

# 说明书

## User Manual



ZMJ60V  
气体一二次融合  
密度继电器

ZMJ60V  
Gas Primary And Secondary  
Fusion Density Monitor

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## 1. 安全提示 Safety tips



在安装、启动和操作此仪表时，必须遵守相应国际安全规范，所有的工作必须在无电压状态进行。如果不按规程程序操作，会造成严重的人身伤害或财产损失。只有经过专业培训的人员可以调装此仪表。

During installation, startup and operation of this instrument, all relevant international safety codes must be obeyed and all the work must be conducted under the voltage-free status. Failure to comply with specific instructions may cause severe injury or property damage. Only professionally trained personnel can debug or install this instrument.

## 2. 一般性提示 Common tips

### A. 功能原理

#### Working principle

气体一二次融合密度继电器是改型的电接点压力表，气体一二次融合密度继电器实现了测量和开关功能的一体化，并具有在不拆卸表计的情况下，进行校验表计、气室补气的功能。温度对气体密度的影响由一个补偿系统平衡，气体一二次融合密度继电器是针对每一个设备特殊设计的(气体的纯度,气体混合比例,校验压力,开关点...)

The gas primary and secondary fusion density monitor is a modified electric contact pressure gauge. The gas primary and secondary fusion density monitor realizes the integration of measurement and switching functions, and has the function of calibrating the meter and supplementing air in the air chamber without disassembling the meter. The influence of temperature on gas density is balanced by a compensation system. The primary and secondary gas fusion density monitor is specially designed for each equipment (gas purity, gas mixing ratio, calibration pressure, switching point...)

## B. 使用前检测

### Test before use

在运输或仓储过程中，可能使气体密度继电器变冷或变热，当温度不等于参考温度(20°C)时指针会动，这种现象是正常的，因为是温度补偿系统在工作。

During transportation or warehousing, gas density monitor may become cold or hot. When the temperature is not equal to reference temperature (20°C), the pointer will move, which shows the temperature compensation system is working.

为了确定气体密度继电器与周围温度是否适应，必须在温度是  $20 \pm 1^\circ\text{C}$  环境下，恒温至少 2 个小时，这样指针才能指示到允许的误差范围内。

To determine whether the gas density monitor is suitable for the ambient temperature, the temperature must be kept constant for at least 2 hours at  $20 \pm 1^\circ\text{C}$ , so that the pointer can indicate to the allowable error range.

## C. 零位补偿区域

### Zero compensation area

密度继电器带有零位补偿区域，仪表指针在无压力状态下，因为温度的升高或降低，会在零位补偿区域摆动，例如:60°C指针指示在低于零位的零位补偿区域下边缘，从而简单的测量出温度补偿值，当仪表温度降低，指针将移向零位补偿区域的正值区域。

Density monitor of this model has a zero compensation area. In the pressure-free state, the pointer swings within the zero compensation area due to temperature rise or fall. For instance: 60°C pointer stays at the lower edge of zero compensation area below zero position and the temperature compensation value can be calculated in a simple way. When the instrument temperature falls, the pointer will move to a positive value of zero compensation area.

## 3. 报警功能点 Alarm functional points

磁助式电接点也就是辅助电源开关，整个电源回路是通过开关实际值指针带动的触点臂达到预先设定的极限值时断开或接通。

Magnetic snap-action contact is also auxiliary power switch. The entire power circuit is disconnected or connected by activating the contact when the preset limit value is reached through internal mechanical mechanism.

#### 4. 在线校验、在线补气功能

##### Online calibration and online air supplement function

为满足国网相关要求，该产品在原有的密度继电器的基础上，增加了校验、补气接口。实现了能在不拆卸密度继电器的情况下对当前工作的密度继电器进行在线校验，并且可以对气室进行补气。

In order to meet the relevant requirements of the State Grid, the product adds calibration and air supply interfaces on the basis of the original density monitor. It realizes the online calibration of the current density monitor without disassembling the density monitor, and can supplement air to the air chamber.

#### 5. 安装 Installation

##### A. 机械接口

##### Mechanical interface

一般仪表常用的技术性规范这里也适用 (如:En837-2)，旋转安装时所用的力不允许直接作用到表壳或接线盒上，而是通过合适的工具作用到扳手面上。

Technical codes (e.g., En837-2) applicable to ordinary instrumentation also apply here. The force applied for rotation installation shall not directly act upon the instrument housing or terminal box but act upon the wrenching face through a suitable tool.



##### B. 电气接口

##### Electrical interface

接线必须由经过专业培训的人员操作。接线分布及其功能都在仪表接口处给出。规定供电电线必须考虑仪表的上限电流需求量并符合 IEC227 或 IEC245 标准。

The wirings shall be performed by professionally trained personnel. Wiring distribution and switching functions are displayed on the instrument type plate with terminal binding posts and ground pole also indicated. The specifications of power line must allow for the upper limit current requirement of the instrument and comply with IEC227 or IEC245.

## 6. 使用和维护 Use and maintenance

密度继电器应垂直安装。用在室外的密度继电器应避免阳光直射到仪表上，考虑在仪表上加装防护罩。

Density monitor shall be installed upright. For a gas density monitor used outdoors, direct exposure to sunlight is not allowed, and it is advisable to use a shield.

密度继电器安装部位应能较真实地反映设备内气体的温度。

Density monitor shall be erected at a proper position to reflect the temperature of gas in relevant equipment.

用肥皂水浸湿的抹布清洁仪表，要清洁接线盒或插头时要先把电源断开，再接通电源前确保所有部件不潮湿。

Clean the instrument with a wiping cloth soaked in soap water. Cut off the power supply before cleaning the terminal box or plugs. Make sure that all components are dry before turning on the power again.

## 7. 技术参数 Technical parameters

### A. 一般参数

#### General parameters

外形尺寸 External dimension	φ64mm
量程范围 Measuring range	依据用户要求定制 Customized
测量介质 Measuring medium	SF <sub>6</sub> 、Air、N <sub>2</sub> 、SF <sub>6</sub> +N <sub>2</sub> 等气体 SF <sub>6</sub> 、Air、N <sub>2</sub> 、SF <sub>6</sub> +N <sub>2</sub> etc.

测量精度 Measuring precision	±1.5%FS (+20±1°C), 可选 (options) ±1.0%FS (+20±1°C) ; ±2.5%FS (-20°C~+60°C) (气态) (gas phase)
抗振性能 Seismic performance	10m/s <sup>2</sup>
抗冲击性能 Shock performance	30g
接点电气参数 Contact capacity	AC380V/DC220V, 30VA 电流1.0A (上限) /Current 1.0A (upper limit)
电接点材料 Material of contact	银镍合金, 镀金处理 Silver-nickel, gold-plated
工作环境 Working environment	-20°C~+60°C 相对湿度 (relative humidity) ≤95 %RH 可选 (options) -40°C~+60°C
压力范围 Pressure range	依据用户要求定制 Customized
防护等级 Protection grade	IP 65
密封性能 Sealing performance	气路(Measuring system): ≤1X10 <sup>-9</sup> Pa·m <sup>3</sup> /s
开关点数量 Quantity of switch points	上限3组 Upper 3 groups
开关动作点 Switch action points	依据用户要求定制 Customized
外壳材质 Casing material	304不锈钢 SUS304
感压元件 Pressure sensing element	波登管 Bourdon tube
压力接口 Pressure interface	依据用户要求定制 Customized
电气接口 Electrical interface	依据用户要求定制 Customized

## B. 电气性能

### Electrical properties

绝缘电阻 Insulation resistance	>100MΩ (DC 500V)
绝缘耐压 Insulation& withstand voltage	2000V, 50/60 Hz 1min 接线端子间耐压 2000V, 50/60 Hz 1min connecting terminal's withstand voltage 2000V, 50/60 Hz 1min 接线端子对地耐压 2000V, 50/60 Hz 1min connecting terminal's withstand voltage to earth

### 8. 投诉/更换/修理 Complaint/replacement/repair

售后服务时请给出生产编号和产品型号，生产编号印在表盘上，产品型号印在标牌上。

At customer service, please provide with the production number and product model. The production number is printed on the dial, while the product model is printed on the nameplate.

密度继电器必须长时间恒温才能达到温度补偿作用(至少两小时)。

Density monitor must be kept in constant temperature for a long time (at least two hours) so as to achieve temperature compensation.

只有厂家可以进行维修，不允许随便打开仪表，否则会使显示和开关点产生误差。

No one other than the manufacturer is allowed to disassemble the instrument for fear that any error may occur to the display and switch point.

### 9. 订货说明 Order instructions

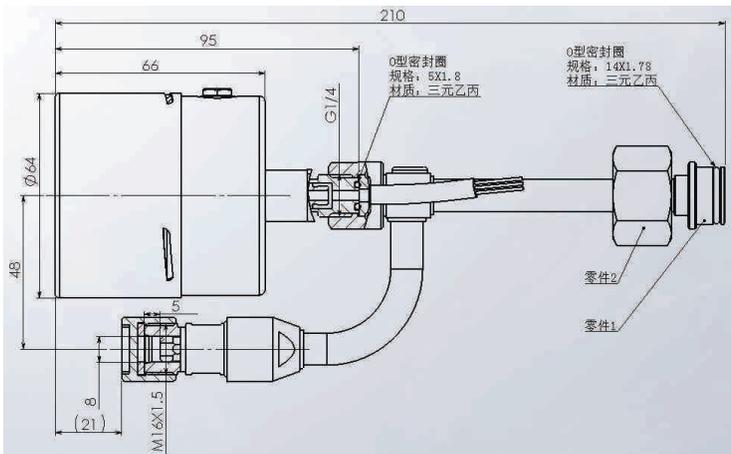
型号/数量/量程/开关动作点/接口尺寸/接口方向/其它特殊事项  
Model/quantity/measuring range/switch action point/interface  
size/interface direction/other special issues

注：说明书中为基础配置，其余定制化需求见客户图。

Note: Basic type is included in the manual, and other customized requirements are shown in the customer's drawing.

### 附件一：外形尺寸图

Attached Drawing 1: External Dimensions

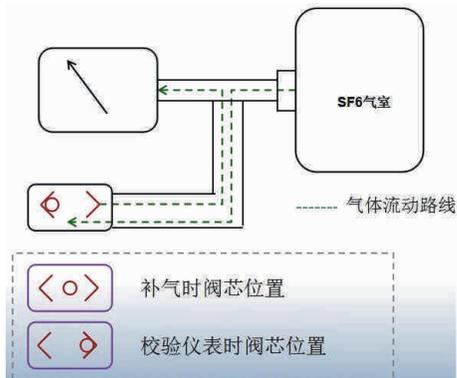


### 附件二：校验补气原理说明

Attached Drawing 2: Description of calibration air supplement principle

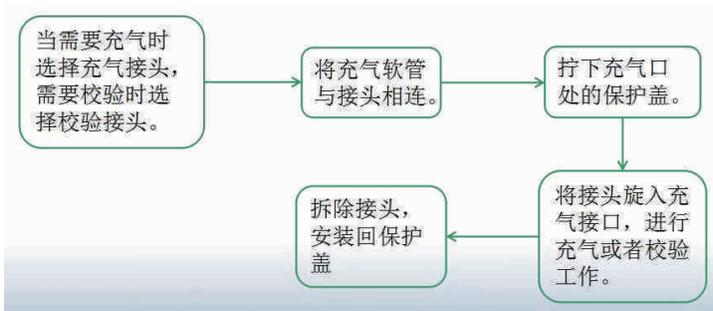
结构上在连接管上增加了一个三通将气路引出并通过一个双向密封的自封阀来实现对不同气路的通断。采用不同的充气接头，能在一个充气接口上实现补气或在线校验功能。

In structure, a three-way is added on the connecting pipe to lead out the gas path and realize the connection and disconnection of different gas paths through a two-way sealed self-sealing valve. Different inflation connectors are used to realize the function of air supplement or online calibration on one inflation interface.



### 附件三：校验补气操作流程

Attached Drawing 3: Check the operation process of air supplement



### 附件四：校验补气注意事项

Attached Drawing 4: Precautions for calibration and air supplement

A. 在安装或拆卸充气接头时，应一手扶住充气口端部，防止表计承受过大弯矩发生形位变化。

When installing or disassembling the inflation connector, hold the end of the inflation port with one hand to prevent the shape and position change of the meter due to excessive bending moment.



B. 要分清充气接头和校验接头，以免混淆。接头上有激光喷码标识，如下图。

The inflation connector and the calibration connector shall be distinguished to avoid confusion. The connector is marked with laser spray code, as shown in the following figure.



C. 安装接头时，要拧紧接头，确保内部阀芯已经起到密封作用。

When installing the connector, tighten the connector to ensure that the internal valve element has played a sealing role.



D. 先将充气或校验软管与补气或校验接头相连，再与仪表充气口相连，以避免气室内的气体漏气。

Connect the inflation or calibration hose to the air supplement or calibration connector, and then to the instrument inflation port to avoid gas leakage in the gas chamber.

**LANSO<sup>®</sup>**

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