORS	
Long-term output drift in 100% O_2[2] (voltage loss/year)	< 10%
Expected operating life	3.6×10^5 % O_2 hours (20 °C)[3] 2.86×10^5 % O_2 hours (40 °C)

[1] The parameters without annotated test condition in the table are obtained under the conditions of 20 ℃, 50% RH, 1013 mbar and oxygen flow rate of 100 mL/min with the recommended circuit. Specifications outline the performance of sensors delivered within the first three months.

[2] Output signal may drift below the lower limit over time.

[3] For example: under the condition of 20 °C, 50% O_2, the expected service life of the oxygen sensor is $(3.6 \times 10^5 \ / \ 50\ )$ hours = 7.2×10^3 hours.

2. Dimension

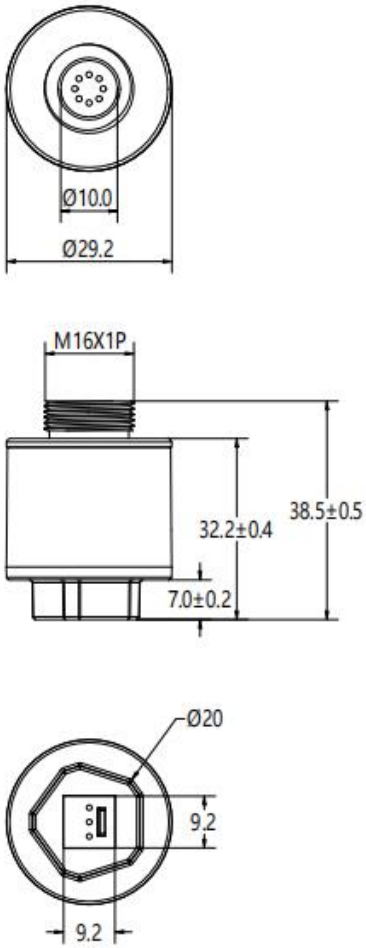

Figure 2. AO-02 outline dimensions (unit: mm, other unmarked tolerances: ± 0.2 mm)

3. Installation and use

3.1 Installation requirements

Please tighten the sensor with hands and ensure a good airtightness when installing the sensor. Do not use wrenches and similar mechanical tools to prevent damage to the sensor threads due to excessive force.

3.2 Storage and use

AO-02 oxygen sensor has to be kept away from high concentrations of organic solvent vapors during storage, installation and operation.

Before installing the sensor on a printed circuit board (PCB), the PCB should be cleaned with a degreasing agent to prevent the contamination on gas-permeable membrane. For example, rosin from volatilizing and condensing can block the gas-permeable membrane in the oxygen sensor. Do not use organic solvents on the sensor housing, as solvents may cause cracking of plastics.

3.3 Cleaning

In case of the sensor contamination, the sensor should be cleaned with distilled water and naturally dried. The sensor is not suitable to be sterilized by steam or to be exposed in chemicals, such as ethylene oxide or hydrogen peroxide.

3.4 Recommended circuit

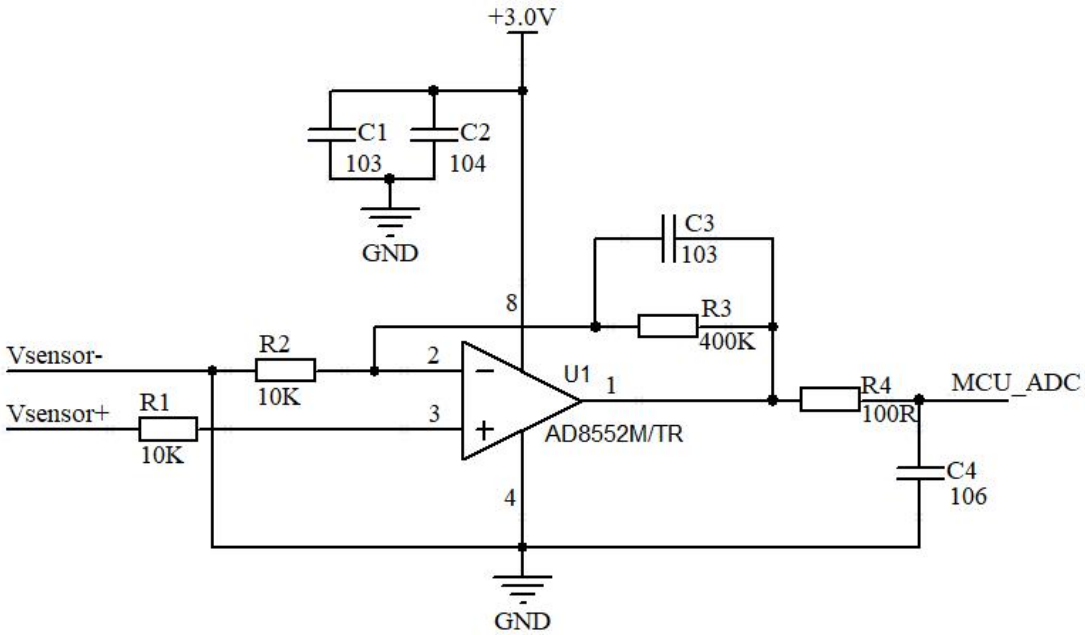

Figure 3. AO-02 recommended application circuit diagram

- Short-circuit the positive and negative pins (Vsensor+ and Vsensor-), read the amplified ADC value (MCU_ ADC), and record it as A_0.
- Place the sensor in the air, read the amplified ADC value, record it as A_1.
- Place the sensor in the environment to be tested, read the amplified ADC value, and record it as A_x.
- The formula for calculating the oxygen concentration in the environment for measurement is:

$$\text{Oxygen Concentration} = \frac{(A_x - A_0) \times 20.9}{(A_1 - A_0)} \times 100\%$$

3.5 Pin definition

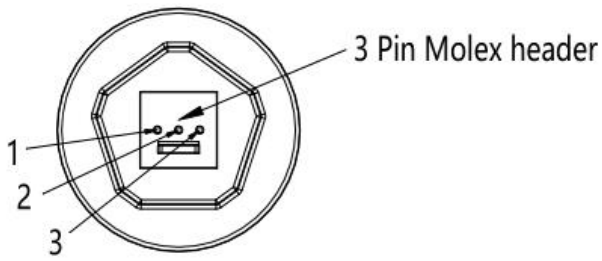

Figure 4. AO-02 pin definition diagram

The AO-02 oxygen sensor interface model is a Molex 3-pin connector. In Figure 4, pin 1 is the positive pin, and pins 2 and 3 are negative pins.

Warning and personal injury

Do not apply this product to safety protection devices or emergency stop equipment, and any other applications that may cause personal injury due to the product's failure. Do not use this product unless there is a special purpose or use authorization. Refer to the product datasheet and application guide before installing, handling, using or maintaining the product. Failure to follow this recommendation may result in death and serious personal injury.

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Description of warranty period

Product Category	Shelf Life
AO-02 oxygen sensor	12 months

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