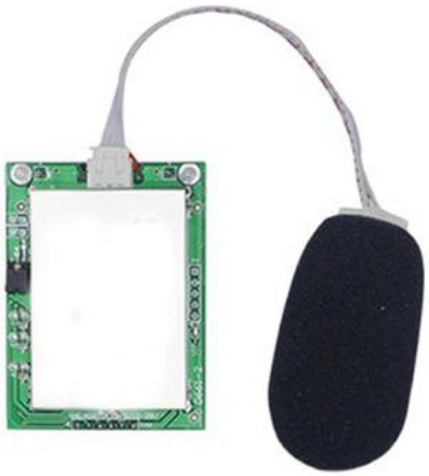
Industrial Noise Sensor (Analog Type)

User Manual



SN-ZS-BZ-V03

1.1 Product Overview

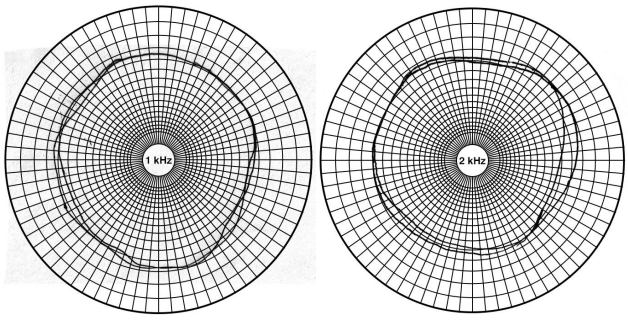
The industrial onboard noise module is mainly used for real-time on-site measurement of various types of noise, including environmental noise, traffic noise, workplace noise, construction noise, and social life noise. With this module, customers no longer need to worry about complex noise signal processing and can focus on their areas of expertise to create value for customers more quickly.

1.2 Features

- PCB board-mounted installation method.
- Wide measurement range of 30 to 130dBA and wide frequency range of 20 to 12.5 kHz.
- Uses a high-performance pre-polarized back-electret condenser microphone with a wide dynamic range and stable performance.
- Output interface: Analog 0-3V.
- Features two measurement modes—slow and fast—to meet different customer requirements.
- Power supply: 5 VDC or 12 VDC (selectable).

1.3 Main Parameters

Operating Voltage	4.5~5.5V (default) 10~28V (optional)
Power Consumption	18.9mA@5V 31.0mA@12V 27.8mA@24V
Transmitter Circuit Operating Temperature	-20°C to +60°C, 0%RH to 90%RH (no condensation)
Output Mode	Output voltage: 0~3V corresponds to 30~120dB
Measurement Range	30dB~130dB
Frequency Weighting	A weighting
Frequency Response Range	20Hz~12.5kHz

<table>
<tr><td rowspan="2">Response Time</td><td>Fast mode</td><td>500ms</td></tr>
<tr><td>Slow mode</td><td>1.5s</td></tr>
<tr><td>Stability</td><td colspan="2">Less than 2% during the usage period</td></tr>
<tr><td>Reference Calibration Point</td><td colspan="2">Calibrated at 94dB and 114dB, reference sound pressure 20uPa, frequency 1kHz</td></tr>
<tr><td>Noise Accuracy</td><td colspan="2">±0.5dB (at reference pitch, 94dB@1kHz)</td></tr>
<tr><td>Dust Cover Effect</td><td colspan="2">Within the range of 50 to 115 dB, the impact is ≤0.5 dB.
Within other ranges of the measurement range, the impact is ≤0.7 dB.</td></tr>
<tr><td>Working Environment</td><td colspan="2">Air temperature: -20 to +60°C
Static pressure: 65 kPa to 106 kPa
No strong mechanical vibrations, shocks, strong electromagnetic fields, or corrosive gases in the surrounding environment</td></tr>
<tr><td>Adjustment Data for Sound Pressure Response and Free Field Response</td><td colspan="2">The sound pressure response generated by the acoustic calibrator or the simulated sound pressure response generated by the electrostatic exciter can be obtained through the adjustment data in the table below to obtain the equivalent free field response.
<table>
<tr><th>Frequency/kHz</th><th>Natural Increase/dB</th><th>Frequency/kHz</th><th>Natural Increase/dB</th></tr>
<tr><td>1</td><td>0.2</td><td>6.3</td><td>2.2</td></tr>
<tr><td>1.25</td><td>0.3</td><td>8</td><td>3.4</td></tr>
<tr><td>1.6</td><td>0.4</td><td>10</td><td>5.0</td></tr>
<tr><td>2</td><td>0.5</td><td>12.5</td><td>6.2</td></tr>
<tr><td>2.5</td><td>0.7</td><td>16</td><td>7.6</td></tr>
<tr><td>3.15</td><td>0.9</td><td>18</td><td>8.4</td></tr>
<tr><td>4</td><td>1.3</td><td>20</td><td>9.0</td></tr>
<tr><td>5</td><td>1.8</td><td>—</td><td>—</td></tr>
</table></td></tr>
<tr><td>Directivity of the module at 1 kHz, 2 kHz, 4 kHz, and 8 kHz</td><td colspan="2"> 
</td></tr>
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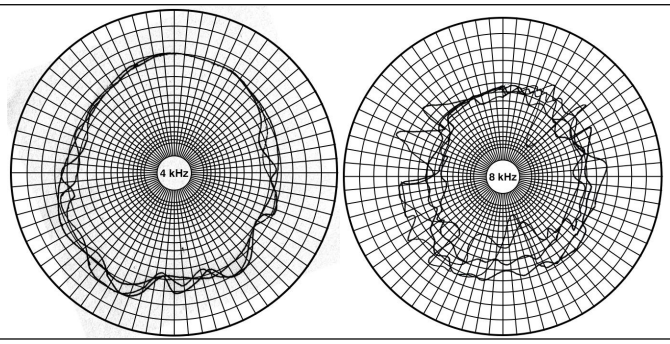
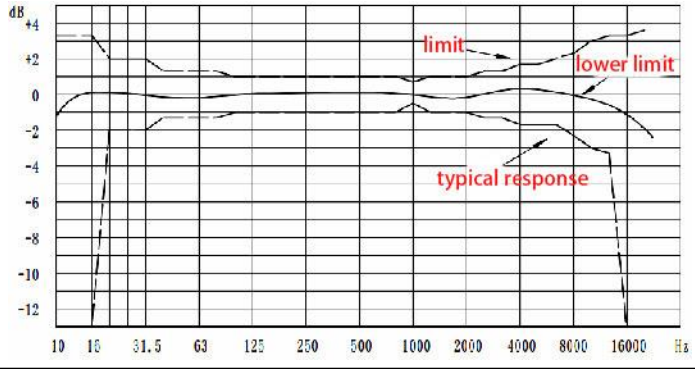
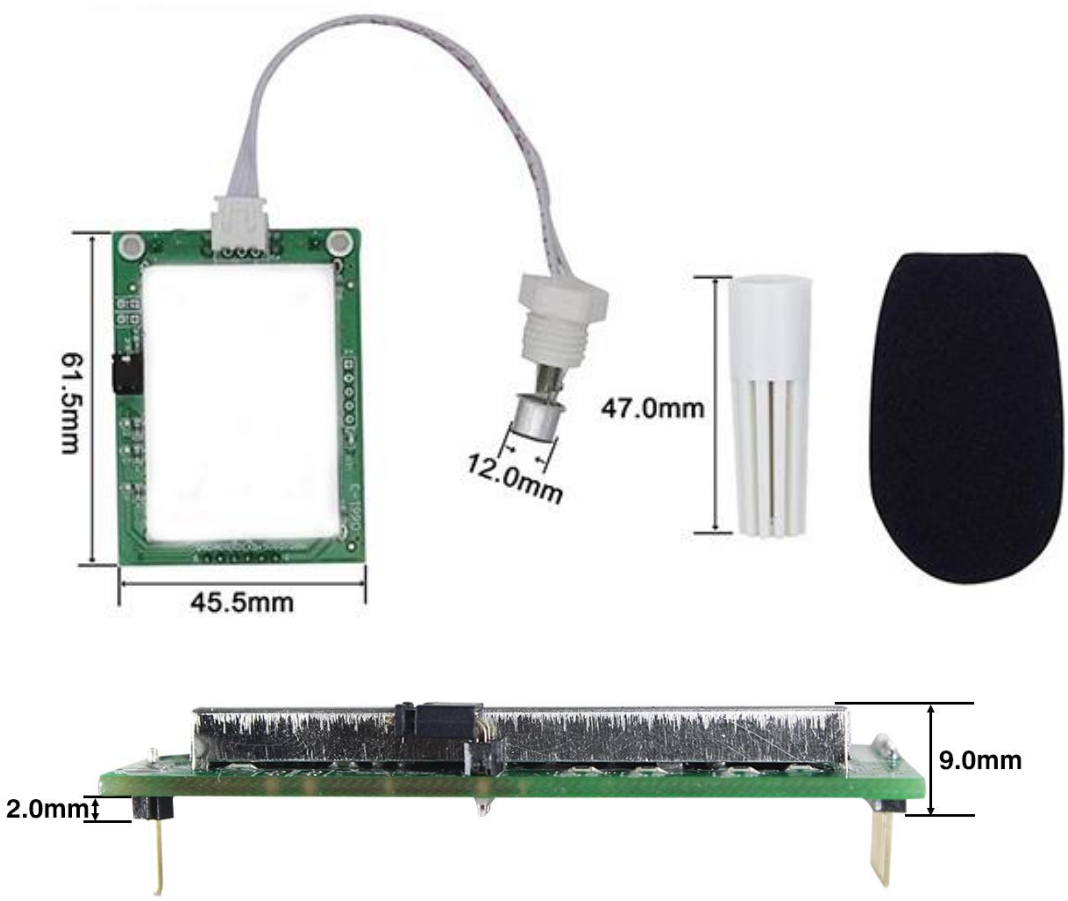
	
Electret Parameters	
Free-field Sensitivity	Approximately 8 mV/Pa (free field sensitivity level of -42 dB, with 1 V as reference)
Electret Capacitance	About 15pF
Typical Frequency Response	

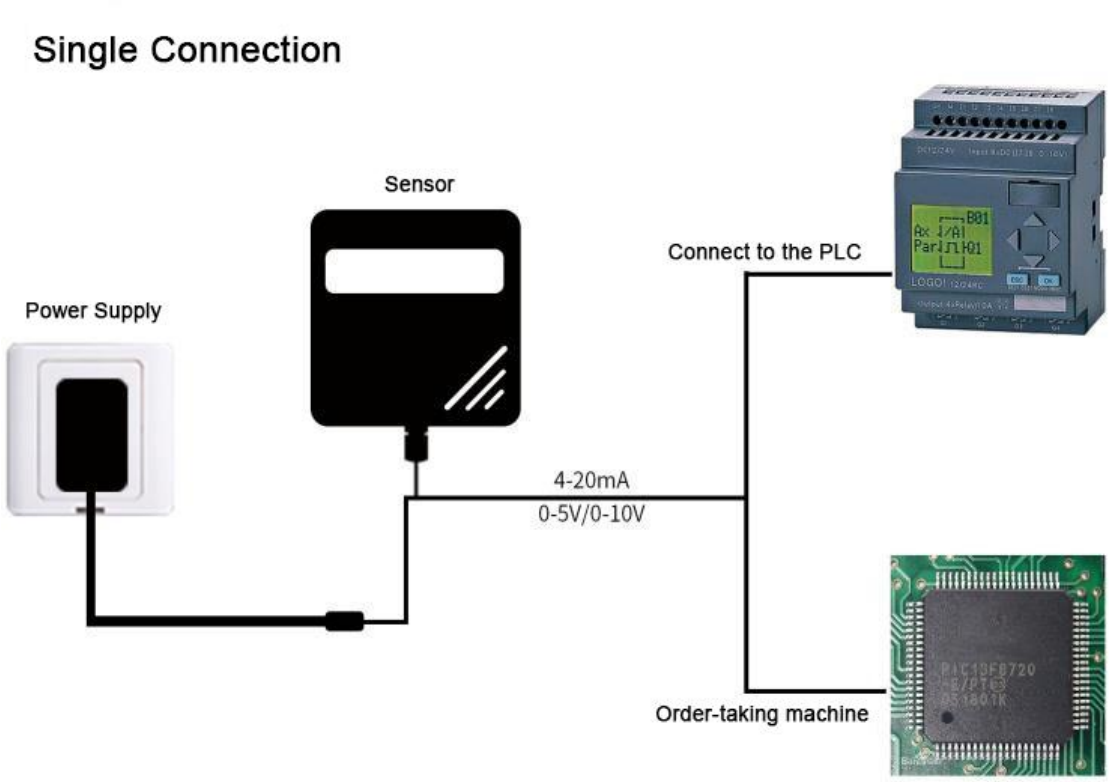
Dimension (unit: mm)



Note: The lead length of the sound probe is 10cm, and the recommended panel opening size is φ13mm if the sound probe is to be clamped.

1.4 System Framework Diagram

When the system needs to connect to an analog sensor, you only need to power the device and connect the analog output line to the DI interface of the microcontroller or PLC. Then, write the corresponding acquisition program according to the conversion relationship described later.



When the system needs to connect to multiple analog version sensors, each sensor must be connected to a different analog input port of the microcontroller or the DI interface of the PLC. Then, the corresponding acquisition program can be written according to the conversion relationship described in the following text.

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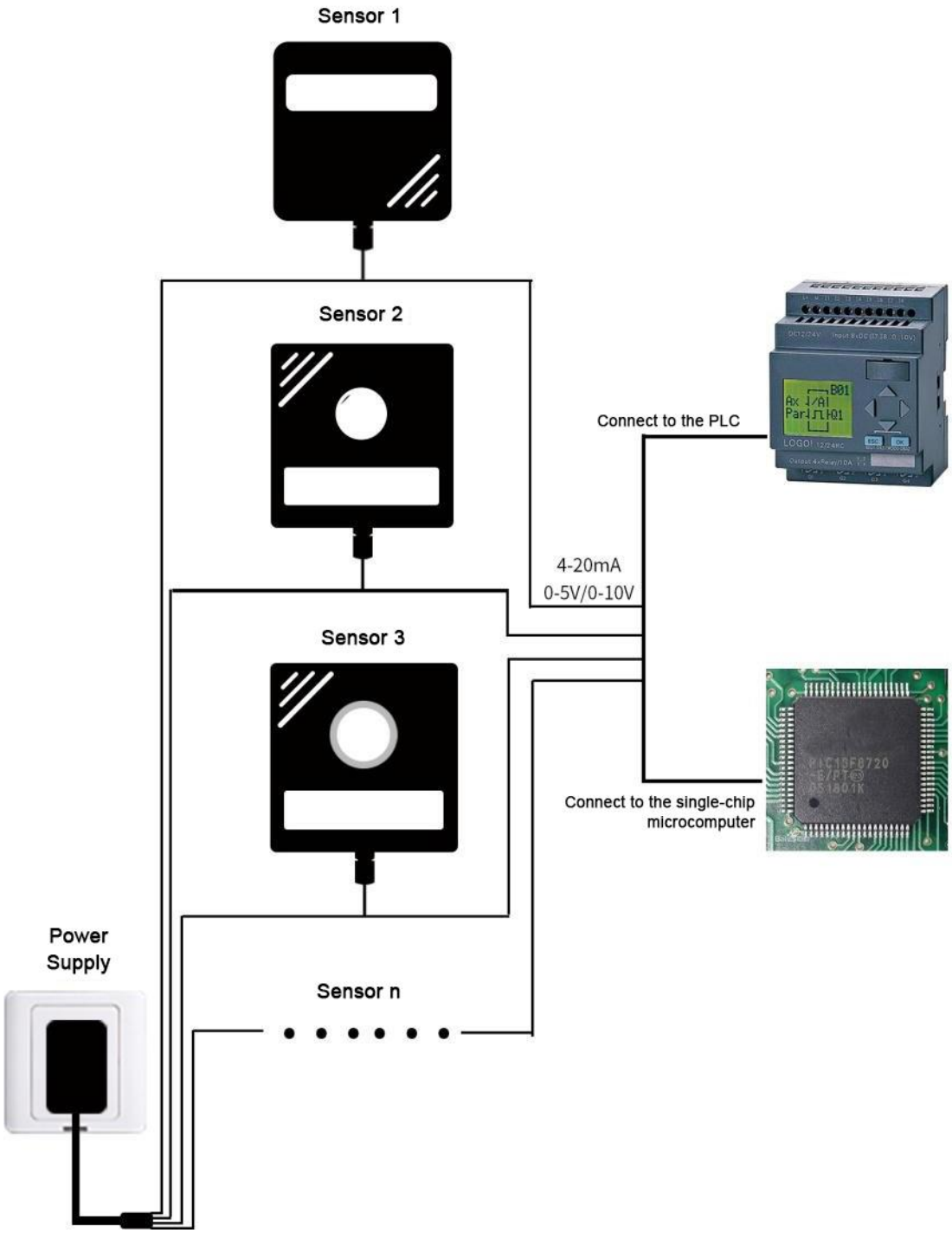
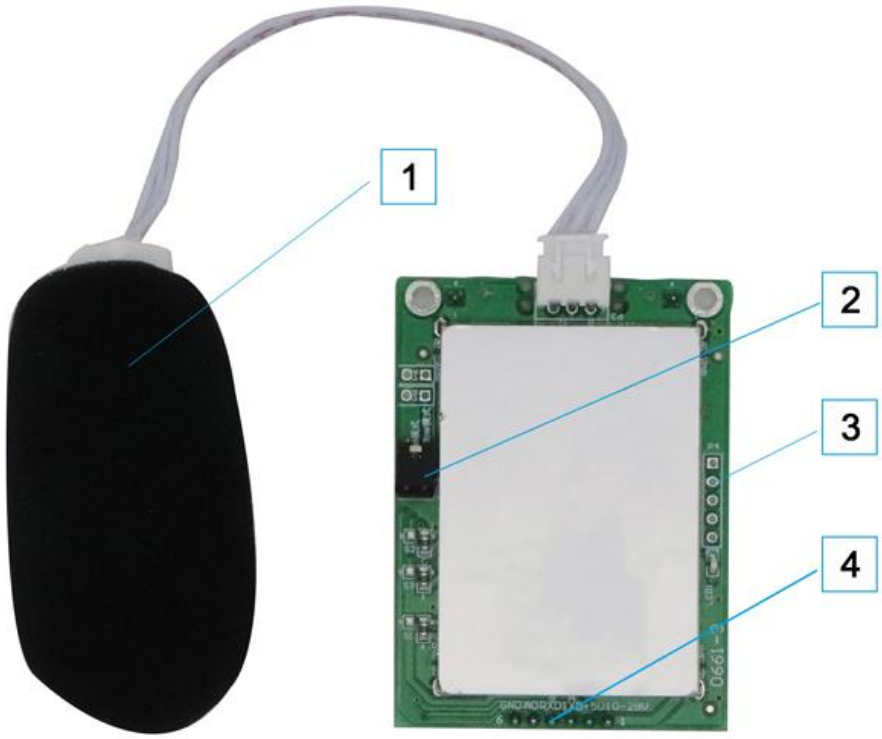
Connect more



Hardware Connection

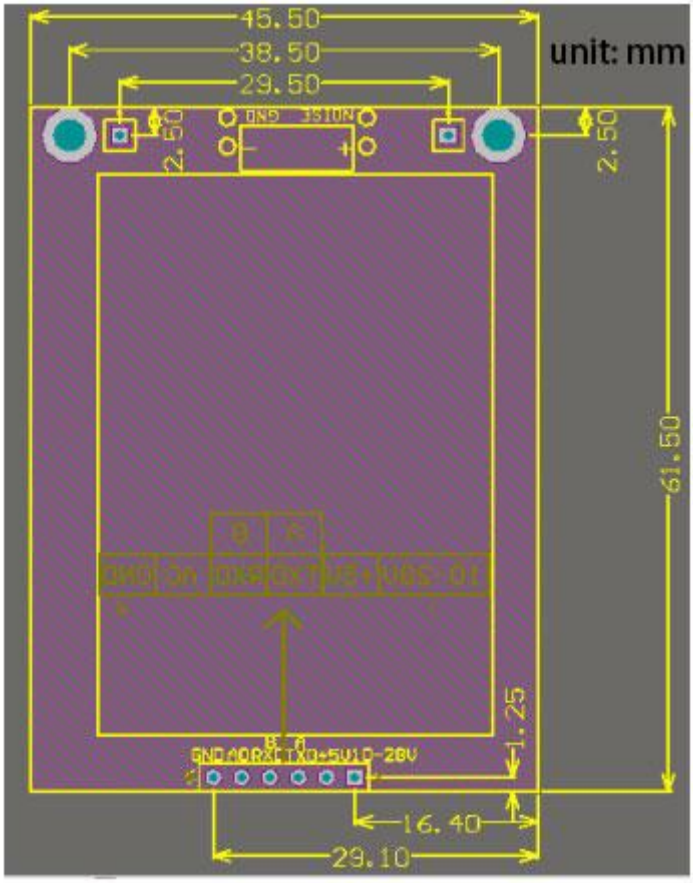
2.1 Device Definition



No.	Name	Description	
1	Sound Probe	Contains electret microphone, plastic sleeve, dust-proof cotton	
2	Mode Selection Terminal	When the jumper cap is short-circuited, it is in fast mode, and the noise update time is 500 ms. When not short-circuited, it is in slow mode, and the noise update time is 1.5s.	
3	Operation Indicator Light	Operation indicator light flashes once every 1s.	
4	Pin Number	Name	Description
	1	10-28V	10-28V power supply input
	2	+5V	5V power supply input
	5	AO	Analog signal output 0~3V
	6	GND	Negative terminal of power supply

2.2 Module PCB Package

The dimensions are as follows:
Please download the data package for the Altium Designer package file.



Meaning of Analog Parameters

3.1 Output Signal Conversion Calculation

Range: 30-130dB, 0-3V output. When the output signal is 2V, calculate the current noise value. The span of this temperature range is 100dB, expressed as a 3V voltage signal. 100dB/3V = 33.3dB/V, meaning that a voltage of 1V represents a noise change of 33.3dB. Measurement value: 2V. 2V*33.3dB/V = 66.6dB. 66.6 + 30 = 96.6dB. The current noise value is 96.6dB.