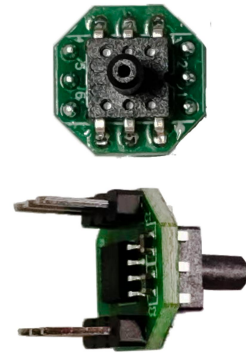


## Features 特色

- Factory Calibrated Pressure Sensor  
出厂全部参数校准
- Supply Voltage: 3.0V ~ 5.5V(Typical value 3.3V or 5V)  
供电电压:3.3V~5V(典型值 3.3V 或 5V)
- Simulation output voltage mode:Standard  
voltage output or proportional voltage output  
模拟输出电压模式: 标准电压输出或比例电压输出
- Operating Temperature Range: -30°C to +105°C  
工作温度范围: -30°C to +105°C
- Air Pressure Measuring Range:  
-100kPa.....0~1KPa.....1000KPa  
气压测量范围: -100KPa.....0KPa~1KPa.....1000KPa



## Applications 应用

- Industrial Equipment 工业设备
- Air Control Systems 气动控制系统
- Vacuum Systems 真空控制系统

## Pin Definition Explanation 引脚定义说明

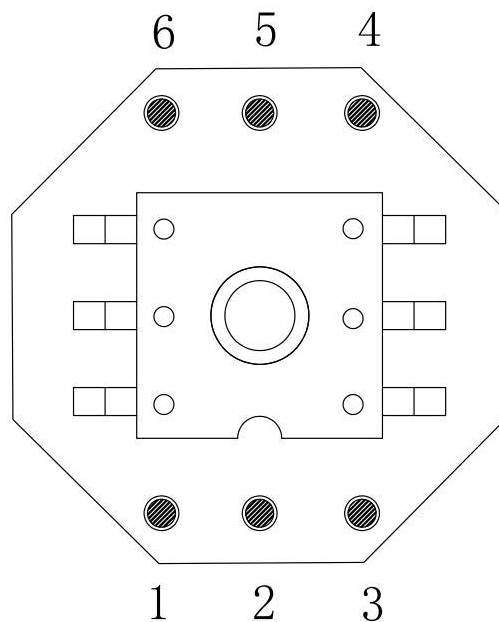


Fig1.Pin schematic diagram (top view)

图 1. 引脚示意图(俯视图)

表 1. 引脚对应关系

| Pin number<br>序号 | Description<br>描述 | Remarks<br>备注                  |
|------------------|-------------------|--------------------------------|
| 1                | NC                | Not connect 悬空引脚               |
| 2                | VDD               | Power supply 电源输入正极            |
| 3                | GND               | Ground 电源输入负极                  |
| 4                | VDD               | Power supply 电源输出正极            |
| 5                | Vout              | Output voltage signal 产品输出电压信号 |
| 6                | GND               | Ground 电源输入负极                  |

1. Before assembly, please confirm the electrical definition.

2. Do not make any electrical connections on the NC pins; otherwise, it may cause the product to malfunction.

2. NC 脚不要有任何的电气连接, 否则可能会造成产品功能失效

3. Take precautions against static electricity during the welding process.

### 3. 焊装过程中做好防静电保护

4. Overload voltage (6.5Vdc) may damage the circuit chips.

#### 4. 过载电压(6.5Vdc)可能烧毁电路芯片

5. Please add a 0.1uf capacitor between VDD and GND.

5. 请在 VDD 和 GND 之间加上 0.1uf 电容

6. This product does not have reverse connection protection. Please pay attention to the power polarity during assembly.

6. 本产品无反接保护，装配时请注意电源极性

### Sensor Function Block Diagram 传感器功能框图

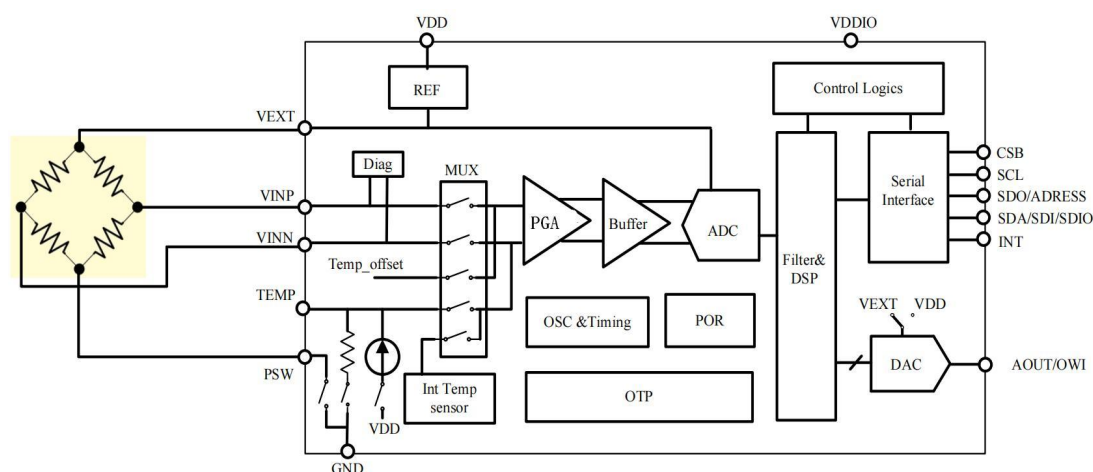


图 2: 传感器功能框图

## Product Description 产品描述

The MSY-200 pressure sensor adopts a DIP-like packaging form. On the two sides of the PCB board, there are SOP-encapsulated pressure sensing chips and signal processing circuit chips installed respectively. The offset, sensitivity, temperature drift and non-linearity of the sensor are digitally compensated with the power supply voltage as the reference, generating a calibrated and temperature-compensated standard voltage signal.

MSY-200 型压力传感器采用类 DIP 封装形式,PCB 板的 2 面分别安装有 SOP 封装的压力传感器芯片与信号处理电路芯片,对传感器的偏移、灵敏度、温漂和非线性进行数字补偿,以供电电压为参考,产生一个经过校准、温度补偿后的标准电压信号。

The MSY-200 pressure sensor has a sturdy structure and is easy to install. It can be calibrated to output signals according to user requirements and is widely used in medical electronics, automotive electronics, sports and fitness equipment, etc.

MSY-200 型压力传感器结构坚固、易安装,可根据用户要求标定输出信号,广泛用于医疗电子、汽车电子、运动健身器材等领域。

## functional description 功能描述

This product is manufactured based on advanced micro-electromechanical principles. Its core technologies include a MEMS pressure sensor chip based on the silicon piezoresistive effect and a high-performance signal conditioning ASIC chip. The silicon micro-piezoresistive MEMS pressure sensor chip, through a Wheatstone bridge composed of four strain-sensitive resistors, outputs a voltage signal proportional to the measured pressure. This signal is amplified, temperature compensated and linearized by the ASIC chip to obtain an output voltage that is in a prescribed relationship with the applied pressure.

本产品用先进的微机电原理制作,核心技术为基于硅压阻效应的 MEMS 压力传感器芯片和高性能的信号调理 ASIC 芯片,硅微压阻式 MEMS 压力传感器芯片通过四个应变敏感电阻构成的惠斯通电桥,输出与被测量压力成比例的电压信号,该信号被 ASIC 芯片放大、温度补偿和线性化,以获得与施加压力成规定关系的输出电压。

The linearization of the transfer function and temperature compensation are achieved by the digital processing circuit in the ASIC, through polynomial compensation algorithms and multiple point pressure calibration techniques at different temperatures, achieving high-precision pressure measurement over the entire operating temperature range.

传递函数的线性化和温度补偿由 ASIC 中的数字处理电路实现,通过多项式补偿算法和多个温度下的多点压力标定技术,实现了全工作温度范围内的高精度压力测量。

The transfer function of the pressure sensor is created by the following parameters:

- Minimum and maximum rated pressure
- Voltage values at minimum and maximum rated pressure
- Clamp voltage

All parameters required for the complete calibration algorithm (such as offset, gain, offset and gain's temperature coefficients, and linearization parameters) are determined and stored in the E<sup>2</sup>PROM inside the ASIC after calibration.

压力传感器的传递函数由以下参数创建:

- 最小和最大额定压力
- 最小和最大额定压力下的电压值
- 钳位电压

完整校准算法所需的所有参数(如偏移、增益、偏移和增益的温度系数以及线性化参数)在校准后确定并存储在 ASIC 内部的 E<sup>2</sup> PROM 中。

## Absolute Ratings 极限指标

All the indicators below were measured under the power supply voltage of  $(5 \pm 0.25)$  V DC and a temperature of 25°C.

以下所有指标均是在供电电压为  $(5 \pm 0.25)$  伏 DC 和温度为 25°C 的条件下测量得出的。

| Parameter<br>参数               | Symbol<br>符号      | Min.<br>最小值 | Typ.<br>典型值 | Max.<br>最大值 | Units<br>单位 |
|-------------------------------|-------------------|-------------|-------------|-------------|-------------|
| Supply Voltage 供电电压           | V <sub>DD</sub>   |             |             | 6.5         | V           |
| Output Load Current<br>输出电流负载 | I <sub>OL</sub>   |             |             | 5           | mA          |
| Operating Temperature<br>工作温度 | T <sub>OP</sub>   | -30         |             | 105         | °C          |
| Storage Temperature<br>储存温度   | T <sub>STOR</sub> | -40         |             | 125         | °C          |
| ESD protection<br>ESD 防护      | HBM               |             | ±2          |             | KV          |

## Sensor Performance Indicators 传感器性能指标

| Parameter<br>参数               | Symbol<br>符号      | Value<br>数值                | Units<br>单位 |
|-------------------------------|-------------------|----------------------------|-------------|
| Output signal voltage<br>输出信号 | V <sub>OUT</sub>  | 0.5~4.5(可定制)               | V           |
| Accuracy 精度*                  |                   | ±1.0                       | %Span       |
| Overload pressure<br>过载压力     | P <sub>OVER</sub> | 4x (量程≤60kPa)              | Rated       |
|                               |                   | 2.5x (60kPa < 量程 ≤ 200kPa) |             |
|                               |                   | 1.5x (量程 > 200kPa)         |             |
| breakdown pressure<br>破坏压力    | P <sub>BR</sub>   | 5x (量程≤60kPa)              |             |
|                               |                   | 3x (量程≤60kPa)              |             |
|                               |                   | 2x (量程≤60kPa)              |             |

|                                  |  |           |    |
|----------------------------------|--|-----------|----|
| Compensation temperature<br>补偿温度 |  | 0~60(可定制) | °C |
|----------------------------------|--|-----------|----|

\*The range is different, and so is the accuracy. 量程不同，精度不同。

## Sensor Electrical Parameters 传感器电气参数

| Parameter<br>参数                                          | Symbol<br>符号 | Conditions<br>条件 | Min.<br>最小值 | Typ.<br>典型值 | Max.<br>最大值 | Units<br>单位 |
|----------------------------------------------------------|--------------|------------------|-------------|-------------|-------------|-------------|
| Supply Voltage<br>供电电压                                   | $V_{DD}$     |                  | 3           |             | 5.5         | V           |
| Operation Current<br>工作电流                                | $I_{OP}$     |                  | -           | 1.8         | -           | mA          |
| Filter Capacitor<br>滤波电容                                 | $C_F$        |                  |             | 100         |             | nF          |
| PSRR 电源抑制比                                               | PSRR         |                  |             | 60          |             | dB          |
| Output Load Current<br>输出电流负载                            | $I_{OL}$     |                  |             |             | 5           | mA          |
| Input Common-mode<br>Signal Rejection Ratio<br>输入共模信号抑制比 | CMRR         |                  | 80          | 110         |             | dB          |
| Short Current limited<br>短路电流限制                          | $I_{SCL}$    |                  | 15          | 20          | 25          | mA          |
| Upper Pull-in<br>Clamping Voltage<br>上拉钳位电压              | $V_{UP}$     |                  | 3/4         |             | 1           | $V_{DD}$    |
| Pull-down Clamping<br>Voltage 下拉钳位电压                     | $V_{PD}$     |                  | 0           |             | 1/4         | $V_{DD}$    |

## Application Circuit Diagram 应用电路图

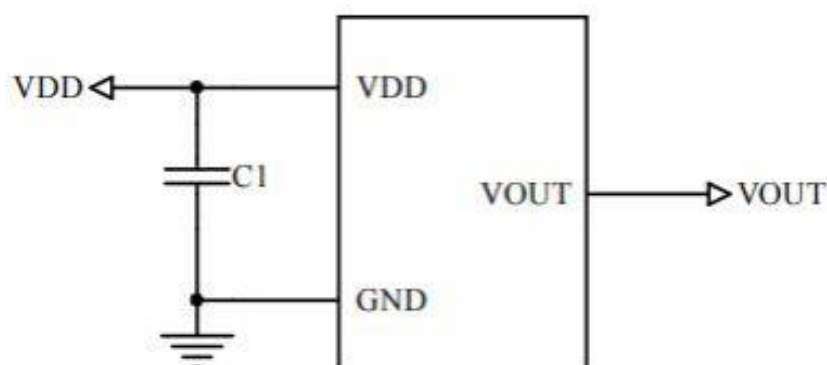


图 3: 芯片推荐应用电路

Note: The recommended value for C1 is 100nF.

注: C1 推荐值为 100nF

## Pressure Function 压力函数

The pressure sensor has been calibrated at the factory. The output signal of the sensor and the applied pressure have a linear transfer relationship as shown below.

压力传感器出厂时已经校准，传感器的输出信号与施加的压力之间具有如下所示的线性传递关系

Pressure sensor transfer function:  $V_{out} = (K * P + B)$ , where,

$V_{out}$  = Signal output voltage (V)

$P$  = Actual pressure (kPa)  $P1$  = Lower limit pressure (kPa)  $P2$  = Upper limit pressure (kPa)

$V_{out1}$  = Lower limit pressure output (V)  $V_{out2}$  = Upper limit pressure output (V)

$K = (V_{out2} - V_{out1}) / (P2 - P1)$

$B = (V_{out1} * P2 - V_{out2} * P1) / (P2 - P1)$

压力传感器传递函数:  $V_{out} = (K * P + B)$  其中,

$V_{out}$  = 信号输出电压 (V)

$P$  = 实际压力 (kPa)  $P1$  = 下限压力(kPa)

$P2$  = 上限压力(kPa)

$V_{out1}$  = 下限压力输出(V)

$V_{out2}$  = 上限压力输出(V)

$K = (V_{out2} - V_{out1}) / (P2 - P1)$

$B = (V_{out1} * P2 - V_{out2} * P1) / (P2 - P1)$

The transmission characteristics of the pressure sensor are shown in Figure 3 as follows:

压力传感器的传递特性如下图 3 所示:

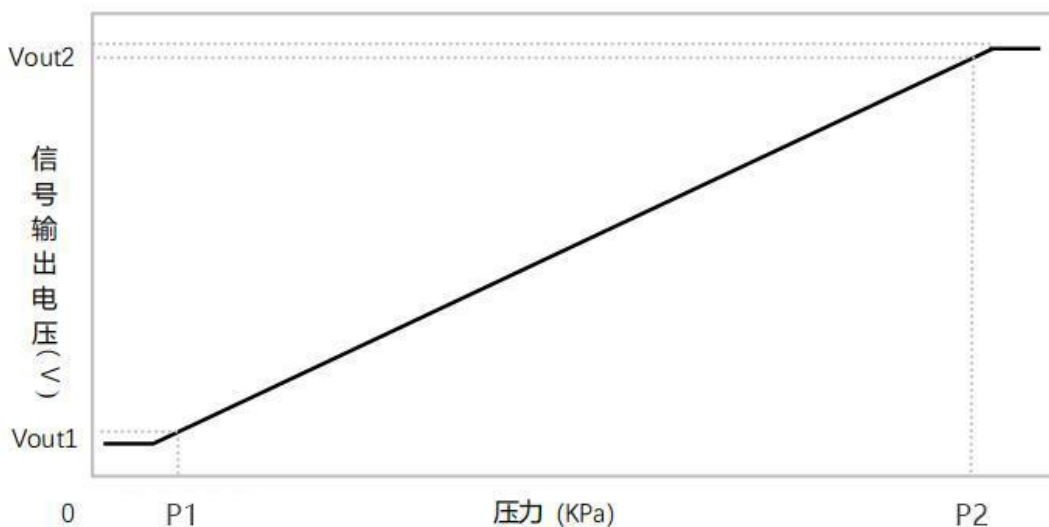


Fig4: Voltage output curve

图 4: 电压输出曲线

## Precision 精度

The accuracy of the MSY-200 pressure sensor is composed of its linear error, repeatability error and hysteresis error. The value calculated using the transfer function is the specified value of the sensor, which is also the theoretical value. The error of the sensor is the difference between the actual output voltage value of the sensor under the specified input pressure and the specified output voltage value.

MSY-200 压力传感器的精度受由其线性、重复性、迟滞的误差组成。用传递函数计算的值是传感器的规定值，也是理论值。传感器的误差等于传感器在规定输入压力下的实际输出电压值与规定的输出电压值的差值。

## composition error 综合误差

The comprehensive error is based on the product's accuracy and also includes more error sources:

综合误差在产品的精度基础上，还包括更多的误差源：

**Pressure drift:** The output voltage at the zero point and full scale within the specified pressure range, and the deviation between the actual output voltage and the specified output voltage.

压力漂移：指定压力范围内，零点和满量程的实际输出电压和规定输出电压的输出偏差。

**Temperature effect:** The output deviation at the zero point and full scale under different temperatures within the temperature range.

温度效应：在温度范围内的，零点和满量程在不同温度下的输出偏差。

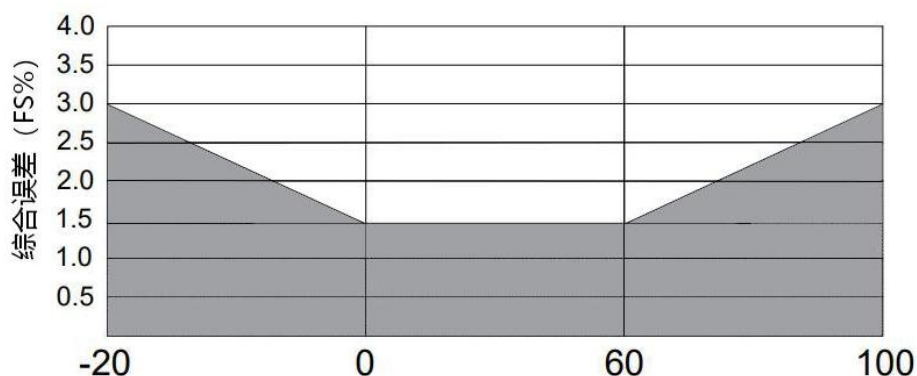
The comprehensive error is represented by an error band, which consists of three line segments. The data is shown in Figure 4 and Table 2.

综合误差采用误差带表示，该误差带由三段线段组成，数据如图 4 和表 2 所示。

Table 2 Comprehensive Error 表 2 综合误差

| Temperature 温度(°C) | Comprehensive Error 综合误差(Fs) |
|--------------------|------------------------------|
| -20~100            | ±3.0%                        |
| 0~60               | ±1.5%                        |

Fig5 Comprehensive Error versus temperature 图 5 综合误差与温度关系

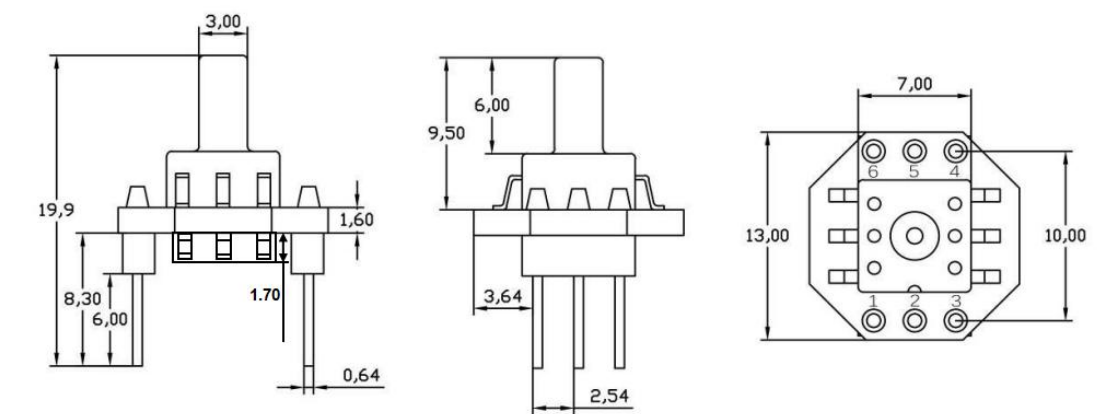




## Package and Assembly 包装与组装

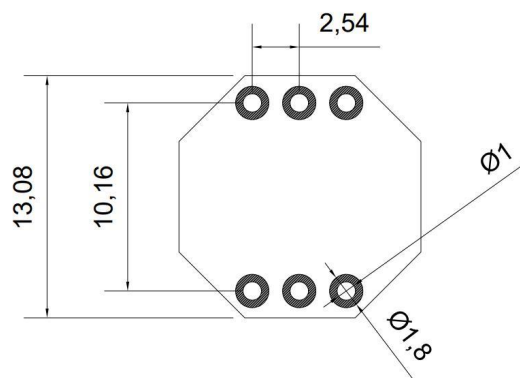
Fig6 Outline Drawing(The unspecified tolerance is  $\pm 0.2\text{mm}$ ,unit:mm)

图 6 外形尺寸图(未标明公差 $\pm 0.2\text{mm}$ , 单位: mm)



**Fig 7 Suggested pad size diagram**

图 7 建议焊盘尺寸图





## Pipe material information(Unit:mm)

### 料管信息(单位为:毫米)

Fig 9 Material cross-sectional diagram

图 9.物料截面示意图

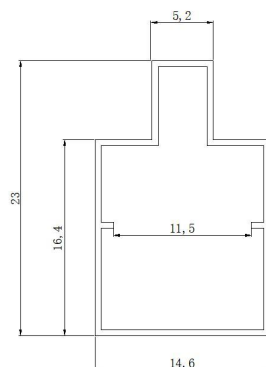


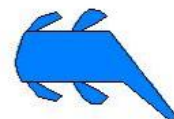
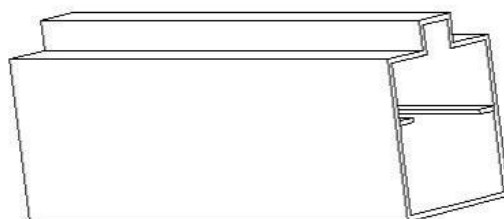
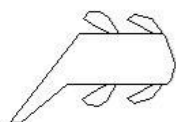
Fig 9 Packaging schemes diagram

图 9 包装示意图

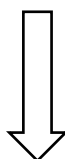
White stopper  
白色塞子

Product Mark Direction →  
产品 mark 朝向 →

Blue stopper  
蓝色塞子



(520mm x 24.6mm x 23mm, 38pcs)



(纸盒 530mm x 145mm x 53mm, 760pcs)

## Selection Guide 选型指南

MS Y-200-040K W 50 1 F01

|          |                                                                                                                                  |
|----------|----------------------------------------------------------------------------------------------------------------------------------|
| MS       | Maspower                                                                                                                         |
| Y        | 传感器                                                                                                                              |
| 200      | 输出类型 200: 模拟输出, 100: IIC 通讯                                                                                                      |
| A        | 最终量程匹配: A:不完全匹配 空白: 完全匹配                                                                                                         |
| 040K     | 压力量程: 040 表示所测压力数值 (含 0~40, -40~0, -40~40)<br>压力单位: <b>K</b> : KPa <b>M</b> :MPa                                                 |
| P        | 压力类型:<br><b>P</b> : 正压(如 0~40) <b>N</b> : 负压 (如-40~0) <b>W</b> : 负压到正压(如-40~40)<br>故 040KW 表示 -40KPa 到 40KPa 的测量压力               |
| 50       | 供电 <b>50</b> :5Vdc <b>33</b> :3.3Vdc                                                                                             |
| 1        | 输出 <b>K</b> :0.5~4.5V <b>Z</b> : 0.2~2.7V <b>H</b> :0.2~4.7V<br><b>E</b> : 比例电压输出 (型号后备注输出电压范围)<br><b>T</b> : 定制输出 (型号后备注输出电压范围) |
| F01(附属项) | 包装方式 F01:料管                                                                                                                      |
| XXX(如有)  | 定制项                                                                                                                              |

## Commonly used range models 常用量程型号

| 压力范围    | 供电/输出/包装           | 型号                   |
|---------|--------------------|----------------------|
| 0~3kPa  | 5V/0.5~4.5V/料管包装   | MSY-200-003KP50K F01 |
| 0~3kPa  | 3.3V/0.2~2.7V/料管包装 | MSY-200-003KP33Z F01 |
| 0~5kPa  | 5V/0.5~4.5V/料管包装   | MSY-200-005KP50K F01 |
| 0~5kPa  | 3.3V/0.2~2.7V/料管包装 | MSY-200-005KP33Z F01 |
| 0~10kPa | 5V/0.5~4.5V/料管包装   | MSY-200-010KP50K F01 |
| 0~20kPa | 5V/0.5~4.5V/料管包装   | MSY-200-020KP50K F01 |
| 0~20kPa | 3.3V/0.2~2.7V/料管包装 | MSY-200-020KP33Z F01 |
| 0~40kPa | 5V/0.5~4.5V/料管包装   | MSY-200-040KP50K F01 |

|               |                       |                          |
|---------------|-----------------------|--------------------------|
| 0~40kPa       | 3.3V/0.2~2.7V/料管包装    | MSY-200-040KP33Z F01     |
| 0~100kPa      | 5V/0.5~4.5V/料管包装      | MSY-200-101KP50K F01     |
| 0~100kPa      | 3.3V/0.2~2.7V/料管包装    | MSY-200-101KP33Z F01     |
| 0~200kPa      | 5V/0.5~4.5V/料管包装      | MSY-200-201KP50K F01     |
| 0~500kPa      | 5V/0.5~4.5V/料管包装      | MSY-200-501KP50K F01     |
| 0~500kPa      | 3.3V/0.2~2.7V/料管包装    | MSY-200-501KP33Z F01     |
| 0~700kPa      | 5V/0.5~4.5V/料管包装      | MSY-200-701KP50K F01     |
| 0~700kPa      | 3.3V/0.2~2.7V/料管包装    | MSY-200-701KP33Z F01     |
| 0~1000kPa     | 5V/0.5~4.5V/料管包装      | MSY-200-001MP50K F01     |
| 0~1000kPa     | 3.3V/0.2~2.7V/料管包装    | MSY-200-001MP33Z F01     |
| 0~1500kPa     | 3.3V/0.2~2.7V/料管包装    | MSY-200-1.5MP33Z F01     |
| -20~0kPa      | 5V/0.5~4.5V/料管包装      | MSY-200-020KN50K F01     |
| -30~0kPa      | 3.3V/0.2~2.7V/料管包装    | MSY-200-030KN33Z F01     |
| -100~0kPa     | 5V/0.5~4.5V/料管包装      | MSY-200-101KN50K F01     |
| -100~0kPa     | 3.3V/0.2~2.7V/料管包装    | MSY-200-101KN33Z F01     |
| -100~0kPa     | 5V/4.5~0.5V 定制输出/料管包装 | MSY-200-101KN50T4505 F01 |
| -100~0kPa     | 5V/4.7~0.2V 定制输出/料管包装 | MSY-200-101KN50T4702 F01 |
| -1~1kPa       | 5V/0.5~4.5V/料管包装      | MSY-200-001KW50K F01     |
| -5~5kPa       | 5V/0.5~4.5V/料管包装      | MSY-200-005KW50K F01     |
| -10~10kPa     | 5V/0.5~4.5V/料管包装      | MSY-200-010KW50K F01     |
| -10~10kPa     | 3.3V/0.2~2.7V/料管包装    | MSY-200-010KW33Z F01     |
| -40~40kPa     | 5V/0.5~4.5V/料管包装      | MSY-200-040KW50K F01     |
| -60~60kPa     | 5V/0.5~4.5V/料管包装      | MSY-200-060KW50K F01     |
| -100~100kPa   | 5V/0.5~4.5V/料管包装      | MSY-200-101KW50K F01     |
| -100~300kPa   | 5V/0.5~4.5V/料管包装      | MSY-200-301KW50K F01     |
| -100~300kPa   | 3.3V/0.2~2.7V/料管包装    | MSY-200-301KW33Z F01     |
| -100~500kPa   | 5V/0.5~4.5V/料管包装      | MSY-200-501KW50K F01     |
| -100~700kPa   | 5V/0.5~4.5V/料管包装      | MSY-200-701KW50K F01     |
| -100~1000kPa  | 5V/0.5~4.5V/料管包装      | MSY-200-001MW50K F01     |
| 更多定制量程,请咨询制造商 |                       |                          |

## Caution 使用注意事项

### 1. Soldering 焊接

Since this product has a relatively small heat capacity and a compact structure, please minimize the influence of external heat as much as possible. Otherwise, it may suffer from thermal deformation and become damaged, leading to changes in its properties. Please use non-corrosive rosin-based soldering flux. Additionally, since the product is exposed to the air, please be careful not to allow the soldering flux to penetrate into the interior.

由于本产品为热容量较小的小型构造，因此请尽量减少来自外部的热量的影响。否则可能会因热变形而造成破损，引起特性变动。请使用非腐蚀性的松香型助焊剂。另外，由于产品暴露在外，因此请注意不要使助焊剂侵入内部。

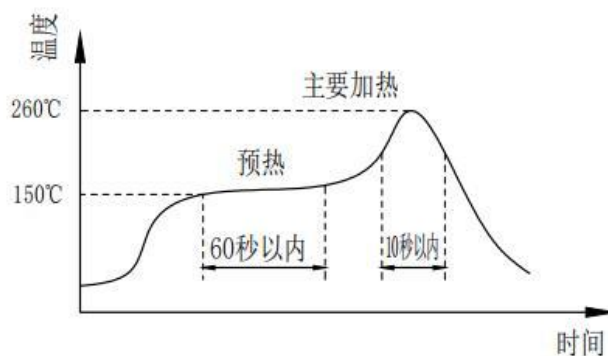
#### 1) Manual soldering 手工焊接

- Please perform the operation using an electric soldering iron with a head temperature ranging from 260 to 300 °C (30 W) within 5 seconds.
- 请使用头部温度在 260 ~ 300 °C (30 W) 的电烙铁 在 5 秒以内实施作业。
- When applying load for soldering on the terminals, note that the output may change, so please be cautious.
- 在端子上施加负载进行焊接的情况下，由于输出可能会发生变化，因此请注意
- Please keep the soldering iron tip clean.
- 请保持电烙铁头洁净。

#### 2) Reflow soldering (SMD terminal type) 回流焊接(SMD 端子型)

The recommended temperature settings for the reflux furnace are as follows:

推荐的回流炉温度设置条件如下所示



3) The warpage of the printed board relative to the entire sensor should be kept below 0.05mm. Please manage this.

印刷板的翘度相对于整个传感器应保持在 0.05mm 以下，请对此进行管理。

4) After installing the sensor, when cutting and bending the substrate, be careful not to cause stress at the welding part.

安装传感器后，对基板进行切割弯折时，请注意不要使焊接部产生应力。

5) Since the terminals of the sensor are of an exposed construction, touching the touch terminals with metal sheets or hands will cause output abnormalities. Please do not touch with metal sheets or hands, etc.

由于传感器的端子为外露构造，因此金属片等触摸端子后，会引发输出异常。请注意不要用金属片或者手等触摸。

6) After welding, when applying the coating to prevent the insulation of the substrate from deteriorating, please be careful not to allow the agent to be attached to the sensor.

焊接后，为了防止基板的绝缘恶化而实施涂层时，请注意不要使传感器上面附着药剂。

## **2. Cleaning Requirements 清洗要求**

1) Since the product is of an open type, please be careful not to allow the cleaning solution to enter the interior.

由于产品为开放型,因此请注意不要使清洗液侵入内部。

2) When using ultrasonic waves for cleaning, it may cause the product to malfunction. Therefore, please avoid using ultrasonic waves for cleaning

使用超声波进行清洗时，可能会使产品发生故障，因此请避免使用超声波进行清洗。

## **3. Storage and Transportation 存储与运输**

1) This product is not designed to be water-resistant. Therefore, please do not use it in places where water or other liquids may splash.

本产品为非防滴构造，因此请勿在可能溅到水等的场所中使用。

2) Do not use in an environment where condensation may form. Additionally, if moisture adheres to the sensor chip and freezes, it may cause fluctuations in the sensor's output or even damage the sensor.

请勿在产生凝露的环境中使用。另外,附着在传感器芯片上的水分冻结后，可能会造成传感器输出的变动或者破坏。

3) Once the chip of the pressure sensor comes into contact with light, its output will change. Especially when pressure is applied through transparent covers or other means, please avoid allowing light to reach the sensor's chip.

压力传感器的芯片在构造上接触到光后,输出会发生变动。尤其是通过透明套等施加压力时,请避免使光接触到传感器的芯片。

4) The pressure sensor in normal packaging can be transported using ordinary conveying tools. Please note: During transportation, the product must be protected from moisture, impact, sun exposure and pressure.

正常包装的压力传感器可通过普通输送工具运输。请注意：产品在运输过程中防止潮湿、冲击、晒伤和压力。

## **4. Other Usage Notes 其他使用注意事项**

1) If the installation method is incorrect, it may cause an accident. Therefore, please be careful. 安装方法错误时，会造成事故，因此请注意。

2) Please avoid using methods that apply high-frequency vibrations, such as ultrasonic waves. 请避免采用超声波等施加高频振动的使用方法。

3) The only pressure medium that can be directly used is dry and non-corrosive gas. Any other medium, especially corrosive ones and those containing moisture or foreign substances, will cause malfunctions and damage. Therefore, please avoid using it in the aforementioned environments.

能够直接使用的压力媒介仅为干燥无腐蚀性气体，除此以外的媒介，尤其是在腐蚀性介质和含有水分、异物的媒介中使用时，会造成故障和破损，因此请避免在上述环境中使用。

4) Inside the pressure inlet, there is a pressure sensor chip. If any foreign object such as a needle is inserted into the pressure inlet, it will cause damage to the chip and blockage of the inlet. Therefore, please absolutely avoid performing such an operation.

压力导入口的内部配置有压力传感器芯片。从压力导入口插入针等异物后,会造成芯片破损和导入口堵塞,因此请绝对避免上述操作。

5) Regarding the use of pressure, please operate within the rated pressure range. Using it outside this range will cause damage.

关于使用压力,请在额定压力的范围内使用。在范围外使用时,会造成破损。

6) Due to the possibility of damage caused by static electricity, please pay attention to the following points when using it.

由于可能因静电而造成破坏,因此使用时请注意以下事项。

Please ground the electrified objects on the table and the workers themselves to ensure that the static electricity around is safely discharged.

请将桌子上的带电物,作业人员接地,以使周围的静电安全放电。

If you have any questions, please feel free to contact us.

如有疑问, 敬请垂询

### **Safety Precautions    安全注意事项**

This product is manufactured using semiconductor components commonly found in electronic devices (communication equipment, measuring devices, work machinery, etc.). Products using these semiconductor components may malfunction or fail due to external interference and surges. Therefore, please confirm the performance and quality under actual usage conditions. To ensure safety, please perform safety design on the device (installation of fuse, circuit breaker, protection circuits, device multiplexing, etc.), so that even if there is a malfunction, it will not cause injury, damage to the body, or loss of property. To prevent injuries and accidents, please strictly follow the following instructions: 本产品是使用一般电子设备用(通信设备,测量设备,工作机械等)的半导体部品而制成的。使用这些半导体部品的产品,可能会因外来干扰和浪涌而发生误动作和故障,因此请在实际使用状态下确认性能及品质。为以防万一,请在装置上进行安全设计(保险丝,断路器等保护电路的设置,装置多重化等),一旦发生误动作也不会侵害生命,身体,财产等。为防止受伤及事故的发生,请务必遵守以下事项:

1. The driving current and voltage should be used below the rated values.驱动电流和电压应在额定值以下使用。

2. Please connect the wires according to the electrical specifications. Especially after reversing the connection of the power supply, there is a risk of circuit damage such as overheating, smoke emission, and fire, which may lead to accidents. Therefore, please pay attention to this.请按照电气定义进行接线。特别是对电源进行逆连接后,会因发热,冒烟,着火等电路损伤引发事故,因此敬请注意。

3. When fixing the product and connecting the pressure inlet, please be very careful.

对产品进行固定和对压力导入口进行连接时请慎重。