

直线位移传感器

Linear position sensor

中国工信部高精度传感器一条龙应用计划示范项目
 国家级专精特新“小巨人”企业，国家级高新技术企业
 中国工业强基重点产品，中国工信部传感器一条龙应用计划示范企业

Demonstration project of one-stop application plan for high-precision sensors of Ministry of Industry and Information Technology of China.
 National level specialized and special new "little giant" enterprise, national level high-tech enterprise.
 Key products of strong industrial base in China, demonstration enterprise of sensor one-stop application plan of Ministry of Industry and Information Technology of China.

客户是我们的上帝
 The customer is our god

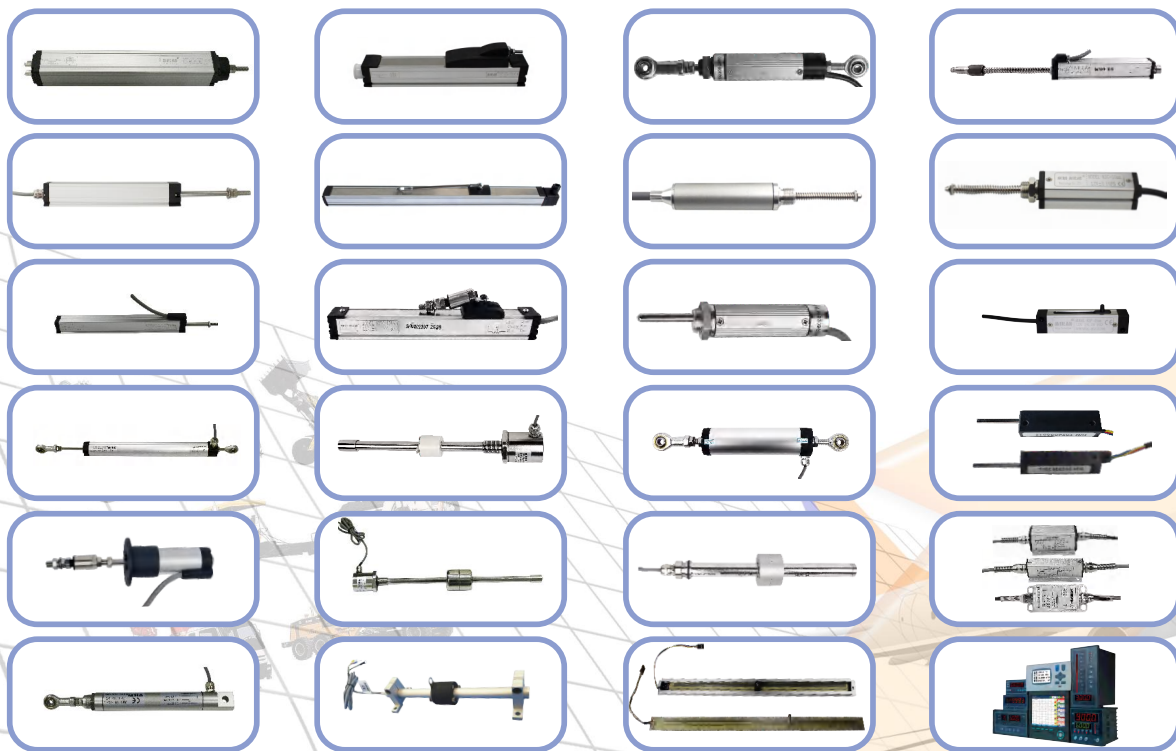
中国位移传感器专家与领导者
 China's displacement sensor expert and leader

深圳市米朗科技有限公司
 Shenzhen Miran Technology Co., Ltd

Sense the Motion →



产品目录 PRODUCT SUMMARY



专利产品 仿冒必究

PRECISION MOTION AND
 DISPLACEMENT TRANSDUCERS



质量第一 用户至上 诚信为本
 Quality first Customer first Credit first

位移传感器领域的先驱和市场领导品牌
 Pioneer in the field displacement sensor and the market leading brand

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通用拉杆型直线位移传感器 Universal Pull Rod Type Linear Displacement Sensor

通用拉杆式 Universal Pull Rod Type

● KTC1(LWH) 系列 KTC1(LWH) Series

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微型弹簧自复位式 Micro Spring Self-Resetting Type	
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磁阻式位移传感器 Magnetostrictive Displacement Sensor

支架安装型 Bracket Mounted Type

● PME12/PME14 系列 PME12/PME14 Series

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浮球液位型 Float Level Type

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无电刷防水防尘型位移传感器 Brushless Waterproof And Dustproof Displacement Sensor

● LEP/KEP/LEPF 系列 LEP/KEP/LEPF Series

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信号转换模块 Signal Conversion Module

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产品介绍 Product Introduction

米朗研发生产的基于电位计原理的位移传感器，在工艺的先进性、材料的选择、结构的设计等方面都远远高于同行业其他厂商。因此，米朗的传感器产品已被广泛应用于汽车、塑料机械、传动设备、测量系统、医疗等领域，在产品的可靠性、稳定性、精度、抗恶劣环境等性能方面得到市场的广泛认可。

The displacement sensor based on potentiometer principle developed and produced by Miran is far superior to other manufacturers in the industry in terms of progressiveness technology, material selection, structural design, etc. Therefore, Mirang's sensor products have been widely used in fields such as automobiles, plastic machinery, transmission equipment, measurement systems, and healthcare, and have been widely recognized in the market for their reliability, stability, accuracy, and resistance to harsh environments.

米朗依据不同的测量原理，分别基于电位计原理、拉线/绳电位器/编码器原理、以及磁致伸缩测量原理、差动变压器原理（LVDT）、电涡流、磁栅、倾角原理等，开发了不同系列的位移传感器，以适应不同场合应用的需求。其中，基于电位计原理的传感器原理简单，内部没有复杂的信号处理电路，结构也很简单，因此，产品的可靠性非常高。而先进的电阻材料处理工艺、多触点贵金属电刷、特殊的滑刷支撑和电阻基片材料的选择以及坚固的外壳提升了产品的耐用性，该类型传感器的使用寿命可以到达上亿次的往复运动，在正常使用的情况下，基本不用考虑该传感器的使用寿命问题。独特的电脑控制激光蚀刻技术，使米朗的电位计式传感器具有很高的线性精度、很平滑的微线性特性、微米级的重复性精度，非常适合应用于精密位置和速度测量的闭环控制系统中。

Mirang has developed different series of displacement sensors based on different measurement principles, including potentiometer principle, wire/rope potentiometer/encoder principle, magnetostrictive measurement principle, differential transformer principle (LVDT), eddy current, magnetic grating, tilt angle principle, etc., to meet the needs of different applications. Among them, sensors based on the principle of potentiometers have a simple principle, without complex signal processing circuits inside, and their structure is also very simple. Therefore, the reliability of the product is very high. The advanced processing technology of resistance materials, multi contact precious metal brushes, special sliding brush supports, and the selection of resistance substrate materials, as well as the sturdy housing, enhance the durability of the product. The service life of this type of sensor can reach hundreds of millions of reciprocating movements, and under normal use, there is basically no need to consider the service life of the sensor. The unique computer-controlled laser etching technology enables Mirang's potentiometer type sensors to have high linear accuracy, smooth micro linear characteristics, and micrometer level repeatability accuracy, making them very suitable for application in closed-loop control systems for precision position and velocity measurement.

而随着米朗的传感器被越来越多的行业所应用，特别是在工程机械、车辆移动设备、重型机械设备等配套中，对传感器的信号接口、抗震性能、特殊温湿环境等提出了更高要求。因此，米朗又基于磁致伸缩测量原理开发出了非接触式的直线位移传感器。该系列传感器特殊的结构设计，适合内置高压的液压或气动环境使用，具有很强的抗震性能，适合高温高湿的应用环境。关于磁致伸缩测量技术的传感器，我们有专门的产品资料介绍，请参照明朗磁致伸缩位移传感器彩页选型参考。

With the increasing application of Mirang's sensors in various industries, especially in supporting equipment such as construction machinery, vehicle mobile equipment, and heavy machinery, higher requirements have been put forward for the signal interface, seismic performance, and special temperature and humidity environments of the sensors. Therefore, Milan developed a non-contact linear displacement sensor based on the principle of magnetostriction measurement. The special structural design of this series of sensors is suitable for use in high-pressure hydraulic or pneumatic environments, with strong seismic performance, suitable for high temperature and high humidity application environments. We have specialized product information on sensors for magnetostrictive measurement technology. Please refer to the selection reference of the Mirang magnetostrictive displacement sensor color page.

米朗的电位计原理的直线位移传感器从测量移动的方式上分为拉杆式、滑块式、回弹式等，这些传感器具有几乎相同的电气特性，只是针对不同应用场合对传感器的工作范围、安装方式等不同的要求而设计。同样出于不同安装方式的考虑，传感器除了标准的KTC1、KTF等系列，还有KTC2、KTM、KPM等系列微型传感器。而WY-01系列传感器则考虑在恶劣环境下使用的要求（水、油或者粉尘较多的环境），对传感器外壳的材料和拉杆往复运动轴承密封处的结构进行了专门的防尘防油/水设计，使该系列传感器比较标准型具有更强的抗震、耐高温高湿、抵御水、油污和粉尘等性能。针对被测量对象不方便与传感器直接连接的应用场合，米朗还开发出了内置和外置复位弹簧的直线位移传感器KTR系列，测量杆与被测量对象通过滚轮或圆点接触，被测物体位置的移动，可以通过滚轮或圆点接触传递给传感器，而无需将传感器的测杆固定在被测移动物体上。

The linear displacement sensor based on Mirang's potentiometer principle can be divided into rod type, slider type, rebound type, etc. in terms of measuring movement. These sensors have almost the same electrical characteristics, but are designed for different application scenarios with different requirements for the working range and installation method of the sensor. Due to different installation methods, in addition to the standard KTC1, KTF and other series, there are also KTC2, KTM, KPM and other series of miniature sensors. The WY-01 series sensors, on the other hand, consider the requirements for use in harsh environments (environments with high levels of

water, oil, or dust), and have specially designed the material of the sensor housing and the structure of the sealing of the reciprocating bearing of the pull rod to prevent dust, oil, and water. This makes the series sensors more resistant to earthquake, high temperature and humidity, water, oil, and dust compared to standard models. For applications where it is inconvenient to directly connect the measured object to the sensor, Mirang has also developed the KTR series of linear displacement sensors with built-in and external reset springs. The measuring rod contacts the measured object through rollers or dots, and the movement of the measured object's position can be transmitted to the sensor through roller or dot contact, without the need to fix the sensor's measuring rod to the moving object being measured.

2013年公司又开发出了磁阻式位移传感器，通过磁性游标取代传统位移传感器中的阻轴，传感器结构更紧凑，即通过磁铁吸力带动内部电刷移动，使内部电器结构与外部运动结构完全隔离开来，可达到防水防油防尘的作用，其中PME14等系列可在水下长期使用。因此，米朗的系列直线位移传感器给客户提供了很大的选择空间，客户可以根据实际应用情况、安装尺寸、精度、连接方式、行程、输出信号、应用环境等特殊要求，选择合适的传感器。米朗可以为客户提供完善的售前、售后服务，以确保客户作出适合的产品选型，并得到长期持续的售后服务，从而帮助客户提升产品整体的质量和市场竞争力。

In 2013, the company also developed a magnetoresistive displacement sensor, which replaces the resistance axis in traditional displacement sensors with a magnetic cursor. The sensor structure is more compact, that is, it drives the internal electric brush to move through magnetic attraction, completely isolating the internal electrical structure from the external moving structure, which can achieve waterproof, oil proof, and dust proof effects. Among them, series such as PME14 can be used underwater for a long time. Therefore, Mirang's series of linear displacement sensors provide customers with a large selection space. Customers can choose the appropriate sensor based on specific requirements such as actual application conditions, installation dimensions, accuracy, connection methods, stroke, output signal, and application environment. Mirang can provide customers with comprehensive pre-sales and after-sales services to ensure that they make suitable product choices and receive long-term and continuous after-sales service, thereby helping customers improve the overall quality and market competitiveness of their products.

本书主要是介绍米朗基于电位计原理位移传感器的相关产品。如有不尽之处，请与我们市场部取得联系。

This book mainly introduces the relevant products of Mirang displacement sensors based on the principle of potentiometers. If there are any discrepancies, please contact our marketing department.

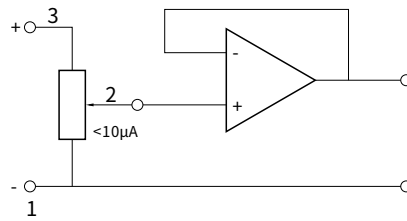
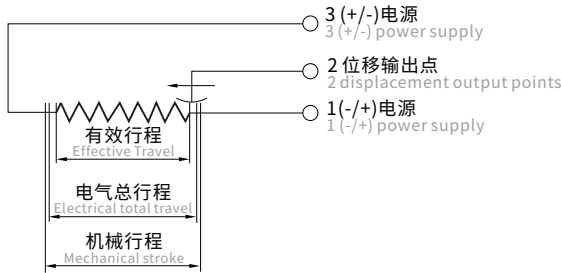
电子尺注意事项 Electronic Ruler Precautions

● 电气原理 Electrical Principles

该样本中，所有传感器为绝对位置测量型，用于调节系统和测量系统中，对位移和长度进行直接测量，输出直流电压信号，也可以通过内置或者外置的V/I转换模块将信号转换成标准的0-5V、0-10V、4-20mA直流信号、RS485数字信号等，可以满足远距离传输控制要求。

In this sample, all sensors are of absolute position measurement type, used for adjusting the system and measuring the displacement and length directly, outputting DC voltage signals. The signals can also be converted into standard 0-5V, 0-10V, 4-20mA DC signals, RS485 digital signals, etc. through built-in or external V/I conversion modules, which can meet the requirements of long-distance transmission control.

● 电气安装示意图 Electrical Installation Diagram ● 测试线路图 Test Circuit Diagram

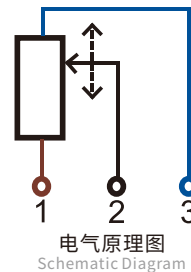


建议接线方式：
Suggested wiring method:
1、电源+/- Power supply +/-
2、输出 Output
3、电源-/+ Power supply -/+

● 电气原理图 Schematic Diagram

电位计原理，0-100%给定输入电压（随位移变化而变化）。

The principle of a potentiometer is to provide a 0-100% input voltage that varies with displacement.



1. 棕色线（电源+/-）
Brown wire (power supply +/-)
2. 黑色线（输出）
Black wire (output)
3. 蓝色线（电源-/+）
Blue wire (power supply -/+)

● 碳膜电阻直线位移传感器工作原理

Working Principle Of Carbon Film Resistance Linear Displacement Sensor

碳膜电阻直线位移传感器在注塑机行业中俗称：电子尺，电子尺实际上就是一个可调的线性电位器。在实际工作中，它可以把图1的①和③两端的10V电压通过滑动电刷②端进行线性调整并输出；②输出端调整至中间位置输出电压是5V，②输出端调整至上端输出是10V（如图2），②输出端调整至下端电压是0V（如图3），并且是一个线性的输出电压值（如图4）。

Carbon film resistance linear displacement sensor in the injection molding machine industry commonly known as: electronic ruler, electronic ruler is actually an adjustable linear potentiometer. In actual work, it can linearly adjust the 10V voltage at both ends of ① and ③ in Figure 1 through the sliding brush ② end and output; ② The output voltage is 5V when the output end is adjusted to the middle position, the output voltage is 10V when the output end is adjusted to the upper end (Figure 2), and the output voltage is 0V when the output end is adjusted to the lower end (Figure 3), and it is a linear output voltage value (Figure 4).

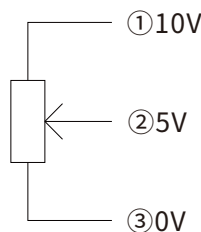


图1
Figure 1

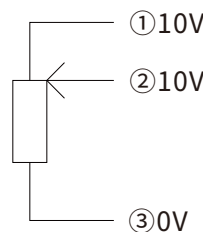


图2
Figure 2

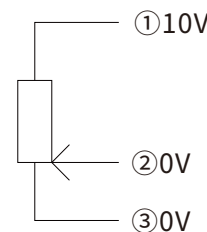
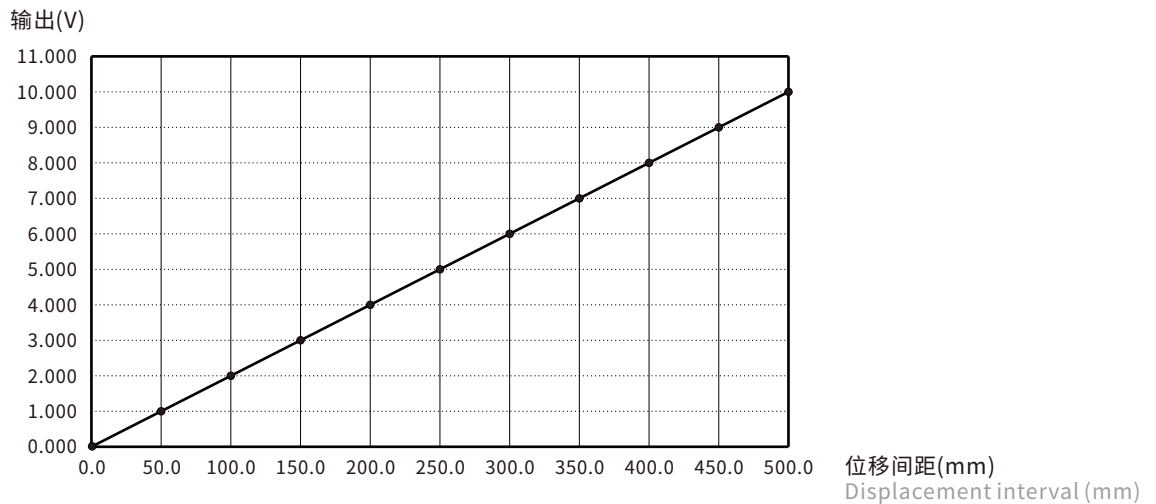


图3
Figure 3



图四
Figure 1

● 碳膜电阻直线位移传感器接线方式及注意事项

Wiring Method And Precautions Of Carbon Film Resistance Linear Displacement Sensor



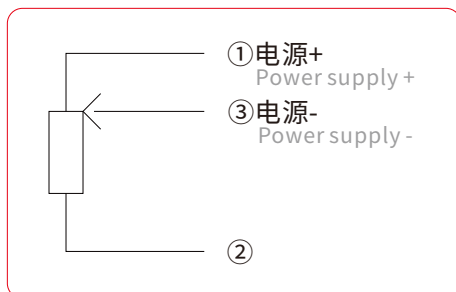
正确接线：图1
Correct wiring: Figure 1

注意事项：

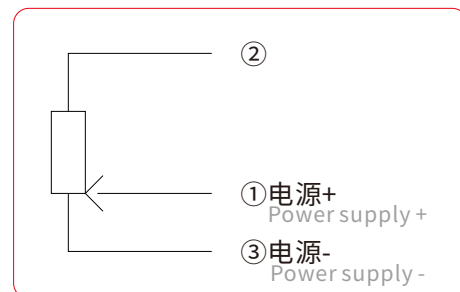
- 一、①和③接线可互换，改变输出逻辑，也就是改变的输出的方向；
- 二、②端必须正确接线，②端与③端交换接线，当电刷移动最上端时，电源正负极短路，会烧坏碳膜和电刷(图二)。
- ②端与①端交换接线，当电刷移动至最下端时，电源正负极短路，导致碳膜和电刷烧坏(图三)。

Note:

First, ① and ③ wiring can be interchangeable, change the output logic, that is, change the direction of the output; Second, ② end must be correctly connected, ② end and ③ end exchange wiring, when the brush moves the top end, the positive and negative terminals of the power supply short circuit, will burn the carbon film and brush (Figure 2). When the brush is moved to the bottom end, the positive and negative terminals of the power supply are short-circuited, causing the carbon film and brush to burn out (Figure 3).



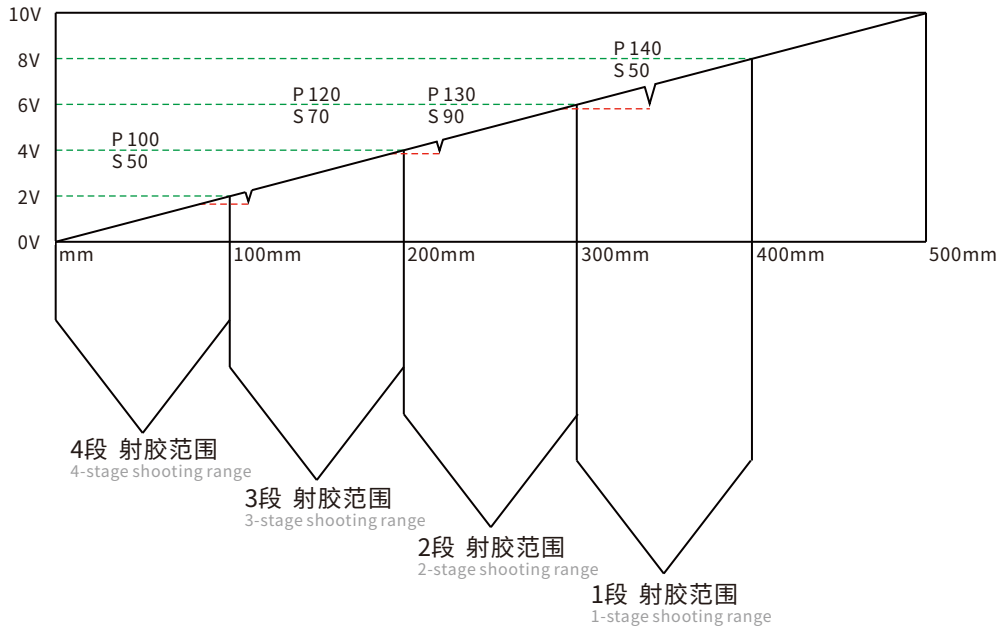
错误接线：图2
False wiring: Figure 2



错误接线：图3
False wiring: Figure 3

● 注塑机中射胶电子尺工作线性原理图（数据跳动分析）

Linear schematic diagram of electronic ruler in injection molding machine (data run-out analysis)



从上图中看出：四段射胶中，每段的压力和流量设定值是不一样的，电子尺出现数字跳动时，一段射胶数据电压值瞬间降至二段射胶数据电压范围之内时，一段射胶将会瞬间执行二段射胶的压力和流量设定值，导致注塑的产品质量不稳定。

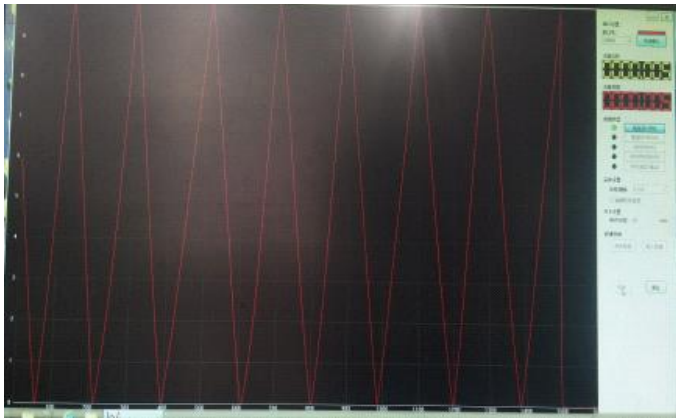
As can be seen from the above figure: in the four stages of injection glue, the pressure and flow setting values of each stage are not the same. When the digital jump occurs on the electronic ruler, the voltage value of the first stage of injection glue data instantly drops to the voltage range of the second stage of injection glue data, the pressure and flow setting value of the second stage of injection glue will be implemented instantly in the first stage of injection glue, resulting in unstable product quality.

● 电子尺出现数据跳动现象的原因分析

Analysis Of The Cause Of Data Jumping In Electronic Ruler

电子尺（开模终止位置、顶针退终止位置、熔胶终止位置）为什么会出现数据跳动现象？当电子尺数据跳动时，大家所看到的数据跳动是停留在终止位置，其实它在整个位移的过程中都会有跳动现象，只是瞬间即过，此时电子尺因长时间往复运动，电刷与碳膜来回运动磨损，电刷已把碳膜表面刮伤，从而引起电刷和碳膜接触不良，导致输出电压降低，引起数据跳动现象，通过本公司分析软件的波形图，可以看出电子尺全量程范围内数据变化的痕迹。

Electronic ruler (open die termination position, thimble retreat termination position, melt glue termination position) why does the data skip phenomenon occur? When the electronic ruler data beat, you see the data beat is to stay in the termination position, in fact, it will have a beating phenomenon in the entire displacement process, but the moment is passed, at this time the electronic ruler because of a long time reciprocating movement, brush and carbon film back and forward motion wear, brush has scratched the surface of the carbon film, resulting in poor contact between the brush and carbon film, resulting in a reduction in output voltage, Cause data jumping phenomenon, through the company's analysis software waveform chart, you can see the traces of data changes in the full range of the electronic ruler.



正常波形状态
Normal waveform state



异常波形状态
Abnormal waveform state

一、当顶针退数据跳动时，电子尺输出的电压值降低至顶针退设定的终止位置时，注塑机会因顶针退未到终止位置而不能锁模，并出现报警；

二、开模终止数据跳动时，电子尺输出的电压值降低至开模终止位置时，注塑机会出现无顶出动作，同时机械手因未接到开模终止信号，而不能正常工作。

First, when the thimble retreat data jump, the electronic ruler output voltage value reduced to the thimble retreat set termination position, the injection machine because the thimble retreat not to the termination position and can not lock, and alarm;

Second, when the die-opening termination data is jumping, when the voltage value of the output of the electronic ruler is reduced to the die-opening termination position, the injection molding machine will have no ejection action, and the manipulator cannot work normally because it has not received the die-opening termination signal.

为什么高速注塑机上电子尺更容易出现数字跳动现象？

Why high-speed injection molding machine electronic ruler is more likely to appear digital jumping phenomenon?

● 高速注塑机对电子尺输出的电压采集周期一般都设定在2-3毫秒左右，AD转换芯片一般都是采用24位ADC转换芯片，采集周期快，也就是说同行程的电子尺在相同时间内移动完毕，系统对电子尺的采样点数要比低速机高许多，如系统设定1毫秒采样周期，以量程500mm的电子尺为例，1秒钟拉完整个量程，采集的点数就达到1000次，如系统设定10毫秒采样周期，同样500mm量程的电子尺，1秒钟拉完整个量程，采集点数为100次，由此可见，采样周期越快，对电子尺输出电压的稳定性要求就越高。

The voltage acquisition cycle of the output of the electronic ruler of the high-speed injection molding machine is generally set at about 2-3 milliseconds, and the AD conversion chip is generally a 24-bit ADC conversion chip, which has a fast acquisition cycle, that is, the electronic ruler with the same stroke is moved in the same time, and the sampling number of the electronic ruler is much higher than that of the low-speed machine, such as the system sets a sampling period of 1 millisecond. Taking the electronic ruler of the range of 500mm as an example, pulling the complete range in 1 second, the number of points collected will reach 1000 times, such as the system set a sampling period of 10 milliseconds, the same electronic ruler of the range of 500mm, pulling the complete range in 1 second, the number of points collected is 100 times, it can be seen that the faster the sampling period, the higher the stability of the output voltage of the electronic ruler.

● 当采集电压10V时，24位ADC转换芯片的分辨率是0.0005mv/ADC，而低速机一般都采用16位ADC转换芯片，其分辨率是0.15mv/ADC，综上所述可以看出：高频率的采样周期对电子尺全量程范围内的电压值不能出现断点现象（也就是电刷和碳膜之间接触电阻值不能出现瞬间接触不良现象），一旦出现瞬间轻微接触不良现象，就会被高密度的采集点检测出来，经高分辨的ADC转换芯片转换成跳动的数字。

When the acquisition voltage is 10V, the resolution of the 24-bit ADC converter chip is 0.0005mv/ADC, while the low-speed machine generally uses the 16-bit ADC converter chip, whose resolution is 0.15mv/ADC. In summary, it can be seen that: The high frequency sampling period does not break the voltage value in the full range of the electronic scale (that is, the contact resistance value between the brush and the carbon film can not appear instantaneous poor contact phenomenon). Once the instantaneous slight poor contact phenomenon occurs, it will be detected by the high-density collection point and converted into a pulsating number by the high-resolution ADC converter chip.

大型注塑机安装电子尺会出现数字跳动现象，如何解决？

Large injection molding machine installation electronic ruler will appear digital jumping phenomenon, how to solve?

解决方法：采用磁致伸缩数字输出型，在PC系统附近加装一个0-10V转换模块，使整个传输过程由数字传输来完成的。

Solution: Adopt magnetostrictive digital output type, install a 0-10V conversion module near the PC system, so that the whole transmission process is completed by digital transmission.

● 电流/电压信号输出优缺点

1. 电流信号适合远距离传输，因为电流信号不受导线电阻的影响，而电压信号在导线本身具有电阻的情况下会分压，导致测量不精准。一般4~20mA最远传送距离控制在100m以内，再远则建议使用数字信号(RS485通讯)。
2. 相对于现场工况比较复杂的，电流信号抗干扰的能力相比电压信号更强。在有干扰的工况下，建议用户选择4~20mA信号。
3. 当导线材质不一样的时候(如铜，镍)，一般会产生磁场，对精度要求较高的场合电压信号会有误差，电流信号不会有。

1. The current signal is suitable for long-distance transmission because the current signal is not affected by the resistance of the wire, while the voltage signal will divide the voltage in the case that the wire itself has resistance, resulting in inaccurate measurement. Generally, the maximum transmission distance of 4~20mA is controlled within 100m, and then it is recommended to use digital signals (RS485 communication).

2. Compared with the more complex field conditions, the anti-interference ability of current signal is stronger than that of voltage signal. In the case of interference, it is recommended that users choose 4~20mA signal.

3. When the wire material is not the same (such as copper, nickel), it will generally generate a magnetic field, and the voltage signal will have an error in the case of higher accuracy requirements, and the current signal will not have.

● 数字RS485接口信号输出优势

1. RS485信号的优势在于用这种传感器可以组成RS485网络，当采集多个传感器信号时，可以用一条总线，连接多个传感器连到电脑上，电脑上只要装有对应的数据采集软件即可实现多点数据的采集，记录，分析，报表，报警等功能。
2. 数字信号的质量很强，抗干扰能力也比较强，信号传输距离可以达到1公里。

1. The advantage of RS485 signal is that this sensor can be used to form RS485 network, when collecting multiple sensor signals, you can use a bus to connect multiple sensors to the computer, as long as the computer is equipped with the corresponding data acquisition software to achieve multi-point data collection, record, analysis, report, alarm and other functions.

2. The quality of the digital signal is very strong, the anti-interference ability is also relatively strong, and the signal transmission distance can reach 1 km.

产品特点 Product Features

使用寿命特长，运行次数：大于 100×10^6 次
Long service life, running more than 100×10^6 times

运行距离：大于 25×10^6 米
Running distance: greater than 25×10^6 meters

无噪音输出顺滑工程导轨
Noisy output smooth engineering guide rail

线性优异，线性误差精度：部分型号优于 $\pm 0.04\%$ FS
Excellent linearity, linear error accuracy: Some models are better than $\pm 0.04\%$ FS

分辨率低于0.01mm，解析度：无断解析
Resolution below 0.01mm, resolution: uninterrupted resolution

高运行速度，最大运行速度：10m/s，最大运行加速度 10m/s^2
High operating speed, maximum operating speed: 10m/s, maximum operating acceleration 10m/s^2

重复精度高，小于0.01mm
High repetition accuracy, less than 0.01mm

冲击系数：IEC 68-2-29:1968 50g
Impact coefficient: IEC 68-2-29:1968 50g

振动系数：IEC 68-2-6:1982 20g
Vibration coefficient: IEC 68-2-6:1982 20g

最大容许电压：DC60V/5K Ω ~20K Ω ，DC36V/2K Ω ~4K Ω ，DC24V/1K Ω
Maximum allowable voltage: DC60V/5K Ω ~20K Ω , DC36V/2K Ω ~4K Ω , DC24V/1K Ω

正常温度-60 $^{\circ}\text{C}$ ~+150 $^{\circ}\text{C}$ 几乎没有温漂，超过正常温度范围情况下温漂系数为： $<1.5\text{ppm}/^{\circ}\text{C}$ 所有传感器外壳：阳极氧化铝合金，表面均做电泳防静电和辐射处理，高耐磨工程滑环，保证运行顺滑。部分外壳为不锈钢材质。
The normal temperature range is from -60 $^{\circ}\text{C}$ to +150 $^{\circ}\text{C}$, with almost no temperature drift. If the temperature exceeds the normal range, the temperature drift coefficient is $<1.5\text{ppm}/^{\circ}\text{C}$. All sensor shells are made of anodized aluminum alloy, and the surface is treated with electrophoretic anti-static and radiation protection. The high wear-resistant engineering slip ring ensures smooth operation. Part of the casing is made of stainless steel material.

全部采用高密封防护等级，防护等级：拉杆式：最高为IP67 滑块式：IP57 磁阻式：最高为IP68，传感器内部导电材料均为进口高级原料，保证传感器的高耐磨性和稳定性，即使在恶劣的条件下传感器也能可靠工作。
All sensors are equipped with high sealing protection level, protection level: pull rod type: up to IP67, slider type: up to IP57, reluctance type: up to IP68. The internal conductive materials of the sensors are all imported high-grade raw materials, ensuring high wear resistance and stability. Even in harsh conditions, the sensors can work reliably.

传感器前端的缓冲万向节可以克服传动杆的一些不对中的倾斜和震动。
The buffering universal joint at the front end of the sensor can overcome some misalignment and vibration of the transmission rod.

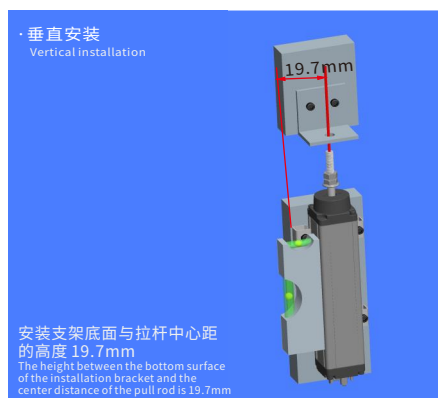
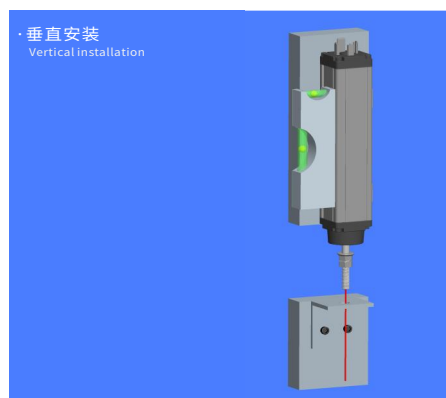
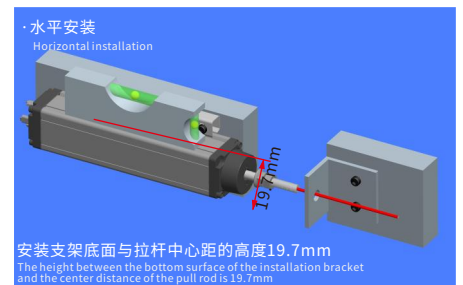
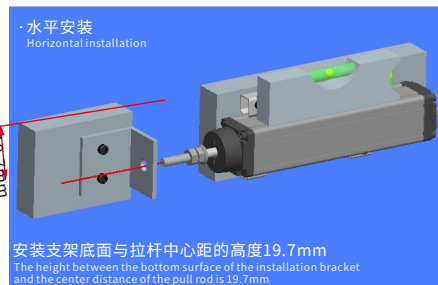
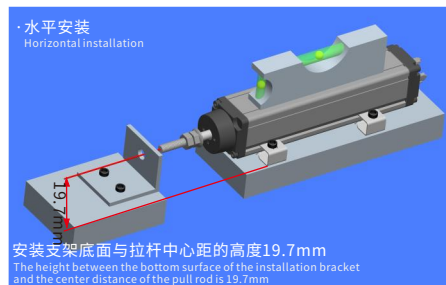
全部为抗寒、抗腐蚀、耐高温、抗老化型，使用温度范围：-60 $^{\circ}\text{C}$ ~+150 $^{\circ}\text{C}$
All of them are cold resistant, corrosion resistant, high temperature resistant and aging resistant, and the operating temperature range is -60 $^{\circ}\text{C}$ ~+150 $^{\circ}\text{C}$

应用范围广阔，包括：注塑机、压铸机、吹瓶机、制鞋机（前帮机、后帮机、EVA注射成型机）、木工机械、印刷机械、包装机械、纸品机械、机械手、飞机操舵、船舶操舵、IT设备等自动化控制领域。
The application scope is broad, including: injection molding machines, die-casting machines, blow molding machines, shoe making machines (front and back lasting machines, EVA injection molding machines), woodworking machinery, printing machinery, packaging machinery, paper machinery, robotic arms, aircraft steering, ship steering, IT equipment and other automation control fields.

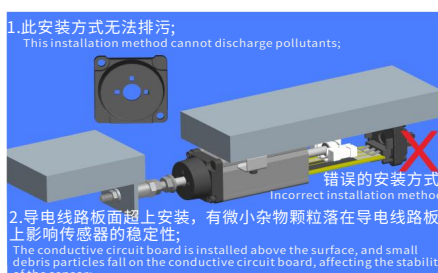
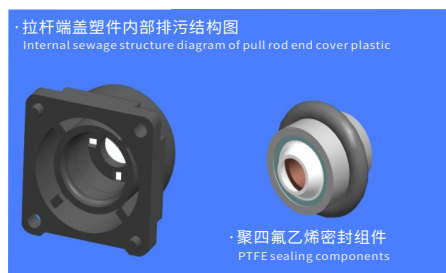
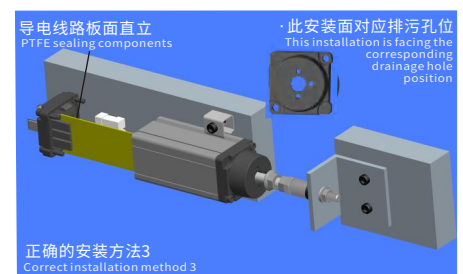
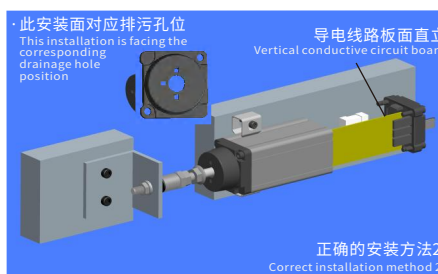
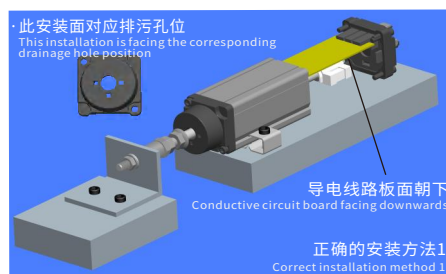
安装概要 Installation Summary

- 定位传感器时要保证水平状态下再进行锁固
When positioning the sensor, it is necessary to ensure that it is in a horizontal state before locking it
- 牵引支架螺丝孔与传感器拉杆必须保持同心
The screw holes of the traction bracket and the sensor pull rod must be kept concentric
- 电子尺有效行程必须大于油缸有效行程
The effective travel of the electronic ruler must be greater than the effective travel of the cylinder

方形拉杆式直线位移传感器建议安装方式：侧装和正装（例如KTC1,KTC2,WDL,KTM,KTR等系列产品） Square tie rod linear displacement sensor recommended installation: side mounting and formal mounting (such as KTC1,KTC2,WDL, KTM,KTR and other products)



以上均是常规正确的安装方法，可降低电刷滑芯与铝管轨道的摩擦系数，从而提高传感器的使用寿命和稳定性。
The above are all conventional and correct installation methods that can reduce the friction coefficient between the brush sliding core and the aluminum tube track, thereby improving the service life and stability of the sensor.



- 在安装传感器时尽可能将导电电路板面向下或直立两个方向安装，禁止将导电电路板面向上时安装，这样可避免传感器内部有微小杂物颗粒落在导电电路板上，从而影响传感器的稳定性。

When installing sensors, try to install the conductive circuit board in both downward and vertical directions as much as possible. It is prohibited to install the conductive circuit board when facing upwards. This can prevent small debris particles from falling on the conductive circuit board inside the sensor, which can affect the stability of the sensor.

- 三个排污孔是根据传感器在正确安装方式下而设计的一款导排水、油污结构，保证了传感器拉杆往复运行时表面上所沾上的水、油及时排除干净，即：传感器导电电路板面向下或直立时均有排污功能。

The three drain holes are a drainage and oil pollution structure designed based on the correct installation method of the sensor, ensuring that the water and oil on the surface of the sensor rod are promptly removed during reciprocating operation. That is, when the conductive circuit board of the sensor is facing downwards or upright, it has a drainage function.

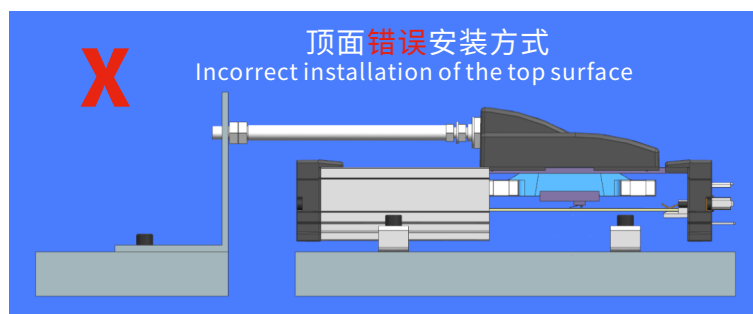
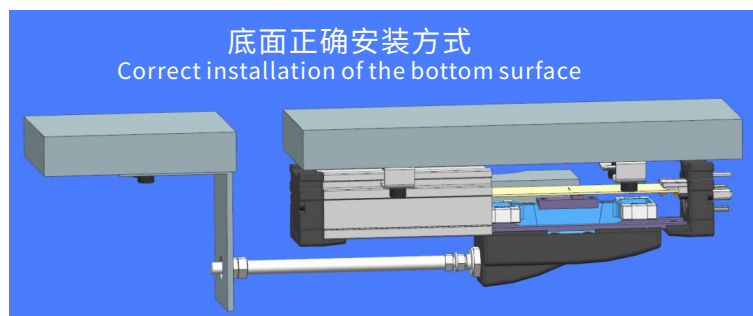
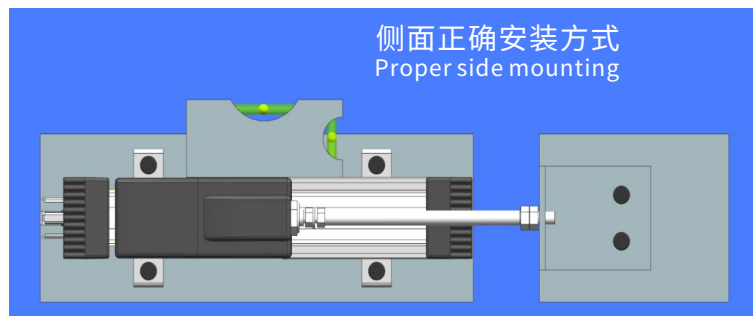
方形滑块式直线位移传感器建议安装方式：侧装和倒置安装（例如KTF1、KTF2、KSF、KFM等系列产品）
Square slider linear displacement sensor recommended installation: side installation and inverted installation (such as KTF1, KTF2, KSF, KFM and other products)

安装固定正确方法：

- 1、尺身必须水平固定安装；
- 2、拉杆牵引孔必须与拉杆同心；
- 3、电子尺有效行程必须大于油缸有效行程；
- 4、安装时碳膜线路板工作面必须侧立或向下（避免油污灰尘或碳粉落在碳膜工作面上）。

Correct method of installation and fixing:

- 1, the ruler body must be fixed horizontally;
2. The drawbar traction hole must be concentric with the drawbar;
- 3, the effective stroke of the electronic ruler must be greater than the effective stroke of the cylinder;
4. When installing the carbon film circuit board, the working surface must stand sideways or downward (to avoid oil dust or carbon powder falling on the carbon film working surface).



所有这种电位计/滑动电阻原理的电子尺，正确的安装方向是要让电子尺碳膜线路板工作面朝下或侧立，油污和灰尘即使进入电子尺内部也不会影响电子尺正常工作，因为油污进去电子尺内部之后由于重力原因会沉积在铝管底部，不会对有工作作用的电刷和线路板产生影响，从而电子尺的信号输出也不会受到影响；

All this potentiometer/sliding resistance principle of the electronic ruler, the correct installation direction is to let the electronic ruler carbon film circuit board working face down or side, oil and dust even into the electronic ruler will not affect the normal work of the electronic ruler, because the oil into the electronic ruler will be deposited at the bottom of the aluminum tube due to gravity. It will not affect the working brush and circuit board, so the signal output of the electronic ruler will not be affected;

错误的安装方法是碳膜线路板工作面朝上，电子尺内部进入油污和灰尘进入到电子尺内部之后，会直接落在碳膜线路板与电刷接触的工作面上，严重影响碳膜线路板与电刷的充分接触，导致接触不良，从而导致电子尺测量数据跳动，或者不准确。

The wrong installation method is that the working face of the carbon film circuit board faces up, and after the oil and dust enter the inside of the electronic ruler, they will directly fall on the working surface where the carbon film circuit board and the brush contact, seriously affecting the full contact of the carbon film circuit board and the brush, resulting in poor contact, resulting in the measurement data of the electronic ruler jumping, or inaccurate.

随着电子尺使用时间的延长，机器周边难免会有一些油污或灰尘通过拉杆的运动带进去电子尺内部；而且电子尺在工作时候，线路板与电刷一直在运动接触摩擦，随着使用时间的延长势必会产生一些的磨损碳粉，当然米朗的电子尺产生的摩擦碳粉比较其他进口或者国产的电子尺碳粉相比来说是非常少的（米朗的电子尺线路板和电刷比较其他进口和国产品牌电子尺都要更加耐磨损，使用寿命更长，推荐安装方式并不是只针对米朗品牌电子尺有效，其他品牌也建议这种方式，道理都是一样的，都可以延长产品寿命，在同样安装方式的情况下，不论是不正确安装方式或者正确安装方式，同等情况下，米朗品牌的产品使用寿命都会优于其他品牌产品，建议安装方式并不意味着本公司产品比其他品牌差）；这些油污杂质或碳粉等如果沉积在线路板上越多，产品就越容易接触不良，造成输出信号不准确，从而大大缩短了产品的使用寿命。线路板朝下或者侧立，就会避免这些杂质掉落在线路板上，从而大大加长了电子尺的使用寿命，所以强烈建议用户按照我们的推荐安装方式进行安装产品。

With the extension of the use time of the electronic ruler, there will inevitably be some oil or dust around the machine through the movement of the pull rod into the internal electronic ruler; And the electronic ruler at work, the circuit board and brush have been in motion contact friction, with the extension of the use of time is bound to produce some wear toner, Of course, the friction toner produced by Milang's electronic ruler is very small compared with other imported or domestic electronic ruler toner (Milang's electronic ruler circuit board and brush are more wear resistant and have longer service life than other imported and domestic brands of electronic ruler). The recommended installation method is not only effective for Milang brand electronic ruler, other brands also recommend this way. The truth is the same, can extend the product life, in the same installation mode, whether it is incorrect installation or correct installation, under the same circumstances, Milang brand product life will be better than other brand products, the recommended installation does not mean that the company's products are worse than other brands; If these oil impurities or toner are deposited on the circuit board, the more easily the product is in poor contact, resulting in inaccurate output signals, which greatly shortens the service life of the product. The circuit board is down or sideways, it will avoid these impurities falling on the circuit board, thus greatly extending the service life of the electronic ruler, so it is strongly recommended that users install the product according to our recommended installation method.

其他型号电子尺同理，在安装时候也应该尽量保证碳膜电路板朝下或者侧立，由于不同型号线路板设计方向不同，所以推荐的建议安装方法方向可能不同，其他型号具体电子尺的线路板安装方向以实际型号为准。

Similar to other models of electronic ruler, when installing the carbon film circuit board should also try to ensure that the carbon film circuit board is over the bottom or side, because different models of the circuit board design direction, so the recommended installation direction may be different, the specific electronic ruler of other models of the circuit board installation direction depends on the actual model.

传感器行程从5mm至最大行程5000mm (KTF系列) , 几乎满足当今所有设备领域的测量需求。
 The sensor travel ranges from 5mm to a maximum travel of 5000mm (KTF series), which almost meets the measurement needs of all equipment fields today.

1、通用拉杆型: KTC1、KTC2、WDL系列、KTM、KSE、KSD为方形拉杆结构, KPM18、KPM18D、KPM16、KPM16D、KPM12、KPM9为圆形拉杆结构, 上述型号拉杆结构是一般通用结构, 配合万向头或鱼眼万向头, 可以减少因安装的非对中性而带来的不良影响; 其中KTM、KSE、KSD、KPM12、KPM9为微型拉杆结构, 特别适用于空间狭小的应用, 可应用于注塑机、压铸机、橡胶机、鞋机、EVA注塑机、中空吹瓶机、木工机械、液压机等。

1. Universal tie rod type: KTC1, KTC2, WDL series, KTM, KSE, KSD for square tie rod structure, KPM18, KPM18D, KPM16, KPM16D, KPM12, KPM9 for circular tie rod structure, the above type of tie rod structure is a general general structure, with universal head or fish eye universal head, Can reduce the adverse effects caused by the installation of non-neutral; Among them, KTM, KSE, KSD, KPM12, KPM9 are micro tie rod structures, especially suitable for the application of narrow space, can be used in injection molding machine, die casting machine, rubber machine, shoe machine, EVA injection molding machine, hollow bottle blowing machine, woodworking machinery, hydraulic press, etc.



通用拉杆型
 Universal pull rod type

2、加强密封拉杆型: WY-01、WY-02为加强密封型拉杆位移传感器, 全身金属材质, 抗粉尘能力强, 密封等级高, 可应用于水泥设备、水泥辊压机、道路和桥梁等设备。

2. Reinforced seal tie rod type: WY-01, WY-02 for reinforced seal tie rod displacement sensor, the whole body metal material, strong dust resistance, high sealing grade, can be used in cement equipment, cement roller press, road and bridge and other equipment.



加强密封型
 Reinforced seal type

3、两端螺纹直出线拉杆型: KPC1-MT、KPM23-MT、KPM22-MT、KPM18-MT、KPM16-MT为两端螺纹尾端直出线拉杆式结构, 广泛应用于预应力千斤顶行业。

3. KPC1-MT, KPM23-MT, KPM22-MT, KPM18-MT, KPM16-MT for the two ends of the thread straight out of the rod type structure, widely used in the prestressed jack industry.



两端螺纹拉杆式
 Pull rod type with both ends threaded

4、**两端鱼眼铰接式拉杆型**：KPC1、KPM23、KPM22、KPM18J、KPM16J、KPM12J为两端固定带铰接运动型拉杆结果，适合摆动的，传感器本体无法固定的测量系统中，传感器会随着测量运动而运动；KPC1适用于较大运动行程，KPM23、KPM22、KPM18J、KPM16J、KPM12J适用于较小运动行程。可应用于注塑机顶针、鞋机、3D座椅、预应力千斤顶、机械手臂、机器人、取出机、砖机、陶瓷机械、水闸等。

4. Two end fish eye articulated tie rod type: KPC1, KPM23, KPM22, KPM18J, KPM16J, KPM12J are fixed at both ends of the hinged kinematic tie rod results, suitable for swing, sensor body can not be fixed in the measurement system, the sensor will move with the measurement movement; KPC1 is suitable for large motion stroke, KPM23, KPM22, KPM18J, KPM16J, KPM12J is suitable for small motion stroke. Can be used in injection molding machine thimble, shoe machine, 3D seat, prestressed jack, mechanical arm, robot, taking out machine, brick machine, ceramic machinery, sluice and so on.



两端鱼眼铰接式
Fisheye articulated at both ends

5、**通用滑块型**：KTF、KTF1、KTF2、KFM、KSF滑块型适应最小安装长度尺寸的应用，配合加长臂，可以消除安装的非对中的不良影响；其中KFM、KSF为微型滑块型，适用于较小的运动行程，可应用于大型注塑机合模行程、橡胶机合模行程、木工机械、液压机械。

5. Universal slider types: KTF, KTF1, KTF2, KFM, KSF slider types adapt to the application of the minimum installation length size, with the extension arm, can eliminate the adverse effects of the installation of non-alignment; Among them, KFM and KSF are micro slider type, which is suitable for small motion stroke, and can be applied to large injection molding machine, rubber machine, woodworking machinery, hydraulic machinery.



通用滑块式
Universal slider type

6、**弹簧自复位型**：KTR系列、TR系列、KPM12R1、KST、KS8、KS8X、KPM12R2、KSC、KSP、KSN型是微型弹簧自复位式拉杆结构，无需牵引安装，特别适合空间狭小的应用，其中KPM12R2、KSC、KSP、KSN为法兰螺纹安装型。可应用于中空吹瓶机、IT设备、张力调节、高速冲自动送料机、速度调节、印刷机械、制品包装机械等。KPF型是法兰盘固定结构，方便检测腔体内部位移。可应用于煤炭机械、液压机械、腔体内部位置检测等。

6. Spring self-resetting type: KTR series, TR series, KPM12R1, KST, KS8, KS8X, KPM12R2, KSC, KSP, KSN type is a micro spring self-resetting tie rod structure, no traction installation, especially suitable for the application of narrow space, wherein KPM12R2, KSC, KSP, KSN for flange thread installation type. IT can be used in hollow blowing machine, IT equipment, tension regulation, high-speed automatic feeding machine, speed regulation, printing machinery, product packaging machinery, etc.



弹簧自复位型
Spring self-resetting type

7、**磁阻式位移传感器**：PME12、PME14、PME17、PMI、PMR、PMF为磁阻式位移传感器，防护等级IP67、采用无阻轴设计，可满足潮湿环境或暂时浸没条件下的位移测量需要；PMI磁阻式位移传感器可应用于气缸或者油缸内置的位移测量；PMR磁阻式位移传感器是测量液位性价比非常高的产品；PME17磁阻式位移传感器为煤矿支架油缸专用位移传感器，其特点可杜绝外界因素的任何干扰；PMF磁阻式位移传感器为滑块式外形结构，配合加长臂，可以消除安装的非对中的不良影响。

7. Magneto-resistive displacement sensor: PME12, PME14, PME17, PMI, PMR, PMF are magneto-resistive displacement sensors, protection class IP67, with unimpeded shaft design, can meet the needs of displacement measurement in wet environment or temporary immersion conditions; The PMI magneto-resistive displacement sensor can be applied to the displacement measurement of the cylinder or cylinder. PMR magneto-resistive displacement sensor is a very cost-effective product for measuring liquid level. PME17 magneto-resistive displacement sensor is a special displacement sensor for coal mine support cylinder, which can eliminate any interference from external factors. The PMF magneto-resistive displacement sensor is a slide-block shape structure with extended arms, which can eliminate the adverse effects of non-alignment installation.



磁阻式
Magneto-resistive type

8、**无电刷防水防尘位移传感器**：LEP、KEP、LEPF为无电刷防水防尘位移传感器，通过外部位置触点施加的外力让采集膜片传感材料与电位计导电材料相接触，从而产生实时位移信号。防护等级IP67，工作环境温度最高可达125°C，常应用于医疗设备、机器人系统，阀门执行机构，太阳能面板位置控制，轿车和卡车作为调整、车窗升降、折合式敞篷车顶、车镜系统等。

8. Brushless waterproof and dust-proof displacement sensors: LEP, KEP, and LEPF are brushless waterproof and dust-proof displacement sensors. The external force exerted by the external position contact makes the collecting diaphragm sensing material contact with the conductive material of the potentiometer to generate real-time displacement signals. Protection level IP67, working environment temperature up to 125°C, often used in medical equipment, robot systems, valve actuators, solar panel position control, car and truck as adjustment, window lifting, convertible roof, car mirror system, etc.



无电刷防水防尘型
Brushless waterproof and dustproof type

重要提示：

所有技术参数只用于正确使用上,可用作分压电位器上以及最大电流为10μA。在数据表中所列的线性度、使用寿命、微线性度、抗外干扰阻值和分压形式的温度系数等数值，是传感器工作在以运算放大器作为电压输出器输出电压给滑刷，且滑刷上不带负载（ $I_e \leq 10\mu A$ ）的条件得出的。

Important reminder:

All technical parameters are only for correct use and can be used as voltage dividers with a maximum current of 10 μA. The values listed in the data table, such as linearity, service life, micro linearity, resistance to external interference, and temperature coefficient in the form of voltage division, refer to the values of the sensor operating on an operational amplifier as a voltage output to the sliding brush without a load ($I_e \leq 10 \mu A$) Derived from the conditions.

所有传感器均获得权威机构CE认证。如超出目录上产品规格的特殊要求，均可以联系我们定制。

All sensors have obtained CE certification from authoritative institutions. If there are special requirements beyond the product specifications listed in the catalog, you can contact us for customization.

赫斯曼插头资料 Hermann Plug Information

型号分别为H1、H2、H3、H4共四种
There are four types of models: H1, H2, H3, and H4

连接器产品电气接线标准：DIN43650
Electrical wiring standard for connector products: DIN43650

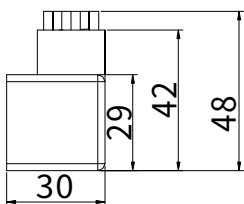
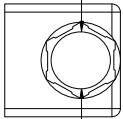


$\phi 6.5$
(橡胶垫柱内径)
(Inner diameter of rubber pad column)

$\phi 15$
(内径)
(Inner diameter)



$\phi 15$ PG9螺纹
screw thread



H1赫斯曼小插头
H1 Hesmann small plug
(默认标配, PG9螺纹)
(default standard configuration,
PG9 thread)

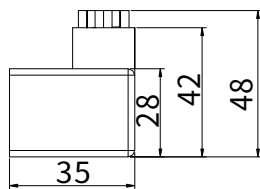
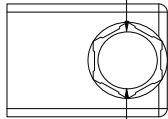


$\phi 6.5$
(橡胶垫柱内径)
(Inner diameter of rubber pad column)

$\phi 15$
(内径)
(Inner diameter)



$\phi 15$ PG9螺纹
screw thread



H2赫斯曼大插头
H2 Hermann large plug
(大插头, PG9螺纹)
(Large plug, PG9 thread)

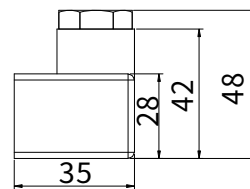
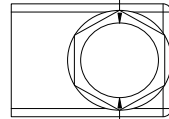


$\phi 9$
(橡胶垫柱内径)
(Inner diameter of rubber pad column)

$\phi 18$
(内径)
(Inner diameter)



$\phi 18$ PG11螺纹
screw thread



H3赫斯曼大插头
H3 Hermann large plug
(大插头, PG11螺纹)
(Large plug, PG11 thread)

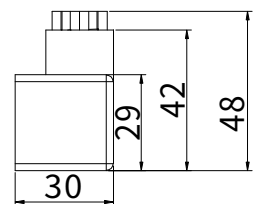
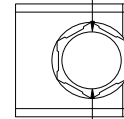


$\phi 9$
(橡胶垫柱内径)
(Inner diameter of rubber pad column)

$\phi 18$
(内径)
(Inner diameter)



$\phi 18$ PG11螺纹
screw thread



H4赫斯曼小插头
H4 Hesmann small plug
(小插头, PG11螺纹)
(Small plug, PG11 thread)

产品选型汇总 Product Selection Summary

KTC1 - 500mm - - - - - -

其他要求:

空白: 标准品, 产品没有“MT”代码中的特殊要求。
M T: 1、有改装要求, 如:尾部直出线, 并且尾部有螺杆或者有鱼眼[KPM(16、18、22、23)/KPC/KPC1可选]等改装要求;
 2、其他特殊要求的非标产品, 如: 阻值非标、安装方式非标、尺寸非标、标签非标(中性包装或者打客户要求的型号标示名称)等。
凡是有特殊要求, 要在产品外包装及产品本身主体上标明具体非标修改情况, 便于后续验货查看。
G D: 滑芯用防滑/防松脱固定螺母。
J M: 加强密封轴芯(压铸机专用轴芯)。
C H: 震雄震德专用。
如以上要求同时存在, 可以中间加“/”, 如GD/JM: 代表滑芯用防滑固定螺母, 并且加强密封轴芯。

安装支架要求:

空白: 不配支架, 或者配五金支架: KTC1/KTC/LWH/WDL/KTM/KTC2/LWH2/KTR/KTF/KTF1/TLH/KFM/KPM12/KPM16/KPM18等系列默认标配为五金支架
SZ: 塑胶支架(KPM12/KPM16/PME12可选)
LZ: 铝合金支架(KTC/KTM/KTR/KFM/KPM12/KPM16/KPM18/PME12/PME14等型号可选)

是否配有万向节或者万向节种类:

空白: 没有配万向节或者配标准万向节 **W1:** 加长万向节 **YW:** 鱼眼万向节

是否配有电缆线, 配多长的电缆线:

空白: 代表赫斯曼插头的产品默认不自带电缆线, 或代表非赫斯曼插头的产品默认自带1米电缆线
1: 只代表赫斯曼插头产品带1米电缆线。
注意: 其他非赫斯曼插头的产品默认自带1米线, 不用选该数字代码“1”
2~2000: 代表需要加长到多少米的电缆线, 单位是m/米, 2代表加长到2米电缆线, 5代表加长到5米电缆线……

是否配有赫斯曼插头或者赫斯曼插头种类:

空白: 没有配赫斯曼插头或者标配H1赫斯曼插头
H2: 配H2赫斯曼插头 **H3:** 配H3赫斯曼插头 **H4:** 配H4赫斯曼插头
 该插头具体介绍请见我司赫斯曼插头资料页面

信号输出类型:

空白: 默认标配, 没有内置信号变送模块, 电阻输出型(0-100%给定输入工作电压, 随位移变化而变化), 即电位计原理输出, 供电电压0-24V皆可(默认标配), 即:如供电电压为5V, 那么输出信号为0-5V; 如供电电压为10V, 那么输出信号为0-10V; 如供电电压为24V, 那么输出信号为0-24V。
 可加外置或插头式信号变送模块将电位计信号转换为其他信号输出, 如供电电压为24V或15-24V的时候, 此时若需要0-5V、0-10V、-10-10V、4-20mA、RS485等信号输出方式的, 可另加选我司外置信号变送模块(注: 供电电压12-24V的时候, 0-5V、0-10V输出的信号变送模块也可工作), 具体型号请见外置或插头式信号变送模块选型资料。
V1: 内置信号变送模块, 电压0-5V输出, 供电电压8-24V **V2:** 内置信号变送模块, 电压0-10V输出, 供电电压12-24V
V3: 内置信号变送模块, 电压5-5V输出, 供电电压12-24V **V4:** 内置信号变送模块, 电压-10-10V输出, 供电电压12-24V
A1: 内置信号变送模块, 电流4-20mA输出, 三线制, 供电电压15-24V **A2:** 内置信号变送模块, 电流4-20mA输出, 二线制, 供电电压15-24V
RS: 内置信号变送模块, RS485数字信号输出, 供电电压15-24V
注意: 模块内置时, 电子尺主体长度会略微加长20mm-50mm左右, 具体尺寸请咨询我们。

有效行程(mm): 5~5000(不同款型可选长度不同, 请参照产品内页的选型参考)

产品款型:

KTC1/LWH1: 位移通用拉杆式, KTC1为KTC的升级款
KTM、KTC2/LWH2、KPM12、KPM9、KSD、KSE: 微型拉杆式
KPM12J/KPM16/KPM18/KPM22/KPM23: 微型铰接安装拉杆式(数字代表圆形铝管直径)
WY-01、WY-02: 加强密封型: 加强防尘防水/油拉杆式, 水泥辊压机等场合用
KFM、KSF: 微型滑块式
KSC、KSP、KS8、KS8X、KSN、KST、KPM12R1、KPM12R2: 微型弹簧自复位式
KSC、KSP、KSN、KPM12R2: 法兰螺纹安装微型弹簧自复位式
LEP、KEP、LEPF: 无电刷防水防尘
PME12、PME14、PME17、PMI: 磁阻悬浮磁环式: 超级防尘防水防油污, 其中PMI可以在水下使用
WDL/1/2/3/4/5/6: 小型拉杆式
KPC1: 绞接安装拉杆式, KPC1为KPC的升级款
KPF: 法兰盘安装拉杆式
KTF/TLH、KTF1、KTF2: 位移滑块式, KTF1、KTF2为KTF的升级款
KTR11/KTR12/KTR2/KTR3/KTR4: 弹簧自复位式
TR11/TR12/TR2/TR3/TR4: 弹簧自复位式
PMR: 磁阻式浮球液位计
PMF: 磁阻滑块式

注意:

- 1、请按照以上选型代码顺序进行选型, 如选择的参数代码为“空白”, 就跳过该代码, 填写下一个参数代码。
- 2、如无特别说明: KTC1/KTC/LWH/KTF/TLH/KTF1/KTF2的出线方式默认标配为赫斯曼插头, 不自带电缆线, 如需要带线, 请按以上选型表填写线的长度。
- 3、不是标配赫斯曼插头的产品, 有常规出线、防水接头出线、航空插头出线等方式, 大部分默认自带1米屏蔽电缆线, 如需要加长线缆, 请在选型代码中表示出来。

产品选型汇总 Product Selection Summary

KTC1 - 500mm - - - - - -

Other requirements:
Blank: Standard product, product does not have special requirements in the "MT" code
MT: 1. There are modification requirements, such as a straight tail wire with screws or fish eyes at the tail [KPM (16, 18, 22, 23)/KPC/KPC1 optional];
 2. Other special requirements of non-standard products, such as: resistance value non-standard, installation method non-standard, size non-standard, label non-standard (neutral packaging or hit the customer requirements of the model name).
Where there are special requirements, the specific non-standard modifications should be marked on the outer packaging of the product and the main body of the product itself to facilitate subsequent inspection.
GD: Anti-slip/anti-loose fixing nut for sliding core.
JM: reinforced seal core (die-casting machine special core).
CH: Zhenxiong Zhende Exclusive
If the above requirements exist at the same time, you can add a "/" in the middle, such as GD/JM: represents the non-slip fixing nut for the slip core, and strengthens the sealing shaft core.

Installation bracket requirements:
Blank: without bracket, or with hardware bracket: KTC1/KTC/LWH/WDL/KTM/KTC2/LWH2/KTR/KTF/KTF1/TLH/KFM/KPM12/KPM16/KPM18 series default to standard hardware bracket
SZ: Plastic bracket (KPM12/KPM16/PME12 optional)
LZ: Aluminum alloy bracket (KTC/KTM/KTR/KFM/KPM12/KPM16/KPM18/PME12/PME14 and other models are optional)

Is it equipped with universal joints or types of universal joints:
Blank: No universal joint or standard universal joint **W1:** Extended universal joint **YW:** fisheye universal joint

Is there a cable installed and how long is the cable installed:
Blank: Products that represent Hermann plugs do not come with a built-in cable by default, or products that represent non Hermann plugs come with a 1-meter cable by default.
1: Only represents Hermann plug products with 1 meter cable. **Note: Other products that are not Hermann plugs come with a 1-meter cable by default, so there is no need to select the number code "1".**
2-2000: represents how many meters of cable need to be extended, measured in meters per meter. 2 represents an extension to 2 meters of cable, 5 represents an extension to 5 meters of cable...

Is it equipped with a Hermann plug or the type of Hermann plug:
Blank: No Hermann plug or standard H1 Hermann plug
H2: Equipped with H2 Hesmman plug, please refer to our Hesmman plug information page for specific introduction.
H3: Equipped with H3 Hesmman plug, please refer to our Hesmman plug information page for specific introduction.
H4: Equipped with H4 Hesmman plug, please refer to our Hesmman plug information page for specific introduction.

Signal output type:
Blank: default standard configuration, without built-in signal transmission module, resistance output type (0-100% given input working voltage, changing with displacement), that is, potentiometer principle output, power supply voltage can be 0-24V (default standard configuration), that is, if the power supply voltage is 5V, the output signal is 0-5V; if the power supply voltage is 10V, then the output signal is 0-10V; if the power supply voltage is 24V, the output signal is 0-24V.
 External or plug type signal transmission modules can be added to convert potentiometer signals into other signal outputs. For example, when the power supply voltage is 24V or 15-24V, if 0-5V, 0-10V, -10-10V, 4-20mA, RS485 and other signal output methods are required, our company's external signal transmission module can be selected separately (note: when the power supply voltage is 12-24V, the signal transmission modules outputting 0-5V and 0-10V can also work). For specific models, please refer to the selection information of external or plug type signal transmission modules.
V1: Built in signal transmission module, output voltage of 0-5V, supply voltage of 8-24V
V2: Built in signal transmission module, voltage 0-10V output, power supply voltage 12-24V
V3: Built in signal transmission module, voltage output of -5-5V, power supply voltage of 12-24V
V4: Built in signal transmission module, voltage output of -10-10V, power supply voltage of 12-24V
A1: Built in signal transmission module, current 4-20mA output, three wire system, power supply voltage 15-24V
A2: Built in signal transmission module, current 4-20mA output, two wire system, power supply voltage 15-24V
RS: Built in signal transmission module, RS485 digital signal output, power supply voltage 15-24V
Attention: When the module is built-in, the length of the electronic ruler body will be slightly extended by about 20mm-50mm. Please consult us for specific dimensions.

Effective stroke (mm):5-5000 (Different models can have different lengths, please refer to the range selection reference on the product's inner page)

Product type:

KTC1/LWH1: Displacement universal pull rod type, KTC1 is an upgrade of KTC
KTM, KTC2/LWH2, KPM12, KPM9, KSD, KSE: Micro tie rod
KTF/TLH, KTF1, KTF2: displacement slider type, KTF1, KTF2 are upgrades of KTF
KTR11 KTR12 / KTR2 / KTR3 / KTR4: spring reset type
KSC, KSP, KS8, KS8X, KSN, KST, KPM12R1, KPM12R2: mini spring self-resetting
KSC, KSP, KSN, KPM12R2: Flange-mounted micro spring self-resetting
TR11/TR12/TR2/TR3/TR4: spring self-resetting
PME12, PME14, PME17, PMI: magnetic resistance suspension magnetic ring: super dustproof, waterproof and oil proof, PMI can be used underwater
KPM12J KPM16 / KPM18 / KPM22 / KPM23: micro articulated installation rod type (number represents the round aluminum tube diameter)
WY-01, WY-02: reinforced sealing type: reinforced dustproof and waterproof/oil-pull rod type, cement roller press and other occasions.

WDL/1/2/3/4/5/6: Small pull rod type
KPC1: The KPC1 is an upgrade of the KPC
KFM, KSF: Miniature slider type
LEP, KEP, LEPP: brushless waterproof and dustproof
KPF: Flange-mounted tie rod type
PMR: Magnetoresistive float ball level gauge
PMF: Magnetoresistive slider type

Attention: 1. Please follow the order of selection codes above. If the selected parameter code is "blank", skip the code and fill in the next parameter code.
 2. Unless otherwise specified: The default wiring method for KTC1/KTC/LWH/KTF/TLH/KTF1/KTF2/is a Hermann plug, which does not come with its own cable. If a cable is required, please fill in the length of the cable according to the selection table above.
 3. Not standard with Hersman plug products, conventional outlet, waterproof connector outlet, aviation plug outlet, etc., most of the default comes with 1 meter shielded cable, if you need to extend the cable, please indicate it in the selection code.

KTC1(LWH):新款KTC通用拉杆式直线位移传感器

KTC1 (LWH): New KTC Universal pull rod linear displacement sensor

产品实物图 Physical Products Pictures

KTC1/LWH

赫斯曼插头式 Hersman plug type



KTC1C/LWHC

防水接头式 Waterproof joint type



KTC1P/LWHP

航空插头式 Aviation plug type



配件选择 Accessory selection:

<p>H1赫斯曼插头 (标配) H1 Hermann plug (standard)</p>		<p>其他赫斯曼插头 (可选) Other Hermann plugs (optional) 详情请见第23页 Please refer to page 23 for details</p>	
<p>万向节 (标配) Universal joint (standard)</p>		<p>加长万向节 (可选) Extended universal joint (optional)</p>	
<p>鱼眼万向节 (可选) Fish eye universal joint (optional)</p>			
<p>专利产品 Patented product 外观设计专利号 Design Patent Number: ZL 2014 3 0127414.1 实用新型专利号 Utility model patent number: ZL 2014 2 0241635.6</p>			

产品简介 Product Introduction

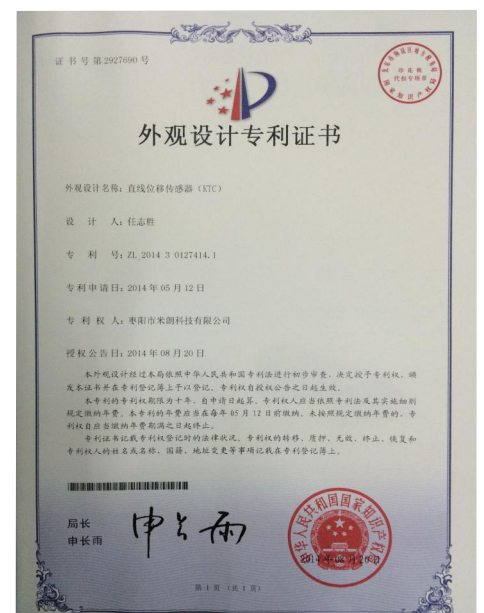
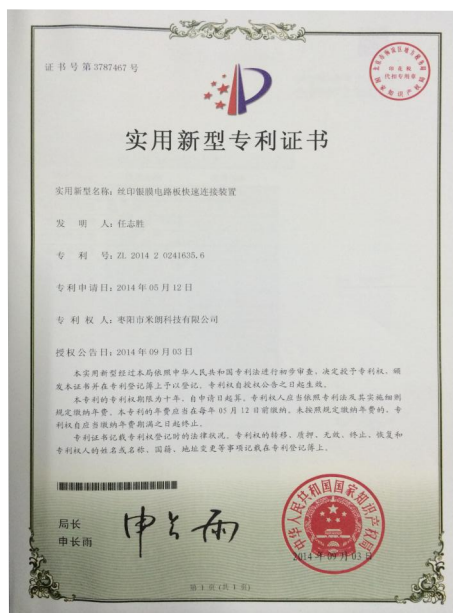
KTC1系列是本公司结合十几年的生产制造经验和客户使用反馈意见,经工程部和研发部共同优化升级改良而成,产品外观、内部结构、材质、生产工艺、技术参数以及密封等级等参数都进行了大幅度升级,原材料均采用原装进口,生产制造完全采用目前国际同行业先进技术及工艺,产品经过一亿次的往复运动寿命试验后,各项性能指标和技术参数仍然符合行业最高标准。其信号输出端与线板连接装置获国家实用新型专利,产品外观获得国家外观设计专利。

The KTC1 series is a combination of our company's over a decade of production and manufacturing experience, as well as customer feedback. Through joint optimization, upgrading, and improvement by the engineering and research and development departments, the product's appearance, internal structure, material, production process, technical parameters, and sealing level have been significantly upgraded. The raw materials are all imported from the original equipment, and the production and manufacturing are completely using advanced technologies and processes in the same industry internationally. After 100 million cycles of reciprocating motion life tests, the product's performance indicators and technical parameters still meet the highest industry standards. The signal output end and the wiring board connection device have obtained a national utility model patent, and the product appearance has obtained a national design patent.

该系列传感器用于测量和控制系统中,对位移和长度进行直接和绝对测量。工作量程最大达1250mm以及高分辨率(0.01mm)可提供精确的线性位移测量。传感器的结构设计上考虑方便安装及拆卸。传感器内外结构表面经过特殊处理,可在高速低磨损状态下工作。传感器前端的柔性缓冲轴承可以克服传动杆的一些微小侧向应力,保证传感器正常工作。传感器导电材料固定和结构设计等工艺保证即使在最恶劣的条件下传感器也能可靠工作。

This series of sensors is used for direct and absolute measurement of displacement and length in measurement and control systems. The maximum working range is 1250mm and the high resolution (0.01mm) provides accurate linear displacement measurement. The structural design of the sensor considers convenience for installation and disassembly. The inner and outer surfaces of the sensor have undergone special treatment, allowing it to operate at high speeds and low wear conditions. The flexible buffer bearing at the front end of the sensor can overcome some small lateral stresses on the transmission rod, ensuring the normal operation of the sensor. The process of fixing conductive materials and structural design of sensors ensures that they can work reliably even under the most adverse conditions.

专利证书 Patent Certificate



选型说明 Physical Products Pictures



其他要求:
空白: 标准品, 产品没有“MT”代码中的特殊要求
M T: 1、有改装要求, 如:尾部直出线, 并且尾部有螺杆或者有鱼眼[KPM(16、18、22、23)/KPC/KPC1可选]等改装要求;
 2、其他特殊要求的非标产品, 如: 阻值非标、安装方式非标、尺寸非标、标签非标(中性包装或者打客户要求型号标示名称)等。
凡是有特殊要求, 要在产品外包装及产品本身上标明具体非标修改情况, 便于后续验货查看。
G D: 滑芯用防滑/防松固定螺母。
J M: 加强密封轴芯(压铸机专用轴芯)。
C H: 震雄震德专用
如以上要求同时存在, 可以中间加“/”, 如GD/JM: 代表滑芯用防滑固定螺母, 并且加强密封轴芯。
Other requirements:
Blank: Standard product, product does not have special requirements in the "MT" code
MT: 1. There are modification requirements, such as a straight tail wire with screws or fish eyes at the tail [KPM (16, 18, 22, 23)/KPC/KPC1 optional];
 2. Other non-standard products with special requirements, such as: resistance value non-standard, installation method non-standard, size non-standard, label non-standard (neutral packaging or hit the model name required by the customer).
Where there are special requirements, the specific non-standard modifications should be marked on the outer packaging of the product and the main body of the product itself to facilitate subsequent inspection.
GD: anti-slip/anti-loose fixing nut for sliding core.
JM: reinforced seal core (die-casting machine special core).
CH: Zhenxiong Zhende Exclusive
If the above requirements exist at the same time, you can add a "/" in the middle, such as GD/JM: represents the non-slip fixing nut for the slip core, and strengthens the sealing shaft core.

是否配有万向节或者万向节种类:
空白: 标配标准万向节 **W1:** 加长万向节 **YW:** 鱼眼万向节
Is it equipped with universal joints or types of universal joints:
Blank: Standard universal joint as standard **W1:** Extended universal joint **YW:** fisheye universal joint

是否配有电缆线, 配多长的电缆线:
空白: 赫斯曼插头的产品标配不自带电缆线
1: 只代表赫斯曼插头产品带1米电缆线。注意: 其他非赫斯曼插头的产品默认自带1米线, 不用选该数字代码“1”
2~2000: 代表需要加长到多少米的电缆线, 单位是m/米, 2代表加长到2米电缆线, 5代表加长到5米电缆线……
Is there a cable installed and how long is the cable installed:
Blank: The product of Hesmman plug does not come with its own cable as standard
1: Only represents Hesmman plug products with 1 meter cable. Note: Other products that are not Hesmman plugs come with a 1-meter cable by default, so there is no need to select the number code "1".
2-2000: represents how many meters of cable need to be extended, measured in meters per meter, 2 represents an extension to 2 meters of cable, 5 represents an extension to 5 meters of cable...

是否配有赫斯曼插头或者赫斯曼插头种类:
空白: 该系列产品标配H1赫斯曼插头 **H2:** 配H2赫斯曼插头, 该插头具体介绍请见我司赫斯曼插头资料页面
H3: 配H3赫斯曼插头, 该插头具体介绍请见我司赫斯曼插头资料页面 **H4:** 配H4赫斯曼插头, 该插头具体介绍请见我司赫斯曼插头资料页面
Is it equipped with a Hesmman plug or the type of Hesmman plug:
Blank: This series of products comes standard with H1 Hesmman plug
H2: Equipped with H2 Hesmman plug, please refer to our Hesmman plug information page for specific introduction.
H3: Equipped with H3 Hesmman plug, please refer to our Hesmman plug information page for specific introduction.
H4: Equipped with H4 Hesmman plug, please refer to our Hesmman plug information page for specific introduction.

信号输出类型:
空白: 默认标配, 没有内置信号变送模块, 电阻输出:5KΩ、10KΩ(0-100%给定输入工作电压, 随位移变化而变化), 即电位计原理输出, 供电电压0-24V皆可(默认标配), 即:如供电电压为5V, 那么输出信号为0-5V; 如供电电压为10V, 那么输出信号为0-10V; 如供电电压为24V, 那么输出信号为0-24V。
 可加外置或插头式信号变送模块将电位计信号转换为其他信号输出, 如供电电压为24V或15-24V的时候, 此时若需要0-5V、0-10V、-10-10V、4-20mA、RS485等信号输出方式的, 可另加选我司外置信号变送模块(注: 供电电压12-24V的时候, 0-5V、0-10V输出的信号变送模块也可工作), 具体型号请见外置或插头式信号变送模块选型资料。
V1: 内置信号变送模块, 电压0-5V输出, 供电电压8-24V **V2:** 内置信号变送模块, 电压0-10V输出, 供电电压12-24V
V3: 内置信号变送模块, 电压-5-5V输出, 供电电压12-24V **V4:** 内置信号变送模块, 电压-10-10V输出, 供电电压12-24V
A1: 内置信号变送模块, 电流4-20mA输出, 三线制, 供电电压15-24V **A2:** 内置信号变送模块, 电流4-20mA输出, 二线制, 供电电压15-24V
RS: 内置信号变送模块, RS485数字信号输出, 供电电压15-24V
注意: 模块内置时, 电子尺主体长度会略微加长20mm-50mm左右, 具体尺寸请咨询我们。

Signal output type:
Blank: Default standard configuration, without built-in signal transmission module, resistance output type: 5KΩ, 10KΩ (0-100% given input working voltage, changing with displacement), that is, the principle output of the potentiometer, the power supply voltage can be 0-24V (default standard configuration), that is, if the power supply voltage is 5V, the output signal is 0-5V; if the power supply voltage is 10V, then the output signal is 0-10V; if the power supply voltage is 24V, the output signal is 0-24V. External or plug-in signal transmission modules can be added to convert potentiometer signals into other signal outputs. For example, when the power supply voltage is 24V or 15-24V, if signal output methods such as 0-5V, 0-10V, -10-10V, 4-20mA, RS485, etc. are required, our external signal transmission module can be selected separately (note: when the power supply voltage is 12-24V, signal transmission modules outputted from 0-5V and 0-10V can also work). For specific models, please refer to the selection information of external or plug-in signal transmission modules
V1: Built in signal transmission module, output voltage of 0-5V, supply voltage of 8-24V
V2: Built in signal transmission module, voltage 0-10V output, power supply voltage 12-24V
V3: Built in signal transmission module, voltage output of -5-5V, power supply voltage of 12-24V
V4: Built in signal transmission module, voltage output of -10-10V, power supply voltage of 12-24V
A1: Built in signal transmission module, current 4-20mA output, three wire system, power supply voltage 15-24V
A2: Built in signal transmission module, current 4-20mA output, two wire system, power supply voltage 15-24V
RS: Built in signal transmission module, RS485 digital signal output, power supply voltage 15-24V
Attention: When the module is built-in, the length of the electronic ruler body will be slightly extended by about 20mm-50mm. Please consult us for specific dimensions.

有效行程(mm): 0~1250(1250mm有效行程以内均可选择, 详情请参照量程选型参考)
Effective stroke (mm): 0-1250(Within 1250mm effective stroke, all options are available. For details, please refer to the range selection reference)

产品款型: KTC1、KTC、LWH: 位移通用拉杆式, KTC1为KTC的升级款
Product Style: KTC1, KTC, LWH: displacement universal pull rod type, KTC1 is an upgraded version of KTC

注意: 1、请按照以上选型代码顺序进行选型, 该型号标配的参数代码为“空白”。
2、如无特别说明: KTC1/KTC/LWH的出线方式默认标配为赫斯曼插头, 不自带电缆线, 如需要带线, 请按以上选型表填写线的长度。
3、不是标配赫斯曼插头的产品, 有常规出线、防水接头出线、航空插头出线等方式, 都默认自带1米屏蔽电缆线, 如需要加长线缆, 请在选型代码中表示出来。

Attention: 1. Please select according to the order of the selection codes above. The parameter code for this model is blank.
2. Unless otherwise specified: The default wiring method for KTC1/KTC/LWH is a Hesmman plug, which does not come with its own cable. If a cable is required, please fill in the length of the cable according to the selection table above.
3. Products that do not come with standard Hesmman plugs come with standard outlets, waterproof connectors, aviation plugs, etc. They all come with a 1-meter shielded cable by default. If you need to extend the cable, please indicate it in the selection code.

产品补充说明 Product Supplement

外壳 Housing	硬制阳极氧化铝 Hard anodized aluminum oxide	滑刷组件 Sliding brush component	贵金属多触脚滑刷，带弹性阻尼 Precious metal multi touch foot sliding brush with elastic damping
安装 Install	划入式可调节固定卡钳 Insert type adjustable fixed calipers	电阻元件 Resistance	导电塑料 Conductive plastics
拉杆 Bar	不锈钢，可旋转，M6外螺纹 Stainless steel, rotatable, M6 external thread	电气连接 Electrical connections	标准4极镀银赫斯曼插座 Standard 4-pole silver plated Hersmann socket
轴承 Bearing	柔性回转缓冲滑动轴承 Flexible rotary buffering sliding bearing		航空插头式4极 Aviation plug type 4-pole
			防水接头式4极 Waterproof joint type 4-pole

标准发货配件 Standard Shipped Parts



注意事项 Matters Need Attention



①

选配锁紧螺母固定
Lock nuts are optional

②

标配双卡簧固定
Standard double circlip fixed

电子尺滑芯用于震动较大场合时，若使用标配双卡簧结构固定拉杆容易脱落，可采用锁紧螺母固定方案，代替标配双卡簧固定方案。如图①，滑芯外用锁紧螺母固定，并用螺纹专用防松胶加固。若使用锁紧螺母固定方案，下单时型号后面需带-GD，例如KTC1-100mm-GD, 详见选型。

多用于注塑机顶针等拉杆容易拉脱的场合，左图①为选配锁紧螺母固定，右图②为标配双卡簧固定。

When the sliding core of the electronic ruler is used for large vibration occasions, if the fixed tie rod is easy to fall off using the standard double spring structure, the locking nut fixing scheme can be used instead of the standard double spring fixing scheme. As shown in Figure 1, the sliding core is fixed with a locking nut and reinforced with a special thread locking adhesive. If the locking nut fixing solution is used, the model should be followed by -GD when ordering, such as KTC1-100mm-GD, see the selection for details.

It is mainly used for the occasions when the pull rod such as the injection molding machine's thimble is easy to pull off. The left figure (1) is fixed with the locking nut, and the right figure (2) is fixed with the double clamping spring as the standard.

标准技术参数 Standard Technical Parameters

注意事项: 在下列数据表中所列的线性度、使用寿命等数值是传感器工作在以运算放大器作为电压输出器输出电压给滑刷,且滑刷上不带负载($I_e \leq 10\mu A$)的条件得出的。

Notes: The linearity, service life, and other values listed in the following data table indicate that the sensor operates with an operational amplifier as the voltage output to the sliding brush, and the sliding brush is not loaded ($I_e \leq 10 \mu A$) Derived from the conditions.

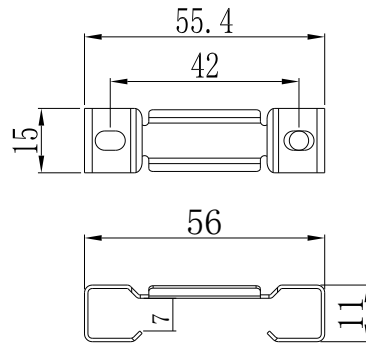
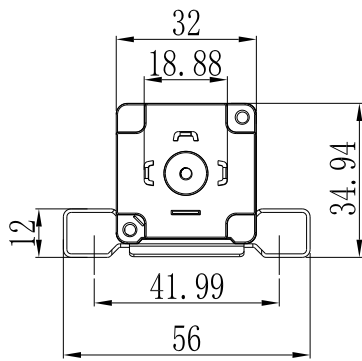
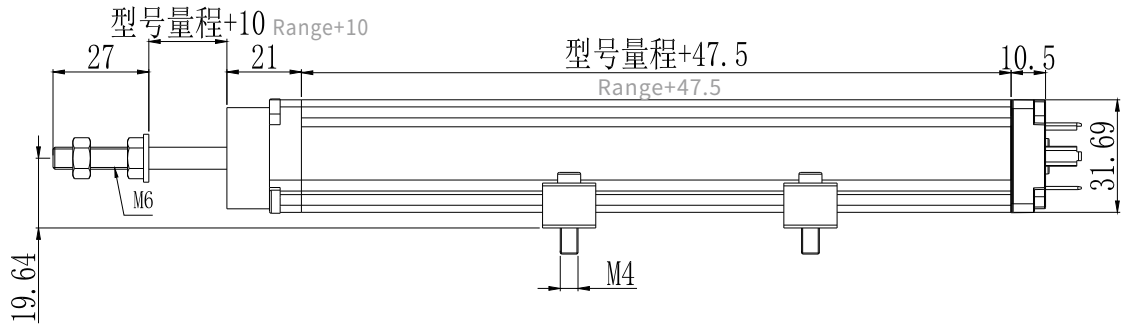
	KTC1通用拉杆系列 KTC1 universal pull rod series	50~150mm	175~550mm	600~1250mm	量程选型参考: Range selection reference:
电气参数 Electrical parameters	独立线性度(±%) Independent linearity (±%)	0.1%	0.05%	0.05%	单位:mm Unit: mm
	电阻公差±10% Resistance tolerance ± 10%	5.0KΩ		10.0KΩ	50 75 100
	电气行程 Electrical stroke	量程+3mm Range+3mm			110 125 130
	解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing			150 175 200
	可重复性 Repeatability	0.01mm			225 250 275
	滑刷正常工作电流 Normal working current of the sliding brush	$\leq 10\mu A$			300 325 350
	致故障时滑刷的最大电流 The maximum current of the sliding brush during the fault	10mA			360 375 400
	最大允许工作电压 Maximum allowable working voltage	36V			425 450 475
	输出电压与输入电压的有效温度系数比 The effective temperature coefficient ratio of output voltage to input voltage	通常5ppm/K Usually 5ppm/K			500 550 600
	绝缘阻抗(500VDC) Insulation impedance (500VDC)	$\geq 10M\Omega$			650 700 750
绝缘强度(500VAC,50Hz) Insulation strength (500VAC, 50Hz)	$\leq 100\mu A$			800 850 900	
机械参数 Mechanical parameters	外壳长度(A) Shell length (A)	量程+78.5mm Range+78.5mm			950 1000
	机械行程(B) Mechanical stroke (B)	量程+8mm Range+8mm			1150 1250
	拉杆最大承载拉力 The maximum load-bearing tension of the pull rod	50KG			
	工作受力 Work stress	水平方向<10N Horizontal direction < 10N 竖直方向≤10N Vertical direction ≤ 10N			
环境参数 Environmental parameters	抗振动标准 Anti vibration standard	5~2000Hz, $A_{max}=0.8mm, a_{max}=20g$			
	抗冲击标准 Impact resistance standard	50g,11ms			
	工作温度范围 Working temperature range	-60°C~+150°C			
	寿命 life	$> 100 \times 10^6$ 次(time)			
	最大运行速度 Maximum operating speed	10m/S,最大运行加速度10m/s ² 10m/S, maximum operating acceleration 10m/s ²			
防护等级 Protection grade	最高IP67(DIN40500/IEC529) Maximum IP67 (DIN40500/IEC529)				

注: KTC1默认不带线, KTC1C、KTC1P线长1米。

Note: KTC1 does not have a line by default, and KTC1C and KTC1P lines are 1 meter long.

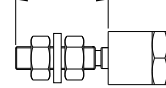
安装尺寸图 Installation Size Chart

单位 unit:mm

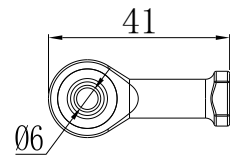


安装支架
Bracket

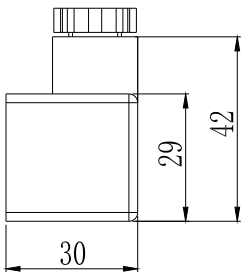
标准28mm Standard 28mm
加长的一款为39mm The extended one is 39mm



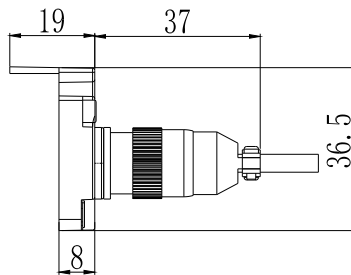
万向节(默认)
Universal joint (default)



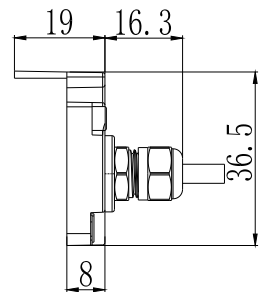
鱼眼接头
Fisheye joint



H1 43650 标准插头式
H1 43650 standard plug



航空插头式
Aviation plug



防水接头式
Waterproof joint

KTC2(LWH2): KTM升级版 微型拉杆式直线位移传感器

KTC2 (LWH2): KTM upgraded miniature tie rod linear displacement sensor

产品实物图 Physical Products Pictures

KTC2

侧出线 Side lead



KTC21

直出线 Straight-line



产品特点 Product Feature

- 专门为注塑机顶针控制以及安装空间受限且运动速度较快的场合设计
Specially designed for injection molding machine thimble control and installation space limited and fast motion occasions
- 结构紧凑
Compact structure
- 使用寿命长，视不同应用场合，运行次数可达1亿次的往复运动
Long service life, depending on different applications, the number of runs can reach 100 million reciprocating movements
- 分辨率优于0.01mm
The resolution is better than 0.01mm
- 线性优异，达±0.05%
Linear excellence, up to ±0.05%
- 可选尾部直出线方式和侧面出线方式
You can select the straight cable from the tail or the side cable
- 信号输出多样，有电位器（默认）、标准电流或电压、RS485等信号输出方式
Various signal output, potentiometer (default), standard current or voltage, RS485 signal output mode
- 抗冲击和振动的性能优异
Excellent resistance to shock and vibration
- 运行速度最高可达10m/S
Operating speed up to 10m/S

标准技术参数 Standard Technical Parameters

	KTC2、LWH2	10mm	15mm	25mm	50-75mm	100-500mm	量程选型参考: Range selection reference:
电气参数 Electrical parameters	独立线性度(±%) Independent linearity (±%)	± 0.1%			±0.1%	±0.05%	单位:mm Unit: mm
	电阻公差±10% Resistance tolerance ± 10%	2KΩ			5KΩ		10 15 25
	电气行程 Electrical stroke	量程+3mm Range+3mm					50 75 100
	解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing					125 150 175
	可重复性 Repeatability	0.01mm					200 225 250
	滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					275 300 350
	致故障时滑刷的最大电流 The maximum current of the sliding brush during the fault	10mA					400 450 500
	最大允许工作电压 Maximum allowable working voltage	36V					
	输出电压与输入电压的有效温度系数比 The effective temperature coefficient ratio of output voltage to input voltage	通常5ppm/K Usually 5ppm/K					
	绝缘阻抗(500VDC) Insulation impedance (500VDC)	≥10MΩ					
	绝缘强度(500VAC,50Hz) Insulation strength (500VAC, 50Hz)	≤100μA					
机械参数 Mechanical parameters	外壳长度(A) Shell length (A)	量程+56mm Range+56mm					
	拉杆最大承载拉力 The maximum load-bearing tension of the pull rod	50KG					
	工作受力 Work stress	水平方向<10N Horizontal direction < 10N					
竖直方向≤10N Vertical direction ≤ 10N							
环境参数 Environmental parameters	抗振动标准 Anti vibration standard	5~2000Hz, A _{max} =0.8mm, a _{max} =20g					
	抗冲击标准 Impact resistance standard	50g, 11ms					
	工作温度范围 Working temperature range	-60°C~+150°C					
	寿命 life	>100x10 ⁶ 次(time)					
	最大运行速度 Maximum operating speed	10m/S, 最大运行加速度200(20g)m/s ² 10m/S, maximum operating acceleration 200(20g)m/s ²					
	防护等级 Protection grade	最高IP67(DIN40500/IEC529) Maximum IP67 (DIN40500/IEC529)					

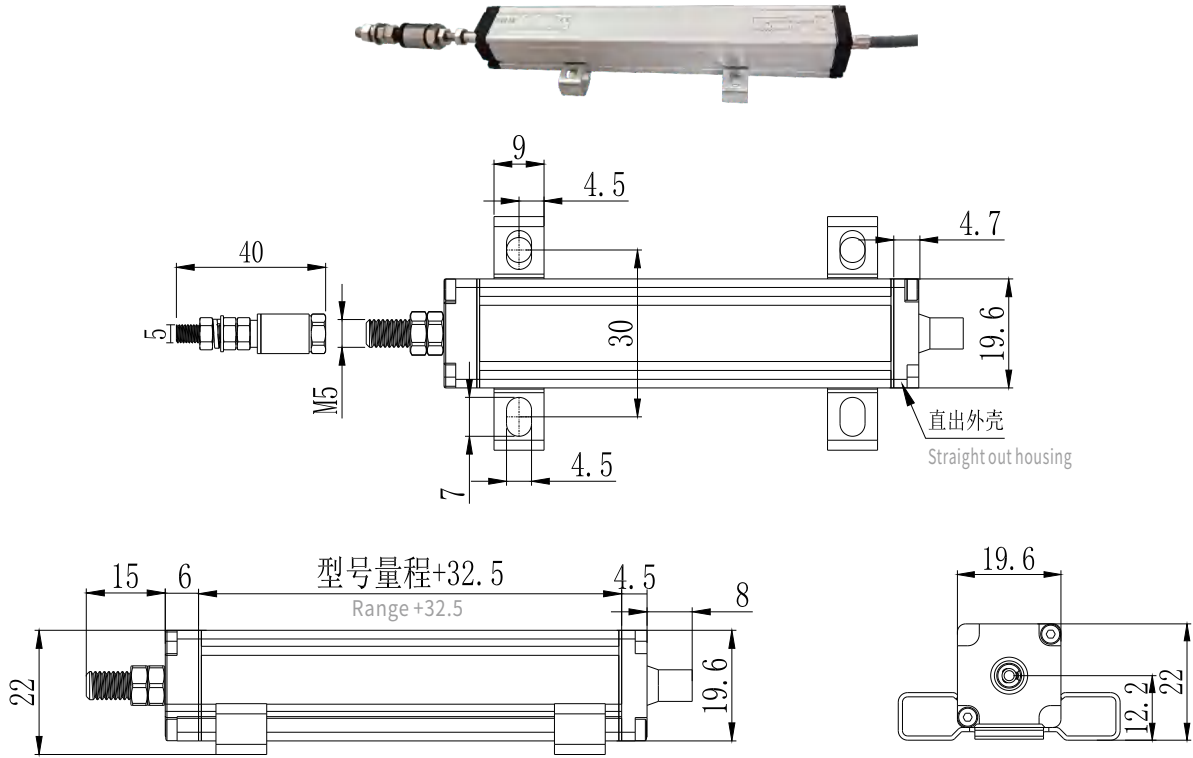
注: KTC2默认出线1米。

Note: KTC2 is 1 meter out by default.

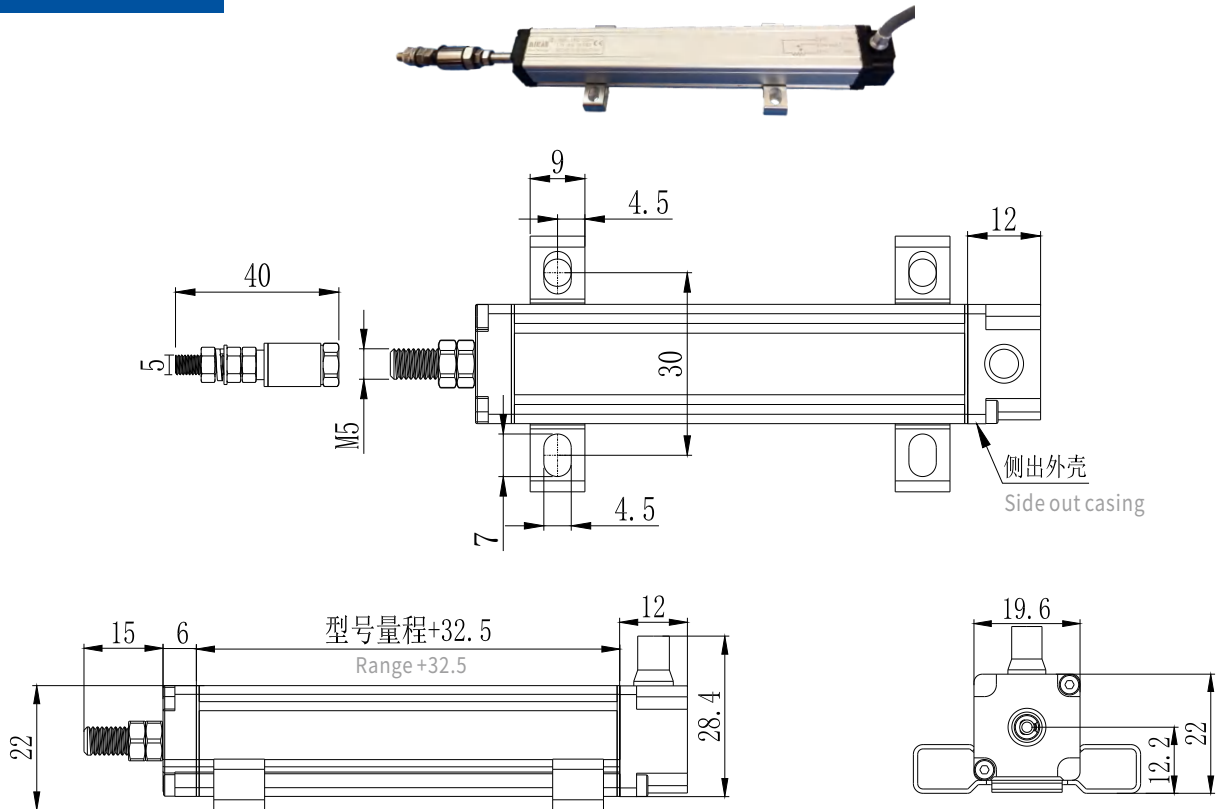
安装尺寸图 Installation Size Chart

单位 unit:mm

KTC2



KTC21



KTC3系列 拉杆式注塑机位移传感器

KTC3 series pull rod injection molding machine displacement sensor

实物及尺寸图 Physical And Dimensional Drawings 单位 units:mm

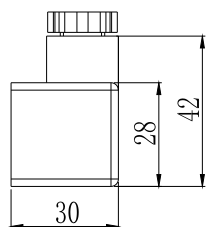
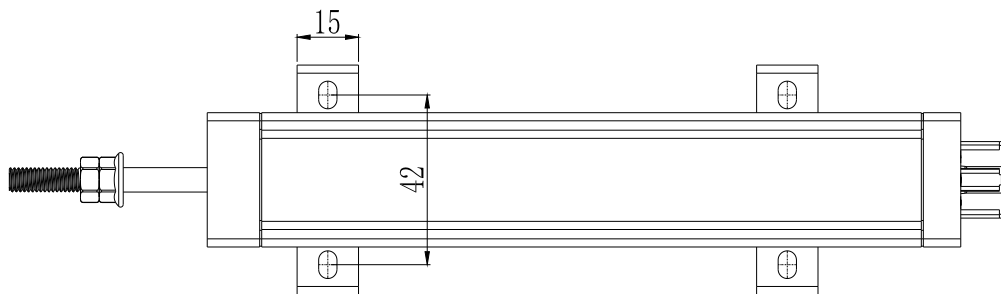
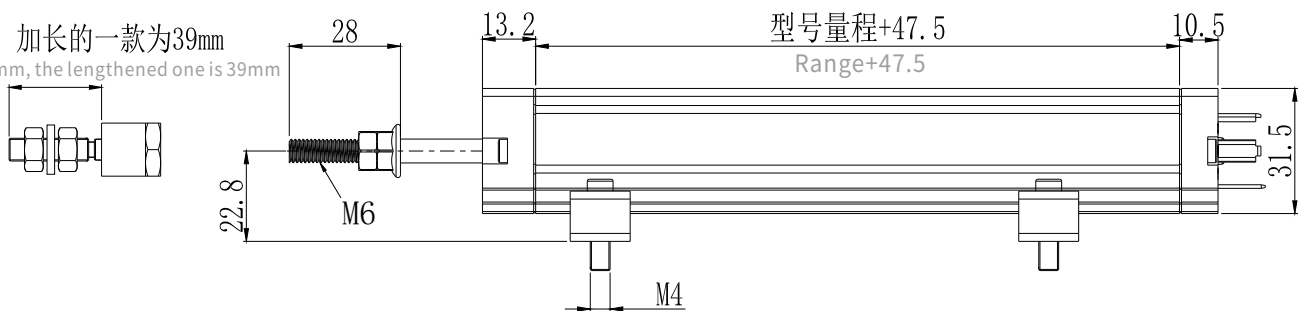
KTC3



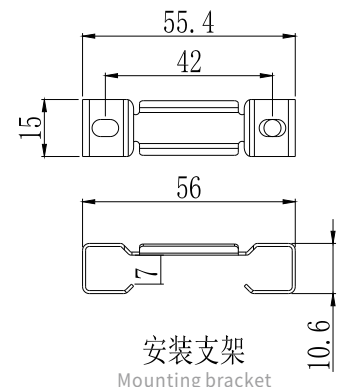
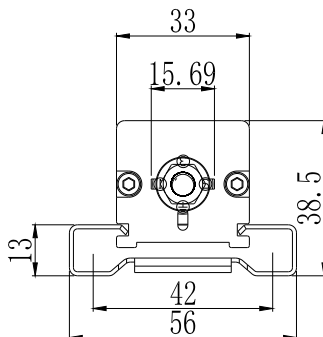
M4螺丝安装
M4 screw mounting

滑入式安装支架
Slide-in mounting bracket

标准28mm, 加长的一款为39mm
Standard 28mm, the lengthened one is 39mm



H1 43650
标准插头式
Standard plug type



安装支架
Mounting bracket

标准技术参数 Standard Technical Parameters

	KTC3通用拉杆系列	50~110mm	125~175mm	200-550mm	600-1250mm	量程选型参考: Range selection reference:
电气参数 Electrical parameters	独立线性度(±%) Independent linearity (±%)	± 0.1%	± 0.05%	± 0.05%	± 0.04%	单位:mm Unit: mm
	电阻公差±10% Resistance tolerance ± 10%	5KΩ			10KΩ	50 75 100
	电气行程 Electrical stroke	量程+3mm Range+3mm				110 125 130
	解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing				150 175 200
	可重复性 Repeatability	0.01mm				225 250 275
	滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				300 325 350
	致故障时滑刷的最大电流 The maximum current of the sliding brush during the fault	10mA				360 375 400
	最大允许工作电压 Maximum allowable working voltage	30V				425 450 475
	输出电压与输入电压的有效温度系数比 The effective temperature coefficient ratio of output voltage to input voltage	通常5ppm/K Usually 5ppm/K				500 550 600
	绝缘阻抗(500VDC) Insulation impedance (500VDC)	≥10MΩ				650 700 750
	绝缘强度(500VAC,50H机械行程z) Insulation strength (500VAC, 50Hz)	≤100μA				800 850 900
	机械参数 Mechanical parameters	外壳长度(A) Shell length (A)	量程+78.5mm Range+78.5mm			
机械行程(B) Mechanical travel (B)		量程+8mm Range+8mm				1150 1250
拉杆最大承载拉力 The maximum load-bearing tension of the pull rod		50KG				
工作受力 Work stress		水平方向<10N Horizontal direction < 10N				
	竖直方向≤10N Vertical direction ≤ 10N					
环境参数 Environmental parameters	抗振动标准 Anti vibration standard	5~2000Hz, A _{max} =0.8mm, a _{max} =20g				
	抗冲击标准 Impact resistance standard	50g, 11ms				
	工作温度范围 Working temperature range	-60°C~+150°C				
	寿命 life	>100x10 ⁶ 次(time)				
	最大运行速度 Maximum operating speed	10m/S, 最大运行加速度10m/s ² 10m/S, maximum operating acceleration 10m/s ²				
	防护等级 Protection grade	最高IP67(DIN40500/IEC529) Maximum IP67 (DIN40500/IEC529)				

注: KTC3默认不带线。

Note: KTC3 has no cable by default.

WDL系列通用小型拉杆式直线位移传感器

WDL series general purpose small pull rod type linear displacement sensor

产品实物图 Physical Products Pictures

型号:WDL(防水接头直出线)

Model: WDL (waterproof joint straight-line)



型号:WDL1(防水接头侧出线)

Model: WDL1 (waterproof joint side lead)



型号:WDL2(航空插头直出线)

Model: WDL2 (aviation plug straight-line)



型号:WDL3(赫斯曼插头侧出线)

Model: WDL3 (Hermann plug side lead)



型号:WDL4(赫斯曼插头侧出线)

Model: WDL4 (Hermann plug side lead)



型号:WDL5(航空插头侧出线)

Model: WDL5 (aviation plug side lead)



型号:WDL6(航空插头直出线)

Model: WDL6 (aviation plug straight-line)



标准技术参数 Standard Technical Parameters

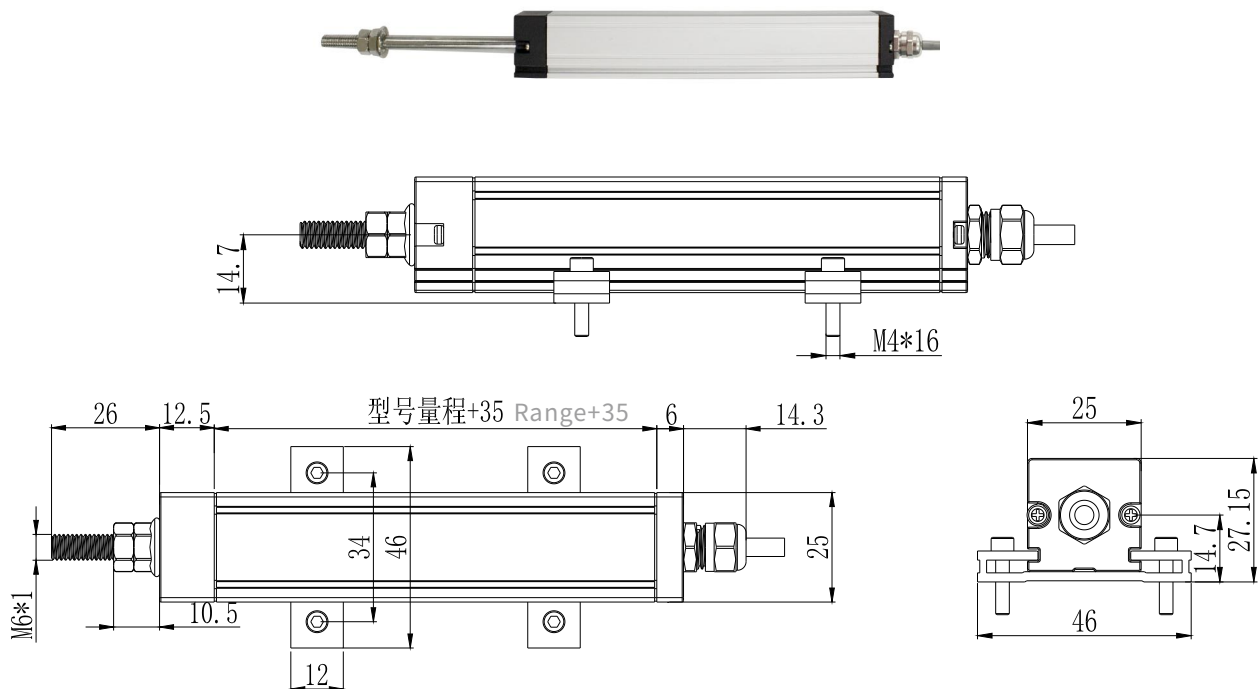
WDL通用拉杆系列 WDL universal pull rod series	50~110mm	125~175mm	200~500mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 50 75 100 125 150 175 200 225 250 275 300 350 400 450 500
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%	±0.1%	±0.05%	
电阻公差±10% Resistance tolerance ± 10%	5.0KΩ			
机械行程 Mechanical travel	行程+7mm Trip+7mm			
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing			
重复性精度 Repeatability accuracy	0.01mm			
最大工作速度 Maximum working speed	10m/S			
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA			
使用温度范围 Operating temperature range	-60°C~+150°C			
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)			
灵敏度 Sensitivity	1			
温漂 Temperature drift	无限小 infinitesimal			

注: WDL3、WDL4默认不带线, WDL、WDL1、WDL2、WDL5、WDL6默认线长1米。
Note: WDL3 and WDL4 have no cable by default. The default cable length of WDL, WDL1, WDL2, WDL5, and WDL6 is 1 meter.

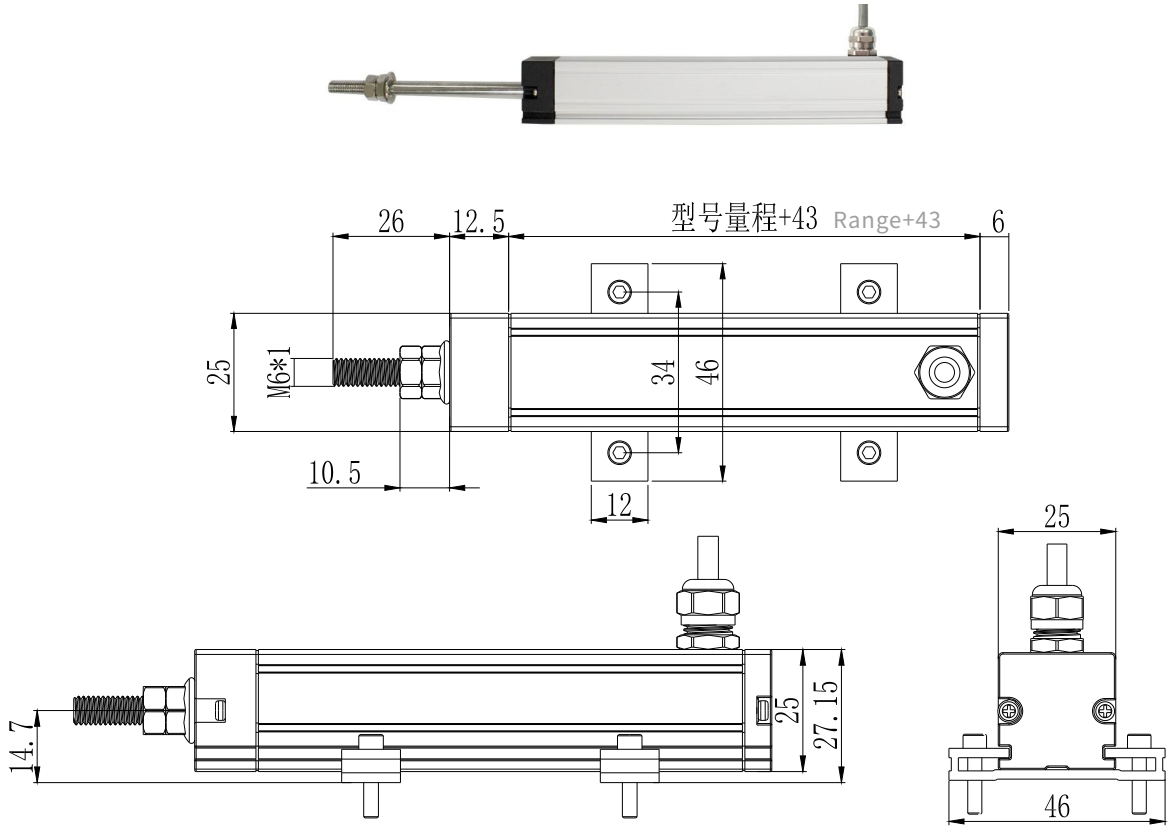
安装尺寸图 Installation Size Chart

单位 unit:mm

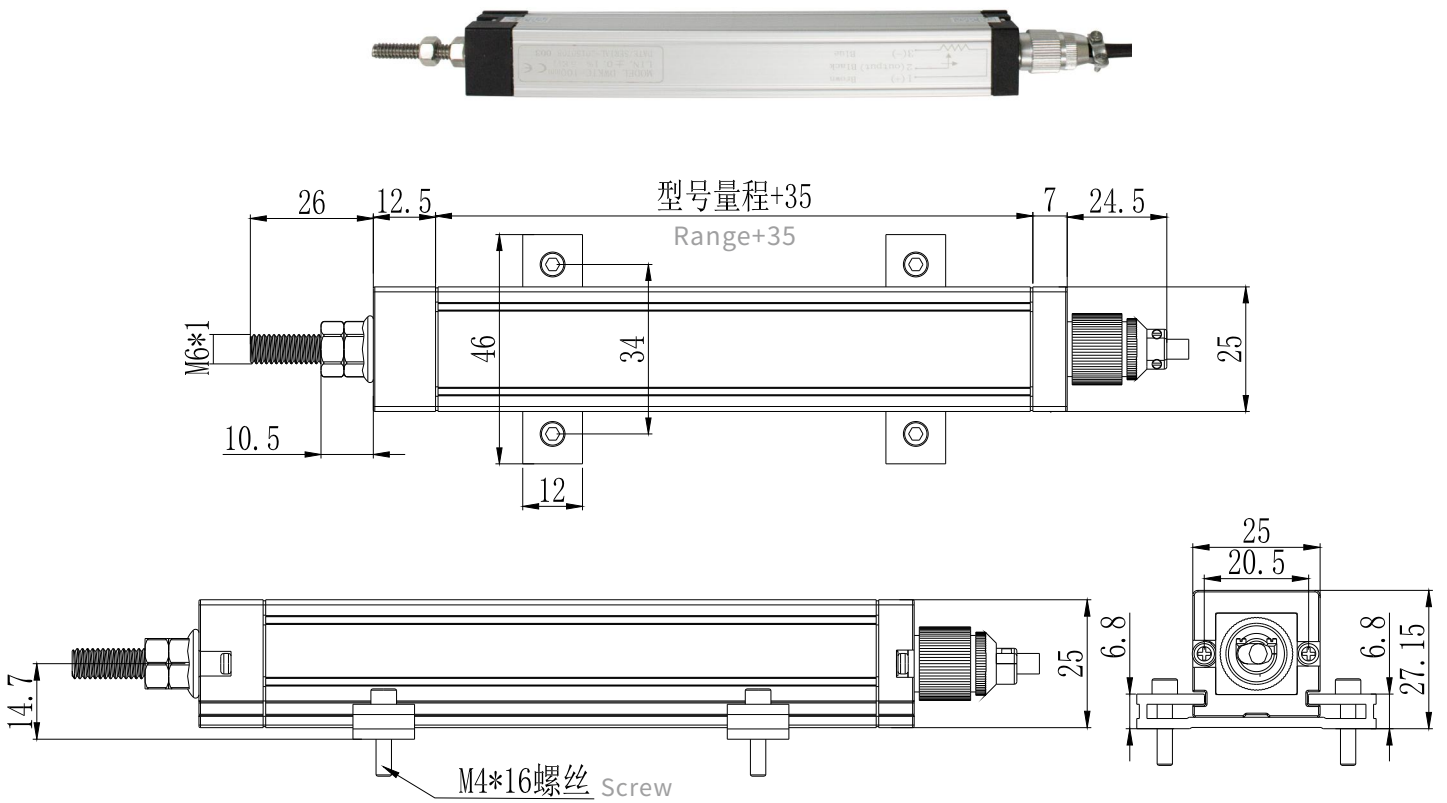
WDL



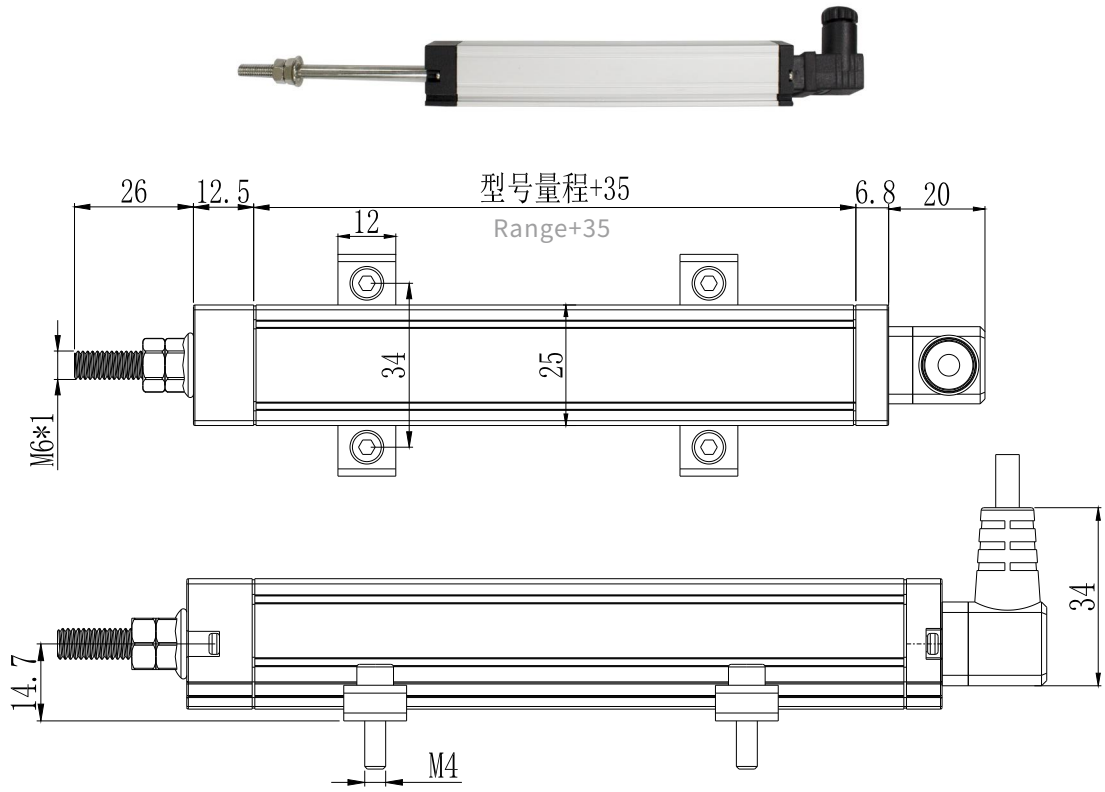
WDL1



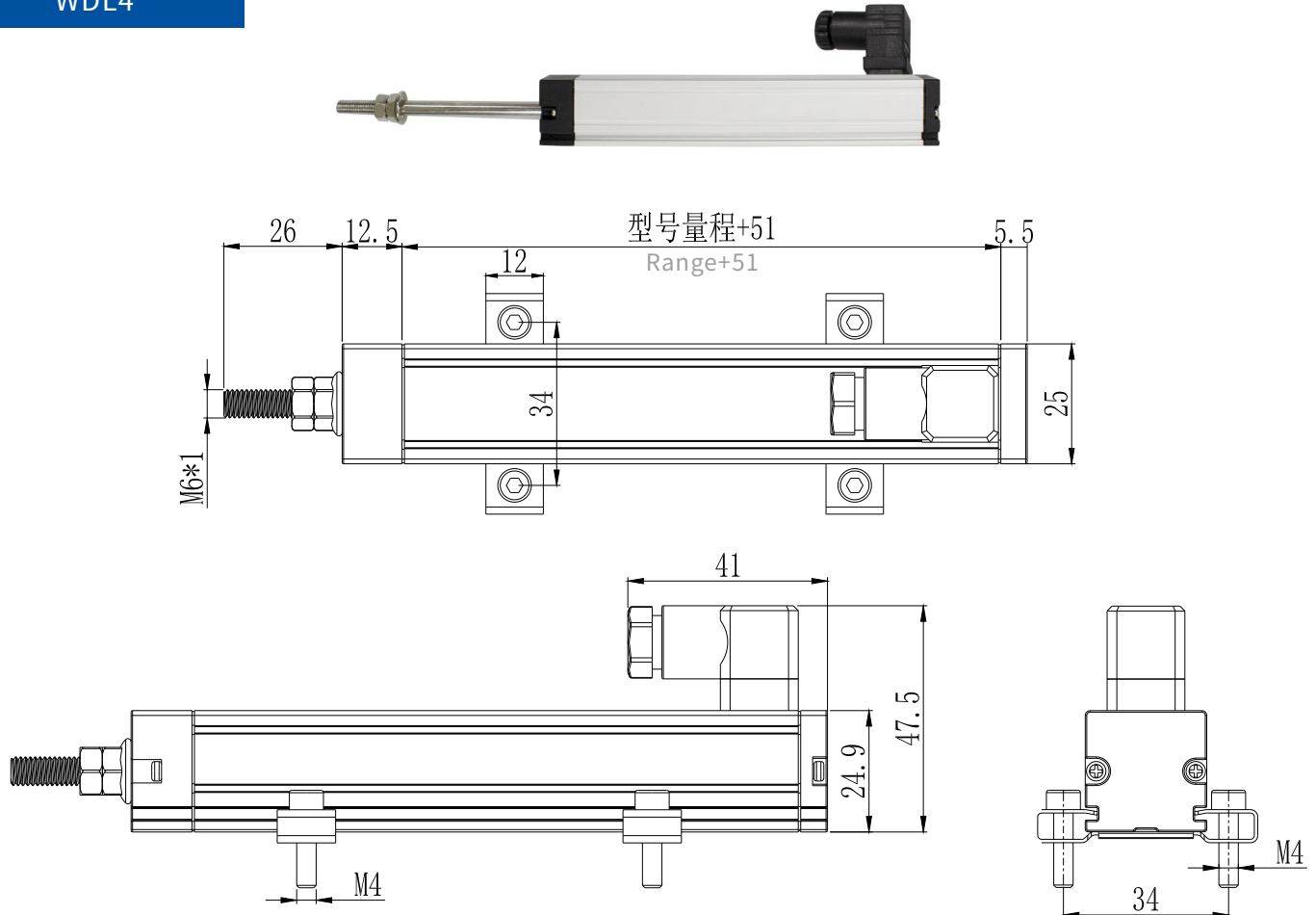
WDL2



WDL3



WDL4



KPC1系列:新款KPC 两端鱼眼铰接式位移传感器

KPC1 series: New KPC two-end fisheye articulated displacement sensor

产品实物图 Physical Products Pictures

KPC1

防水接头侧出线 Cable out from the waterproof connector side



KPC1P

航空插头侧出线 Aviation plug side outlet



KPC1H

赫斯曼插头侧出线 HERSMAN plug side outlet



KPC1-MT

尾部直出线，预应力千斤顶行业专用
Straight out of the tail line, special for prestressed jack industry



标准技术参数 Standard Technical Parameters

KPC1通用铰接系列 KPC1 general articulated series	50~110mm	125~150mm	175~550mm	600~1250mm	量程选型参考: Range selection reference:
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%		±0.05%		单位:mm Unit: mm
电阻公差±10% Resistance tolerance ± 10%	5.0KΩ			10.0KΩ	50 75 100 110 125 130
机械行程 Mechanical travel	行程+7mm Trip+7mm				150 175 200 225 250 275
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing				300 325 350 360 375 400
重复性精度 Repeatability accuracy	0.01mm				425 450 475 500 550 600
最大工作速度 Maximum working speed	10m/S				650 700 750 800 850 900
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				950 1000 1150 1250
使用温度范围 Operating temperature range	-60°C~+150°C				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				注Note: 950 1000 1150 1250
灵敏度 Sensitivity	1				(限垂直安装方式) (vertical installation only)
温漂 Temperature drift	无限小 infinitesimal				

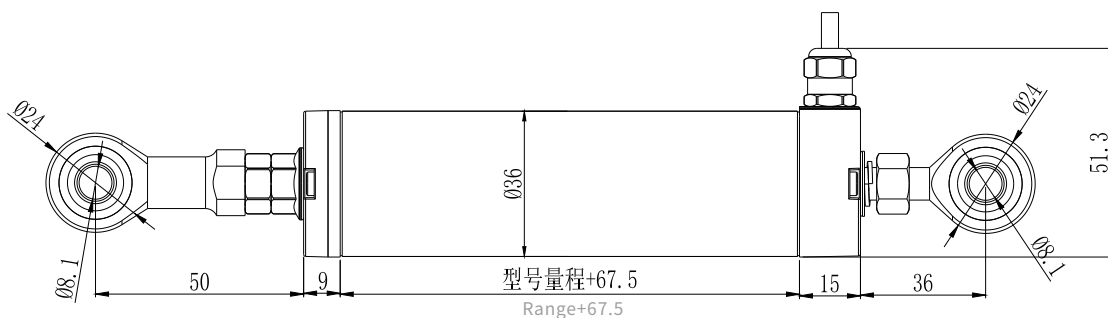
注: KPC1H默认不带线, KPC1、KPC1P、KPC1-MT默认线长1米。

Note: The KPC1H has no cable by default, and the KPC1, KPC1P, and KPC1-MT cables are 1 meter long by default.

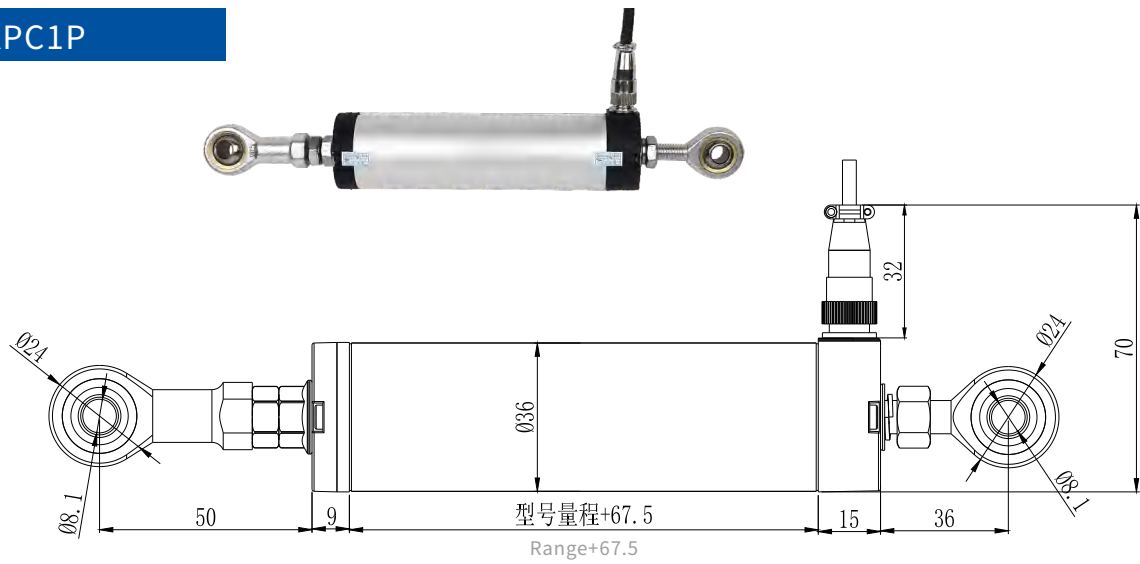
安装尺寸图 Installation Size Chart

单位 units:mm

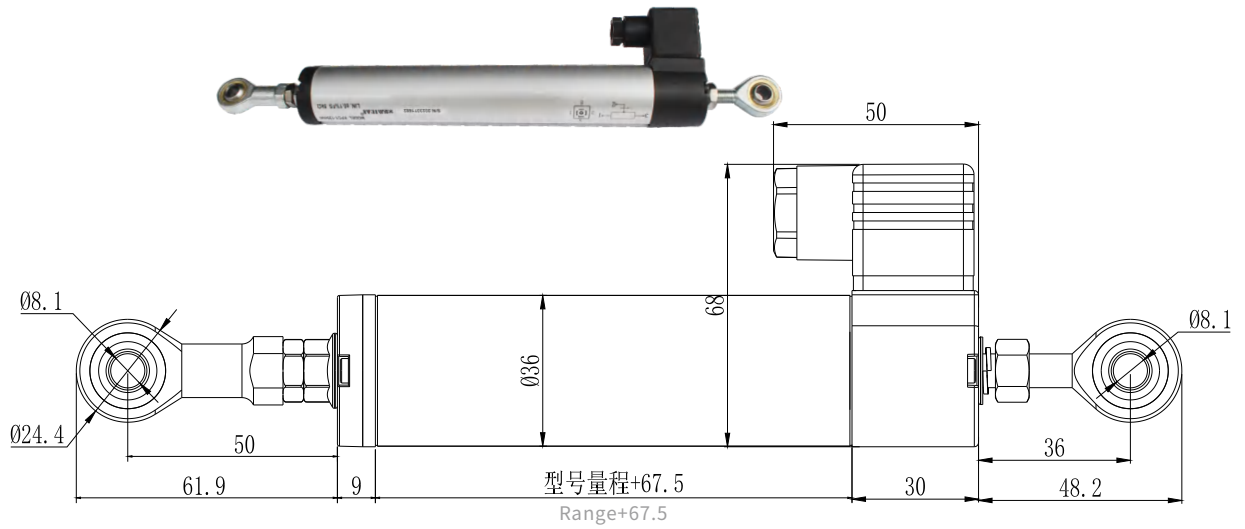
KPC1



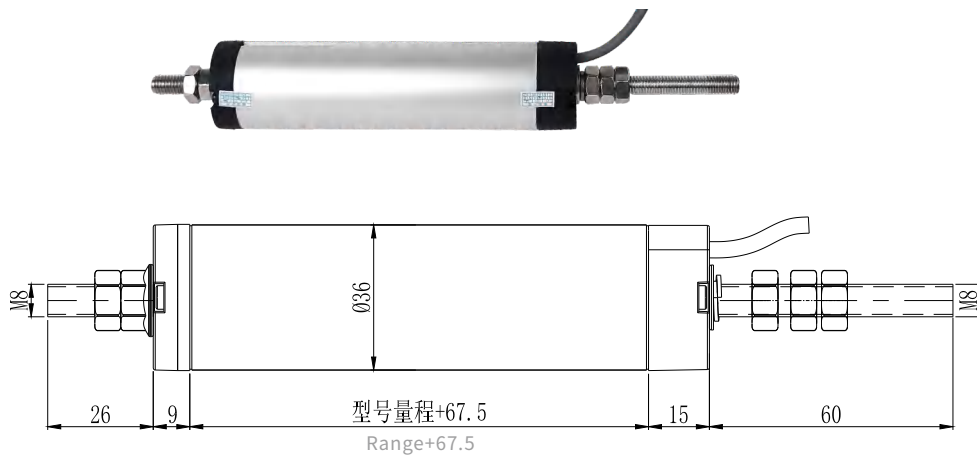
KPC1P



KPC1H



KPC1-MT



KPM23系列:KPM22加强版 小型铰接式位移传感器

KPM23 Series :KPM22 enhanced small articulated displacement sensor

产品实物图 Physical Products Pictures

KPM23

防水接头侧出线 Waterproof connector exits from the cable side



KPM23-MT

尾部直出线, 预应力千斤顶行业专用

Straight out of the tail line, special for prestressed jack industry



标准技术参数 Standard Technical Parameters

KPM23微型拉杆系列 KPM micro tie rod series	10mm	15mm	25mm	50~150mm	175~500mm	量程选型参考: Range selection reference:
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%	单位:mm Unit: mm
电阻公差 ±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ		10 15 25
机械行程 Mechanical travel	行程+3mm Trip+3mm					50 75 100
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing					125 150 175
重复性精度 Repeatability accuracy	0.01mm					200 225 250
最大工作速度 Maximum working speed	5m/S					275 300 350
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					400 450 500
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

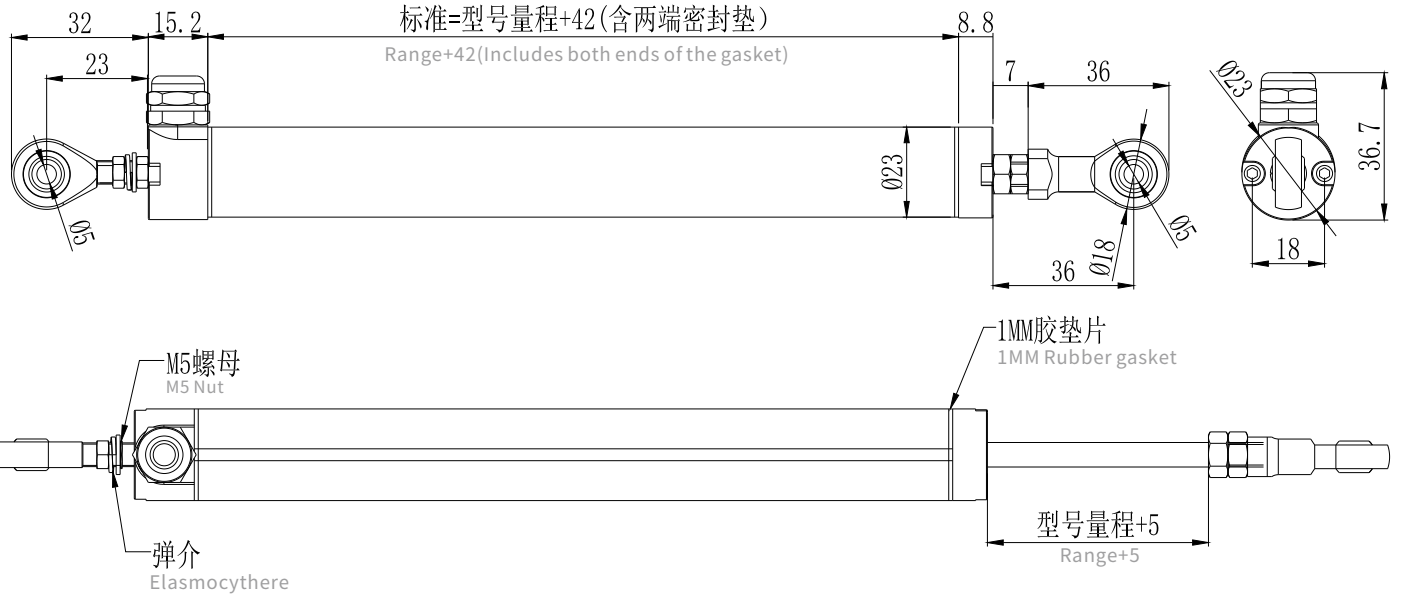
注: KPM23、KPM23-MT默认出线1米。

Note: The KPM23 and KPM23-MT routes are 1 meter by default.

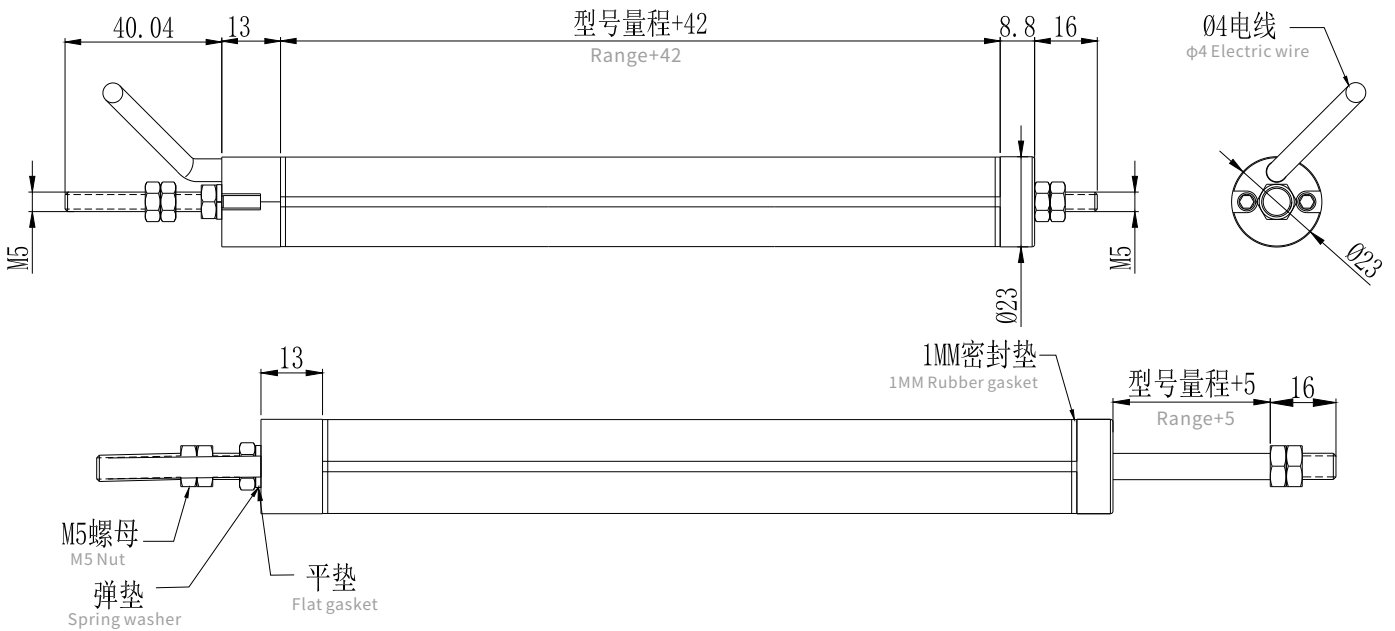
安装尺寸图 Installation Size Chart

单位 units:mm

KPM23



KPM23-MT



KPM22系列 小型铰接式位移传感器

KPM22 series small articulated displacement sensor

产品实物图 Physical Products Pictures

KPM22



KPM22-MT

尾部直出线，预应力千斤顶行业专用
Straight out of the tail line, special for prestressed jack industry



标准技术参数 Standard Technical Parameters

KPM22小型铰接系列 KPM22 small tie rod series	10mm	15mm	25mm	50~75mm	100~300mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 10 15 25 30 40 50 75 100 125 150 175 200 225 250 275 300
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%	
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ		
机械行程 Mechanical travel	行程+3mm Trip+3mm					
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing					
重复性精度 Repeatability accuracy	0.01mm					
最大工作速度 Maximum working speed	5m/S					
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

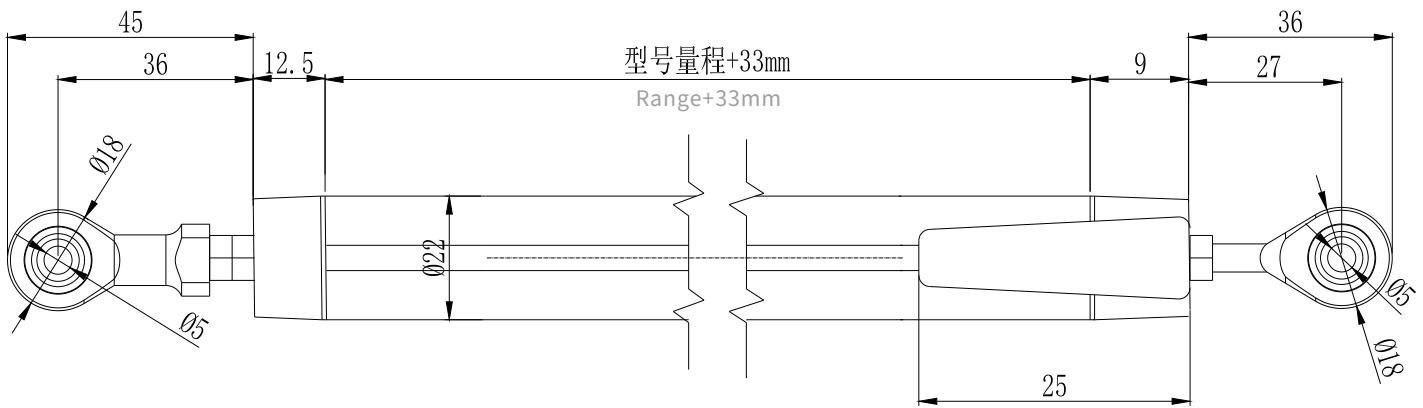
注: KPM22、KPM22-MT默认出线1米。

Note: The KPM22 and KPM22-MT routes out 1 meter by default.

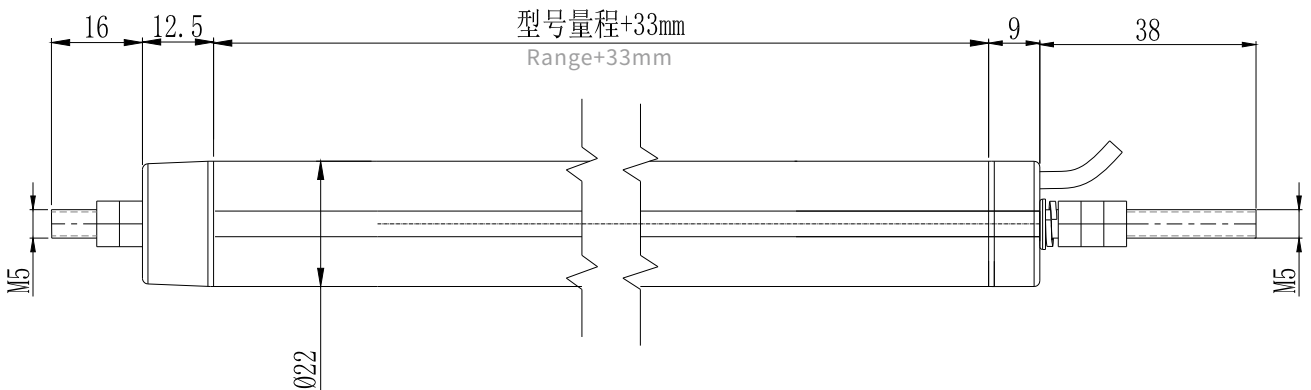
安装尺寸图 Installation Size Chart

单位 units:mm

KPM22



KPM22-MT



KPM18系列 小型铰接式位移传感器

KPM18 series small articulated displacement sensor

产品实物图 Physical Products Pictures

KPM18

尾部侧出线 Tail side outlet



KPM18D

尾部直出线 Tail straight out line



KPM18J

两端鱼眼侧出线 Both ends of the fisheye side out



KPM18-MT

尾部直出线，预应力千斤顶行业专用
Straight out of the tail line, special for prestressed jack industry



标准技术参数 Standard Technical Parameters

KPM18小型铰接系列 KPM18 small tie rod series	10mm	15mm	25mm	50~75mm	100~300mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 10 25 50 75 100 125 150 175 200 225 250 275 300
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%	
电阻公差 ±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ		
机械行程 Mechanical travel	行程+3mm Trip+3mm					
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing					
重复性精度 Repeatability accuracy	0.01mm					
最大工作速度 Maximum working speed	5m/S					
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

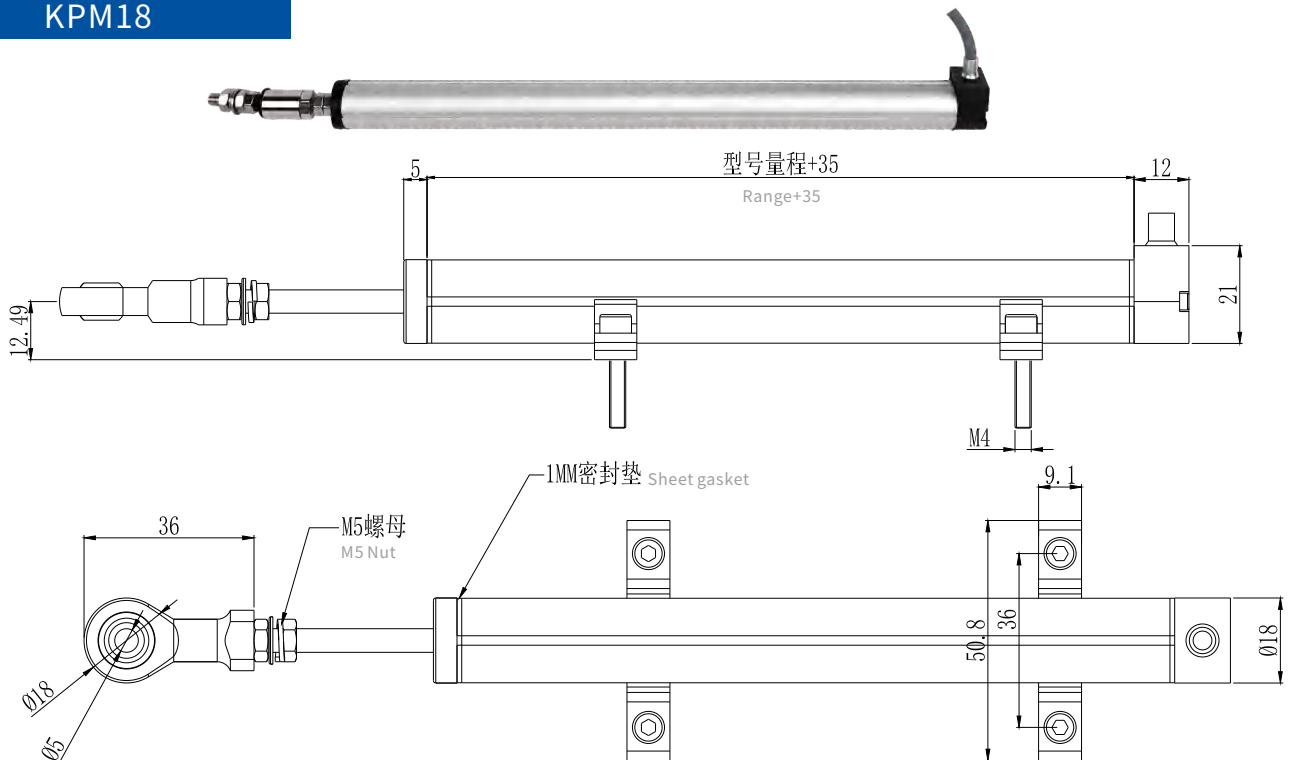
注: KPM18、KPM18D、KPM18J、KPM18-MT默认出线1米。

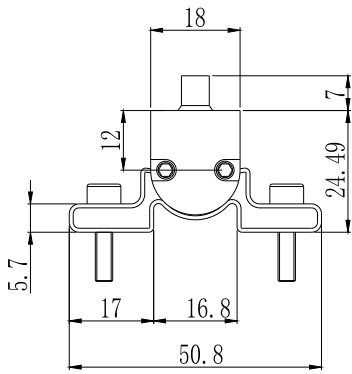
Note: KPM18, KPM18D, KPM18J, and KPM18-MT exit 1 meter by default.

安装尺寸图 Installation Size Chart

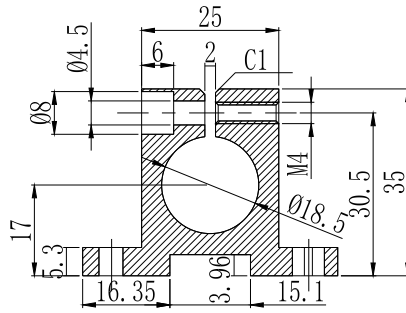
单位 units:mm

KPM18

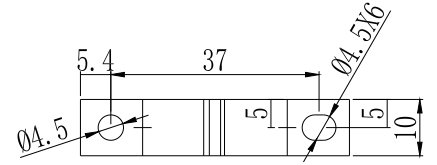




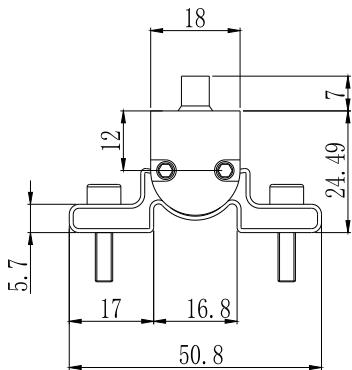
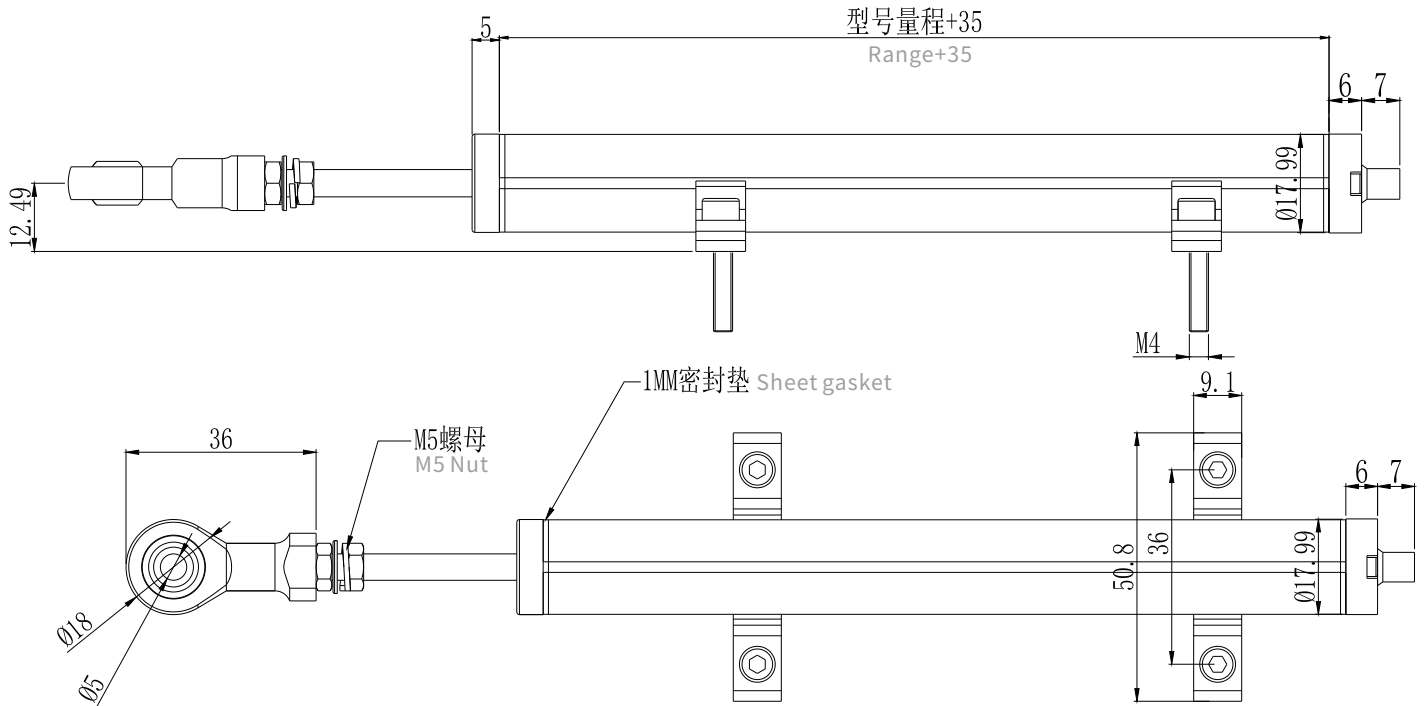
标配:五金支架
Standard:Hardware bracket



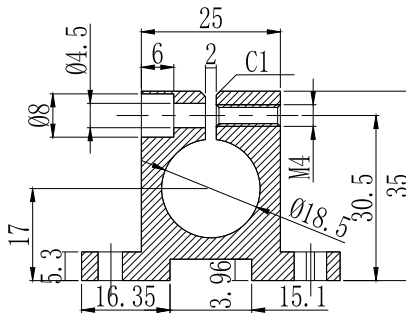
可选:铝合金支架
Optional:Aluminium alloy post



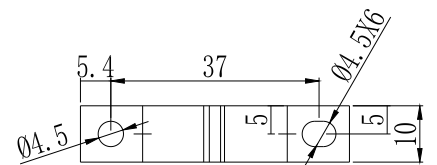
KPM18D



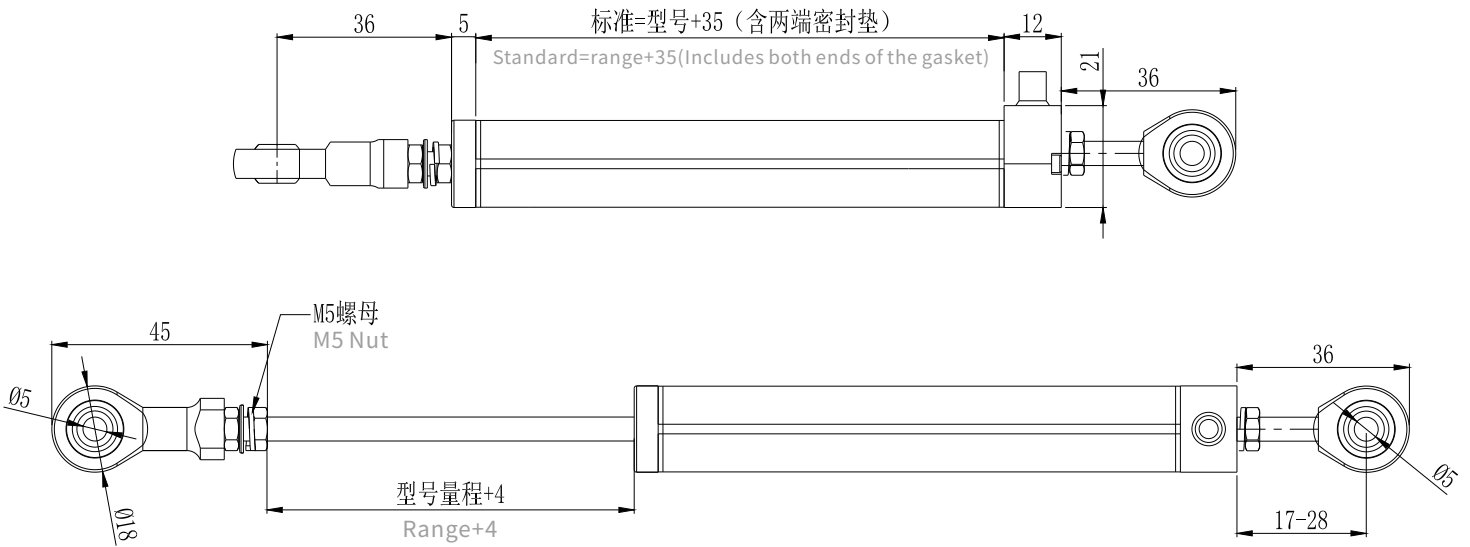
标配:五金支架
Standard:Hardware bracket



可选:铝合金支架
Optional:Aluminium alloy post



KPM18J



KPM18-MT



KPM16系列 微型铰接式位移传感器

KPM16 series miniature articulated displacement sensor

产品实物图 Physical Products Pictures

KPM16

尾部侧出线 Tail side outlet



KPM16D

尾部直出线 Tail straight out line



KPM16J

两端鱼眼侧出线 Both ends of the fisheye side out



KPM16-MT

尾部直出线，预应力千斤顶行业专用
Straight out of the tail line, special for prestressed jack industry



标准技术参数 Standard Technical Parameters

KPM16微型铰接系列 KPM16 mini articulated series	10mm	25mm	50~75mm	100~300mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 10 25 50 75 100 125 150 175 200 225 250 275 300
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%			±0.05%	
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ		5.0KΩ		
机械行程 Mechanical travel	行程+3mm Trip+3mm				
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing				
重复性精度 Repeatability accuracy	0.01mm				
最大工作速度 Maximum working speed	5m/S				
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				
使用温度范围 Operating temperature range	-60°C~+150°C				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				
灵敏度 Sensitivity	1				
温漂 Temperature drift	无限小 infinitesimal				

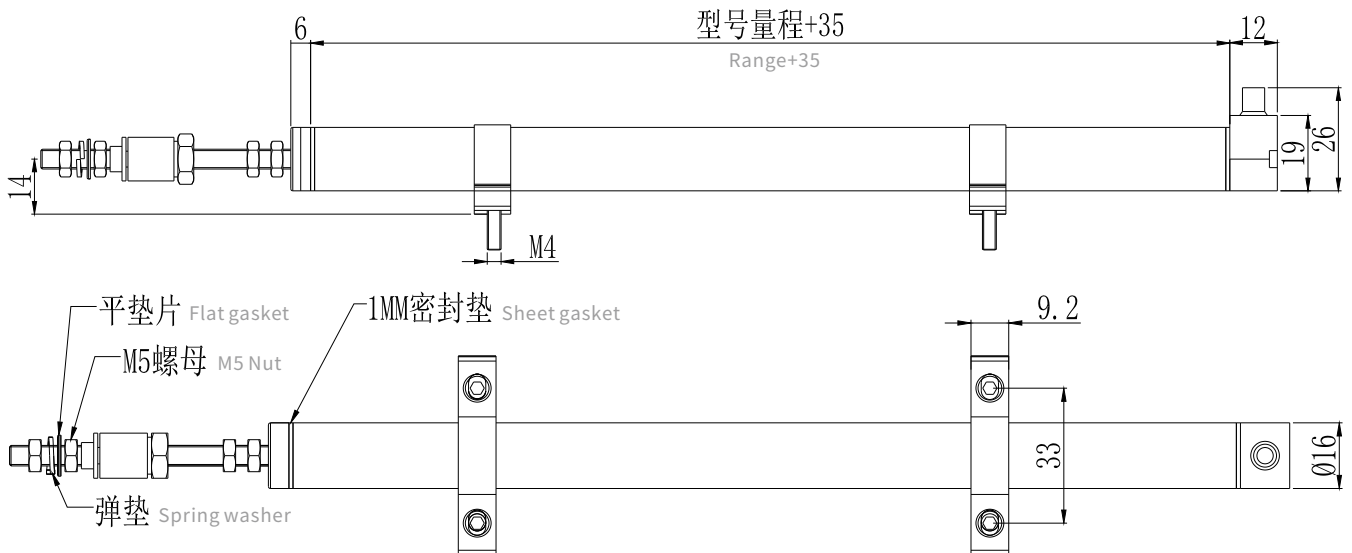
注: KPM16、KPM16D、KPM16J、KPM16-MT默认出线1米。

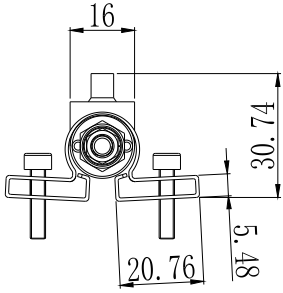
Note: KPM16, KPM16D, KPM16J, and KPM16-MT exit 1 meter by default.

安装尺寸图 Installation Size Chart

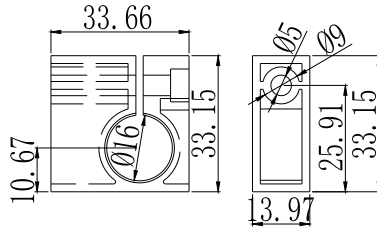
单位 units:mm

KPM16

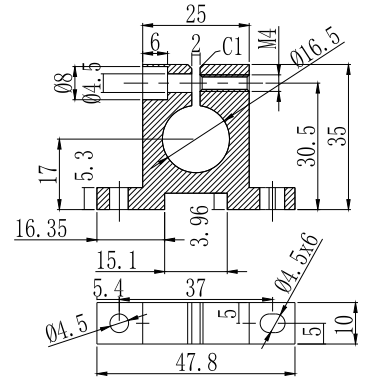




标配:五金支架
Standard:Hardware bracket

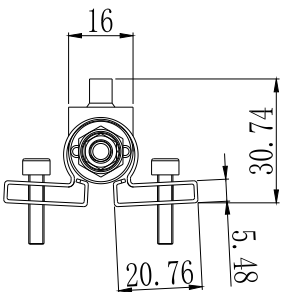


可选:塑料支架
Optional:Plastic trestle

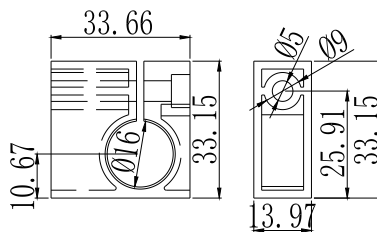


可选:铝合金支架
Optional:Aluminium alloy post

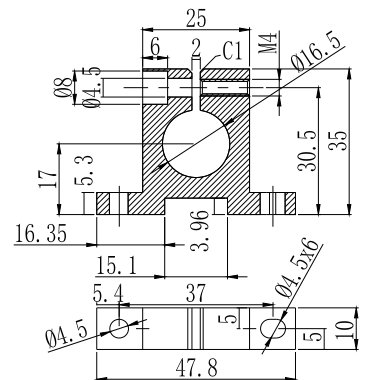
KPM16D



标配:五金支架
Standard:Hardware bracket

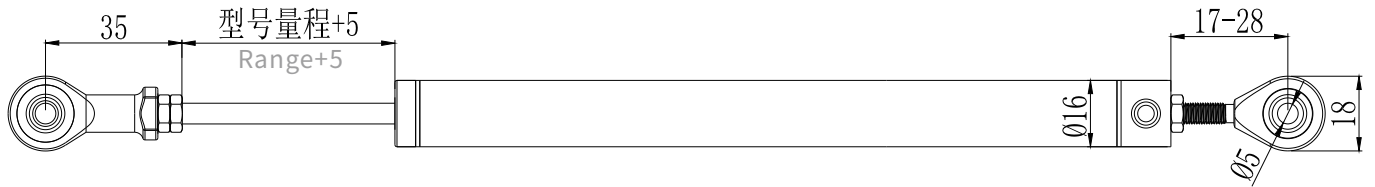


可选:塑料支架
Optional:Plastic trestle

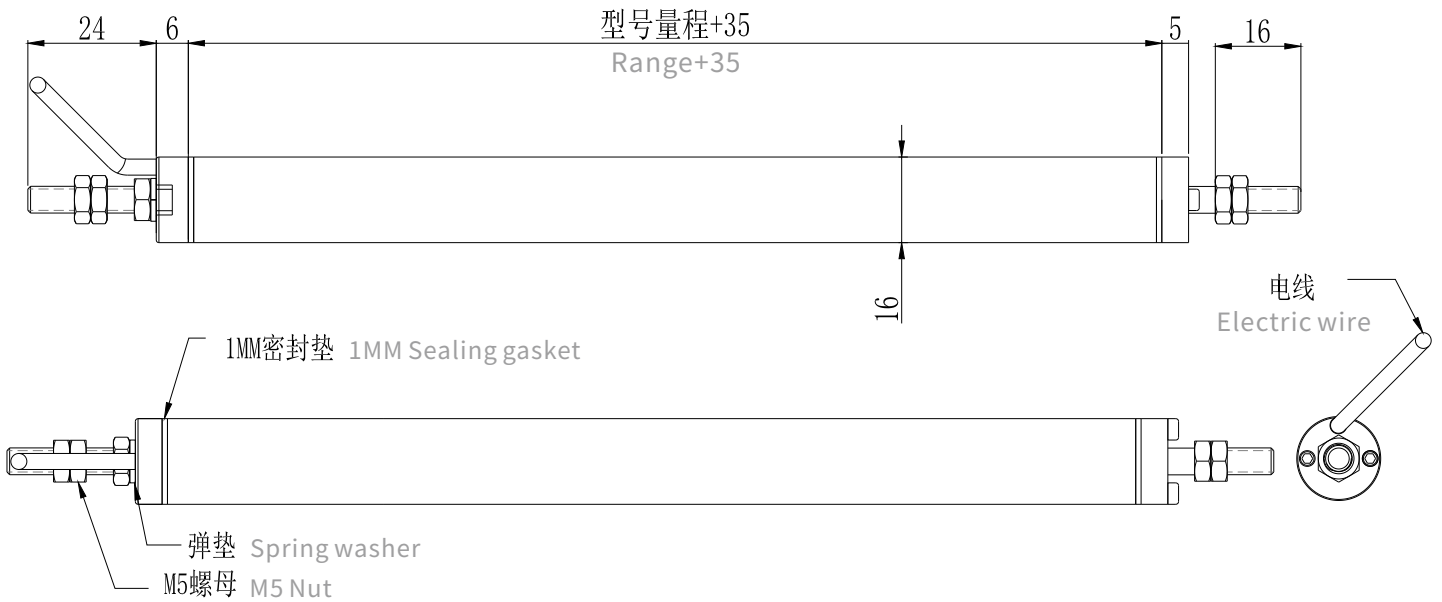


可选:铝合金支架
Optional:Aluminium alloy post

KPM16J



KPM16-MT



KPM12系列 微型拉杆式位移传感器

KPM12 series micro pull rod displacement sensor

产品实物图 Physical Products Pictures

KPM12

尾部直出线 Tail straight out line



KPM12J

两端鱼眼侧出线 Both ends of the fisheye side out



标准技术参数 Standard Technical Parameters

KPM12微型拉杆系列 KPM12 micro tie rod series	10mm	15mm	25mm	50~75mm	100~300mm	量程选型参考: Range selection reference: 单位:mm Unit:mm 10 15 25 50 60 75 85 100 125 150 175 200 225 250 275 300
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%	
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ		5.0KΩ			
机械行程 Mechanical travel	行程+3mm Trip+3mm					
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing					
重复性精度 Repeatability accuracy	0.01mm					
最大工作速度 Maximum working speed	5m/S					
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

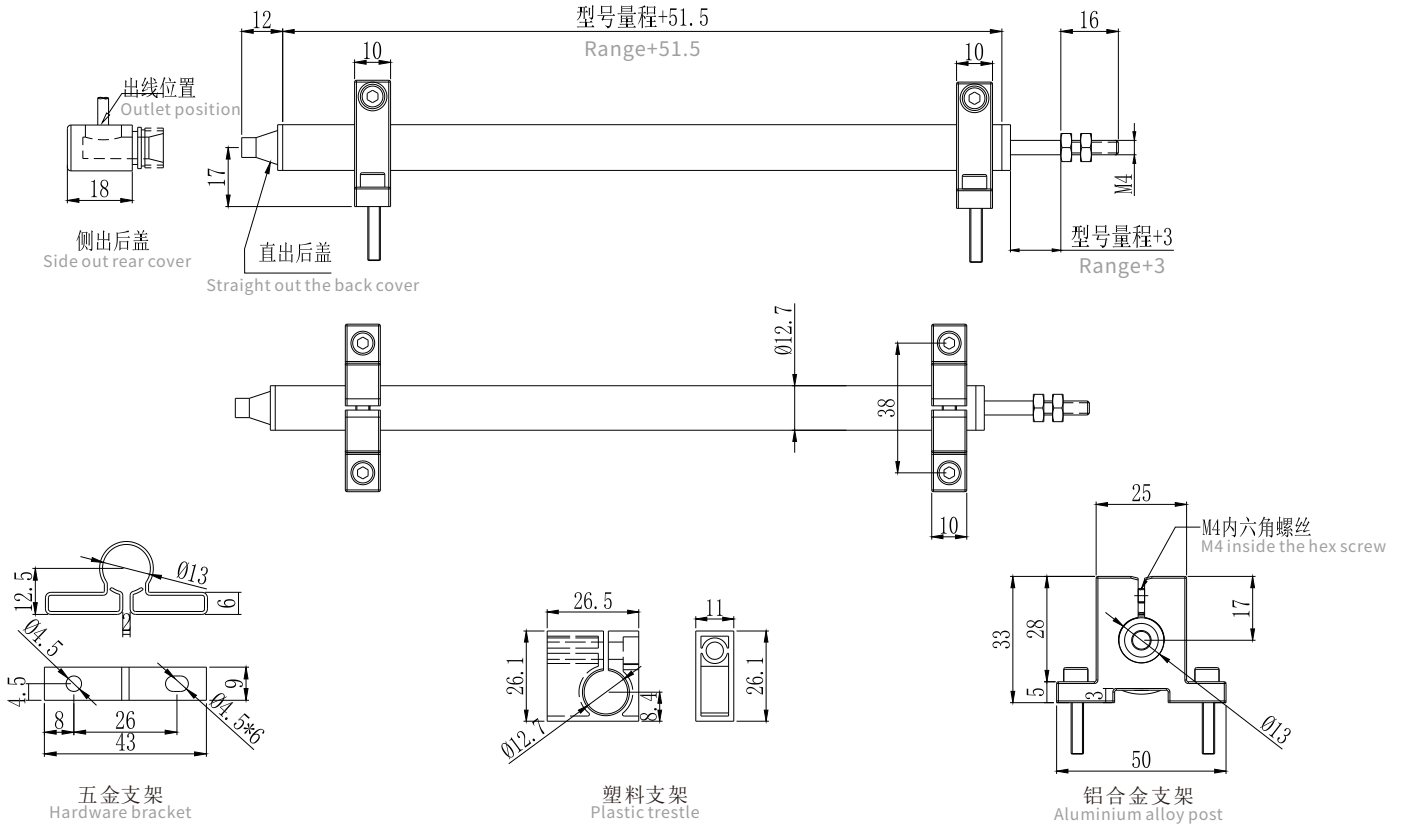
注: KPM12、KPM12J默认出线1米。

Note: KPM12 and KPM12J exit 1 meter by default.

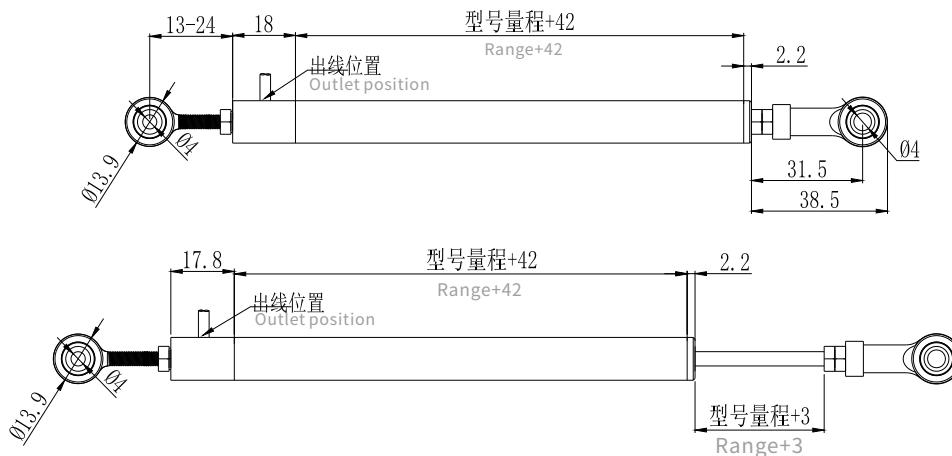
安装尺寸图 Installation Size Chart

单位 units:mm

KPM12



KPM12J

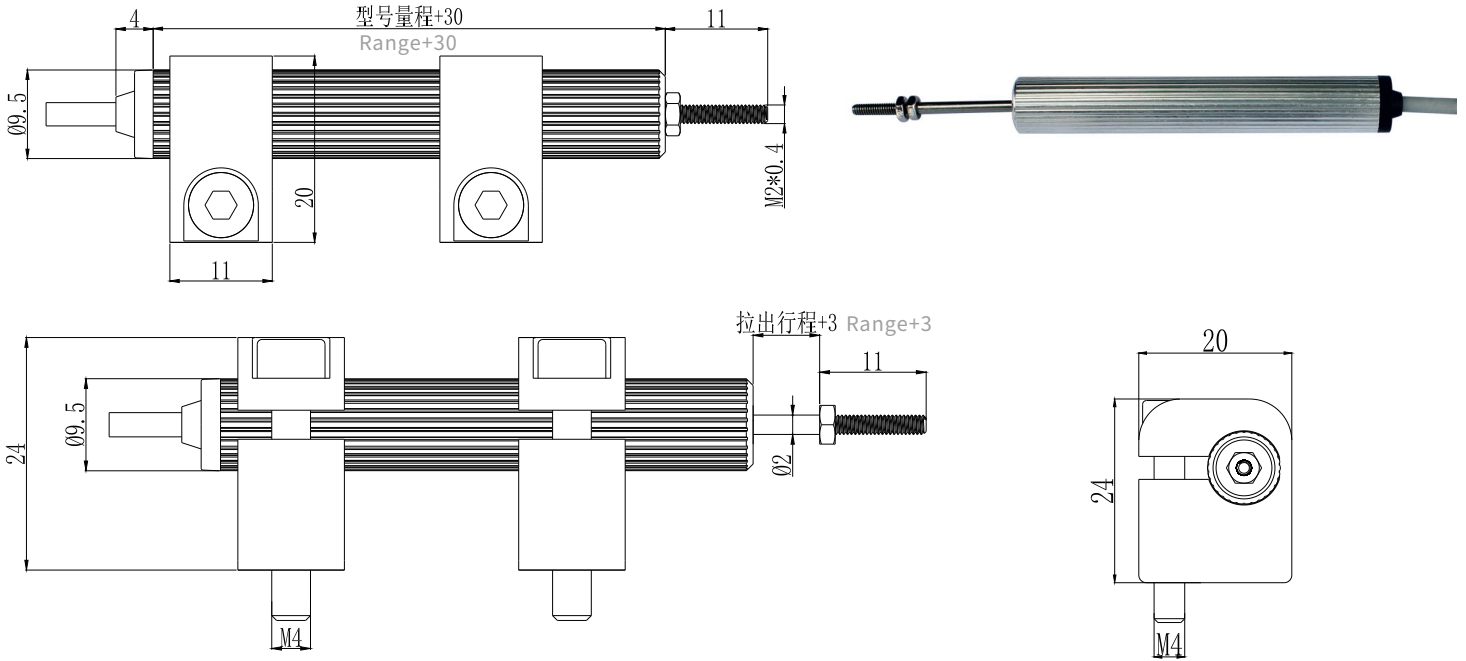


KPM9系列 微型拉杆式位移传感器

KPM9 series micro pull rod displacement sensor

实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm



标准技术参数 Standard Technical Parameters

KPM9微型拉杆系列 KPM9 micro tie rod series	10~35mm	50~55mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 10 15 20 25 30 35 50 55
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%		
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ	5.0KΩ	
机械行程 Mechanical travel	行程+3mm Trip+3mm		
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing		
重复性精度 Repeatability accuracy	0.01mm		
最大工作速度 Maximum working speed	5m/S		
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA		
使用温度范围 Operating temperature range	-60°C~+150°C		
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)		
灵敏度 Sensitivity	1		
温漂 Temperature drift	无限小 infinitesimal		

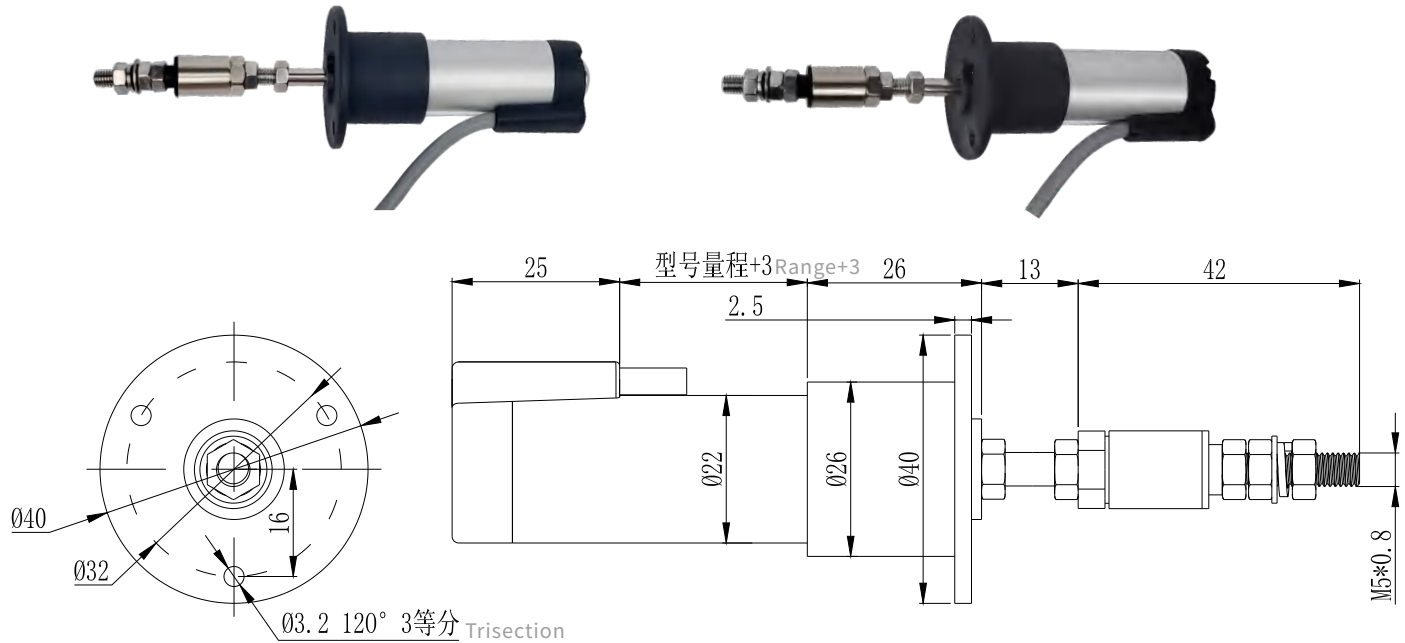
注: KPM9默认出线350mm。

Note: The KPM9 cables are 350mm by default.

KPF系列 法兰盘安装小型拉杆式位移传感器

KPF series flanges mounted small pull rod displacement sensor

实物及尺寸图 Physical And Dimensional Drawings 单位 units:mm



标准技术参数 Standard Technical Parameters

KPF法兰系列 KPF Flange series	10mm	15mm	25-40mm	50~150mm	175~300mm	量程选型参考: Range selection reference: 单位:mm Unit:mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%	
电阻公差 ±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ		10 15 25
机械行程 Mechanical travel	行程+3mm Trip+3mm					30 40 50
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing					75 100 125
重复性精度 Repeatability accuracy	0.01mm					150 175 200
最大工作速度 Maximum working speed	5m/S					225 250 275
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					300
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

注: KPF默认出线1米。

Note: By default, the KPF outlet is 1 meter.

KTM系列 微型拉杆式直线位移传感器

KTM micro tie rod linear displacement sensor, working range: 0-300mm(other travel can be customized)

产品实物图 Physical Products Pictures



标准技术参数 Standard Technical Parameters

KTM:标准产品出线 KTMC:防水接头出线 KTMP:航空插头出线

KTM: standard product outlet KTMC: waterproof connector outlet KTMP: aviation plug outlet

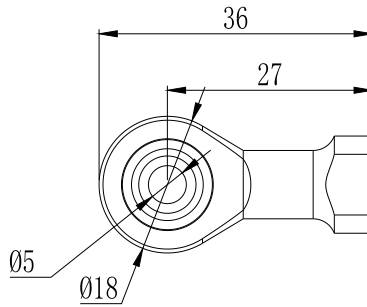
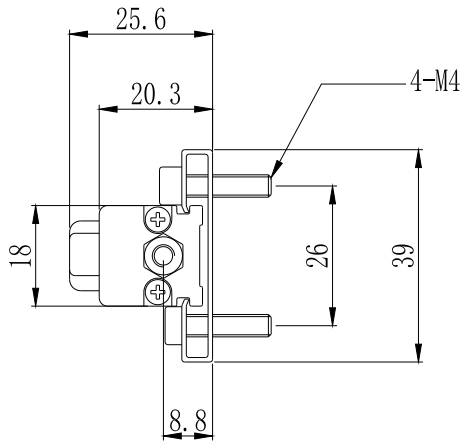
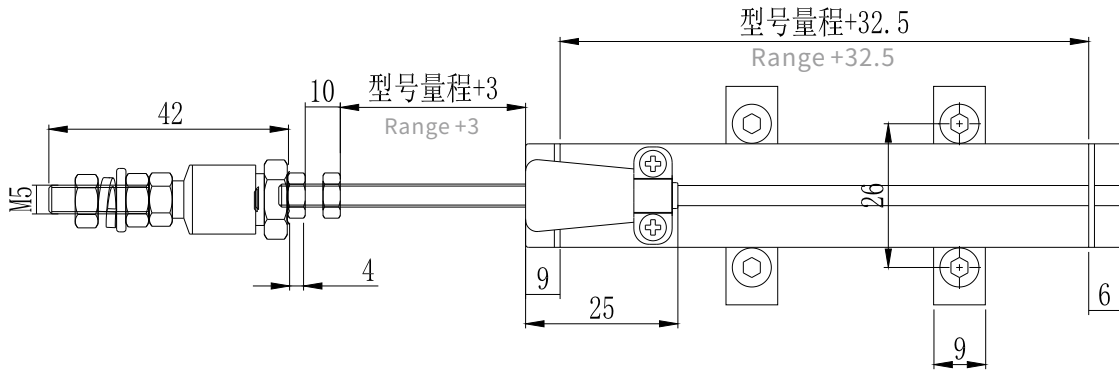
KTM微型拉杆系列 KTM micro tie rod series	10mm	15mm	25-40mm	50~150mm	175~300mm	量程选型参考: Range selection reference: 单位:mm Unit: mm	
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%			±0.1%	±0.05%		10 15 25
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ			30 40 50
机械行程 Mechanical travel	行程+3mm Trip+3mm						75 100 125
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing						130 150 175
重复性精度 Repeatability accuracy	0.01mm						200 225 250
最大工作速度 Maximum working speed	5m/S						275 300
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA						
使用温度范围 Operating temperature range	-60°C~+150°C						
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)						
灵敏度 Sensitivity	1						
温漂 Temperature drift	无限小 infinitesimal						

注: KTM默认出线1米。

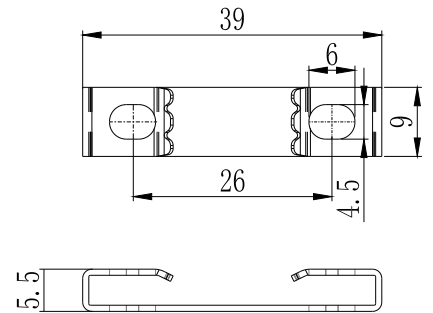
Note: The KTM wire is 1 meter by default.

安装尺寸图 Installation Size Chart

单位 unit:mm



标配万向头, 可选鱼眼接头
Standard with universal head,
optional fisheye connector



五金支架
Hardware bracket



标配四个M4x16螺丝
Four M4x16 screws are standard



标配两个五金支架
Two hardware brackets are standard

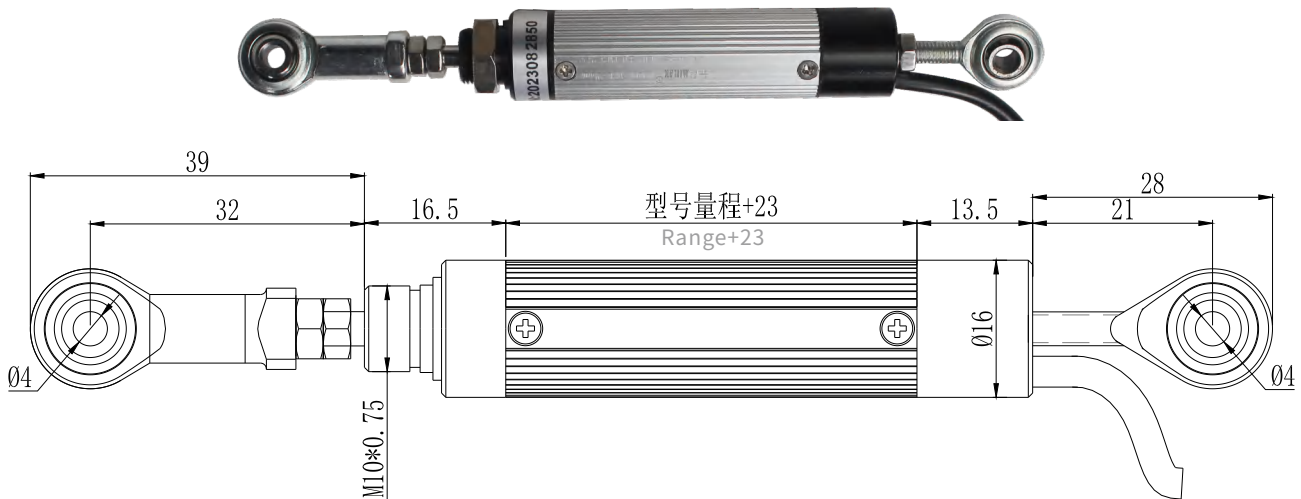


可以选配两个铝合金支架
Two aluminum alloy brackets
are available

KSE系列 微型拉杆式圆管位移传感器

KSE series micro pull rod type round tube displacement sensor

实物及尺寸图 Physical And Dimensional Drawings 单位 units:mm



标准技术参数 Standard Technical Parameters

KSE微型拉杆系列 KSE miniature tie rod series	10mm~25mm	50mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 10 15 25 50
线性精度 (±%FS) Linear accuracy (±% FS)	±0.25%		
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ	5.0KΩ	
机械行程 Mechanical travel	行程+3mm Trip+3mm		
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing		
重复性精度 Repeatability accuracy	0.01mm		
温度系数 Temperature coefficient	≤1.5ppm/°C		
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA		
工作电压 Working voltage	(4KΩ-5KΩ)≤24VDC; (2KΩ-3KΩ)≤12VDC; (1KΩ)≤5VDC		
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)		
灵敏度 Sensitivity	1		
温漂 Temperature drift	无限小 infinitesimal		
负载特性 Load characteristic	≥10mA		

防护等级:IP65; 最大运行速度:≤5m/S; 最大返回速度:≤1m/S; 使用寿命100X10⁶次or2X10⁶ m

Protection class: IP65; Maximum operating speed: ≤5m/S; Maximum return speed: ≤1m/S; Service life 100X10⁶ times or2X10⁶ m

注: KSE默认出线1米。

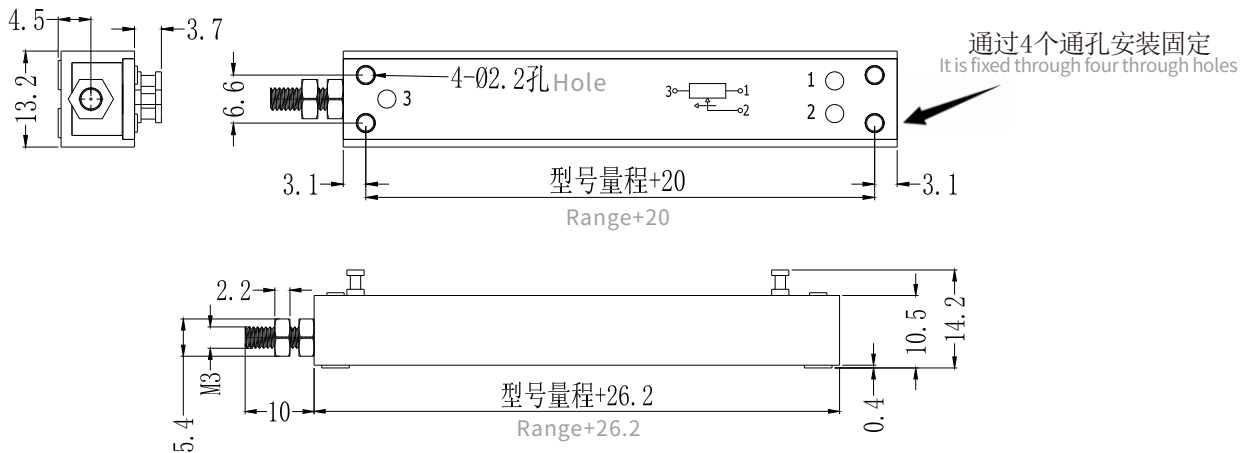
Note:KSE exits 1 meter by default.

KSD系列 微型拉杆式位移传感器

KSD series micro pull rod displacement sensor

实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm



标准技术参数 Standard Technical Parameters

KSD微型滑块系列 KSD micro pull rod series	12.5mm~25mm	50~52mm	100mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 12.5 25 50 52 100
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%, ±0.25%			
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ	5.0KΩ	5.0KΩ	
机械行程 Mechanical travel	行程+3mm Trip+3mm			
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing			
重复性精度 Repeatability accuracy	0.01mm			
最大工作速度 Maximum working speed	5m/S			
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA			
使用温度范围 Operating temperature range	-60°C~+150°C			
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)			
灵敏度 Sensitivity	1			
温漂 Temperature drift	无限小 infinitesimal			

注: KSD默认出线1米。

Note:KSD exits 1 meter by default.

WY系列 高密封等级的小型拉杆式位移传感器

WY series of high sealing class of small pull rod displacement sensor

产品实物图 Physical Products Pictures

WY-01

带安装螺母 With mounting nut



WY-02

不带安装螺母 No mounting nut



标准技术参数 Standard Technical Parameters

WY小型拉杆系列 WY small tierod series	10mm	25mm	50~150mm	175~500mm	量程选型参考: Range selection reference: 单位:mm Unit: mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%			±0.05%	
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ		5.0KΩ		
机械行程 Mechanical travel	行程+3mm Trip+3mm			75 100 125	
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing			150 175 200	
重复性精度 Repeatability accuracy	0.01mm			225 250 275	
最大工作速度 Maximum working speed	5m/S			300 350 400	
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA			450 500	
使用温度范围 Operating temperature range	-60°C~+150°C				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				
灵敏度 Sensitivity	1				
温漂 Temperature drift	无限小 infinitesimal				

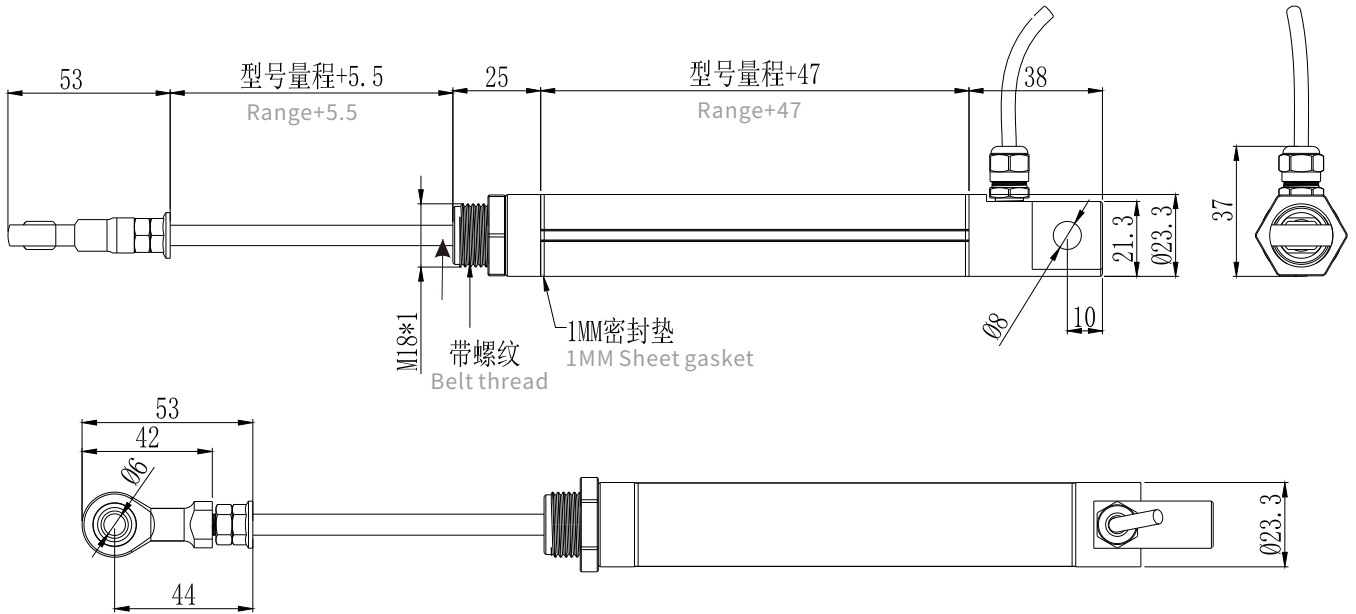
注: WY-01、WY-02默认出线1米。

Note: WY-01 and WY-02 exit 1 meter by default.

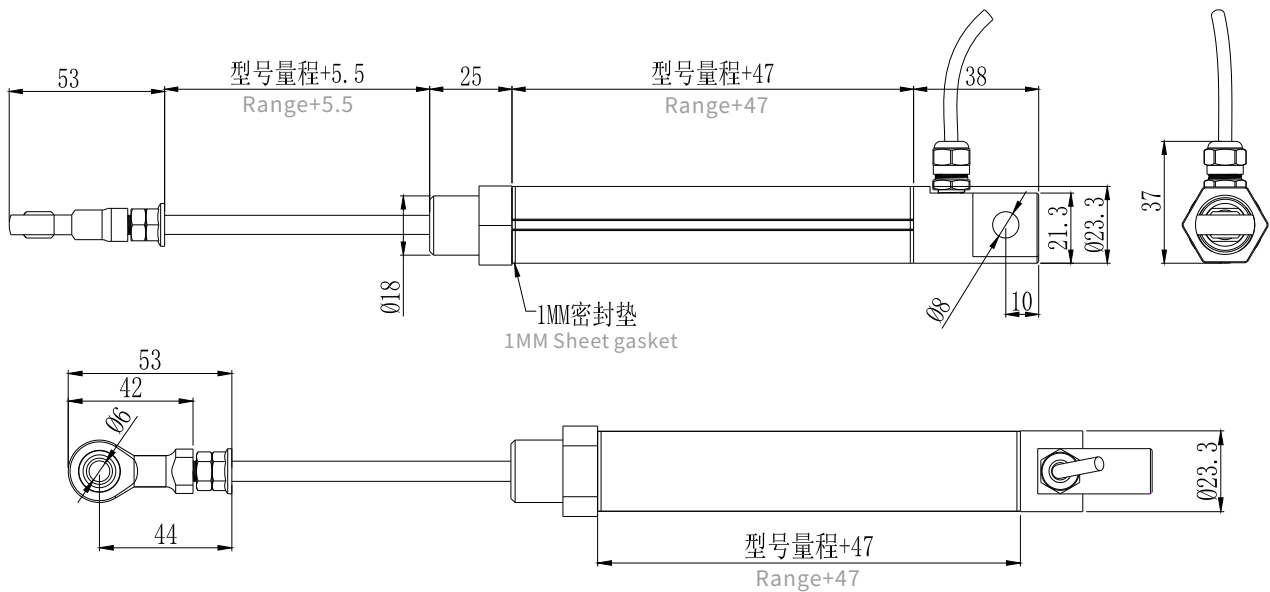
安装尺寸图 Installation Size Chart

单位 units:mm

WY-01



WY-02



KTF/TLH系列 通用滑块式直线位移传感器

KTF/TLH series universal sliding block linear displacement sensor

产品实物图 Physical Products Pictures



标准技术参数 Standard Technical Parameters

KTF/TLH:赫斯曼插头式 KTFC/TLHC:防水接头出线 KTFP/TLHP:航空插头出线

KTF/TLH: Hersman plug type KTFC/TLHC: waterproof connector outlet KTFP/TLHP: Aviation plug outlet

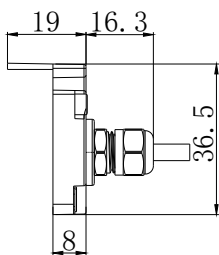
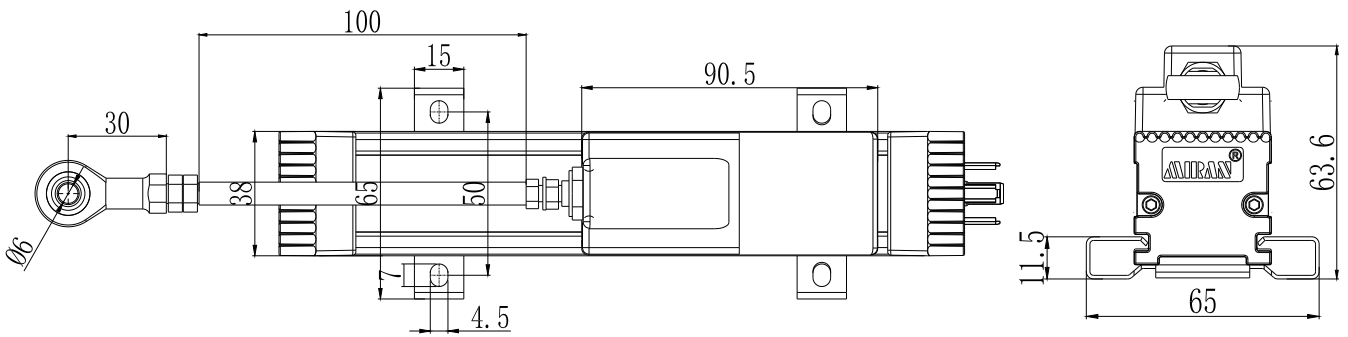
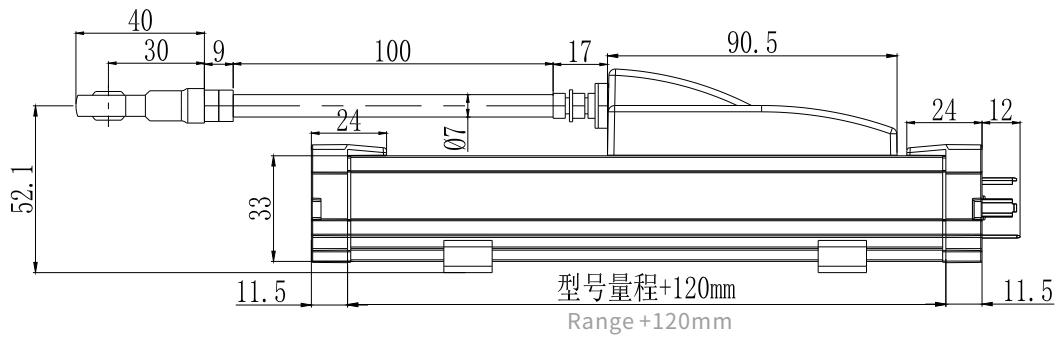
KTF/TLH滑块系列 KTF/TLH slider series	50~175 mm	200~500 mm	600~1000 mm	1150~2000 mm	>2000 mm	量程选型参考: Range selection reference:
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%	±0.05%			±0.04%	单位:mm Unit: mm
电阻公差±10% Resistance tolerance ± 10%	5.0KΩ		10.0KΩ	20.0KΩ	20.0KΩ	50 75 100 110 125 130
机械行程 Mechanical travel	行程+7mm Trip+7mm					150 175 200 225 250 275
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing					300 325 350 360 375 400
重复性精度 Repeatability accuracy	0.01mm					425 450 475 500 550 600
最大工作速度 Maximum working speed	5m/S					650 700 750 800 850 900
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					950 1000 1150 1250 1350
使用温度范围 Operating temperature range	-60°C~+150°C					1450 1500 1600 1800
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					2000 2250 2500
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					
尺寸 Size	如下图(单位:mm) As shown in the following figure (unit: mm)					

注: KTF默认不带线, KTFC、KTFP默认线长1米。

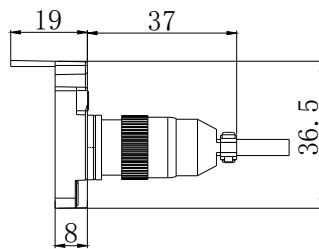
Note: KTF does not have a line by default, and KTFC and KTFP default lines are 1 meter long.

安装尺寸图 Installation Size Chart

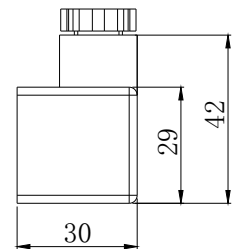
单位 unit:mm



防水接头式
Waterproof joint type



航空插头式
Aviation plug type



赫斯曼插头式 (标配)
Hersman plug (standard)

KTF1系列 通用滑块式直线位移传感器

KTF1 series general purpose slider linear displacement sensor

产品实物图 Physical Products Pictures

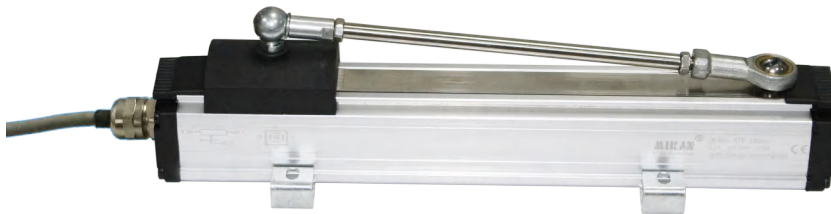
KTF1

赫斯曼插头 Hersman plug



KTF1C

防水接头式 Waterproof joint type



KTF1P

航空插头式 Aviation plug type



产品特点 Product Feature

滑块上面的连接杆水平方向可以360度任意角度安装，上下方向安装角度也很灵活，解决了老款KTF安装角度受限的问题。

The connecting rod above the slider can be installed at any Angle in the horizontal direction of 360 degrees, and the installation Angle in the upper and lower direction is also flexible, which solves the problem of limited installation Angle of the old KTF.

标准技术参数 Standard Technical Parameters

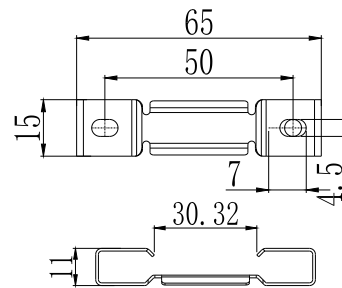
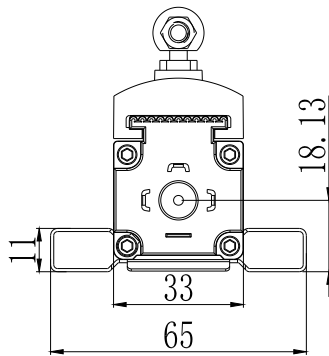
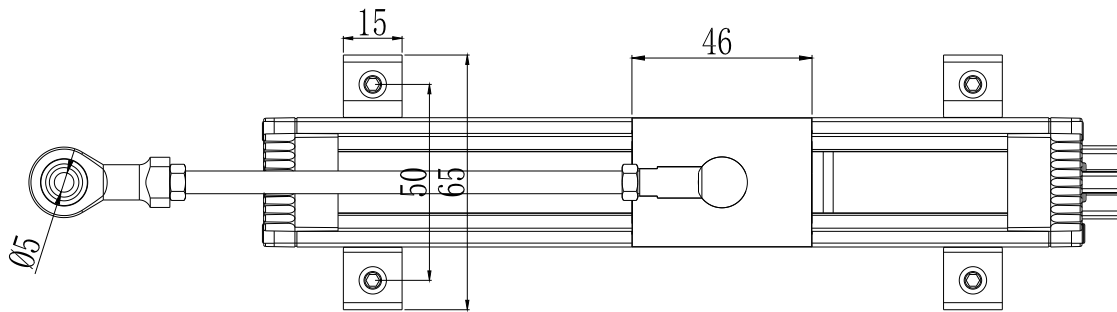
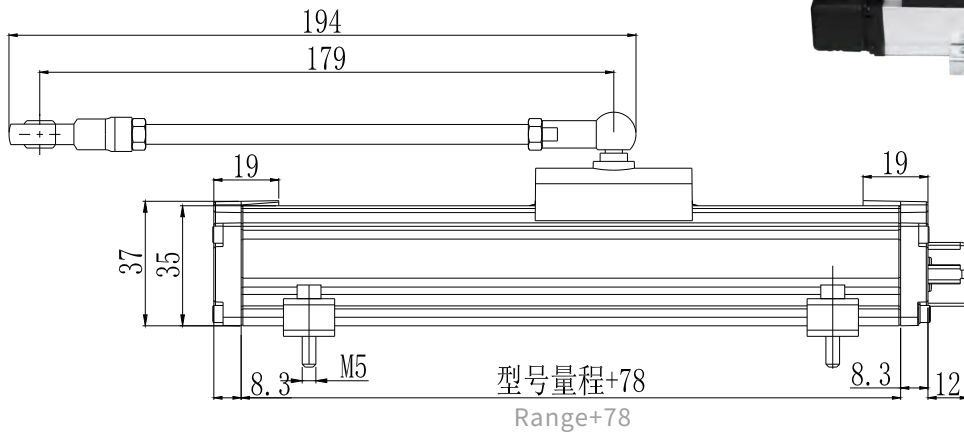
	KTF1滑块式系列 KTF1 sliding block series	50~175 mm	200~500 mm	600~1000 mm	1150~2000 mm	>2000 mm	量程选型参考: Range selection reference: 单位:mm Unit: mm	
电气参数 Electrical parameters	独立线性度(±%) Independent linearity (±%)	0.1%	0.05%			±0.04%		50 75 100
	电阻公差±10% Resistance tolerance ± 10%	5.0KΩ		10.0KΩ	20.0KΩ	20.0KΩ	110 125 130	
	电气行程 Electrical stroke	量程+3mm Range+3mm					150 175 200	
	解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing					225 250 275	
	可重复性 Repeatability	0.01mm					300 325 350	
	滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					360 375 400	
	致故障时滑刷的最大电流 The maximum current of the sliding brush during the fault	10mA					425 450 475	
	最大允许工作电压 Maximum allowable working voltage	36V					500 550 600	
	输出电压与输入电压的有效温度系数比 The effective temperature coefficient ratio of output voltage to input voltage	通常5ppm/K Usually 5ppm/K					650 700 750	
	绝缘阻抗(500VDC) Insulation impedance (500VDC)	≥10MΩ					800 850 900	
	绝缘强度(500VAC,50Hz) Insulation strength (500VAC, 50Hz)	≤100μA					950 1000 1150	
机械参数 Mechanical parameters	外壳长度(A) Shell length (A)	量程+56mm Range+56mm					1250 1350	
	机械行程 Mechanical stroke	量程+8mm Range+8mm					1450 1500	
	拉杆最大承载拉力 The maximum load-bearing tension of the pull rod	50KG					1600 1800	
	工作受力 Work stress	水平方向<10N Horizontal direction<10N 竖直方向≤10N Vertical direction ≤ 10N					2000 2250	
环境参数 Environmental parameters	抗振动标准 Anti vibration standard	5~2000Hz,A _{max} =0.8mm,a _{max} =20g					2500	
	抗冲击标准 Impact resistance standard	50g,11ms						
	工作温度范围 Working temperature range	-60°C~+150°C						
	寿命 life	>100x10 ⁶ 次(time)						
	最大运行速度 Maximum operating speed	10m/S,最大运行加速度200(20g)m/s ² 10m/S, maximum operating acceleration 200(20g)m/s ²						
	防护等级 Protection grade	最高IP67(DIN40500/IEC529) Maximum IP67 (DIN40500/IEC529)						

注: KTF1默认不带线, KTF1C、KTF1P默认线长1米。

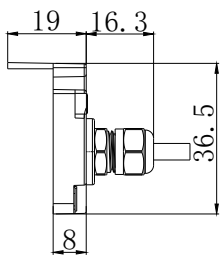
Note:KTF1 has no wire by default, and KTF1C and KTF1P have a wire length of 1 meter by default.

安装尺寸图 Installation Size Chart

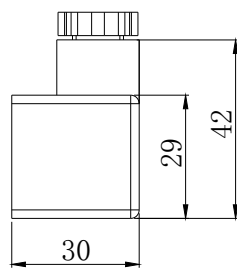
单位 unit:mm



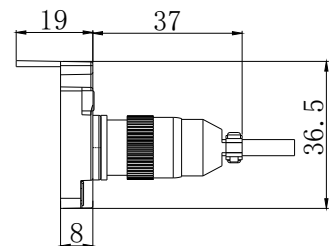
五金支架
Mounting bracket



防水接头式
Waterproof joint type



赫斯曼插头式(标配)
Hersman plug (standard)

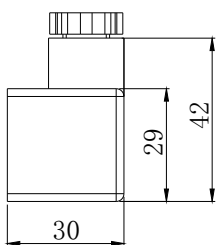
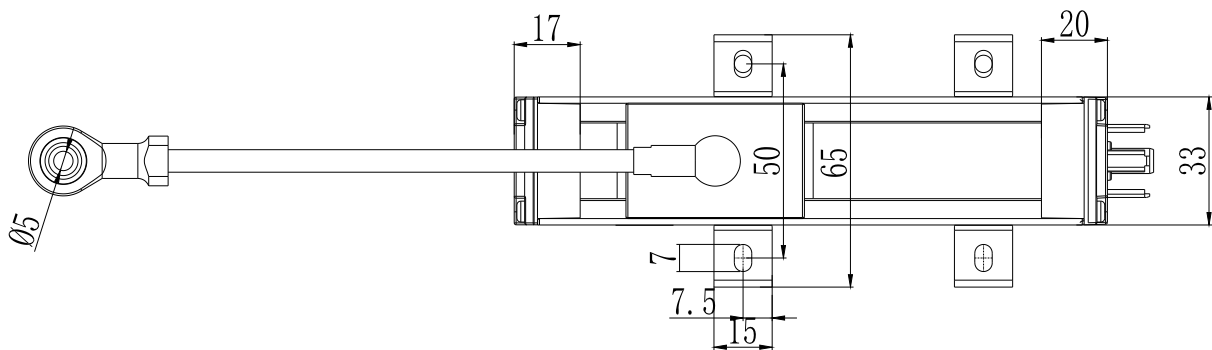
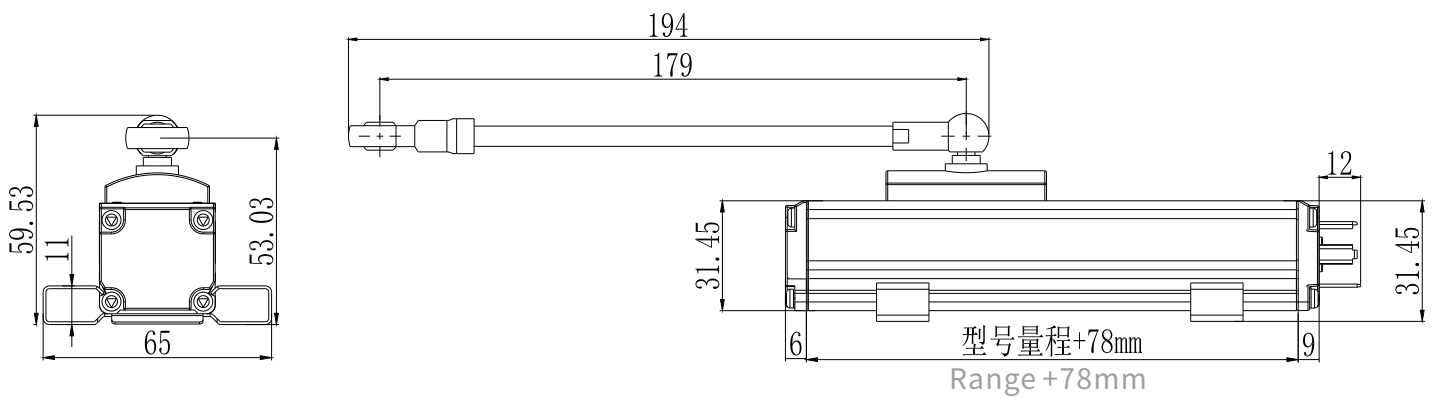


航空插头式
Aviation plug type

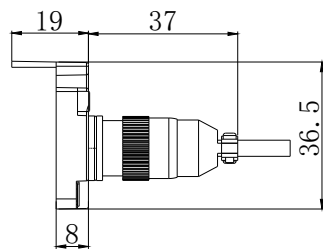
KTF2系列 通用滑块式直线位移传感器

KTF2 series universal sliding block linear displacement sensor

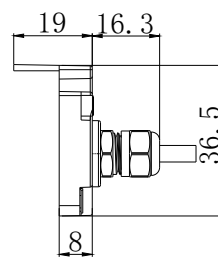
实物及尺寸图 Physical And Dimensional Drawings 单位 unit:mm



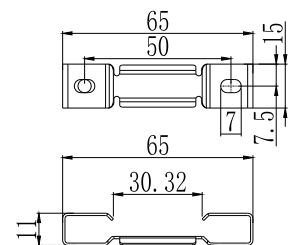
赫斯曼插头式
Hersman plug type



航空插头式
Aviation plug type



防水接头式
Aviation plug type



安装支架
Mounting bracket

- 型号说明：KTF2:赫斯曼插头式；KTF2C:防水接头式；KTF2P:航空插头式

Model description: KTF2: Hersman plug type, KTF2C: waterproof connector type, KTF2P: Aviation plug type

- 特点：滑块上面的连接杆水平方向可以360度任意角度安装，上下方向安装角度也很灵活，解决了老款KTF安装角度受限的问题。

Features: The horizontal direction of the connecting rod above the slider can be installed at any Angle of 360 degrees, and the installation Angle of the upper and lower direction is also flexible, which solves the problem of limited installation Angle of the old KTF.

标准技术参数 Standard Technical Parameters

KTF2:赫斯曼插头式 KTF2C:防水接头出线 KTF2P:航空插头出线

KTF2: Hersman plug type KTF2C: waterproof connector outlet KTF2P: Aviation plug outlet

KTF2滑块系列 KTF2 slider series	50~175 mm	200~500 mm	600~1000 mm	1150~2000 mm	>2000 mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 50 75 100 110 125 130 150 175 200 225 250 275 300 325 350 360 375 400 425 450 475 500 550 600 650 700 750 800 850 900 950 1000 1150 1250 1350 1450 1500 1600 1800 2000 2250 2500
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%	±0.05%			±0.04%	
电阻公差±10% Resistance tolerance ± 10%	5.0KΩ		10.0KΩ	20.0KΩ	20.0KΩ	
机械行程 Mechanical travel	行程+7mm Trip+7mm					
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing					
重复性精度 Repeatability accuracy	0.01mm					
最大工作速度 Maximum working speed	5m/S					
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

注：KTF2默认不带线，KTF2C、KTF2P默认线长1米。

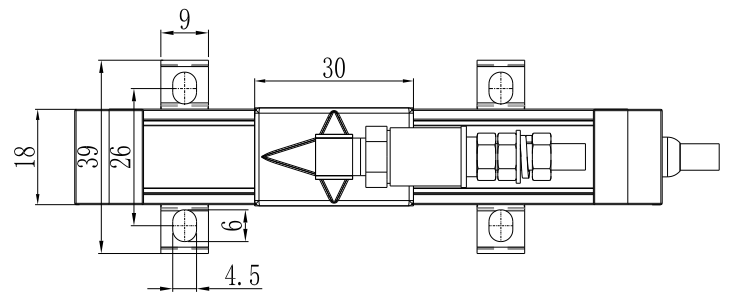
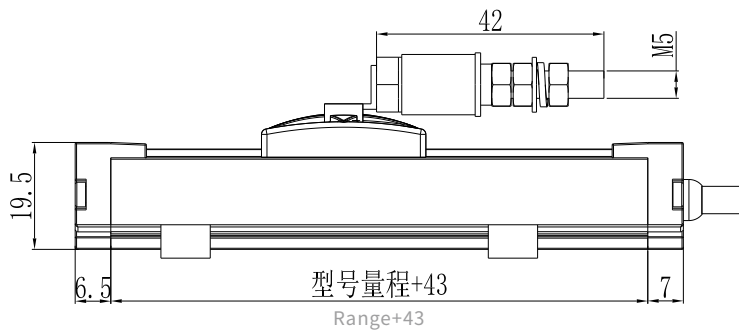
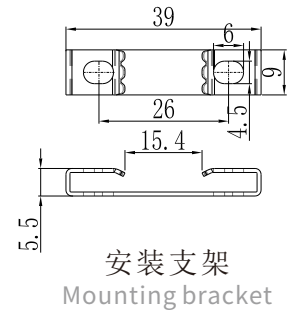
Note: KTF2 has no wire by default, and KTF2C and KTF2P have a wire length of 1 meter by default.

KFM系列 小型滑块式位移传感器

KFM series small slider type displacement sensor

实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm



标准技术参数 Standard Technical Parameters

KFM小型滑块系列 KPF small tie rod series	10mm	15mm	25mm	40~150mm	175~300mm	量程选型参考: Range selection reference: 单位:mm Unit:mm	
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%		
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ			10 15 25
机械行程 Mechanical travel	行程+3mm Trip+3mm						40 50 75
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing						100 125 130
重复性精度 Repeatability accuracy	0.01mm						150 175 200
最大工作速度 Maximum working speed	5m/S						225 250 275
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA						300
使用温度范围 Operating temperature range	-60°C~+150°C						
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)						
灵敏度 Sensitivity	1						
温漂 Temperature drift	无限小 infinitesimal						

注: KFM默认出线1米。

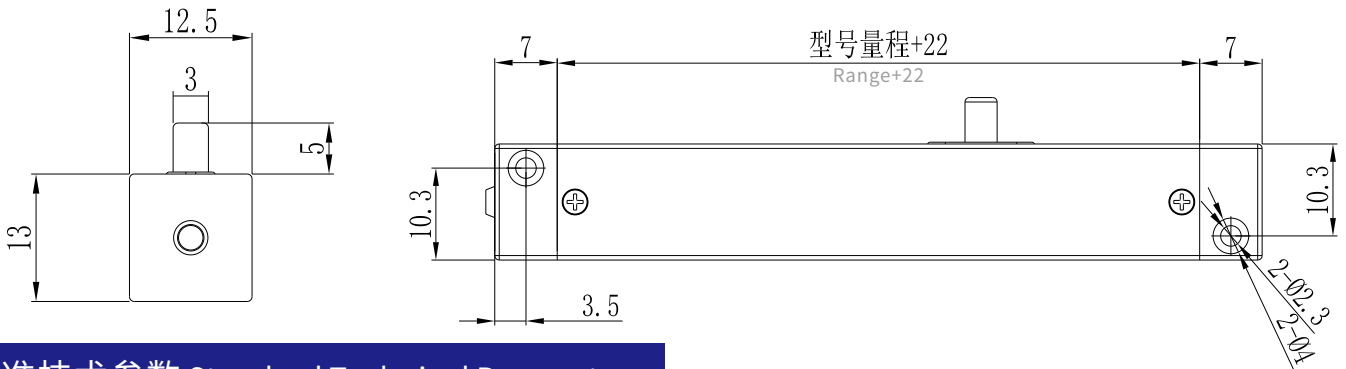
Note: By default, the KFM outlet is 1 meter.

KSF系列 微型滑块式位移传感器

KSF series micro sliding block displacement sensor

实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm



标准技术参数 Standard Technical Parameters

KSF微型滑块式系列 KSF mini slider series	5mm~25mm	30mm~120mm	量程选型参考: Range selection reference:
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%		单位:mm Unit: mm
电阻公差 ±10% Resistance tolerance ± 10%	2.0KΩ	5.0KΩ	5 10 15
机械行程 Mechanical travel	行程+3mm Trip+3mm		25 30 35
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing		50 60 70
重复性精度 Repeatability accuracy	0.01mm		120
温度系数 Temperature coefficient	≤1.5ppm/°C		
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA		
工作电压 Working voltage	≤24VDC		
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)		
灵敏度 Sensitivity	1		
温漂 Temperature drift	无限小 infinitesimal		
负载特性 Load characteristic	≥10mA		

防护等级:IP65; 最大运行速度:≤5m/S; 最大返回速度:≤1m/S; 使用寿命100X10⁶ 次or2X10⁶ m

Protection class: IP65; Maximum operating speed: ≤5m/S; Maximum return speed: ≤1m/S; Service life 100X10⁶ times or2X10⁶ m

注: KSF默认出线350mm, 另配1米线长带杜邦插头。

Note: The KSF has a default output line of 350mm, and an additional 1 meter line length with Dupont plug.

KTR系列 外置弹簧自复位式位移传感器

KTR series external spring self-resetting displacement sensor

产品实物图 Physical Products Pictures

KTR11



KTR12




KTR2



标准技术参数 Standard Technical Parameters

KTR2C/KTR11C/KTR12C:防水接头出线 KTR2P/KTR11P/KTR12P:航空插头出线

KTR2C/KTR11C/KTR12C: waterproof connector outlet KTR2P/KTR11P/KTR12P: aviation connector outlet

KTR微型自恢复系列 KTR micro self recovery series	10~15mm	25~40mm	50~150mm	175~300mm	量程选型参考: Range selection reference: 单位:mm Unit: mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.05%, ±0.1%, ±0.25%				10 15 25
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ		5.0KΩ		30 40 50
机械行程 Mechanical travel	行程+3mm Trip+3mm				75 100 125
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing				130 150 175
重复性精度 Repeatability accuracy	0.01mm				200 225 250
最大工作速度 Maximum working speed	5m/S				300
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				
使用温度范围 Operating temperature range	-60°C~+150°C				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				标配四个M4x16螺丝 两个五金支架 可以选配两个铝合金支架 Comes standard with four M4x16 screws two hardware brackets, and optionally two aluminum brackets
灵敏度 Sensitivity	1				
温漂 Temperature drift	无限小 infinitesimal				

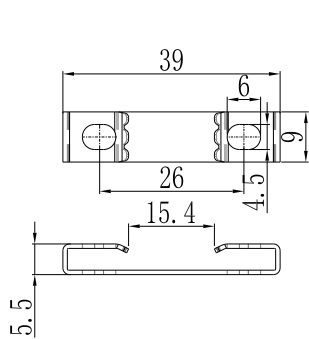
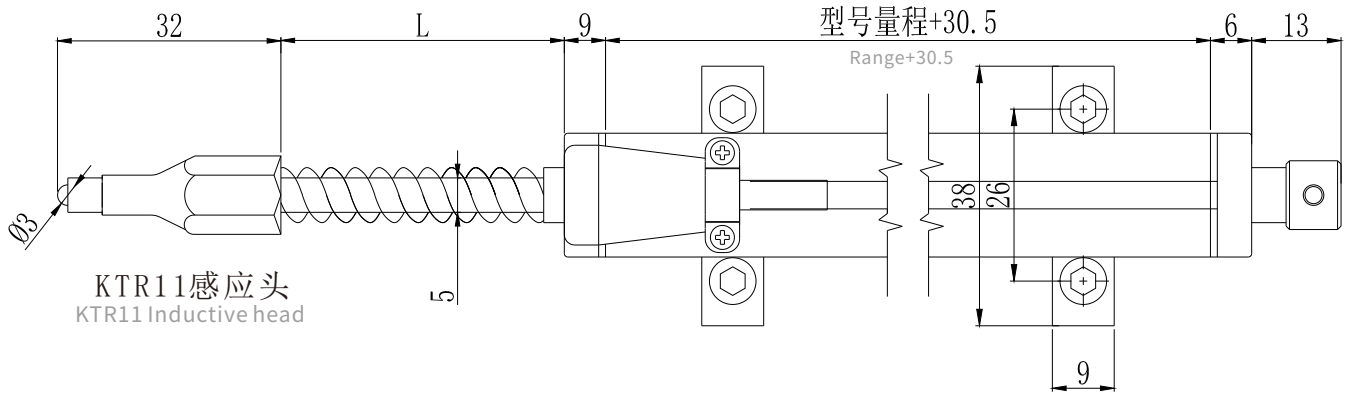
注: KTR11、KTR12、KTR2默认出线1米。

Note: KTR11, KTR12, and KTR2 are routed 1 meter by default.

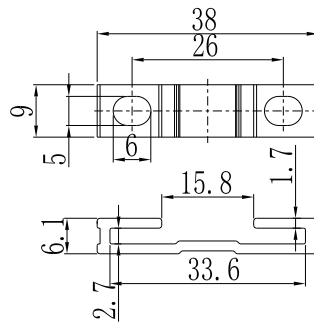
安装尺寸图 Installation Size Chart

单位 unit:mm

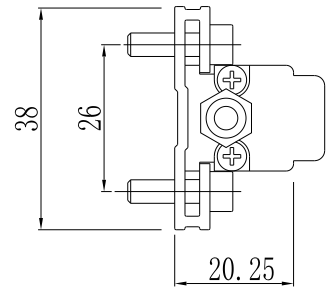
KTR11



标配五金支架
Standard hardware support

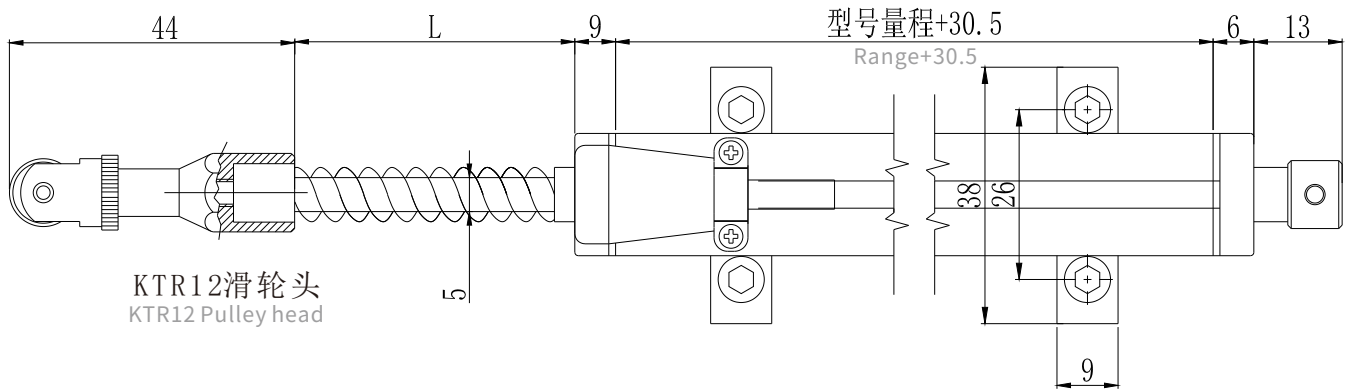
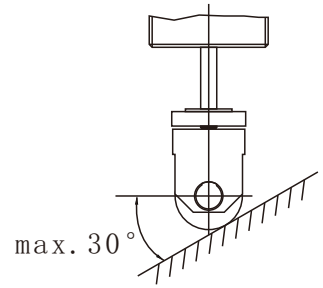


可选铝合金支架
Optional aluminum bracket

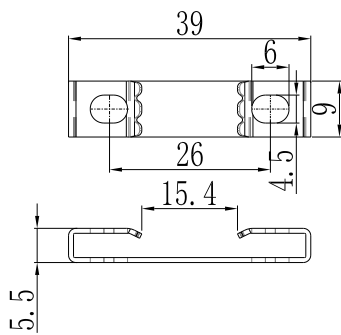


参数 Parameter	量程 Range	10 mm	15 mm	25 mm	50 mm	75 mm	100 mm	125 mm	150 mm	175 mm	200 mm	250 mm	300 mm
自然伸长 Natural elongation L/mm		22	28	33	66	99	131	175	198	225	254	330	393
压缩后 After compression L/mm		10	11	6	15	21	30	48	45	48	52	78	90
标准弹簧回弹力 Standard spring resilience (N)		4N左右 about	4N左右 about	4N左右 about	4N左右 about	4.5N左右 about	6N左右 about	6N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about
标准弹簧规格 Standard spring specification		0.4	0.4	0.4	0.4	0.4	0.45	0.45	0.45	0.45	0.45	0.45	0.45

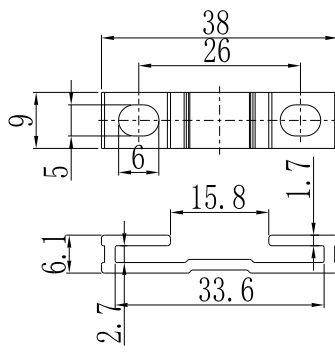
KTR12



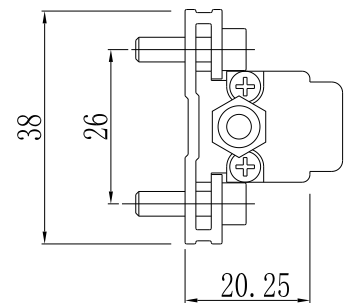
KTR12滑轮头
KTR12 Pulley head



标配五金支架
Standard hardware support

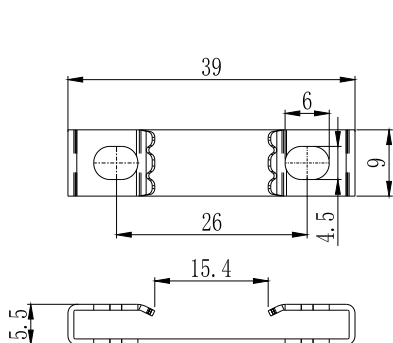
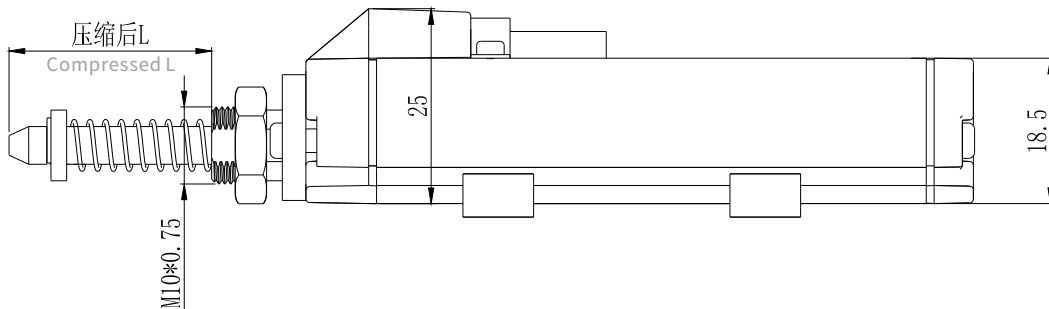
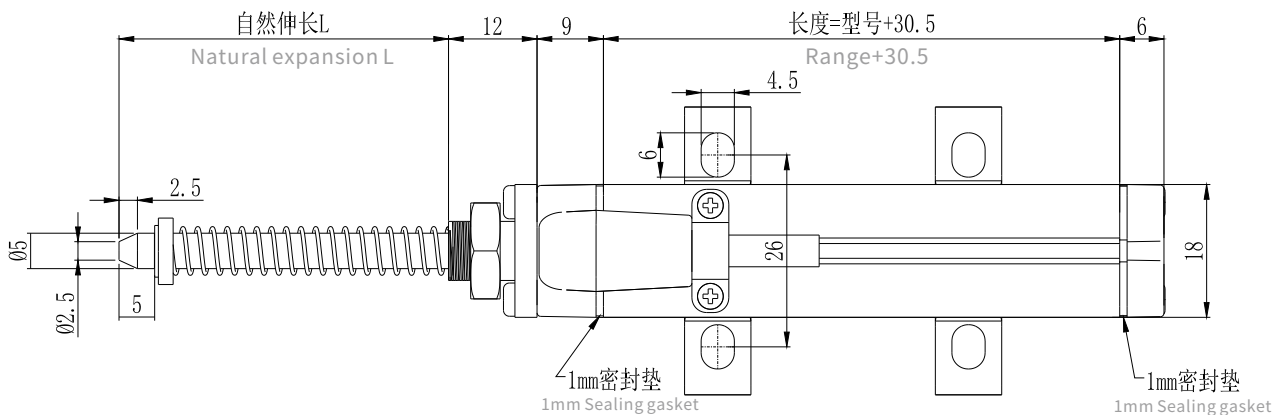


可选铝合金支架
Optional aluminum bracket

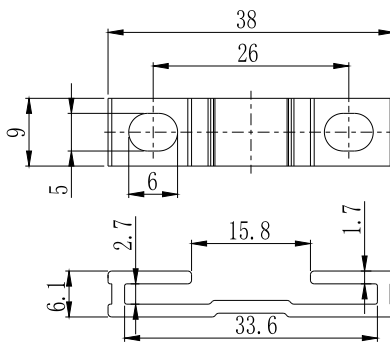


参数 Parameter	量程 Range	10 mm	15 mm	25 mm	50 mm	75 mm	100 mm	125 mm	150 mm	175 mm	200 mm	250 mm	300 mm
自然伸长 Natural elongation L/mm		22	28	33	66	99	131	175	198	225	254	330	393
压缩后 After compression L/mm		10	11	6	15	21	30	48	45	48	52	78	90
标准弹簧回弹力 Standard spring resilience (N)		4N左右 about	4N左右 about	4N左右 about	4N左右 about	4.5N左右 about	6N左右 about	6N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about
标准弹簧规格 Standard spring specification		0.4	0.4	0.4	0.4	0.4	0.45	0.45	0.45	0.45	0.45	0.45	0.45

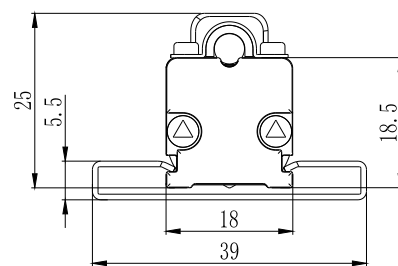
KTR2



标配五金支架
Standard hardware support



可选铝合金支架
Optional aluminum bracket



参数 Parameter	量程 Range	10 mm	15 mm	25 mm	50 mm	75 mm	100 mm	125 mm	150 mm	175 mm	200 mm	250 mm	300 mm
自然伸长 Natural elongation L/mm		36	42	48	81	113	146	190	212	241	269	345	409
压缩后 After compression L/mm		23	24	20	28	35	43	62	59	63	66	92	106
标准弹簧回弹力 Standard spring resilience (N)		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7-9N	7-9N	7-9N	7-9N	7-9N
标准弹簧规格 Standard spring specification		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

KTR系列 内置弹簧自复位式位移传感器

KTR series built-in spring self-resetting displacement sensor

产品实物图 Physical Products Pictures

KTR3



后盖有孔

KTR4



后盖无孔

标准技术参数 Standard Technical Parameters

KTR3C/KTR4C: 防水接头出线 KTR3P/KTR4P: 航空插头出线

KTR3C/KTR4C: waterproof connector outlet KTR3P/KTR4P: aviation plug outlet

KTR3/KTR4微型自恢复系列 KTR3/KTR4 micro self recovery series	10~15mm	25~40mm	50~150mm	175~250mm	量程选型参考: Range selection reference:
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%			±0.05%	单位:mm Unit: mm
电阻公差±10% Resistance tolerance ± 10%	1.0KΩ/2.0KΩ	2.0KΩ	5.0KΩ		KTR3:
机械行程 Mechanical travel	行程+3mm Trip+3mm				10 15 25 30 40 50 75 100 125
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing				150 175 200 225 250
重复性精度 Repeatability accuracy	0.01mm				KTR4:
最大工作速度 Maximum working speed	5m/S				10 15 25
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				
使用温度范围 Operating temperature range	-60°C~+150°C				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				标配四个M4x16螺丝 两个五金支架 可以选配两个铝合金支架 Comes standard with four M4x16 screws, two hardware brackets, and optionally two aluminum brackets
灵敏度 Sensitivity	1				
温漂 Temperature drift	无限小 infinitesimal				

注: KTR3、KTR4默认出线1米。

Note: KTR3 and KTR4 are routed 1 meter by default.

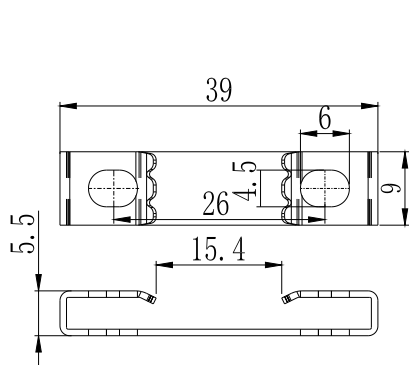
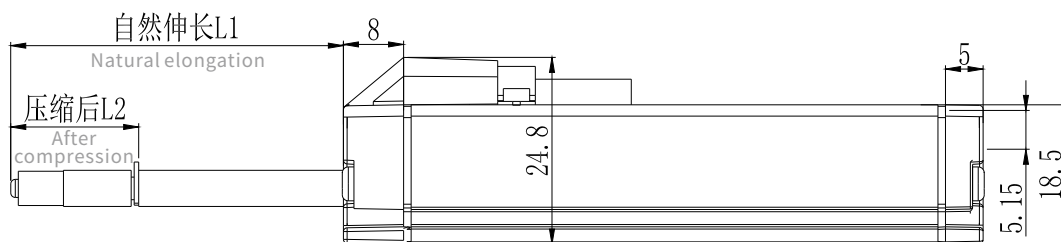
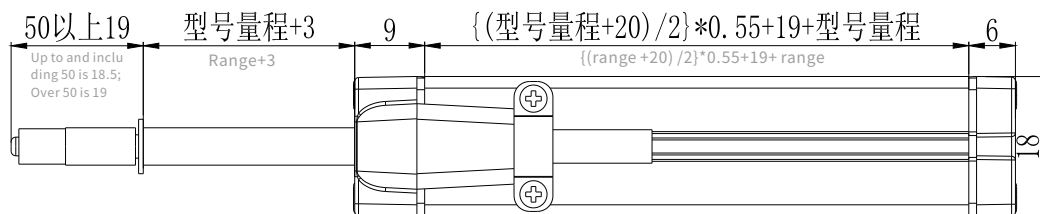
安装尺寸图 Installation Size Chart

单位 unit:mm

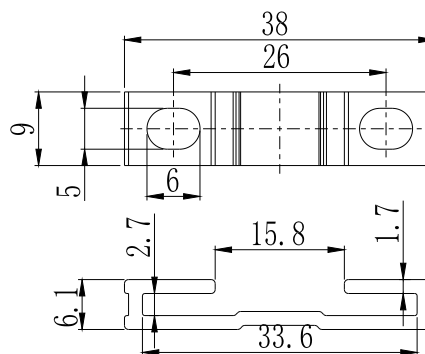
KTR3



50(含)以内18.5



标配五金支架
Standard hardware support



可选铝合金支架
Optional aluminum bracket

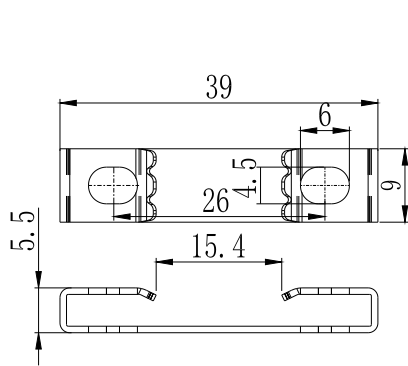
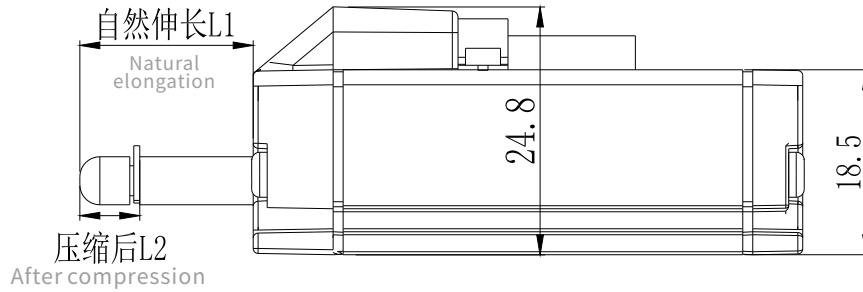
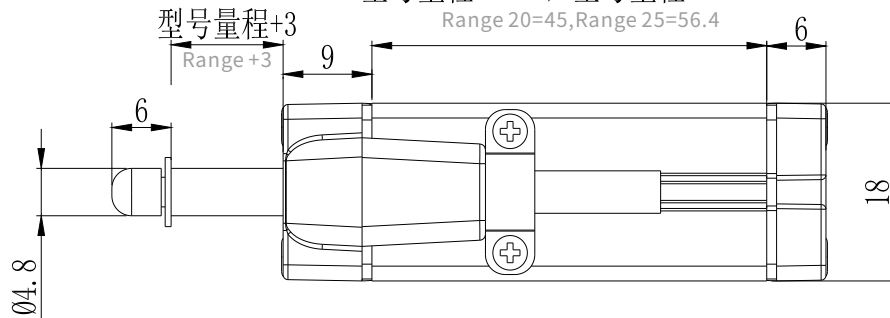
参数 Parameter	量程 Range	10mm	15mm	25mm	30mm	50mm	75mm	100mm	125mm	150mm	175mm	200mm	225mm	250mm
自然伸长L1/mm Natural elongation		31.5	36.5	46.5	51.5	68.5	97	122	147	172	197	222	247	272
压缩后L2/mm After compression		18.5	18.5	18.5	18.5	18.5	19	19	19	19	19	19	19	19
标准弹簧回弹力(N) Standard spring resilience		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7-9N	7-9N	7-9N	7-9N	7-9N
标准弹簧规格 Standard spring specification		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

KTR4

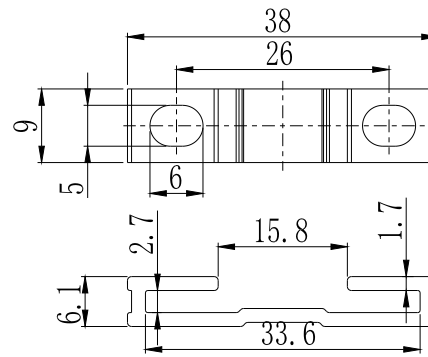


型号量程10=37.5, 型号量程15=43.6
Range 10=37.5, Range 15=43.6

型号量程20=45, 型号量程25=56.4
Range 20=45, Range 25=56.4



标配五金支架
Standard hardware support



可选铝合金支架
Optional aluminum bracket

参数 Parameter	量程 Range	10mm	15mm	25mm
自然伸长L1/mm Natural elongation		19	24	34
压缩后L2/mm After compression		6	6	6
标准弹簧回弹力 (N) Standard spring resilience		5-7N	5-7N	5-7N
标准弹簧规格 Standard spring specification		0.5	0.5	0.5

TR系列:KTR升级款 外置/内置弹簧自复位式位移传感器

TR Series: KTR upgrade external/built-in spring self-resetting displacement sensor

产品实物图 Physical Products Pictures

TR11



TR12



TR2



后盖无孔
The back cover has no hole

TR3



后盖无孔
The back cover has no hole

TR4




后盖无孔
The back cover has no hole

TR11/TR12/TR2/TR3/TR4:防水接头式 TR11P/TR12P/TR2P/TR3P/TR4P:航空插头式
TR11 TR12 / TR2 / TR3 / TR4: waterproof connector type TR11P TR12P/TR2P/TR3P/TR4P: aviation plug type

标准技术参数 Standard Technical Parameters

TR11/TR12/TR2/TR3/TR4:防水接头出线 TR11P/TR12P/TR2P/TR3P/TR4P:航空插头出线

TR11/TR12/TR2/TR3/TR4: waterproof connector outlet TR11P/TR12P/TR2P/TR3P/TR4P: aviation connector outlet

TR微型自恢复系列 TR micro self recovery series	10~15mm	25~40mm	50~150mm	175~200mm	量程选型参考: Range selection reference: 单位:mm Unit: mm TR11/TR12/TR2: 10 15 25 40 50 75 100 125 150 175 200 TR3/TR4: 10 15 25 30 40 50 75 100  标配四个M4x16螺丝 两个五金支架 可以选配两个铝合金支架 Comes standard with four M4x16 screws, two hardware brackets, and optionally two aluminum brackets
线性精度 (±%FS) Linear accuracy (±% FS)	±0.05%, ±0.1%, ±0.25%				
电阻公差 ±10% Resistance tolerance ± 10%	1KΩ/2.0KΩ	2.0KΩ	5.0KΩ		
机械行程 Mechanical travel	行程+3mm Trip+3mm				
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing				
重复性精度 Repeatability accuracy	0.01mm				
最大工作速度 Maximum working speed	5m/S				
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				
使用温度范围 Operating temperature range	-60°C~+150°C				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				
灵敏度 Sensitivity	1				
温漂 Temperature drift	无限小 infinitesimal				

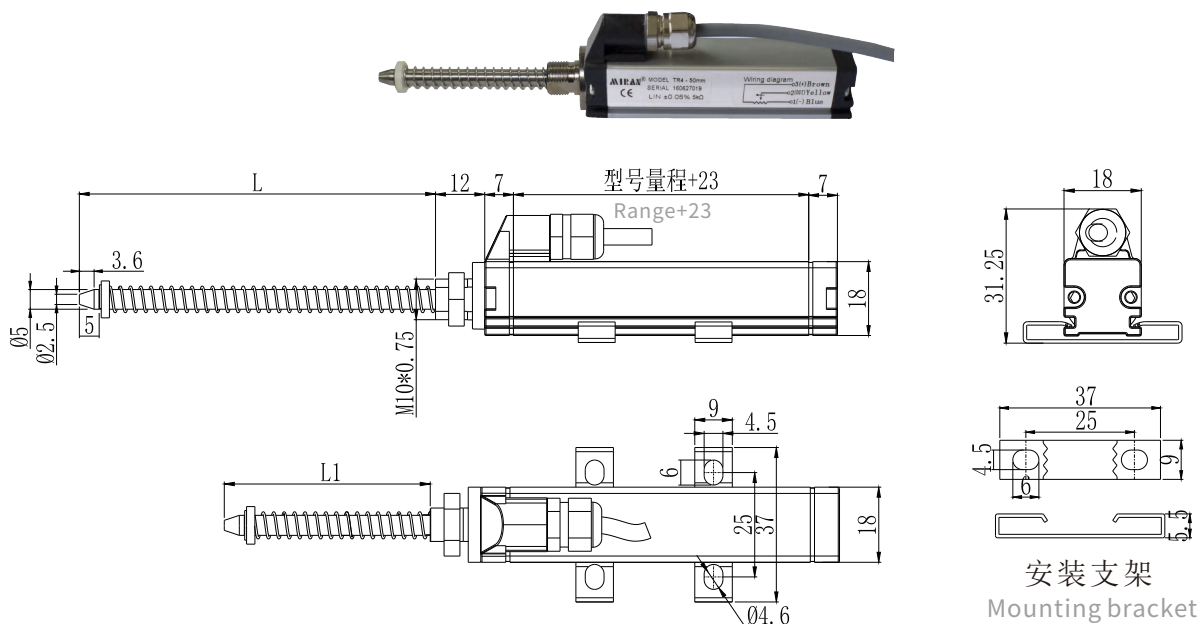
注: TR11、TR12、TR2、TR3、TR4默认出线1米。

Note: TR11, TR12, TR2, TR3, and TR4 are routed 1 meter by default.

安装尺寸图 Installation Size Chart

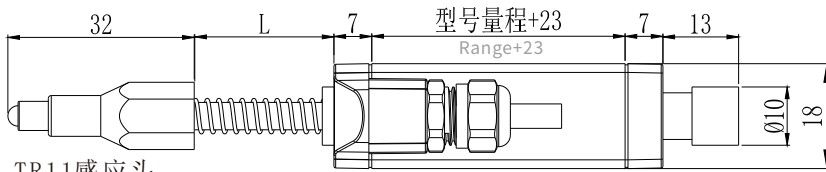
单位 unit:mm

TR2

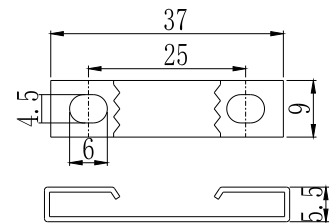


参数 Parameter	量程 Range	TR2-10mm	TR2-15mm	TR2-25mm	TR2-40mm	TR2-50mm	TR2-75mm	TR2-100mm	TR2-125mm	TR2-150mm	TR2-175mm	TR2-200mm
自然伸长L/mm Natural elongation		28	33	49	74	82	114	147	191	213	241	271
压缩后长度L1/mm Compressed length		15	15	21	31	27	36	44	63	60	63	68
标准弹簧回弹力(N) Standard spring resilience		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7-9N	7-9N	7-9N
标准弹簧规格 Standard spring specification		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

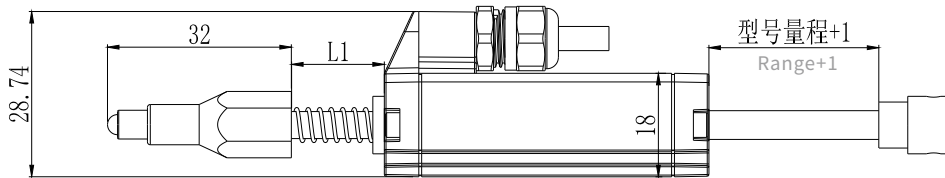
TR11



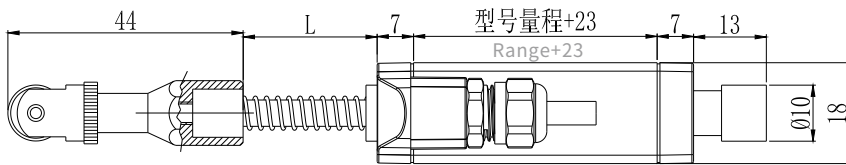
TR11感应头
TR11 Inductive head



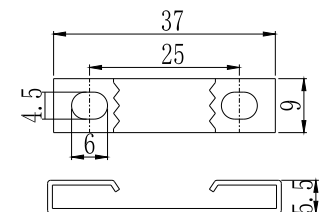
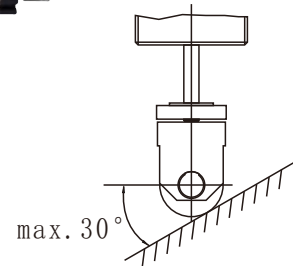
安装支架
Mounting bracket



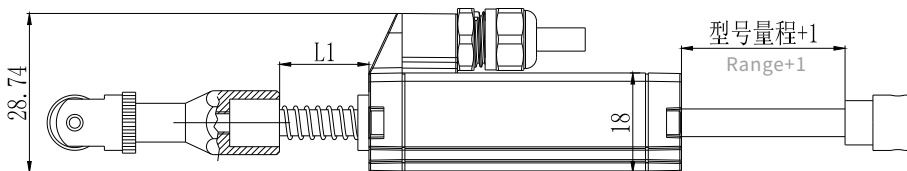
TR12



TR12滑轮头
TR12 Pulley head

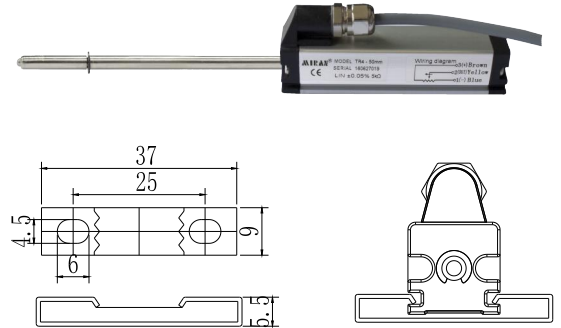
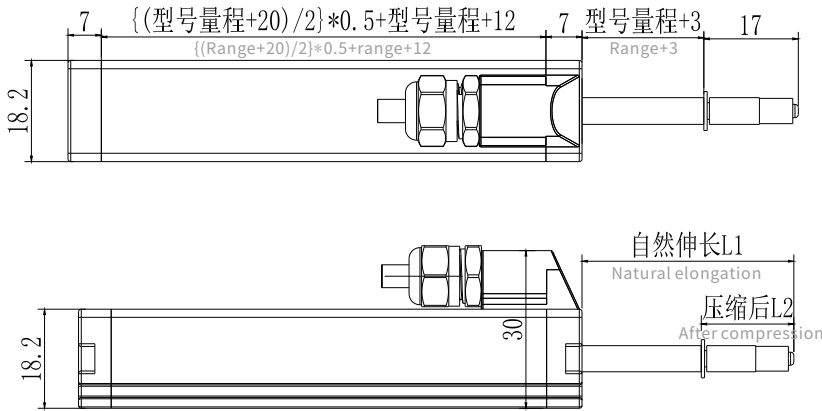


安装支架
Mounting bracket



参数 Parameter	量程 Range	TR11/12-10mm	TR11/12-15mm	TR11/12-25mm	TR11/12-40mm	TR11/12-50mm	TR11/12-75mm	TR11/12-100mm	TR11/12-125mm	TR11/12-150mm	TR11/12-175mm	TR11/12-200mm
自然伸长L/mm Natural elongation		28	34	39	64	72	104	137	181	203	231	261
压缩后长度L1/mm Compressed length		17.5	17.9	13.2	23.8	21.9	28.3	35.7	54.3	50.5	54.9	60
标准弹簧回弹力(N) Standard spring resilience		4N左右 about	4N左右 about	4N左右 about	4N左右 about	4N左右 about	4.5N左右 about	6N左右 about	6N左右 about	7N左右 about	7N左右 about	7N左右 about
标准弹簧规格 Standard spring specification		0.4	0.4	0.4	0.4	0.4	0.4	0.45	0.45	0.45	0.45	0.45

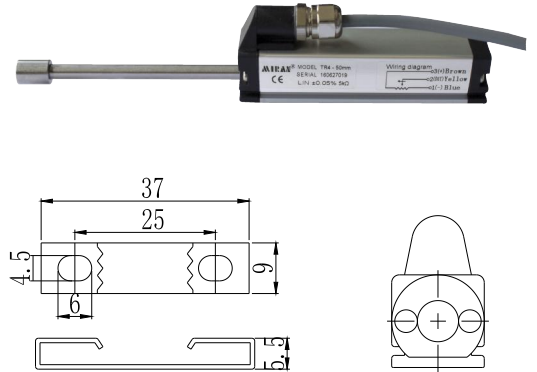
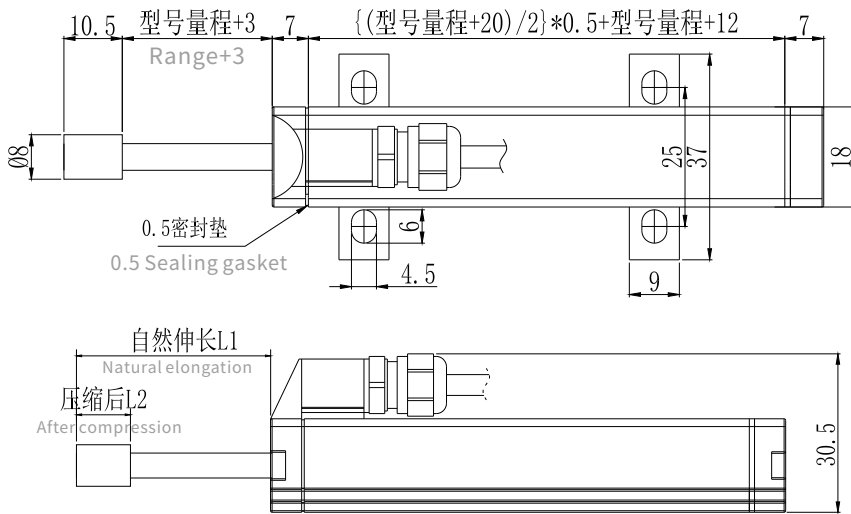
TR3



安装支架
Mounting bracket

参数 Parameter	量程 Range	TR3-10mm	TR3-15mm	TR3-25mm	TR3-30mm	TR3-40mm	TR3-50mm	TR3-75mm	TR3-100mm
自然伸长L1/mm Natural elongation		30	35	45	50	60	70	95	120
压缩后L2/mm After compression		17	17	17	17	17	17	17	17
标准弹簧回弹力(N) Standard spring resilience		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7-9N
标准弹簧规格 Standard spring specification		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

TR4



安装支架
Mounting bracket

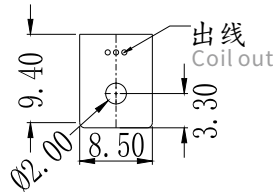
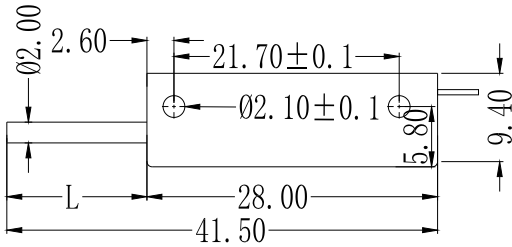
参数 Parameter	量程 Range	TR4-10mm	TR4-15mm	TR4-25mm	TR4-30mm	TR4-40mm	TR4-50mm	TR4-75mm	TR4-100mm
自然伸长L1/mm Natural elongation		23.5	28.5	38.5	43.5	53.5	63.5	88.5	113.5
压缩后L2/mm After compression		10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
标准弹簧回弹力(N) Standard spring resilience		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7-9N
标准弹簧规格 Standard spring specification		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4

KS8系列 微型内置弹簧自复位式位移传感器

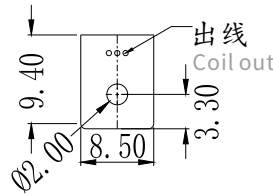
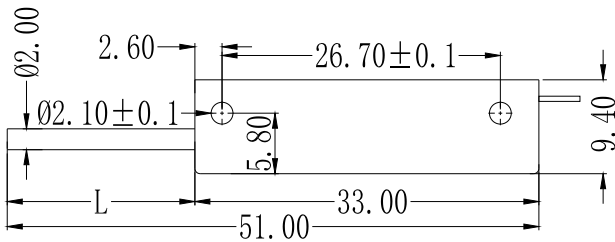
KS8 series micro built-in spring self-resetting displacement sensor

实物及尺寸图 Physical And Dimensional Drawings 单位 units:mm

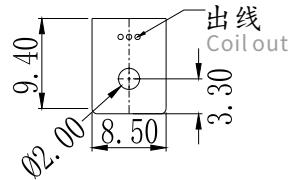
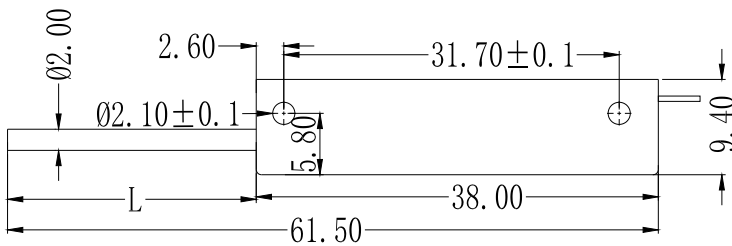
KS8-10mm



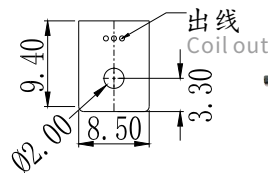
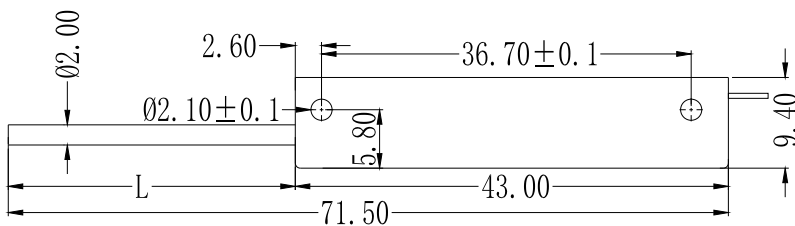
KS8-15mm



KS8-20mm



KS8-25mm



参数 Parameter	量程 Range	KS8-10mm	KS8-15mm	KS8-20mm	KS8-25mm
自然伸长 Natural elongation L/mm		13	18	23	28
压缩后 After compression L/mm		1	2	2	3
标准弹簧回弹力(N) Standard spring resilience		1-2N	1-2N	1-2N	3-4N用完更换为1-2N Replace with 1-2N
标准弹簧规格 Standard spring specification		0.2	0.2	0.2	0.25用完更换为0.2 Replace with 0.2 when used up

KS8标准产品为塑胶外壳，如有需要可定制为金属外壳，外形尺寸略有不同。

The KS8 standard product is a plastic case, which can be customized into a metal case if necessary, with slightly different dimensions.

标准技术参数 Standard Technical Parameters

KS8微型滑块系列 KS8 micro pull rod series	10mm	15mm	20mm	25mm	量程选型参考: Range selection reference:
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				单位:mm Unit: mm
电阻公差±10% Resistance tolerance ± 10%	5.0KΩ				10 15 20
机械行程 Mechanical travel	行程+3mm Trip+3mm				25
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing				
重复性精度 Repeatability accuracy	0.01mm				
温度系数 Temperature coefficient	≤1.5ppm/°C				
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA				
工作电压 Working voltage	≤24VDC				
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)				
灵敏度 Sensitivity	1				
温漂 Temperature drift	无限小 infinitesimal				
负载特性 Load characteristic	≥10mA				

防护等级:IP65; 最大运行速度:≤5m/S; 最大返回速度:≤1m/S; 使用寿命100X10⁶次or2X10⁶ m

Protection class: IP65; Maximum operating speed: ≤5m/S; Maximum return speed: ≤1m/S; Service life 100X10⁶ times or2X10⁶ m

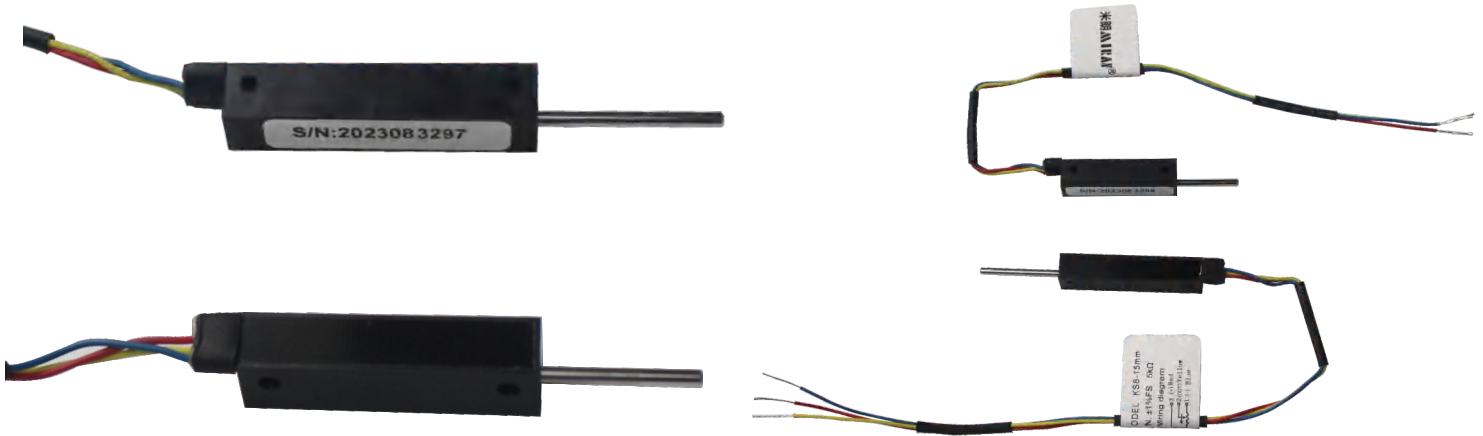
注: KS8默认出线为180mm的裸线。

Note:The KS8 uses 180mm bare cables by default.

KS8X系列 微型内置弹簧自复位式位移传感器

KS8X series micro built-in spring self-resetting displacement sensor

产品实物图 Physical Products Pictures



标准技术参数 Standard Technical Parameters

KS8X线长标配150MM KS8X line length standard 150mm

KS8X微型滑块系列 KS8X micro pull rod series	10mm	15mm	量程选型参考: Range selection reference: 单位:mm Unit: mm 10 15
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%		
电阻公差±10% Resistance tolerance ± 10%	5.0KΩ(1KΩ、2KΩ、10KΩ可定制) 5.0KΩ(1KΩ, 2KΩ, 10KΩ can be customized)		
机械行程 Mechanical travel	行程+3mm Trip+3mm		
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing		
重复性精度 Repeatability accuracy	0.01mm		
温度系数 Temperature coefficient	≤1.5ppm/°C		
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA		
工作电压 Working voltage	≤24VDC		
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)		
灵敏度 Sensitivity	1		
温漂 Temperature drift	无限小 infinitesimal		
负载特性 Load characteristic	≥10mA		

防护等级:IP65; 最大运行速度:≤5m/S; 最大返回速度:≤1m/S; 使用寿命100X10⁶次or2X10⁶ m

Protection class: IP65; Maximum operating speed: ≤5m/S; Maximum return speed: ≤1m/S; Service life 100X10⁶ times or2X10⁶ m

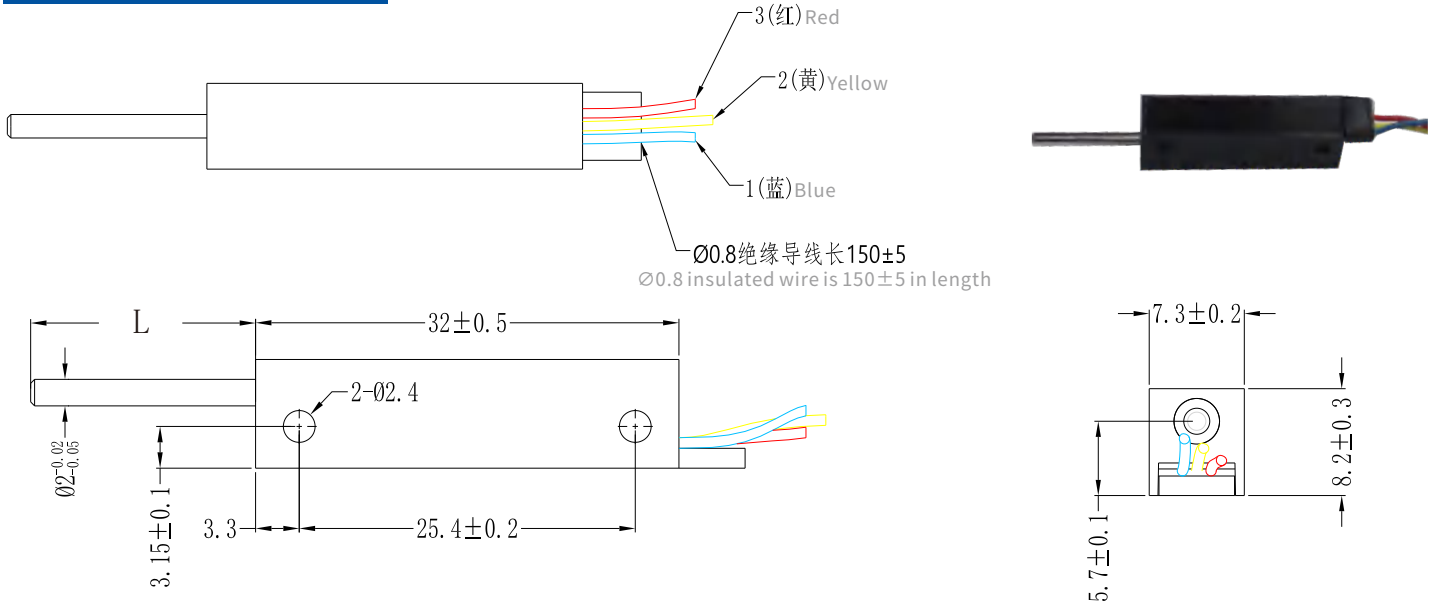
注: KS8X默认出线为180mm的裸线。

Note:The KS8X uses 180mm bare cables by default.

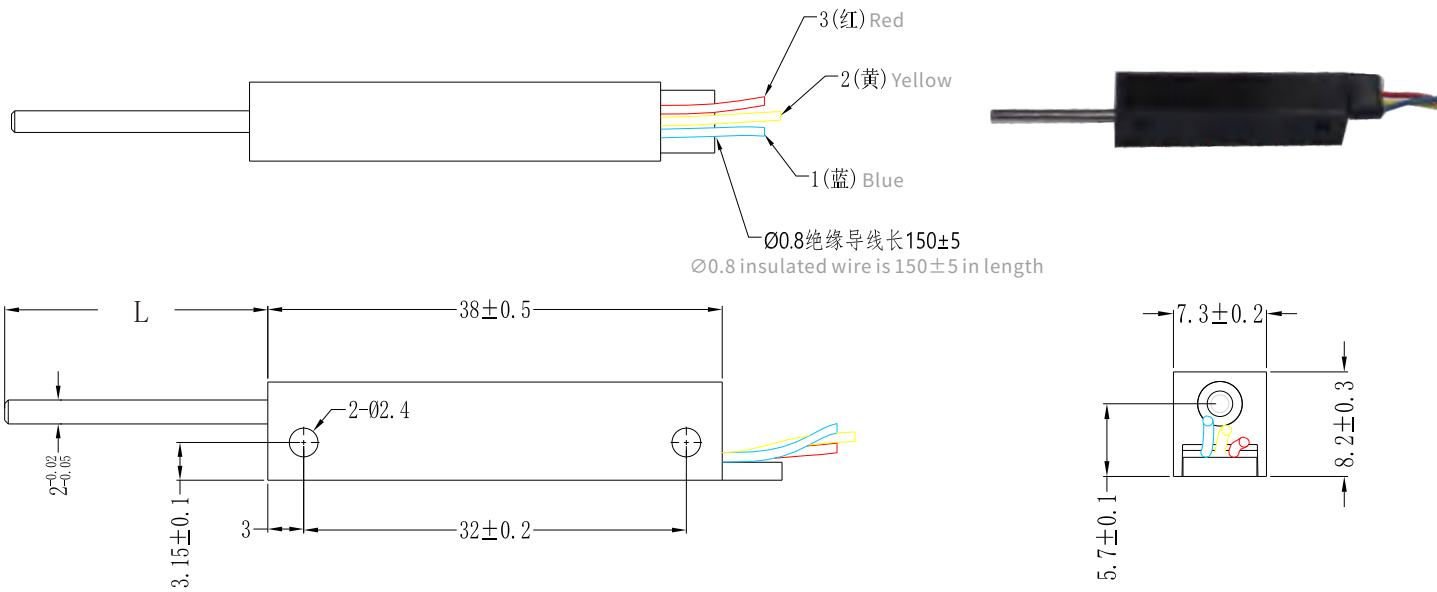
安装尺寸图 Installation Size Chart

单位 units:mm

KS8X-10mm



KS8X-15mm



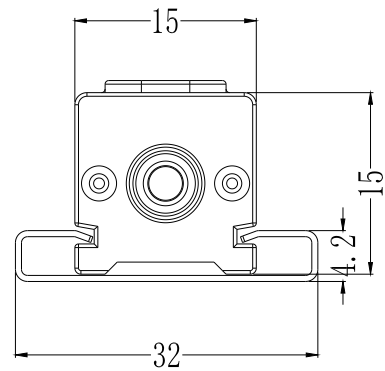
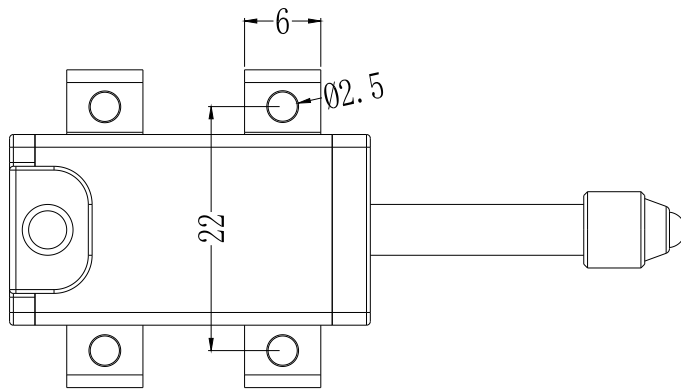
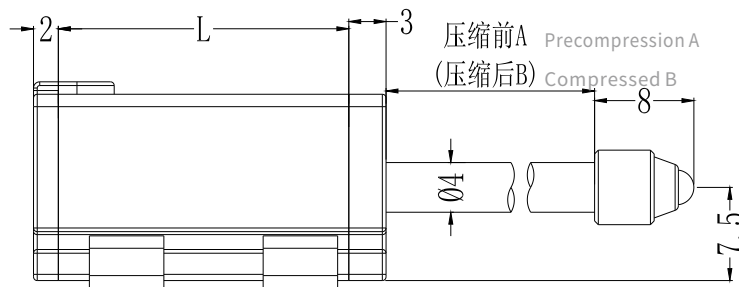
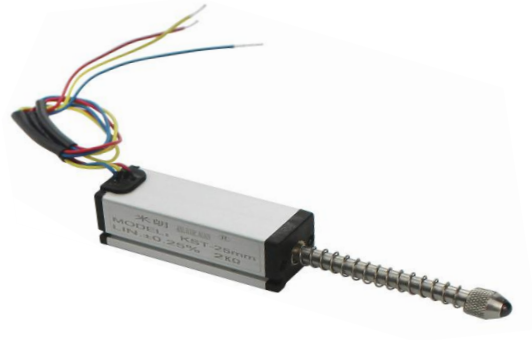
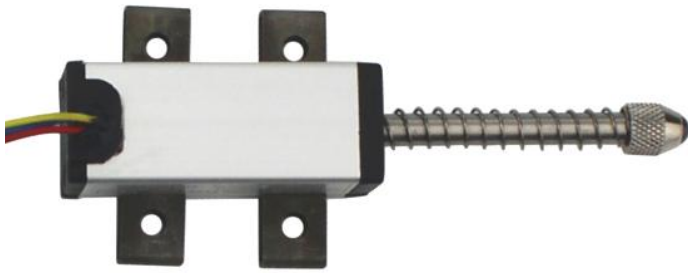
量程 Range	参数 Parameter	自然伸长 Natural elongation L/mm	压缩后 After compression L/mm	标准弹簧回弹力(N) Standard spring resilience	标准弹簧规格 Standard spring specification
KS8X-10mm		17	5	1-2N	0.2
KS8X-15mm		22	5	1-2N	0.2

KST系列 微型自复位式位移传感器

KST series micro self-resetting displacement sensor

实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm



量程 Range	参数 Parameter	铝管 Aluminum tube L (mm)	伸长 Elongation A (mm)	压缩后 After compression B (mm)	标准弹簧回弹力(N) Standard spring resilience	标准弹簧规格 Standard spring specification
10mm		25.3	19.2	4.5	3-4N	0.3
15mm		30.3	26	6.5	3-4N	0.3
20mm		35.3	33	8.5	3-4N	0.3
25mm		40.1	40	9.5	3-4N	0.3

标准技术参数 Standard Technical Parameters

KST微型自复位系列 KST micro self-reset series	10mm 15mm 20mm 25mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.25%
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ
机械行程 Mechanical travel	行程+3mm Trip+3mm
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing
重复性精度 Repeatability accuracy	0.01mm
温度系数 Maximum working speed	≤1.5ppm/°C
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA
工作电压 Operating voltage	(4~5KΩ) ≤24VDC; (2~3KΩ) ≤12VDC; (1KΩ) ≤5VDC
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)
灵敏度 Sensitivity	1
温漂 Temperature drift	无限小 infinitesimal
负载特性 load characteristic	≥10mA
量程选型参考: Range selection reference: 单位:mm Unit: mm	10 15 20 25

注: KST默认出线为180mm的裸线。

Note: The KST uses 180mm bare cables by default.

KPM12R系列 弹簧微型自复位式位移传感器

KPM12R series spring micro self-resetting displacement sensor

产品实物图 Physical Products Pictures

KPM12R1

支架安装式 Bracket mounted



KPM12R2

法兰螺纹安装式 Flange threaded mounting type



标准技术参数 Standard Technical Parameters

KPM12R外置弹簧微型自复位系列 KPM12R external spring micro self-reset series	10mm	15mm	25~30mm	50~75mm	100mm	量程选型参考: Range selection reference: 单位:mm Unit: mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%				±0.05%	10 15 25 30 50 75 100
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ			5.0KΩ		
机械行程 Mechanical travel	行程+3mm Trip+3mm					
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing					
重复性精度 Repeatability accuracy	0.01mm					
最大工作速度 Maximum working speed	5m/S					
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA					
使用温度范围 Operating temperature range	-60°C~+150°C					
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)					
灵敏度 Sensitivity	1					
温漂 Temperature drift	无限小 infinitesimal					

注: KPM12R1、KPM12R2默认出线1米。

Note: The KPM12R1 and KPM12R2 are routed 1 meter by default.

安装尺寸图 Installation Size Chart

单位 units:mm

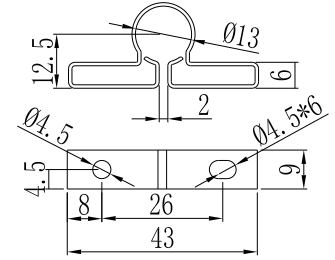
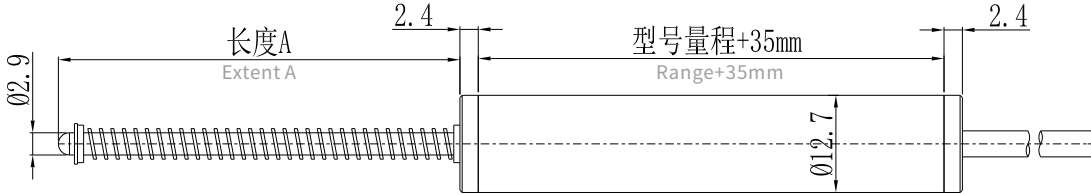
KPM12R1

支架安装式 Bracket mounted



弹簧未压缩尺寸:

Spring uncompressed dimensions:



弹簧压缩后尺寸:

Spring compression dimensions:



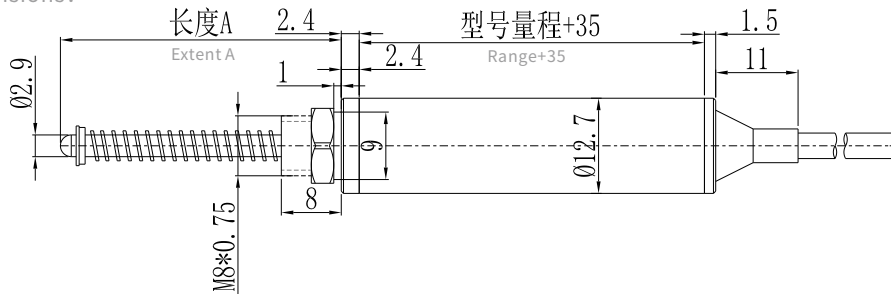
KPM12R2

法兰螺纹安装式 Flange threaded mounting type



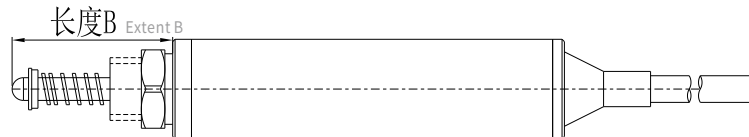
弹簧未压缩尺寸:

Spring uncompressed dimensions:



弹簧压缩后尺寸:

Spring compression dimensions:



参数 Parameter	量程 Range	KPM12R1/2-10mm	KPM12R1/2-15mm	KPM12R1/2-25mm	KPM12R1/2-30mm	KPM12R1/2-50mm	KPM12R1/2-75mm	KPM12R1/2-100mm
自然伸长A/mm Natural elongation		37.5	42.5	52.5	57.5	77.5	130	155
压缩后B/mm After compression		20.5	21	22	24	25	48	48
标准弹簧回弹力(N) Standard spring resilience		6-8N	6-8N	6-8N	6-8N	6-8N	6-8N	6-8N
标准弹簧规格 Standard spring specification		0.4	0.3	0.3	0.3	0.3	0.3	0.3

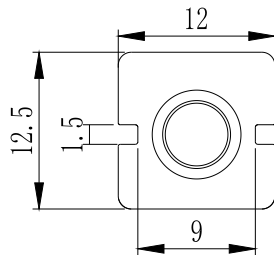
KSC系列 微型外置弹簧自复位式位移传感器

KSC series micro external spring self-resetting square tube displacement sensor

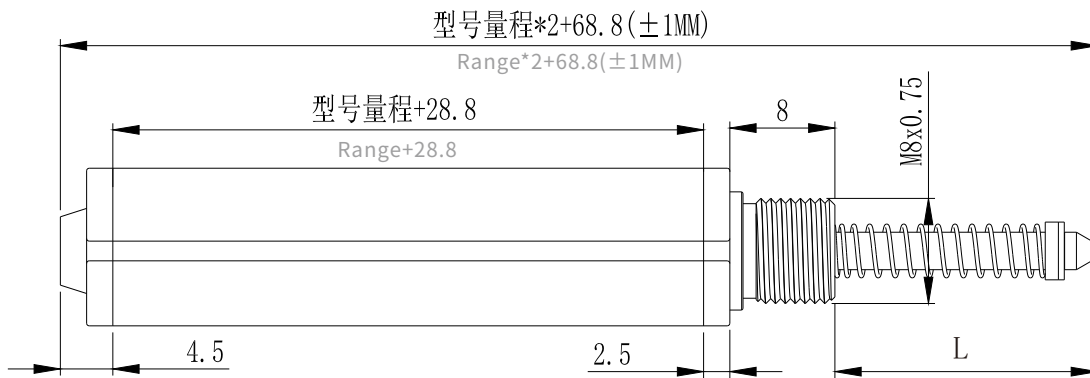
实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm

法兰螺纹安装式 Flange threaded mounting type



标配杜邦插头
Dupont plug as standard



参数 Parameter	量程 Range	5mm	10mm	15mm	20mm	25mm	30mm	35mm	40mm	45mm	50mm	55mm	60mm	75mm	100mm
自然伸长L/mm Natural elongation		30	35	40	45	50	55	60	65	70	75	80	85	110	144
压缩后L/mm After compression		23	23	23	23	23	23	23	23	23	23	23	23	33	42
原标准弹簧回弹力(N) Original standard spring rebound force		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about
原标准弹簧规格 Original standard spring specification		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
现标准弹簧回弹力(N) Now standard spring resilience		2N	2N	2N	2N	2.5N	2.5N	3N	3N	3N	3N	3N	3N	3N	3N
现标准弹簧规格 Original standard spring specification		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

原标准弹簧用完即止，如对弹簧回弹力有要求，下单时需备注要什么规格的弹簧。

When the original standard spring is used up, if there is a requirement for spring resilience, it is necessary to note what specifications of the spring when placing an order.

标准技术参数 Standard Technical Parameters

KSC微型自恢复系列 KSC Micro self recovery series	5mm~25mm	30mm~100mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%	
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ	5.0KΩ
机械行程 Mechanical travel	行程+3mm Trip+3mm	
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing	
重复性精度 Repeatability accuracy	0.01mm	
温度系数 Temperature coefficient	≤1.5ppm/°C	
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA	
工作电压 Working voltage	(4KΩ-5KΩ)≤24VDC; (2KΩ-3KΩ)≤12VDC; (1KΩ)≤5VDC	
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)	
灵敏度 Sensitivity	1	
温漂 Temperature drift	无限小 infinitesimal	
负载特性 Load characteristic	≥10mA	

量程选型: 5mm-100mm 可选(mm):

Range selection: 5mm-100mm optional(mm):

5	10	15	20	25	30	35	40	45	50	55	60	75	100
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防护等级:IP65; 最大运行速度:≤5m/S; 最大返回速度:≤1m/S; 使用寿命100X10⁶次or2X10⁶m

Protection class: IP65; Maximum operating speed: ≤5m/S; Maximum return speed: ≤1m/S; Service life 100X10⁶times or2X10⁶m

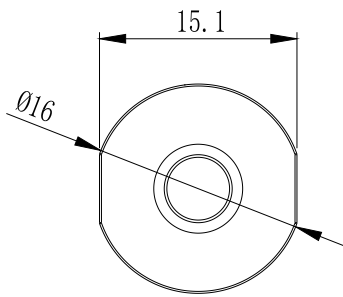
注: KSC默认出线350mm,另配1米线长带杜邦插头。

Note:The KSC has a default output line of 350mm, and an additional 1 meter line length with Dupont plug.

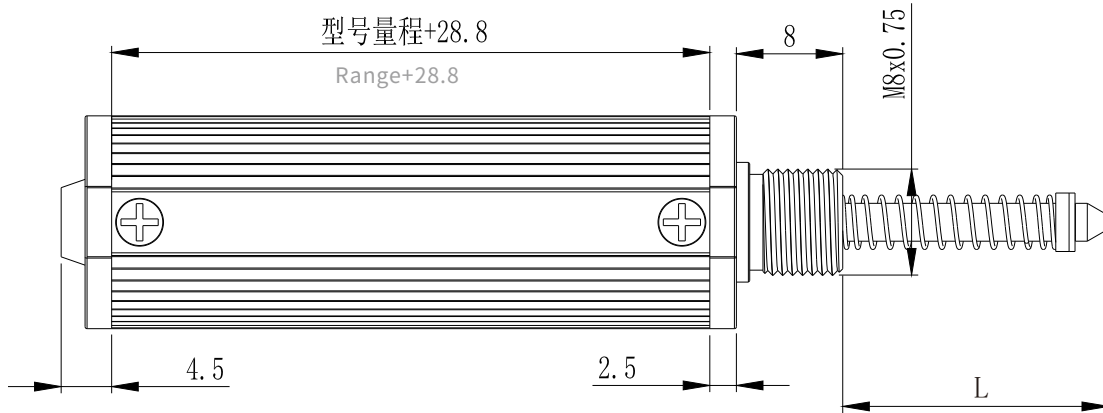
KSP系列 微型外置弹簧自复位式圆管位移传感器

KSP series micro external spring self-resetting round tube displacement sensor

实物及尺寸图 Physical And Dimensional Drawings 单位 units:mm



标配杜邦插头
Dupont plug as standard



参数 Parameter	量程 Range	5mm	10mm	15mm	20mm	25mm	30mm	35mm	40mm	45mm	50mm	55mm	60mm	75mm	100mm
自然伸长L/mm Natural elongation		30	35	40	45	50	55	60	65	70	75	80	85	110	144
压缩后L/mm After compression		23	23	23	23	23	23	23	23	23	23	23	23	33	42
原标准弹簧回弹力(N) Original standard spring rebound force		7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about	7N左右 about
原标准弹簧规格 Original standard spring specification		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
现标准弹簧回弹力(N) Now standard spring resilience		2N	2N	2N	2N	2.5N	2.5N	3N	3N	3N	3N	3N	3N	3N	3N
现标准弹簧规格 Original standard spring specification		0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

原标准弹簧用完即止，如对弹簧回弹力有要求，下单时需备注要什么规格的弹簧。

When the original standard spring is used up, if there is a requirement for spring resilience, it is necessary to note what specifications of the spring when placing an order.

标准技术参数 Standard Technical Parameters

KSP微型自恢复系列 KSP Micro self recovery series	5mm~25mm	30mm~100mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.1%	
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ	5.0KΩ
机械行程 Mechanical travel	行程+3mm Trip+3mm	
解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing	
重复性精度 Repeatability accuracy	0.01mm	
温度系数 Temperature coefficient	≤1.5ppm/°C	
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA	
工作电压 Working voltage	(4KΩ-5KΩ)≤24VDC; (2KΩ-3KΩ)≤12VDC; (1KΩ)≤5VDC	
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)	
灵敏度 Sensitivity	1	
温漂 Temperature drift	无限小 infinitesimal	
负载特性 Load characteristic	≥10mA	

量程选型：5mm-100mm 可选(mm)：

Range selection: 5mm-100mm optional(mm) :

5	10	15	20	25	30	35	40	45	50	55	60	75	100
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防护等级:IP65; 最大运行速度:≤5m/S; 最大返回速度:≤1m/S; 使用寿命100X10⁶ 次or2X10⁶ m

Protection class: IP65; Maximum operating speed: ≤5m/S; Maximum return speed: ≤1m/S; Service life 100X10⁶ times or2X10⁶ m

注：KSP默认出线350mm,另配1米线长带杜邦插头。

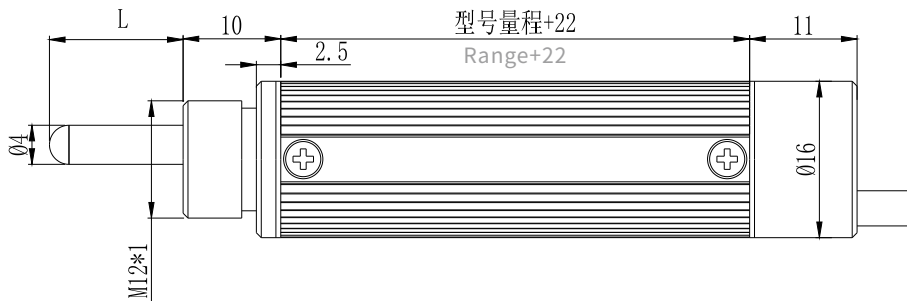
Note:The KSP has a default output line of 350mm, and an additional 1 meter line length with Dupont plug.

KSN系列 微型内置弹簧自复位式位移传感器

KSN series miniature built-in spring self-resetting displacement sensor

实物及尺寸图 Physical And Dimensional Drawings 单位 units:mm

法兰螺纹安装式 Flange threaded mounting type



参数 Parameter	量程 Range	量程		
		10mm	15mm	25mm
自然伸长L/mm Natural elongation		11.5	16.5	26.5
压缩后L/mm After compression		/	/	/
标准弹簧回弹力(N) Standard spring resilience		2-3N	2-3N	2-3N
标准弹簧规格 Standard spring specification		0.3	0.3	0.3

标准技术参数 Standard Technical Parameters

KSN微型自复位系列 KSN mini self-reset series	10mm~25mm	量程选型参考: Range selection reference: 单位:mm Unit: mm
线性精度 (±%FS) Linear accuracy (±% FS)	±0.25%	10 15 25
电阻公差±10% Resistance tolerance ± 10%	2.0KΩ	
机械行程 Mechanical travel	行程+3mm Trip+3mm	
解析度/分辨率 Resolution	Infinite无限解析 Infinite uninterrupted parsing	
重复性精度 Repeatability accuracy	0.01mm	
温度系数 Temperature coefficient	≤1.5ppm/°C	
滑刷正常工作电流 Normal working current of the sliding brush	≤10μA	
工作电压 Working voltage	(4KΩ-5KΩ)≤24VDC; (2KΩ-3KΩ)≤12VDC; (1KΩ)≤5VDC	
输出类型 Type of output	0~100%给定输入工作电压(随位移变化而变化) 0~100% of the given input working voltage (varies with displacement)	
灵敏度 Sensitivity	1	
温漂 Temperature drift	无限小 infinitesimal	
负载特性 Load characteristic	≥10mA	

注: KSN默认出线1米。

Note: The KSN exits 1 meter by default.

PME12/PME14系列 磁阻式位移传感器

PME12/PME14 series magnetoresistive displacement sensors

产品实物图 Physical Products Pictures

PME12



标配：
Standard configuration



磁环安装导片
Magnetic ring mounting guide

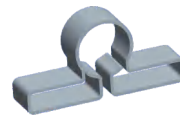
支架可选：
Support optional



铝合金支架 (标配)
Aluminum alloy bracket
(standard)



塑胶支架 (可选)
Aluminum alloy bracket
(standard)



五金支架 (可选)
Aluminum alloy bracket
(standard)

PME14



标配：
Standard configuration



磁环安装导片
Magnetic ring
mounting guide



铝合金支架
Aluminum
alloy bracket

主要特征 Major Characteristic

- PME12密封等级IP67,PME14密封等级IP68.
- PME12 /PME14系列直线位移传感器采用无阻轴设计可满足灰尘或油污较多或潮湿环境或暂时浸没条件下的位移测量需要。
- PME12 /PME14系列产品是基于外部电磁执行器与内部测量游标连接的新型位移测量传感器。
- 通过磁性游标取代传统位移传感器中的阻轴，传感器结构更紧凑。PME14为全身不锈钢材质。
- 超出理论电气行程后无电气信号变化，安装更简单。
- 本系统传感器适用于各种空压环境的位移测量,工作压力 $\leq 2.5\text{MPa}$ 。
- PME12 seal grade IP67,PME14 seal grade IP68.
- PME12 /PME14 series linear displacement sensor adopts unimpeded shaft design to meet the needs of displacement measurement in dusty or oily or humid environments or temporary immersion conditions.
- PME12 /PME14 series products are new displacement measurement sensors based on the connection of external electromagnetic actuators and internal measurement cursors.
- By replacing the resistance axis in the traditional displacement sensor with a magnetic cursor, the sensor structure is more compact. PME14 is made of stainless steel.
- No electrical signal changes beyond the theoretical electrical travel, easier installation.
- The sensor of this system is suitable for displacement measurement in various air pressure environments with working pressure $\leq 2.5\text{MPa}$.

标准技术参数 Standard Technical Parameters

电阻公差 Resistance tolerance	±10%
指针阻力 Pointer resistance	≤0.5N
最大加速度 Maximum acceleration	≤10m/s ²
运行次数 Run times	一亿次 One hundred million times
最大应用电压 Maximum applied voltage	36V
储存温度范围 Storage temperature range	-50°C~+150°C
位移效率 Displacement efficiency	≤5m/s
环境保护等级 Environmental protection grade	IP67
绝缘强度 Dielectric strength	<100uA当500V=,50Hz,2s,1bar <100uA when 500V=,50Hz,2s,1bar
DIN振动IEC 68T2-6 DIN Vibration IEC 68T2-6	12g,10...2000Hz
电气绝缘 Electrical insulation	>100MΩ当500V=,1bar,2s
工作温度范围 Operating temperature range	-40°C~+120°C
独立线性(C.E.U.范围之内) Independent linearity (within C.E.U. range)	0.05%
位移灵敏度(无迟滞) Displacement sensitivity (no hysteresis)	0.05~0.1mm
有效电气行程(C.E.U.) Effective electrical travel(C.E.U.)	50~1500mm
推荐指针电流 Recommended pointer current	<0.1uA
输出电压的实际温度系数 The actual temperature coefficient of the output voltage	<1.5ppm/°C
冲击测试DIN IEC68T2-27 Impact testing DIN IEC68T2-27	50g,11ms,单击(cilck)
最大指针电流在性能差的条件下 Maximum pointer current under poor performance conditions	10mA

量程选型：50mm-1500mm 可选(mm)： Range selection: 50mm-1500mm optional (mm)：

50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1250	1500
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注： PME12、PME14默认出线1米。

Note: PME12 and PME14 are routed 1 meter by default.

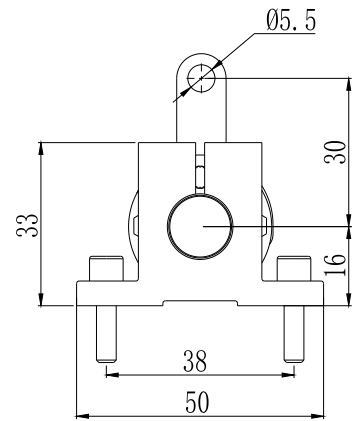
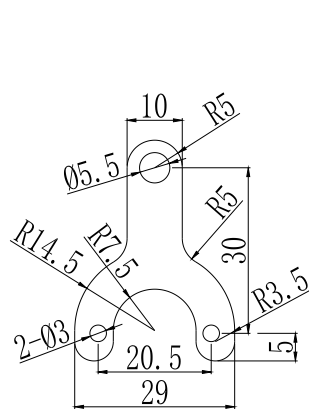
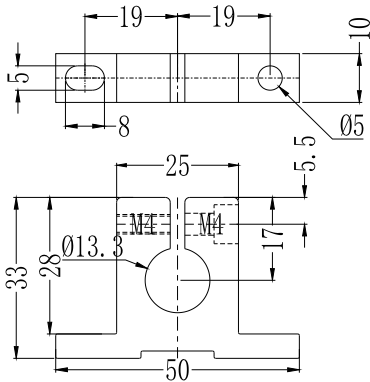
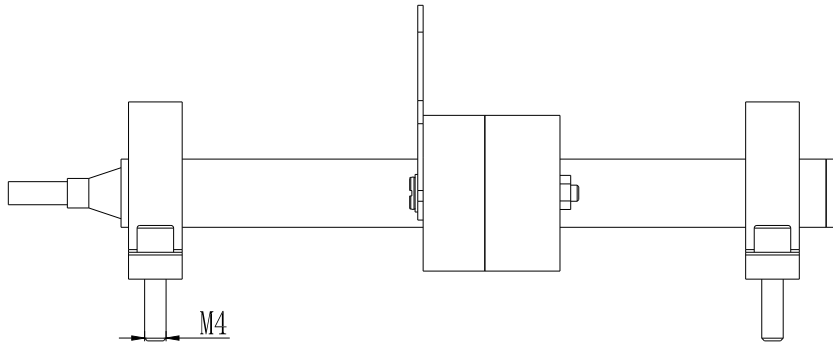
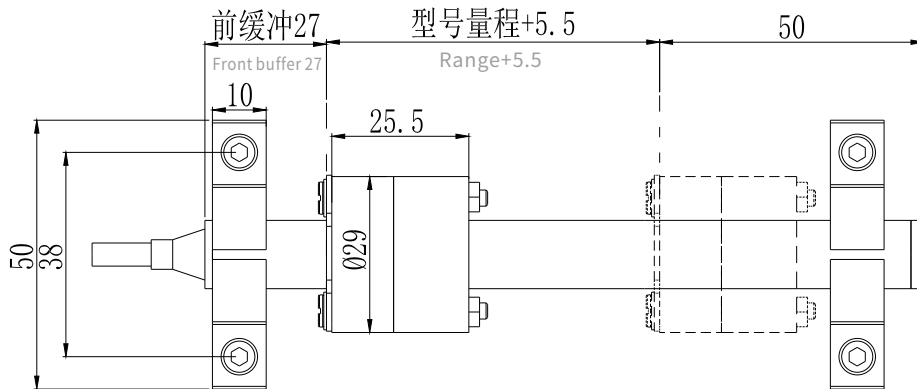
重要提示： 目录中呈报的数据，直线和温度系数只对米制装置通过指针电路IC的最大流量≤10uA时有效

Important: The data, linear and temperature coefficients presented in the catalog are valid only for the maximum flow rate of the metric device through the pointer circuit IC ≤10uA

安装尺寸图 Installation Size Chart

单位 units:mm

PME12



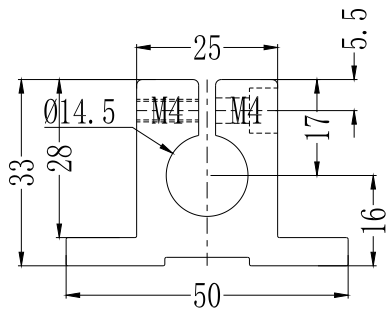
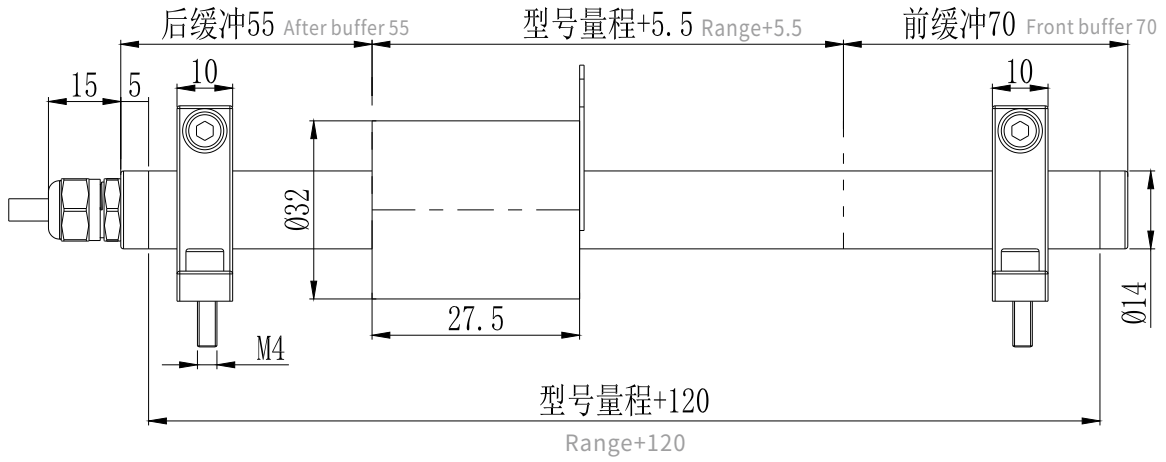
Ø12.7 铝合金支架(默认)

Ø12.7 Aluminum bracket (default)

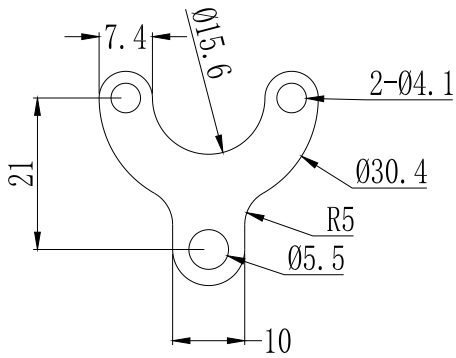
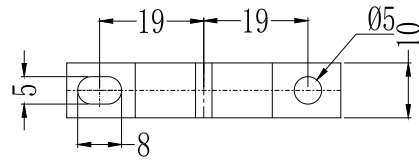
磁环安装导片

Magnet ring

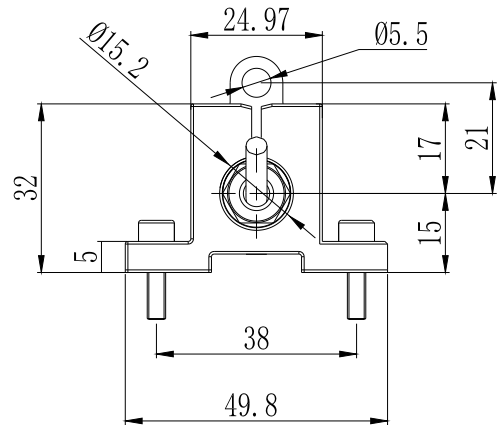
PME14



铝合金支架
Aluminum bracket



磁环安装导片
Magnetic ring mounting guide



PMF系列 磁阻式位移传感器

PMF series magnetostrictive displacement sensor

产品实物图 Physical Products Pictures



标准技术参数 Standard Technical Parameters

型号 Model	PMF	独立线性(C.E.U.范围之内) Independent linearity (within C.E.U. range)	0.05%
有效电气行程(C.E.U.) Effective Electrical travel (C.E.U)	50~1000mm	最大加速度 Maximum acceleration	$\leq 10m/s^2$
位移效率 Displacement efficiency	$\leq 5m/s$	指针阻力 Pointer resistance	$\leq 0.5N$
DIN振动IEC 68T2-6 DIN Vibration IEC 68T2-6	12g,10...2000Hz	位移灵敏度(无迟滞) Displacement sensitivity (no hysteresis)	0.05~0.1mm
冲击测试DIN IEC68T2-27 Shock resistance	50g,11ms,单击 50g,11ms,click	推荐指针电流 Recommended pointer current	$< 0.1\mu A$
电阻公差 Resistance tolerance	$\pm 3\%$	最大应用电压 Insulation resistance	36V
最大指针电流在性能差的条件下 Maximum pointer current under poor performance conditions	10mA	绝缘强度 Dielectric strength	$< 100\mu A$ 当500V=,50Hz,2s,1bar
电气绝缘 Electric insulation	$> 100M\Omega$ 当500V=,1bar,2s	环境保护等级 Environmental protection grade	IP67
运行次数 Run times	一亿次 One hundred million times	工作温度范围 Operating temperature range	-40°C~+120°C
输出电压的实际温度系数 The actual temperature coefficient of the output voltage	$< 1.5ppm/^\circ C$	储存温度范围 Storage temperature range	-50°C~+150°C

量程选型：50mm-1000mm 可选(mm)：

Range selection: 50mm-1000mm optional (mm) :

50	100	110	130	150	200	220	250	275	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
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注：PMF默认不带线。

Note:By default, the PMF does not contain cables.

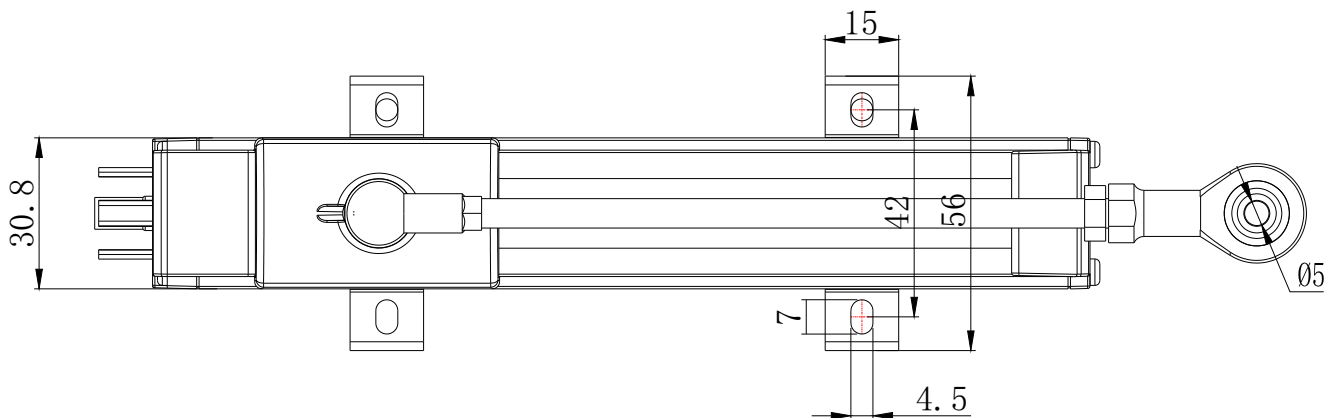
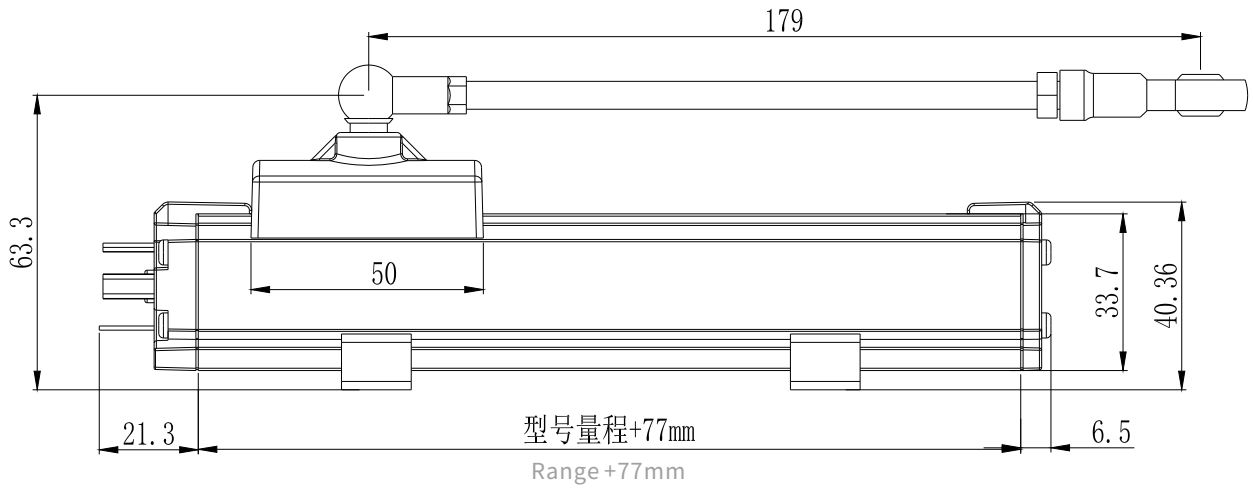
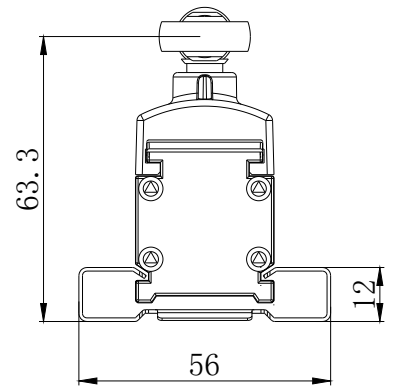
主要特征 Major Characteristic

- PMF 直线位移传感器采用无阻轴设计，可满足潮湿环境或暂时浸没条件下的位移测量需要。
- PMF系列产品是基于外部电磁执行器与内部测量游标连接的新型位移测量传感器。
- 通过磁性游标取代传统位移传感器中的阻轴，传感器结构更紧凑。
- 超出理论电气行程后无电气信号变化，安装更简单。
- 本系统传感器适用于各种空压环境的位移测量,工作压力 $\leq 2.5MPa$ 。

- The PMF linear displacement sensor uses an unimpeded shaft design to meet the needs of displacement measurement in wet environments or temporary immersion conditions.
- The PMF series is a new type of displacement measurement sensor based on the connection of an external electromagnetic actuator with an internal measurement cursor.
- By replacing the resistance axis in the traditional displacement sensor with a magnetic vernier, the sensor structure is more compact.
- No electrical signal changes beyond the theoretical electrical travel, making installation easier.
- The sensor of this system is suitable for displacement measurement in various air pressure environments with working pressure $\leq 2.5\text{MPa}$.

安装尺寸图 Installation Size Chart

单位 units:mm



PMI系列 磁阻式位移传感器

PMI series magneto-resistive displacement sensors

实物及尺寸图 Physical And Dimensional Drawings

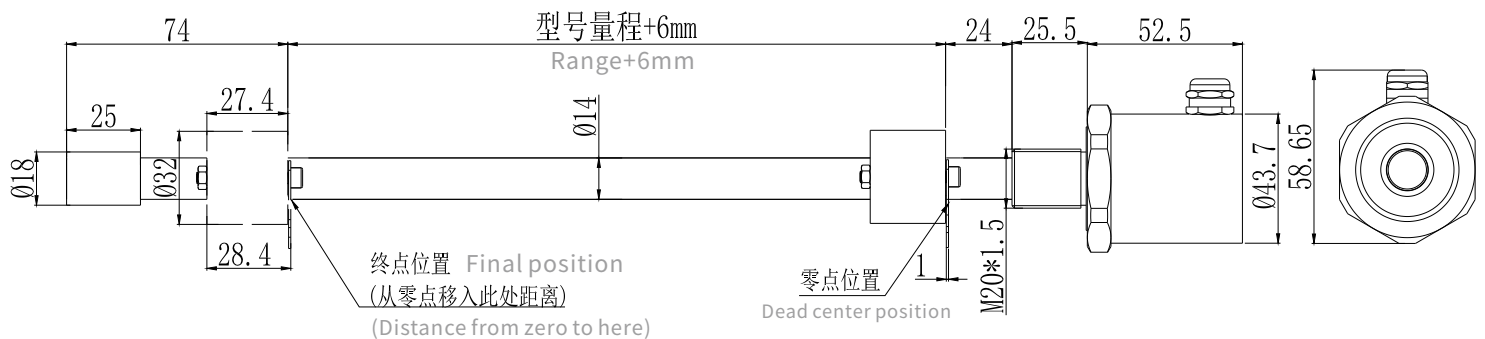
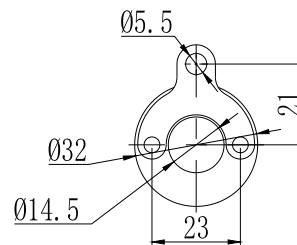
单位 units:mm



标配:
Standard configuration



磁环安装导片
Magnetic ring mounting guide



主要特征 Major Characteristic

- PMI传感器应用于气缸或者油缸内置的位移测量(传感器的运动磁环与油/气缸活塞相连), 也可以进行外置位移测量。
- 不锈钢的外壳提高了保护等级, 允许被测量气/油缸的压力最高可达2.5MPa。
- 提供螺纹连接形式, 而且可以定制法兰安装方式, 兼容各种主流缸型。
- 专利产品, 全身不锈钢。

- PMI sensors are used for displacement measurement within the cylinder or cylinder (the sensor's moving magnetic ring is connected to the oil/cylinder piston), as well as external displacement measurement.
- The stainless steel housing increases the level of protection, allowing the pressure of the measured gas/cylinder to be up to 2.5MPa.
- Provide threaded connection form, and can be customized flange installation mode, compatible with various mainstream cylinder types.
- Patented products, full stainless steel.

标准技术参数 Standard Technical Parameters

电阻公差 Resistance tolerance	±10%
指针阻力 Pointer resistance	≤0.5N
最大加速度 Maximum acceleration	≤10m/s ²
运行次数 Run times	一亿次 One hundred million times
最大应用电压 Maximum applied voltage	36V
储存温度范围 Storage temperature range	-50°C~+150°C
位移效率 Displacement efficiency	≤5m/s
环境保护等级 Environmental protection grade	IP67
绝缘强度 Dielectric strength	<100uA当500V=,50Hz,2s,1bar <100uA when 500V=,50Hz,2s,1bar
DIN振动IEC 68T2-6 DIN Vibration IEC 68T2-6	12g,10...2000Hz
电气绝缘 Electrical insulation	>100MΩ当500V=,1bar,2s
工作温度范围 Operating temperature range	-40°C~+120°C
独立线性(C.E.U.范围之内) Independent linearity (within C.E.U. range)	0.05%
位移灵敏度(无迟滞) Displacement sensitivity (no hysteresis)	0.05~0.1mm
有效电气行程(C.E.U.) Effective electrical travel(C.E.U.)	50~1500mm
推荐指针电流 Recommended pointer current	<0.1uA
输出电压的实际温度系数 The actual temperature coefficient of the output voltage	<1.5ppm/°C
冲击测试DIN IEC68T2-27 Impact testing DIN IEC68T2-27	50g,11ms,单击(cilck)
最大指针电流在性能差的条件下 Maximum pointer current under poor performance conditions	10mA

量程选型：50mm-1500mm 可选(mm)： Range selection: 50mm-1500mm optional (mm) :

50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1250	1500
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注：PMI默认出线1米。

Note:The default PMI output line is 1 meter.

重要提示：目录中呈报的数据，直线和温度系数只对米制装置通过指针电路IC的最大流量≤10uA 时有效

Important: The data, linear and temperature coefficients presented in the catalog are valid only for the maximum flow rate of the metric device through the pointer circuit IC ≤10uA

PME17系列 磁阻式位移传感器

PME17 series magneto-resistive displacement sensor

实物及尺寸图 Physical And Dimensional Drawings

单位 units:mm



标准技术参数 Standard Technical Parameters

有效行程 Effective travel	50~1500mm	线性精度 Linear accuracy	优于±0.05%FS Better than ±0.05%FS
重复性 Repeatability	0.01mm	分辨率 Resolution ratio	无断解析(infinitesimal) Unbroken analysis (infinitesimal)
传感器类型 Sensor type	磁拖式滑动变阻器 Magnetic drag sliding rheostat	输出信号 infinitesimal	0~5或0~10V 0~5 or 0~10V
工作电压 Working voltage	DC12~24V	抗振性能 Resistance to shock	10G, 10Hz-1500Hz
耐冲击性 Shock resistance	50g(11 ms)	最大往复速度 Maximum reciprocating speed	≤2000mm/s
工作电流 Working current	≤2mA	绝缘阻抗 Insulation resistance	≥100MQ(500VDC)
防爆标志 Explosion-proof sign	Ex ia IIC T6 Ga	工作温度 Operating temperature	-50°C~150°C
防护等级 Level of protection	IP68	工作压力 Working pressure	≥35Mpa
外壳材质 Shell material	304不锈钢(可更换) 304 stainless steel (replaceable)		
电气连接 Electrical connection	防水电缆接头直出线 Waterproof cable connector straight out of the cable		
寿命 Life span	≥1000万次(根据使用环境决定) ≥10 million times (depending on the use environment)		

量程选型：50mm-1500mm 可选(mm)： Range selection: 50mm-1500mm optional (mm) :

50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1250	1500
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注：PME17默认出线1米。

Note: The PME17 exits 1 meter by default.

PME17煤矿支架油缸专用位移传感器(磁拖式碳膜直线位移传感器)为绝对位置测量型，用于调节系统(控制系统)和测量系统中，对位移和长度进行直接测量，输出电压0-5V或0-10V信号，煤矿支架油缸专用位移传感器(磁拖式碳膜直线位移传感器)其特点可杜绝外界因素的任何干扰。

PME17 special displacement sensor for coal mine support cylinder (magnetic drag carbon film linear displacement sensor) is an absolute position measurement type, used for direct measurement of displacement and length in the adjustment system (control system) and measurement system, output voltage 0-5V or 0-10V signal. The special displacement sensor for coal mine support cylinder (magnetic drag carbon film linear displacement sensor) can eliminate any interference from external factors.

标准技术参数 Standard Technical Parameters

电阻公差 Resistance tolerance	±10%
指针阻力 Pointer resistance	≤0.5N
最大加速度 Maximum acceleration	≤10m/s ²
运行次数 Run times	一亿次 One hundred million times
最大应用电压 Maximum applied voltage	36V
储存温度范围 Storage temperature range	-50°C~+150°C
位移效率 Displacement efficiency	≤5m/s
环境保护等级 Environmental protection grade	IP67
绝缘强度 Dielectric strength	<100uA当500V=,50Hz,2s,1bar <100uA when 500V=,50Hz,2s,1bar
DIN振动IEC 68T2-6 DIN Vibration IEC 68T2-6	12g,10...2000Hz
电气绝缘 Electrical insulation	>100MΩ当500V=,1bar,2s
工作温度范围 Operating temperature range	-40°C~+120°C
独立线性(C.E.U.范围之内) Independent linearity (within C.E.U. range)	0.05%
位移灵敏度(无迟滞) Displacement sensitivity (no hysteresis)	0.05~0.1mm
有效电气行程(C.E.U.) Effective electrical travel(C.E.U.)	50~1500mm
推荐指针电流 Recommended pointer current	<0.1uA
输出电压的实际温度系数 The actual temperature coefficient of the output voltage	<1.5ppm/°C
冲击测试DIN IEC68T2-27 Impact testing DIN IEC68T2-27	50g,11ms,单击(click)
最大指针电流在性能差的条件下 Maximum pointer current under poor performance conditions	10mA

量程选型：50mm-1500mm 可选(mm)： Range selection: 50mm-1500mm optional (mm) :

50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1250	1500
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注：PMR默认出线1米。

Note:The default outlet of PMR is 1 meter.

重要提示：目录中呈报的数据，直线和温度系数只对米制装置通过指针电路IC的最大流量≤10uA 时有效

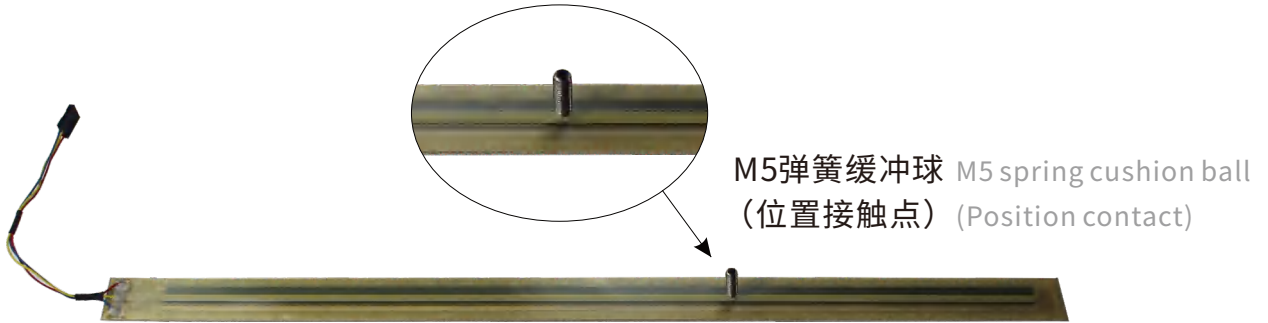
Important: The data, linear and temperature coefficients presented in the catalog are valid only for the maximum flow rate of the metric device through the pointer circuit IC ≤10uA

LEP/KEP/LEPF系列 无电刷防水防尘位移传感器

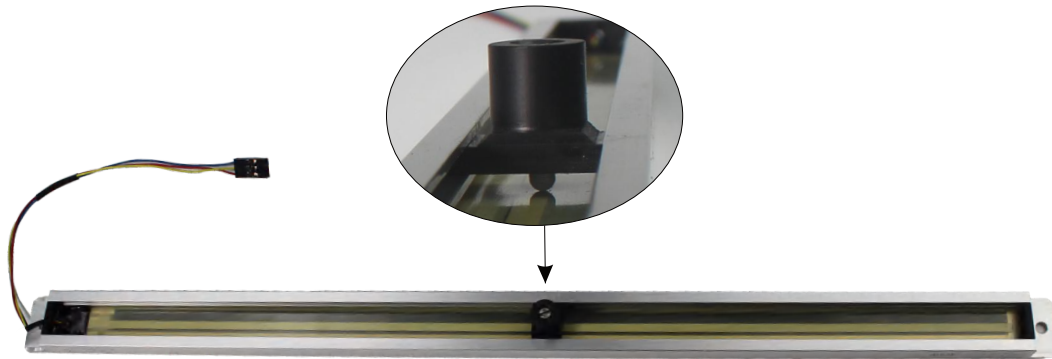
LEP/KEP/LEPF series brushless waterproof and dustproof displacement sensor

产品实物图 Physical Products Pictures

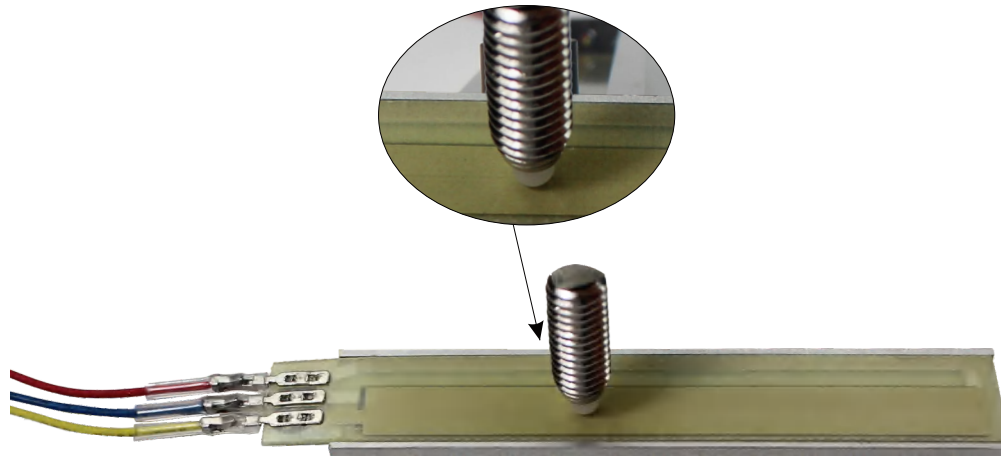
LEP



KEP



LEPF



标准技术参数 Standard Technical Parameters

		LEP	KEP	LEPF
性能参数 Performance parameter	独立线性度(±%) Independent linearity (±%)	50mm~200mm为(is)±0.1%FS; 250mm~500mm为(is)±0.05%FS		±0.1%FS~±0.05%FS
	量程范围 range ability	50~500mm	50~500mm	15~500mm
	宽度 width	21.3±0.5mm	25±0.5mm	12.7±0.5mm
	厚度 Thickness	1.3±0.2mm	10.5±0.2mm (带滑块为20mm) (20mm with slider)	3.5±0.2mm
	位置触点 Position contact	M5弹簧缓冲球 M5 spring cushion ball	M6弹簧缓冲球 M6 spring cushion ball	M5弹簧缓冲球 M5 spring cushion ball
	安装 Install	可选择粘合剂沾碳膜基板背面 Adhesive carbon film substrate backing can be selected	螺丝固定 screw fixation	底部螺丝固定安装 The bottom screw is fixed for installation
电气参数 Electrical parameters	电阻公差±10% Resistance tolerance ± 10%	5KΩ		
	电气行程 Electrical stroke	量程+6mm Range+6mm		
	解析度/分辨率 Resolution	Infinite无断解析 Infinite uninterrupted parsing		
	可重复性 Repeatability	0.05mm		
	最大允许工作电压 Maximum allowable working voltage	36V		
	输出电压与输入电压的有效温度系数比 The effective temperature coefficient ratio of output voltage to input voltage	通常5ppm/K Usually 5ppm/K		
	绝缘阻抗(500VDC) Insulation impedance (500VDC)	≥10MΩ		
	绝缘强度(500VAC,50Hz) Insulation strength (500VAC, 50Hz)	≤100μA		
机械参数 Mechanical parameters	位置触点缓冲压力 Position contact buffer pressure	2±1N		
	电气连接 Electrical connection	150mm导线与杜邦插头，特殊连接方式可按客户要求定制 150mm wire and Dupont plug, special connection can be customized according to customer requirements		
	抗振动标准 Anti-vibration standard	5~2000Hz, A _{max} =0.8mm, a _{max} =20g		
	抗冲击标准 Impact resistance standard	50g, 11ms		
	工作温度范围 Operating temperature range	-40°C~+125°C		
	寿命 life span	>25x10 ⁶ 次(time)		
	最大运行速度 Maximum operating speed	1.1m/S		
	防护等级 level of protection	IP67(不含接头) IP67 (without connectors)		

量程选型：15mm-500mm 可选(mm)： Range selection: 15mm-500mm optional (mm)：

LEP/KEP: 60、100、150、300、350、500

LEPF: 15、20、25、35、50、60、75、90、100、125、150

注：LEP、KEP、LEPF默认出线180mm,另配300mm线长带杜邦插头。

Note: LEP, KEP, LEPF default cable 180mm, another 300mm cable length with Dupont plug.

产品介绍 Product Introduction

LEP/KEP/LEPF无电刷防水防尘位移传感器是由两个碳膜基板构成，两者中间中空隔开。其中KEP无电刷防水防尘位移传感器外壳采用硬质阳极氧化铝,碳膜基板上采用丝网印刷先进技术及工艺处理的电位计导电材料，基片正上方的采集碳膜箔片上印有低阻值的采集传感材料；外部位置触点施加的外力让采集膜片传感材料与电位计导电材料相接触，从而产生实时位移信号。

专用的丝网印刷涂料以及连续的几道光刻机线性修刻工序，从而能保证线性精度优异、高寿命的传感器。该产品主要特点为平坦载体、使用寿命长、分辨率高、稳定性高、材质精良；防污渍、灰尘和液体的侵入；线性优异，最高可达±0.05%FS；防护等级IP67，工作温度高。

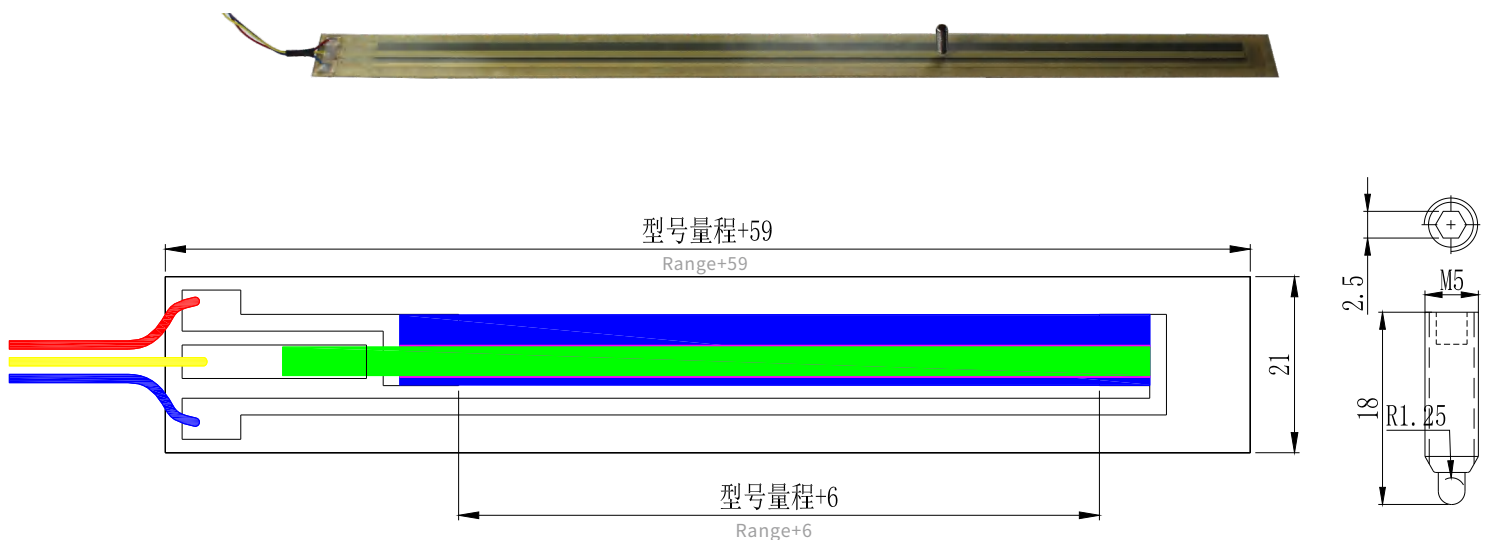
The LEP/KEP/LEPF brushless waterproof and dustproof displacement sensor is composed of two carbon film substrates, which are separated by a hollow middle. The shell of the KEP brushless waterproof and dustproof displacement sensor is made of hard anodized aluminum, the carbon film substrate is made of screen printing advanced technology and process processing potentiometer conductive material, and the collection carbon film foil directly above the substrate is printed with low resistance collection sensing material; The external force applied by the external position contact makes the collecting diaphragm sensing material contact with the potentiometer conductive material, thus generating a real-time displacement signal.

Dedicated screen printing coatings and several consecutive linear lithography processes guarantee sensors with excellent linear accuracy and long life. The main features of the product are flat carrier, long service life, high resolution, high stability, excellent material; Anti-stain, dust and liquid intrusion; Excellent linearity, up to ±0.05%FS; Protection class IP67, high operating temperature.

安装尺寸图 Installation Size Chart

单位 units:mm

LEP



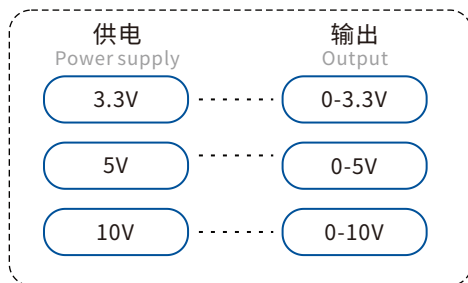
变送模块 Transmitter Module

产品说明 Description Of Products

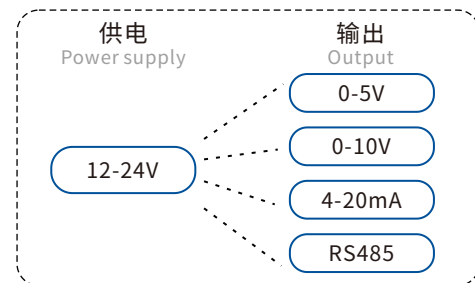
普通的电子尺和拉绳尺，电阻式的，都是电位计原理的位移传感器，实际上就相当于一个电位器，通俗点讲也叫：滑动变阻器，供电多少V电压，输出就是0~多少V电压；即，客户如果供电电压是5V，那输出直接就是0~5V。如果供电电压是10V，那输出就是0~10V。如果供电3.3V，那输出就是0~3.3V。如果供电3.6V，那输出就是0~3.6V。如果供电电压是24V，那输出就是0~24V。如果客户问我们电子尺是什么信号输出的，可以直接回答是电压输出，因为原则上是根本没有电阻输出这一说法的，电阻根本是无法被输出的。

如果客户供电电压只有24V的，没有5V或者是10V的电源，但是输出却想要0~5V或者0~10V，那就需要配我们的模块即可。如果客户需要4~20mA或者RS485信号输出的，就必须配模块才行。模块可以内置在传感器内部，也可以外置插头模块、或单独的铝合金或塑胶壳的模块，此时直接给模块供电电压12~24V均可以，输出可以是0~5V，0~10V，4~20mA，RS485其中一种。如果选择的是四线制模块，那么供电电压为18~36V。

Ordinary electronic ruler and rope ruler, resistance type, are the displacement sensor of the principle of potentiometer, in fact, it is equivalent to a potentiometer, popular point also called: sliding rheostat, power supply how many V voltage, the output is 0~ how many V voltage; That is, if the customer supply voltage is 5V, the output is directly 0~5V. If the supply voltage is 10V, the output is 0~10V. If the power supply is 3.3V, the output is 0~3.3V. If the power supply is 3.6V, the output is 0~3.6V. If the supply voltage is 24V, the output is 0~24V. If the customer asks us what signal output electronic ruler, you can directly answer is the voltage output, because in principle there is no resistance output of this statement, resistance can not be output at all. If the customer supply voltage is only 24V, there is no 5V or 10V power supply, but the output wants 0~5V or 0~10V, it needs to be equipped with our module. If the customer needs 4~20mA or RS485 signal output, it must be equipped with a module. Module can be built in the sensor, can also be external plug module, or a separate aluminum alloy or plastic shell module, at this time directly to the module power supply voltage 12~24V can be, the output can be 0~5V, 0~10V, 4~20mA, one of the RS485. If you choose a four-wire molding block, then the supply voltage is 18~36V.



电子尺不配模块
Electronic ruler without module



电子尺搭配模块
Electronic ruler with module

内置变送模块 Built-in transmitter module

产品概述 Product Overview

KTC1/LWH1、KTC2/LWH2、KTM、WDL/1-6、KTF/TLH、KTF1、KTF2、KTR2、TR2、TR4、KPC1、KPM23、KPM22、KPM18、KPM16、WY-01、WY-02、KPF、PME17、PMI、PMR均可定制内置式变送模块，此时模块直接嵌入到电子尺壳体中，整个电子尺长度在标准长度的情况下要加长33~50mm左右（视不同型号略有差别），可以让电子尺直接输出标准4~20mA电流、0~5V或0~10V或-5~5V或-10~10V电压、RS485等信号。

KTC1/LWH1、KTC2/LWH2、KTM、WDL/1-6、KTF/TLH、KTF1、KTF2、KTR2、TR2、TR4、KPC1、KPM23、KPM22、KPM18、KPM16、WY-01、WY-02、KPF、PME17、PMI、PMR can be customized built-in transmission module, then the module is directly embedded in the electronic ruler housing, The entire length of the electronic ruler in the case of standard length should be extended by 33 ~ 50mm or so (depending on the different models slightly different), so that the electronic ruler can directly output the standard 4 ~ 20mA current, 0 ~ 5V or 0 ~ 10V or -5 ~ 5V or -10 ~ 10V voltage, RS485 and other signals.



部分内置模块案例
Some built-in module cases

内置模块汇总 Built-in module summary

现将内置式变送模块铝管加长尺寸做统一标准，具体尺寸如下表，如客户安装空间受限，内置式电流模块铝管尺寸最短可加长33mm（下单需备注），无备注默认为标准尺寸铝管加长50mm。若有老客户返单或者要求与原来尺寸一致的务必在备注用老尺寸。

电子尺内置模块

产品型号	铝管长度	内置模块铝管加长尺寸	备注
KTC1/LWH1	型号量程+47.5	内置电流、电压、485、本安防爆，统一加长50mm	
LS2	型号量程+48	内置电流、电压、485、本安防爆，统一加长50mm	
KTF	型号量程+118.5	内置电流、电压、485、本安防爆，统一加长50mm	
LF	型号量程+118.5	内置电流、电压、485、本安防爆，统一加长50mm	
PF	型号量程+118.5	内置电流、电压、485、本安防爆，统一加长50mm	
KTF1	型号量程+76	内置电流、电压、485、本安防爆，统一加长50mm	
KTF2	型号量程+76	内置电流、电压、485、本安防爆，统一加长50mm	
KPC	型号量程+42.5	内置电流、电压、485、本安防爆，统一加长50mm	停产
KPC1	型号量程+65.5	内置电流、电压、485、本安防爆，统一加长50mm	
WY-01/WY-02	型号量程+45	内置电流、电压、本安防爆，统一加长50mm	
KPM23	型号量程+40	内置电流、电压、本安防爆，统一加长50mm	
KTC2/LWH2	型号量程+30.5	内置电流、电压、本安防爆，统一加长50mm	
WDL2/3/5/6	型号量程+33	内置电流，加长50mm	
WDL1	型号量程+41	内置电流，加长50mm	
WDL4	型号量程+49	内置电流，加长50mm	
KPM22	型号量程+33	内置电流、电压、本安防爆，统一加长50mm	
KPF		内置电流、电压、本安防爆，统一加长50mm	
KTM	型号量程+32.5	内置电流、电压、本安防爆，统一加长50mm	
KTR2	型号量程+30.5	内置电流、电压、本安防爆，统一加长50mm	
TR2	型号量程+23	内置电流、电压、本安防爆，统一加长50mm	
TR4	公式	内置电流、电压、本安防爆，统一加长50mm	
KPM18	型号量程+33	内置电流、加长50mm	
KPM16	型号量程+33	内置电流、加长50mm	
PME17		内置电流、电压、本安防爆，不加长	
PMI		内置电流、电压、485、本安防爆，不加长	
PMR		内置电流、电压、485、本安防爆，不加长	

以下型号不可内置模块：KSC、KSP、KS8、KS8X、KTR11\TR11、KTR12\TR12、KTR3\TR3、KSF、KPM12、KPM9、KPM12R1、KPM12R2、KST、KFM、KSD、KSE、KSN、PME12、LEP、KEP、LEPF、PME14、PMF

The extension size of the aluminum tube of the built-in transmission module is now a unified standard, the specific size is as follows: If the customer's installation space is limited, the minimum extension size of the aluminum tube of the built-in current module can be 33mm (note to order), and the default is 50mm extension of the standard size aluminum tube without remarks. If an old customer returns an order or requires the same size as the original, be sure to use the old size in the remarks.

Electronic ruler built-in module

Product model	Aluminum tube length	The built-in module aluminum tube is extended in size	Comment
KTC1/LWH1	Range +47.5	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
LS2	Range+48	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
KTF	Range+118.5	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
LF	Range+118.5	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
PF	Range+118.5	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
KTF1	Range+76	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
KTF2	Range+76	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
KPC	Range+42.5	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	Suspend production
KPC1	Range+65.5	Built-in current, voltage, 485, intrinsic safety and explosion-proof, unified extension 50mm	
WY-01/WY-02	Range+45	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
KPM23	Range+40	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
KTC2/LWH2	Range+30.5	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
WDL2/3/5/6	Range+33	Built-in current, lengthened 50mm	
WDL1	Range+41	Built-in current, lengthened 50mm	
WDL4	Range+49	Built-in current, lengthened 50mm	
KPM22	Range+33	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
KPF		Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
KTM	Range+32.5	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
KTR2	Range+30.5	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
TR2	Range+23	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
TR4	Formula	Built-in current, voltage, intrinsic safety and explosion-proof, unified extension 50mm	
KPM18	Range+33	Built-in current, lengthening 50mm	
KPM16	Range+33	Built-in current, lengthening 50mm	
PME17		Built-in current, voltage, intrinsic safety explosion-proof, not extended	
PMI		Built-in current, voltage, intrinsic safety explosion-proof, not extended	
PMR		Built-in current, voltage, intrinsic safety explosion-proof, not extended	

The following models do not have built-in modules: KSC, KSP, KS8, KS8X, KTR11\TR11, KTR12\TR12, KTR3\TR3, KSF, KPM12, KPM9, KPM12R1, KPM12R2, KST, KFM, KSD, KSE, KSN, PME12, LEP, KEP, LEPP, PME14, PMF

电位器转RS485信号变送模块

Potentiometer To RS485 Signal Transmission Module

产品概述 Product overview

米朗电位器转换RS485信号变送器是一款工业级电位器转数字信号输出产品，采用12位/16位ADC精准采样，经过内部高性能MCU处理输出RS485信号，并遵循标准工业协议MODBUS-RTU，适用于各种工业场合及自动化控制系统。模块配套米朗公司PC端上位机软件，更方便客户进行数据测试及现场调试工作。

Milan Potentiometer conversion RS485 signal transmitter is an industrial-grade potentiometer to digital signal output product, using 12 bit / 16 bit ADC precision sampling, through the internal high-performance MCU processing output RS485 signal, and follow the standard industrial protocol MODBUS-RTU, suitable for various industrial occasions and automatic control systems. The module is compatible with the PC software of Milang Company, which is more convenient for customers to carry out data testing and field debugging.

技术参数 Technical parameters

工作电压 Operating voltage	+12V~+28VDC
工作电流 Operating current	≤25mA(供电24VDC)
输入信号 Input signal	电位器 Potentiometer
输出信号 Output signal	RS-485
采样基准电压 Sampling reference voltage	2.5V基准源 2.5V reference source
采样分辨率 Sampling resolution	12位/16位ADC(可选) 12-bit / 16-bit ADC(optional)
通信协议 Communication protocol	MODBUS-RTU
通信波特率 Communication baud rate	2400~115200bps
通信距离 Communication distance	RS-485通信距离<1200m RS-485 communication distance < 1200m
工作环境 Work environment	温度-30~+85°C，湿度0~85%不结露 Temperature -30~+85°C, humidity 0~85% no condensation
接线端子说明(输入端) Terminal description (input)	棕色：电位器1号线 Brown: Potentiometer line 1
	蓝色：电位器3号线 Blue: Potentiometer line 3
	黑色：电位器2号线(信号线) Black: Potentiometer Line 2 (signal line)
接线端子说明(输出端) Terminal description (output)	棕色：电源+12V~+28VDC Brown: Power supply +12V to +28VDC
	黑色：电源GND Black: GND of the power supply
	绿色：RS485 A信号 Green: indicates RS485 A signal
	白色：RS485 B信号 White: Signals of Rs485 B
	黑色环状端子：屏蔽线 Black ring terminal: shielded cable

● 外置变送模块 External transmitter module

产品概述 Product Overview

可方便与任意一款电子尺相连接，分为航空插头和防水接头两种出线方式。大部分外置式变送模块外壳防水，防尘，结构紧凑，美观大方。多种外观尺寸可供客户选择，信号变送输出：0~5V、0~10V、-5~5V、-10~10V、4~20mA、RS485；电流模块：将电压信号直接转换成4~20mA的电流信号，分二线制和三线制；电压模块：将12~24V工作电压稳压并输出成0~5V或0~10V等电压信号；RS485模块：将模拟信号转成RS485数字信号。

Can be easily connected with any electronic ruler, divided into aviation plug and waterproof connector two ways of wire. Most of the external transmission modules are waterproof, dust-proof, compact and beautiful. A variety of sizes are available for customers to choose, signal transmission output: 0 ~ 5V, 0 ~ 10V, -5 ~ 5V, -10 ~ 10V, 4 ~ 20mA, RS485; Current module: the voltage signal is directly converted into 4 ~ 20mA current signal, divided into two wire system and three wire system; Voltage module: the 12 ~ 24V working voltage regulator and output into 0 ~ 5V or 0 ~ 10V equal voltage signal; RS485 module: Converts analog signals into RS485 digital signals.

产品选型 Product Types Choosing

MO

模块外壳选择:

Module housing selection:

MO: 外置式铝合金外壳

MO: External aluminum alloy housing

MO1: 外置式塑胶外壳

MO1: External plastic shell

MO2: 外置式黑色小塑胶外壳

MO2: External small black plastic case

MO3: 外置式塑胶小圆管外壳

MO3: External plastic cylindrical tube shell

MO4: 固定式安装电子仓

MO4: Fixed installation electronic bin

MO5: 标准35mm导轨式安装电子仓

MO5: Standard 35mm rail mounted electronic bin



输出信号方式:

Output signal mode:

V1: 0-5V **V2:** 0-10V

V3: -5~5V **V4:** -10~10V

A1: 4-20mA 三线制

A1: 4-20mA three-wire system

A2: 4-20mA 二线制

A2: 4-20mA two-wire system

RS: RS485(MODBUS-RTU)

GLV3: -5~5V 隔离四线制

GLV3:-5~5V isolated four-wire

GLV4: -10~10V 隔离四线制

GLV4:-10~10V isolated four-wire

GLV5: 0~5V 隔离四线制

GLV5:0~5V isolated four-wire

GLV6: 0~10V 隔离四线制

GLV6:0~10V isolated four-wire

GLA4: 4-20mA 隔离四线制

GLA4:4-20mA isolated four-wire system



信号输出逻辑大小方向

Signal output logical size direction

N: 电子尺拉杆拉出数值增大(默认)

N: electronic ruler rod pull out value increased (default)

S: 电子尺拉杆拉出数值减小

S: The pull-out value of the electronic ruler rod decreases



结构选配

Structure selection

空白: 默认标准

Blank: Default standard

K: 卡扣式安装(限MO系列)

K: Snap mounting (MO series only)

R: 耳式安装(限MO系列)

R: Ear mounting (MO series only)

r: 小耳式安装(限MO系列)

r: Small ear mounting (MO series only)

FGV3: -5~5V 非隔离四线制

FGV3:-5~5V non-isolated four-wire system

FGV4: -10~10V 非隔离四线制

FGV4:-10~10V non-isolated four-wire system

FGV5: 0~5V 非隔离四线制

FGV5:0~5V non-isolated four-wire system

FGV6: 0~10V 非隔离四线制

FGV6:0~10V non-isolated four-wire system

FGA4: 4-20mA 非隔离四线制

FGA4:4-20mA non-isolated four-wire system

例: MOV2N表示外置式铝合金外壳, 0-10V信号输出, 电子尺拉杆拉出数值增大。

MOA2NK表示外置式铝合金外壳, 4-20mA二线制信号输出, 电子尺拉杆拉出数值增大, 卡扣式安装。

Example: MOV2N represents the external aluminum alloy shell, 0-10V signal output, and the value of the electronic ruler pull rod is increased.

MOA2NK indicates external aluminum alloy shell, 4-20mA two-wire signal output, electronic ruler rod pull out value increases, snap installation.

注1: V3:-5~5V; V4:-10-10V; GLV3:-5~5V隔离四线制; FGV3:-5~5V非隔离四线制; GLV4:-10~10V隔离四线制; FGV4:-10~10V非隔离四线制限MO外壳模块可做。

Note 1: V3:-5~5V; V4:-10-10V; GLV3:-5~5V isolated four-wire system; FGV3:-5~5V non-isolated four-wire system; GLV4:-10~10V isolation four-wire system; FGV4:-10~10V non-isolated four-wire limited MO housing modules can be done.

注2: 其他隔离四线制限MO, MO-R外壳模块可做, 这种型号是变送模块中包含电源隔离模块, 抗干扰能力比较强, 该模块可以内置在传感器内部(部分产品可内置)也可以通过外置单独模块, 将其与传感器连接。RS485信号输出限MO, MO-R, MO1, MO4, MO5外壳可做, MO-r外壳仅可做电流信号输出。

Note 2: Other isolated four-wire system limited MO, MO-R shell module can be done, this model is the transmission module contains the power isolation module, anti-interference ability is relatively strong, the module can be built in the sensor (some products can be built in) can also be external separate module, it is connected with the sensor. RS485 signal output limit MO, MO-R, MO1, MO4, MO5 enclosures can do, MO-R enclosures can only do current signal output.

注3: 拉杆式电子尺默认拉杆未拉出时数值为最小值, 完全拉出时数值为最大值; 弹簧自复位式电子尺默认测杆完全向内压缩为最小值, 未压缩状态为最大值(既此时的信号输出逻辑大小方向为N, 如需改变信号输出逻辑大小方向请选S)

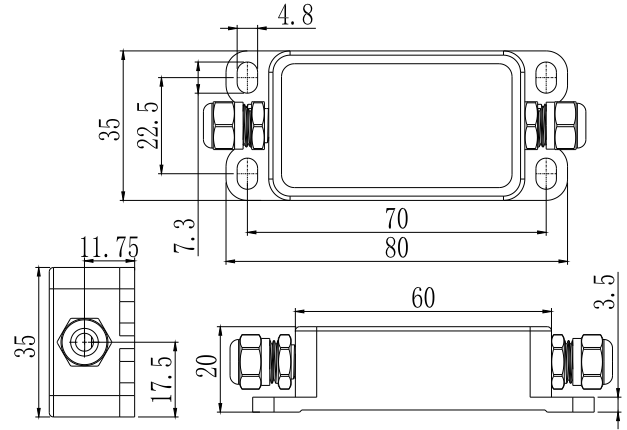
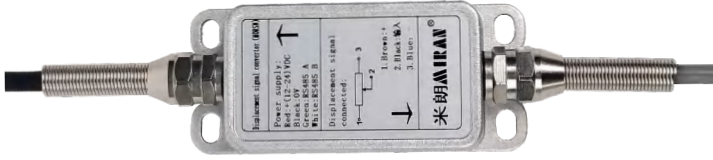
Note 3: The default value is the minimum value when the rod is not pulled out, and the maximum value when the rod is completely pulled out. Spring self-resetting electronic ruler default measuring rod full inward compression is the minimum value, the uncompressed state is the maximum value (at this time, the signal output logical size direction is N, if you need to change the signal output logical size direction, please select S)

安装尺寸图 Installation Size Chart

单位 units:mm

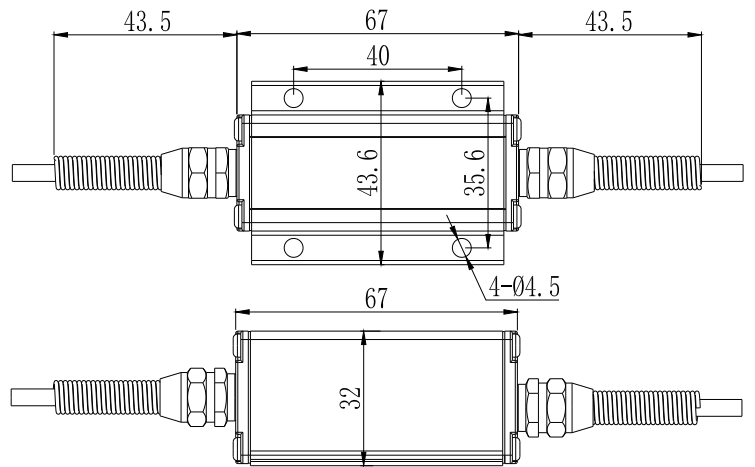
MO

外置式铝合金外壳 External aluminum alloy housing



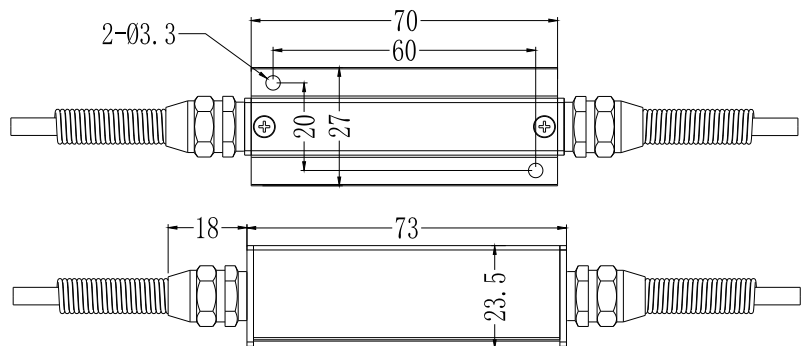
MO-r

小耳式安装 Small ear mounting



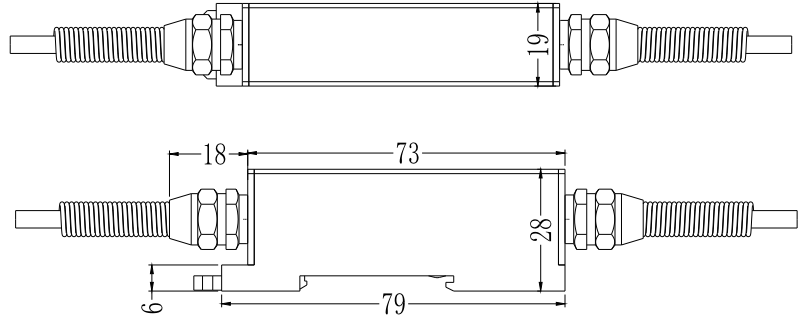
MO-R

耳式安装 Ear mounting



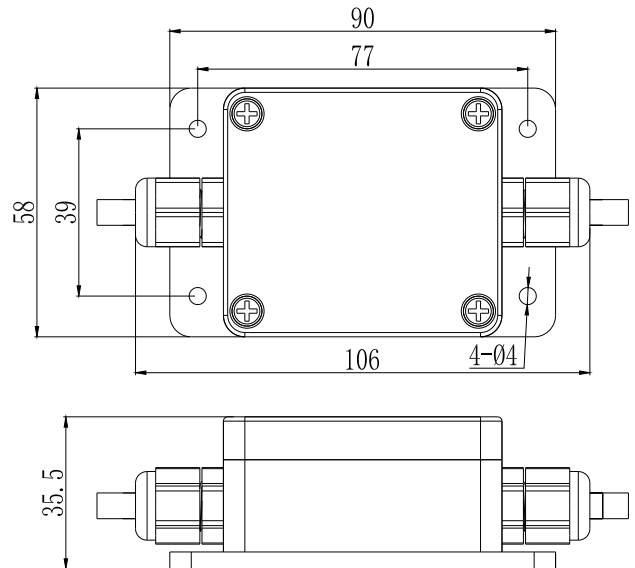
MO-K

导轨卡扣式安装 Guide rail snap mounting



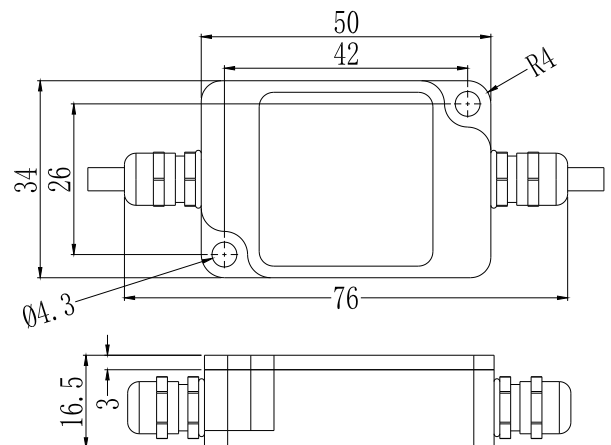
MO1

外置式塑胶外壳 External plastic housing



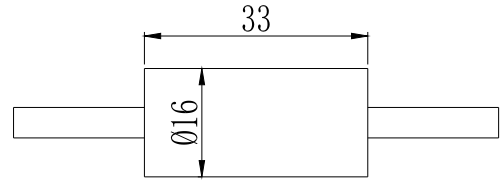
MO2

外置式黑色小塑料外壳 Small black plastic external housing



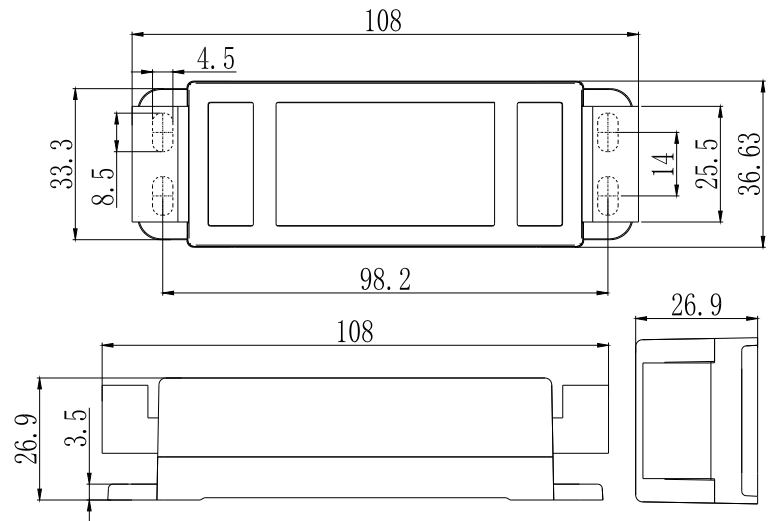
MO3

外置式塑料小圆管外壳 External plastic cylindrical tube shell



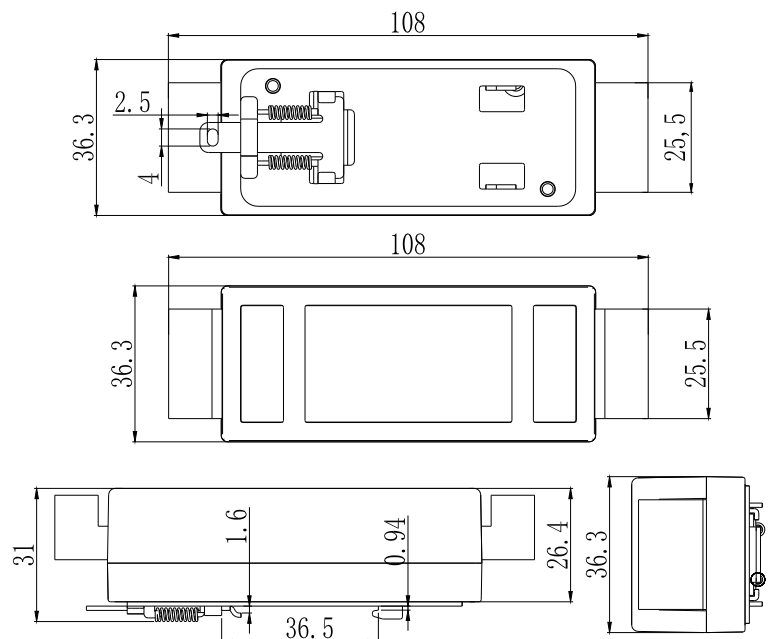
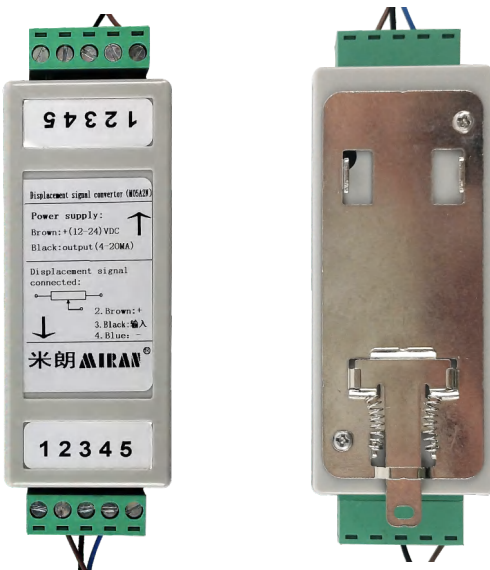
MO4

固定式安装电子仓 Fixed mounting electronic bin



MO5

标准35mm导轨式安装电子仓 Standard 35mm rail mounted electronic bin



● 插头式变送模块 Plug type transmitter module

产品概述 Product Overview

可方便与KTC1、KTC、LWH、KTF、KTF1、KTF2、TLH电子尺相接。

信号变送输出：0~5V;0~10V;4~20mA

电流模块：将电压信号直接转换成4~20mA的电流信号，分二线制和三线制

电压模块：将12~24V工作电压稳压并输出成0~5V或0~10V等电压信号

It can be easily connected with KTC1, KTC, LWH, KTF, KTF1, KTF2, TLH electronic ruler.

Signal transmission output: 0 ~ 5V; 0 ~ 10V; 4 to 20mA

Current module: The voltage signal is directly converted into 4 ~ 20mA current signal, divided into two wire system and three wire system

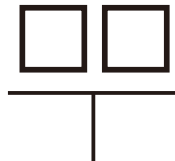
Voltage module: The operating voltage of 12 ~ 24V is regulated and output into 0 ~ 5V or 0 ~ 10V equal voltage signals

产品选型 Product Types Choosing

MP

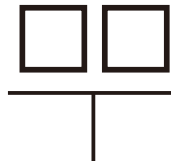
模块外壳选择：
Module housing selection:

MP: 插头式变送模块
MP: Plug transmitter module



输出信号方式：
Output signal mode:

V1: 0-5V
V2: 0-10V
A1: 4-20mA三线制
A1:4-20mA three-wire system
A2: 4-20mA二线制
A2:4-20mA two-wire system



信号输出逻辑大小方向
Signal output logical size direction

N: 电子尺拉杆拉出数值增大 (默认)
N: electronic ruler rod pull out value increased (default)
S: 电子尺拉杆拉出数值减小
S: The pull-out value of the electronic ruler rod decreases

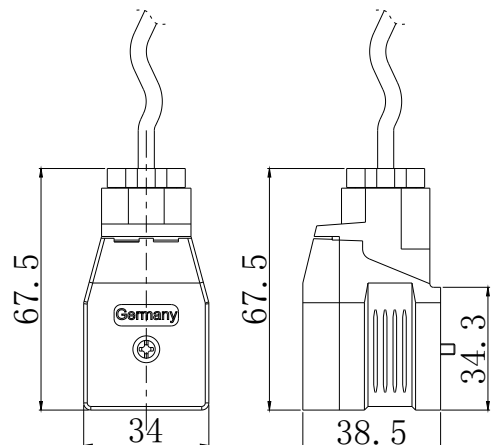
例:MPV2N表示外置插头式变送模块,0-10V信号输出,电子尺拉杆拉出数值增大。

Example:

MPV2N indicates an external plug type transmitter module, 0-10V signal output, and the value of the electronic ruler pull rod is increased.

安装尺寸图 Installation Size Chart

单位 units:mm



● 本安防爆模块 Intrinsically safe explosion-proof module

产品概述 Product Overview

外置式本安防爆变送模块，可方便与任意一款电子尺相接，分航空插头和防水接头两种出现方式。

外壳：防水，防尘，结构紧凑，美观大方。

信号变送输出：4~20Am；RS485

External intrinsic safety explosion-proof transmission module, can be easily connected with any electronic ruler, divided into aviation plug and waterproof joint two ways.

Shell: waterproof, dust-proof, compact structure, beautiful and generous.

Signal transmission output: 4~20Am; RS485

产品选型 Product Types Choosing

BAMO

本安防爆型
Intrinsically safe
explosion-proof type



输出信号方式：
Output signal mode:
A2: 4-20mA二线制
A2:4-20mA two-wire syste

RS: RS485(MODBUS-RTU)
RS485信号输出限MO, MO-R外壳可做。
RS485 signal output limit MO, MO-R housing can do.



信号输出逻辑大小方向
Signal output logical size direction
N: 传感器拉杆拉出数值增大(默认标准)
N: Sensor rod pull-out value increased (default standard)

S: 传感器拉杆拉出数值减小
S: Sensor rod pull-out value reduction



结构选配
Structure selection
空白: 默认标准
Blank: Default standard
r: 小耳式安装(限MO系列)
r: Small ear mounting (MO series only)
R: 耳式安装(限MO系列)
R: Ear mounting (MO series only)
K: 卡扣式安装(限MO系列)
K: Snap mounting (MO series only)

例：BAMOA2NR表示本安防爆型变送模块，4-20mA二线制信号输出，传感器拉杆拉出数值增大，耳式安装。

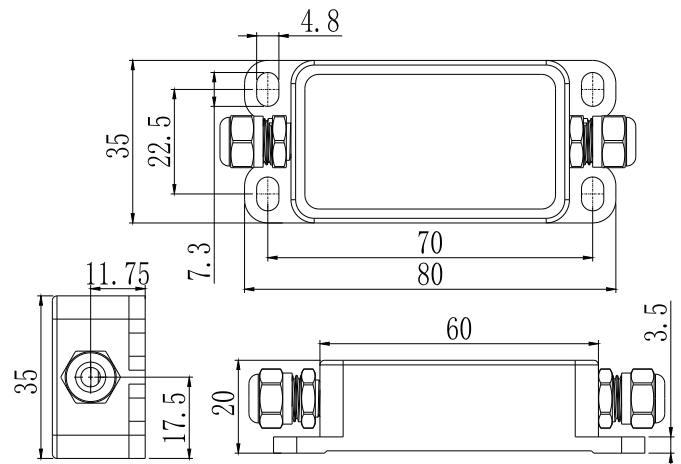
Example: BAMOA2NR indicates the intrinsically safe explosion-proof transmitter module, 4-20mA two-wire signal output, sensor pull rod pull out value increases, ear mounted.

安装尺寸图 Installation Size Chart

单位 units:mm

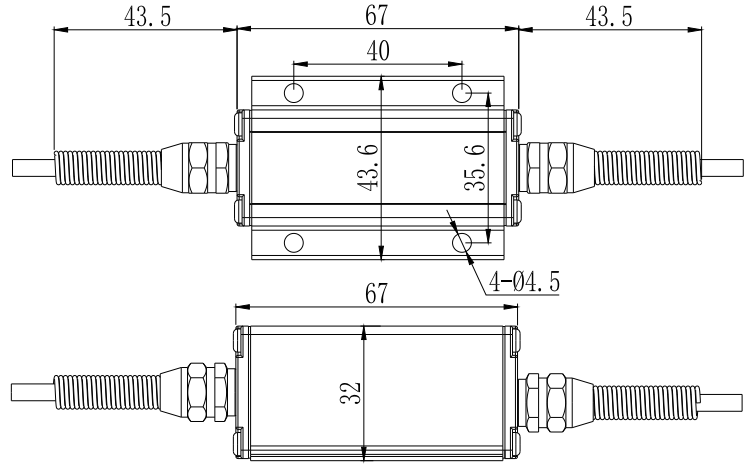
MO

外置式铝合金外壳 External aluminum alloy housing



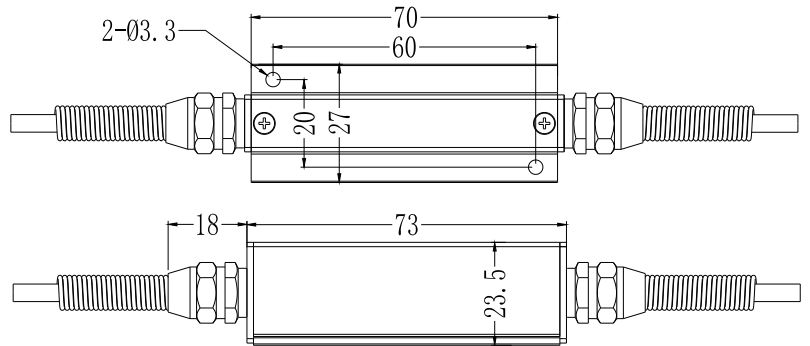
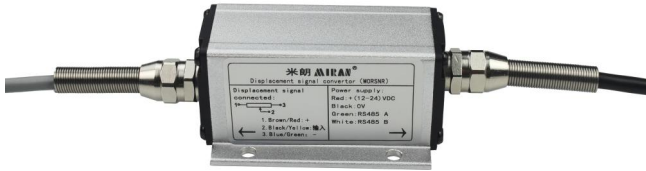
MO-r

小耳式安装 Small ear mounting



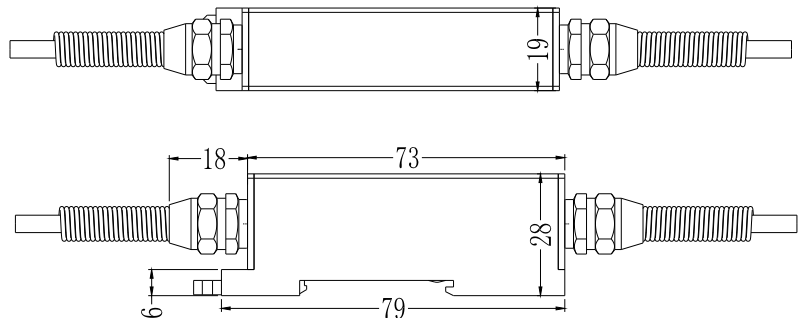
MO-R

耳式安装 Ear mounting



MO-K

导轨卡扣式安装 Guide rail snap mounting





编号: CNEx21.2288X

防爆合格证

制造单位 枣阳市米朗科技有限公司
地址: 湖北省枣阳市建设西路 112 号 (米朗工业园)

产品名称 直线位移传感器

型号规格 BAMO 24VDC

防爆标志 Ex ia IIB T6 Ga

产品标准 Q/MLKJ03-2021

总装图号 BAMO .00

经对上述产品图样及技术文件的审查和样品检验,确认符合下列标准:
GB3836.1-2010 《爆炸性环境 第 1 部分: 设备 通用要求》
GB3836.4-2010 《爆炸性环境 第 4 部分: 由本质安全型“i”保护的的设备》
GB3836.20-2010 《爆炸性环境 第 20 部分: 设备保护级别 (EPL) 为 Ga 的设备》

记事:

1. 本产品用在 0 区时, 应采取措施防止由于冲击或摩擦引起的点燃危险!
2. 本产品由安全栅供电, 本安参数 $U_i=28VDC$, $I_i=93mA$, $P_i=0.65W$, $C_i=0.044\mu F$, $L_i=0mH$.
3. 环境温度 $-30\sim+60^{\circ}C$.

中心主任

颁发日期

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本证有效期

2021年7月13日至2026年7月12日



国家防爆电气产品质量监督检验中心
南阳防爆电气研究所

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传真: 0377-63208175
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公众号

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● 隔离电源模块 Isolating power module

产品概述 Product Overview

在有复杂的电气干扰环境下，将有干扰信号的直流电源隔离并且稳压成标准稳定的直流电源，然后再给模块或者传感器供电，从而实现传感器信号的稳定输入和输出。可以将该模块单独封装在MO，MO-R，MO1，MO2等模块外壳内部，也可以与变送模块一起封装在一个外壳里面，也可以直接内置在传感器电子仓内部。在下单时候要备注清楚封装形式。在生产和销售过程中，该电源模块不论是单独封装还是与变送模块一起封装，或者是封装在传感器内部，都要将该电源模块型号单独列出来，电源模块和变送模块的型号、数量和价格都需要分别单独列出，以方便生产和销售。

In a complex electrical interference environment, the DC power supply with interference signals is isolated and stabilized into a standard stable DC power supply, and then the module or sensor is powered to achieve stable input and output of sensor signals. The module can be individually packaged inside the module housing of MO, MO-R, MO1, MO2, etc. It can also be packaged in a housing together with the transmitter module, or it can be built directly inside the sensor electronics compartment. Note the packaging form clearly when placing the order. In the production and sales process, whether the power module is packaged separately or packaged with the transmitter module, or packaged inside the sensor, the power module model should be listed separately, and the model, quantity and price of the power module and the transmitter module need to be listed separately to facilitate production and sales.

产品选型 Product Types Choosing

MGV

米朗隔离电源模块
Miran isolated power module



模块外壳选择:
Module housing selection:

- O:** 外置式铝合金外壳
O: External aluminum alloy housing
- O1:** 外置式塑胶外壳
O1: External plastic shell
- O2:** 外置式黑色小塑胶外壳
O2: Small black plastic external case
- O3:** 外置式塑胶小圆管外壳
O3: External cylindrical plastic pipe shell
- O4:** 固定式安装电子仓
O4: Fixed installation electronic bin
- O5:** 标准35mm导轨式安装电子仓
O5: Standard 35mm rail mounted electronic bin



供电电压及输出电压:
Supply voltage and output voltage:

- V183624:**
将供电电压18-36V隔离稳压为24V
(常用, 有库存)
Supply voltage 18-36V isolation voltage regulator 24V (commonly used, in stock)
- V091824:**
将供电电压9-18V隔离稳压为24V
Set the supply voltage 9-18V to 24V
- V183612:**
将供电电压18-36V隔离稳压为12V
Set the power supply voltage from 18-36V to 12V
- V183609:**
将供电电压18-36V隔离稳压为9V
Set the power supply voltage from 18-36V to 9V
- V183605:**
将供电电压18-36V隔离稳压为5V
Set the power supply voltage from 18-36V to 5V



电源能提供的总功率:
The total power supply can provide:

- W3:** 3W(常用, 有库存)
W3: 3W (commonly used, in stock)
- W1:** 1W
- W2:** 2W



结构选配
Structure selection

- 空白:** 默认标准
Blank: Default standard
- r:** 小耳式安装(限MO系列)
r: Small ear mounting(MO series only)
- R:** 耳式安装(限MO系列)
R: Ear mounting(MO series only)
- K:** 卡扣式安装(限MO系列)
K: Snap mounting(MO series only)

例：MGVOV183624W3 表示米朗隔离电源模块，外置式铝合金外壳，将供电电压18-36V隔离稳压为24V，总功率为3W。

Example: MGVOV183624W3 represents the Millan isolated power module, external aluminum alloy shell, the power supply voltage 18-36V isolated voltage regulator 24V, the total power is 3W.

注： 拉杆式电子尺默认拉杆未拉出时数值为最小值，完全拉出时数值为最大值；弹簧自复位式电子尺默认测杆完全向内压缩为最小值，未压缩状态为最大值(既此时的信号输出逻辑大小方向为N，如需改变信号输出逻辑大小方向请选S)

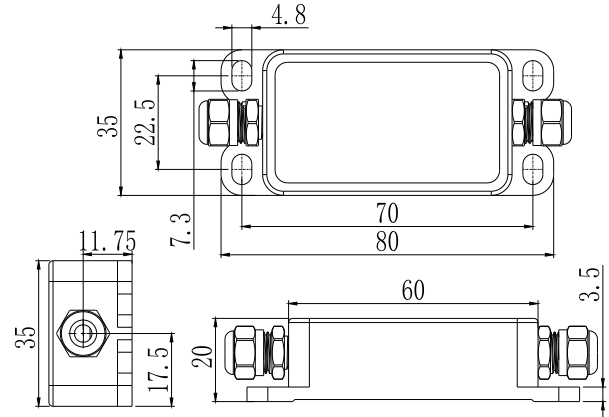
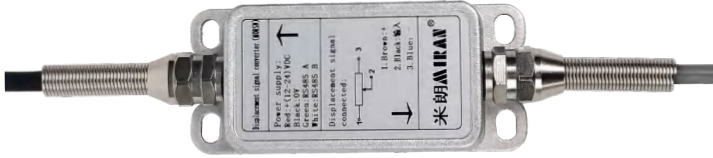
Note: The default value is the minimum value when the rod is not pulled out, and the maximum value when the rod is completely pulled out. Spring self-resetting electronic ruler default measuring rod is completely compressed inward

安装尺寸图 Installation Size Chart

单位 units:mm

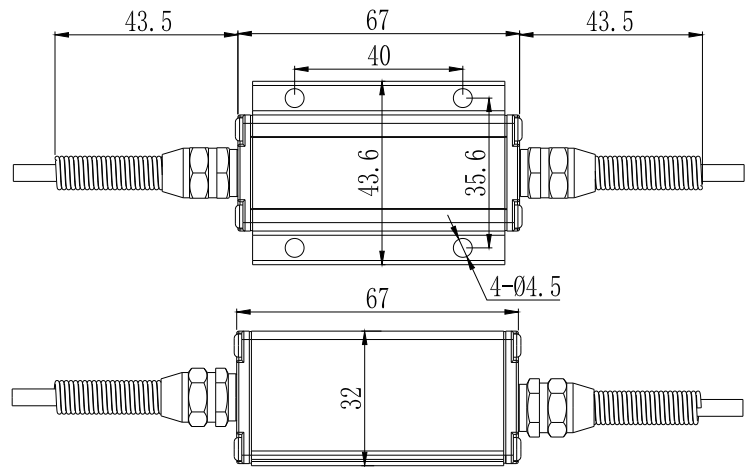
MO

外置式铝合金外壳 External aluminum alloy housing



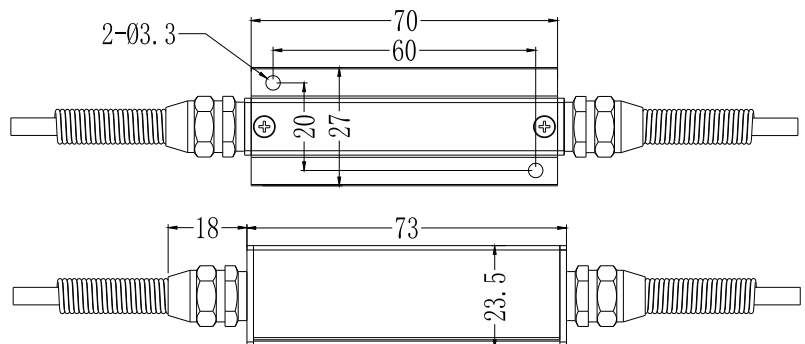
MO-r

小耳式安装 Small ear mounting



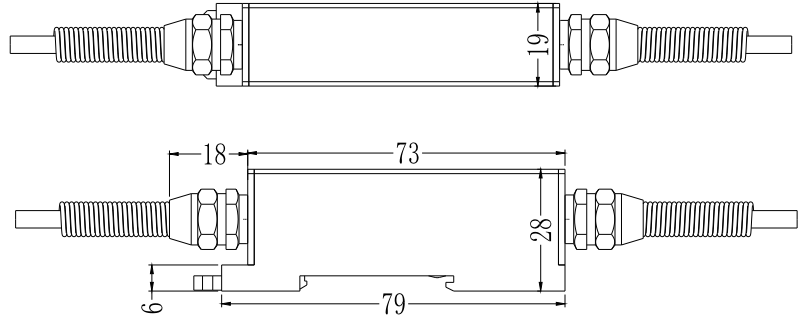
MO-R

耳式安装 Ear mounting



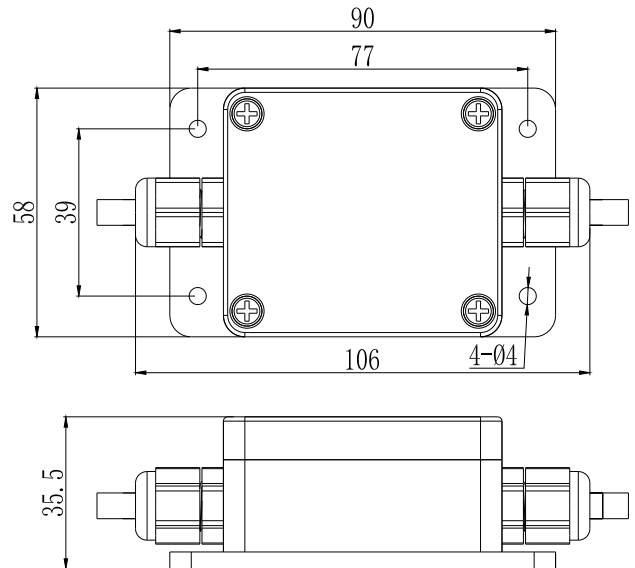
MO-K

导轨卡扣式安装 Guide rail snap mounting



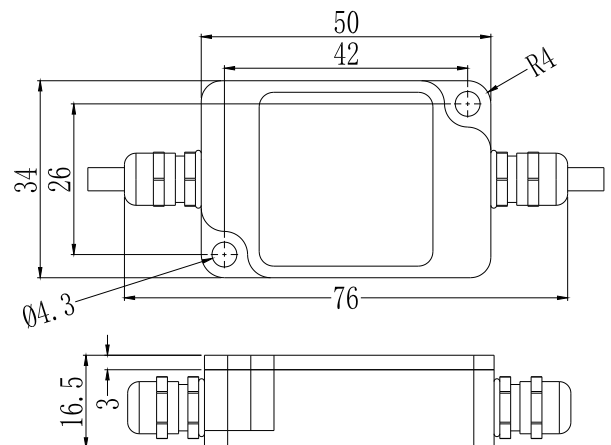
MO1

外置式塑胶外壳 External plastic housing



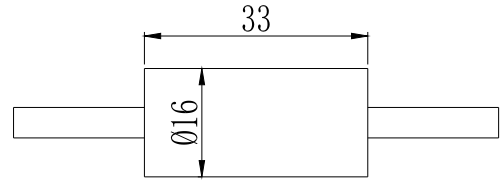
MO2

外置式黑色小塑料外壳 Small black plastic external housing



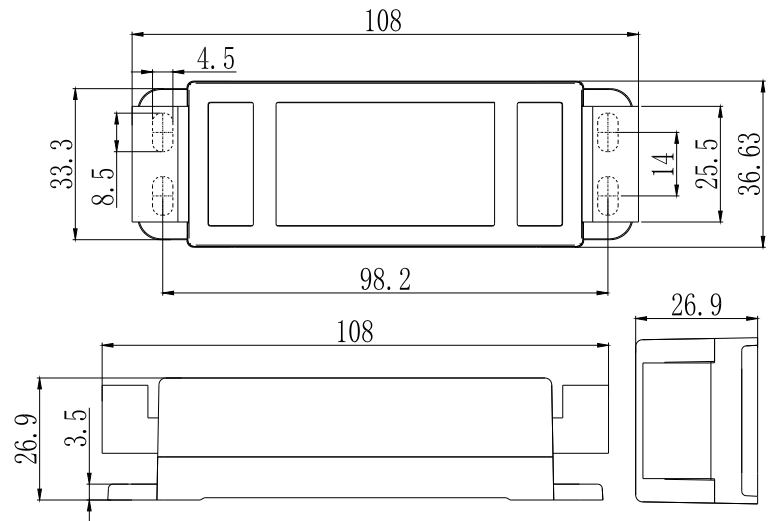
MO3

外置式塑料小圆管外壳 External plastic cylindrical tube shell



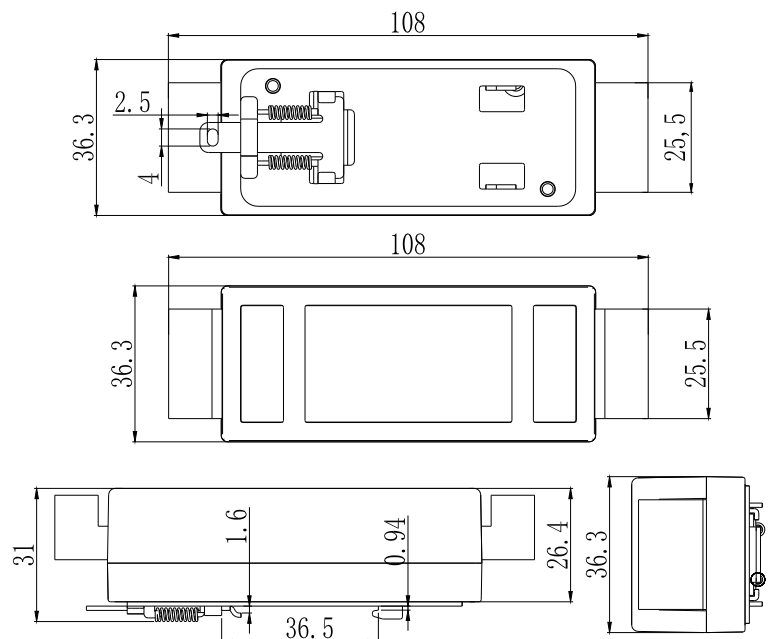
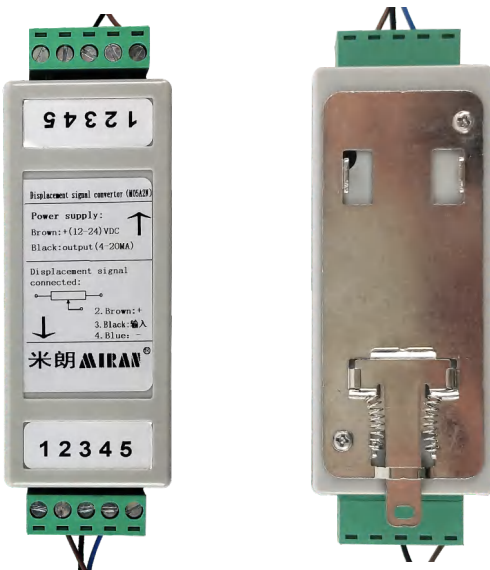
MO4

固定式安装电子仓 Fixed mounting electronic bin



MO5

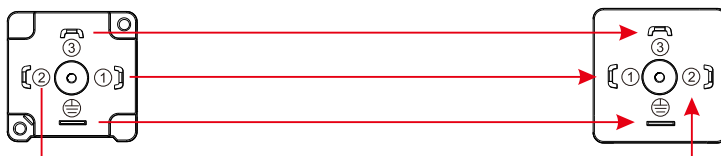
标准35mm导轨式安装电子仓 Standard 35mm rail mounted electronic bin



● 变送模块接线方式 Wiring Mode Of The Transmitter Module

● 传感器赫斯曼插座 Sensor Hermann socket

(KTC1、LWH、KTF等型号标配)
(KTC1, LWH, KTF and other models come standard)



● 赫斯曼插头/插头式模块 Hermann plug/plug type module

温馨提示:

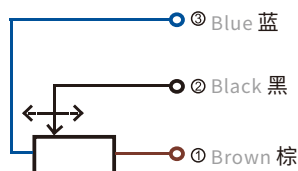
- ★ 建议传感器供电电压为DC5V-24V，严禁接220V电源。
- ★ 为避免新手因接错线导致传感器短路烧坏，建议在接线之前将电子尺拉杆拉出一些，这样如果1和2或者2和3不小心接到了电源正负极，不至于会导致短路，传感器也就不会因接错线而轻易烧掉了。

Kind reminder:

It is recommended that the sensor supply voltage is DC5V-24V, and it is strictly prohibited to connect to a 220V power supply. To prevent beginners from short circuiting and burning out the sensor due to incorrect wiring, it is recommended to pull out the electronic ruler rod before wiring. This way, if 1 and 2 or 2 and 3 are accidentally connected to the positive and negative poles of the power supply, it will not cause a short circuit, and the sensor will not be easily burned out due to incorrect wiring.

● 传感器 Sensor

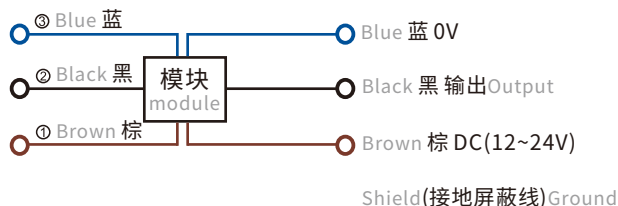
位移传感器输出端直接与模块输入端相连
The output end of the displacement sensor is directly connected to the input end of the module



● 三线制电压/电流模块 Three wire voltage/current module

模块输入端
Module Input

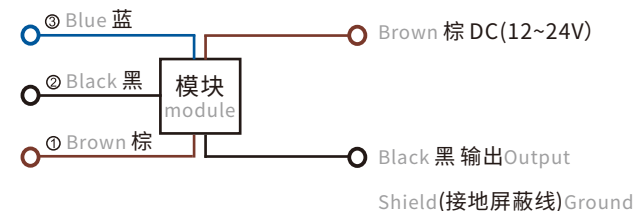
模块输出端与电源、PLC输入端相连
The module output terminal is connected to the power supply and PLC input terminal



● 二线制电流模块 Two wire current module

模块输入端
Module Input

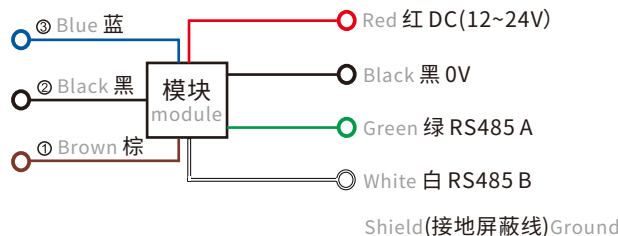
模块输出端与电源、PLC输入端相连
The module output terminal is connected to the power supply and PLC input terminal



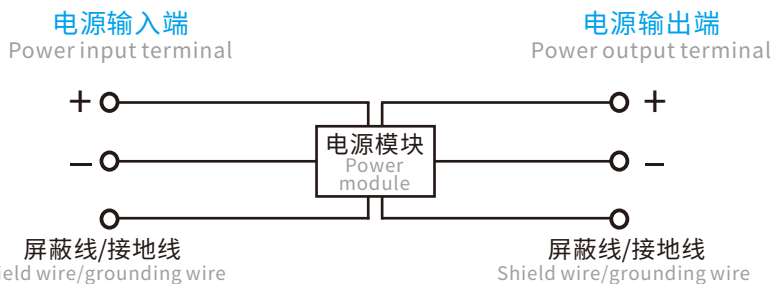
● RS485模块 RS485 module

模块输入端
Module Input

模块输出端与电源、PLC输入端相连
The module output terminal is connected to the power supply and PLC input terminal



● 隔离电源模块 Isolation power module



以上仅为参考，具体接线定义以产品实物标签上的标注为准。

The above is for reference only. The specific wiring definition shall be based on the markings on the product's physical label.

数字式智能显示控制仪表/位移显示控制器

Digital intelligent display control instrument/displacement display controller

产品概述 Product Overview

可方便与任意一款电子尺相接，方便直观的显示位移距离值，除了基本的显示功能外，还有报警控制、显示记录仪等功能。显示小数点位置可设定，上下限报警功能，报警点数可增加，多种报警方式，任意位置清零功能(可选)，变送输出：0~5V，0~10V，4~20mA，RS485，RS232等信号。输入信号选择：电位器，0~5V，0~10V，4~20mA，RS485，双向脉冲输出等。按显示位数分：有4位，5位，6位，7位等。按显示精度分：有0.05%FS，0.2%FS，0.5%FS等。

It can be easily connected with any electronic ruler, convenient and intuitive display of displacement distance value, in addition to the basic display function, there are alarm control, display recorder and other functions. Display decimal point position can be set, upper and lower limit alarm function, alarm number can be increased, a variety of alarm methods, zero function at any position (optional), transmission output: 0 ~ 5V, 0 ~ 10V, 4 ~ 20mA, RS485, RS232 and other signals. Input signal selection: Potentiometer, 0 ~ 5V, 0 ~ 10V, 4 ~ 20mA, RS485, two-way pulse output, etc. According to the display number of points: there are 4, 5, 6, 7 and so on. According to the display accuracy points: 0.05%FS, 0.2%FS, 0.5%FS and so on.



★详细的仪表选型资料，有单独的样册，如有需求，请联系米朗索要。

Detailed instrument selection information, there is a separate sample book, if there is a need, please contact Miran to ask for.

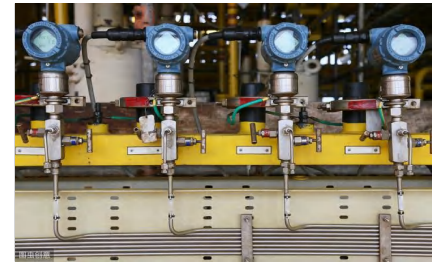
行业应用案例 Industry Application Case



● 机械/机器设备
Machinery/machine equipment



● 机床设备
Machine tool equipment



● 气压传动设备
Pneumatic transmission equipment



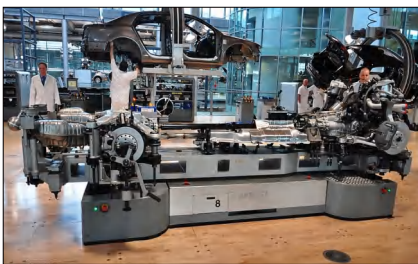
● 液压传动设备
Hydraulic transmission equipment



● 建筑设备
Construction equipment



● 机器人
Robot



● 自动化加工设备
Automatic processing equipment



● 工程机械
Engineering machinery



广泛应用于机械/机器设备，机床设备，液、气压传动设备，工程机械，建筑设备，机器人，自动化加工设备等，进行工程控制、自动调节、反馈控制系统等。

Widely used in machinery/machine equipment, machine tool equipment, hydraulic, pneumatic transmission equipment, construction machinery, construction equipment, robots, automatic processing equipment, engineering control, automatic regulation, feedback control system, etc.

产品技术支持 Product Technical Support

一、电子尺常见故障现象及处理方法

First, electronic ruler common fault phenomena and treatment methods

本书所列的电子尺实际上就是一个滑动变阻器，是作为分压器使用，以相对电压来显示所测量位置的实际位置。因此，就对这个装置（电子尺）提出了几点要求：

The electronic ruler listed in this book is actually a sliding rheostat, which is used as a voltage divider to show the actual position of the measured position in relation to the voltage. Therefore, several requirements are put forward for this device (electronic ruler):

1. 供电电压要稳定，工业电源要求 $\pm 0.1\%$ 的稳定性，比如基准电压10V，允许有 $\pm 0.01V$ 的波动，否则，会导致显示的较大波动。如果这时的显示波动幅度不超过波动电压的波动幅度，电子尺就属于正常。

1. The power supply voltage should be stable, industrial power supply requires a stability of $\pm 0.1\%$, such as the reference voltage of 10V, allowing a fluctuation of $\pm 0.01V$, otherwise, it will lead to large fluctuations in the display. If the fluctuation amplitude of the display at this time does not exceed the fluctuation amplitude of the fluctuation voltage, the electronic ruler is normal.

2. 供电电源要有足够的容量，如果电源容量太小，容易发生如下情况：合模运动会导致射胶电子尺显示跳动，或熔胶运动会导致合模电子尺的显示波动。特别是电磁阀驱动电源于电子尺供电电源在一起时容易出现上述情况，严重时可以用万用表的电压档测量到电压的波动。如果在排除了静电干扰、高频干扰、对中性不好的情况下仍不能解决问题，也可以怀疑是电源的功率偏小。

2. The power supply should have sufficient capacity, if the power supply capacity is too small, it is easy to occur the following situations: the mold movement will cause the ejector electronic ruler to show jumping, or the melting glue movement will cause the display fluctuation of the mold electronic ruler. In particular, the above situation is easy to occur when the electromagnetic valve drive power supply from the electronic ruler power supply together, and the voltage fluctuation can be measured with the voltage file of the multimeter in serious cases. If static interference, high-frequency interference, and neutrality are excluded, the problem cannot be solved, and the power of the power supply can also be suspected to be small.

3. 不能有外界的干扰，包括静电干扰和高频干扰。因此，设备的强电路与电子尺的信号线应分开线槽。电子尺应使用强制接地支架，且使电子尺外壳（可测量端盖螺丝与支架之间的电阻，应小于 1Ω 电阻）良好接地，信号线应使用屏蔽线，且在电箱的一端应予以屏蔽线接地或接直流电源负极。静电干扰时，一般万用表的电压测量非常正常，但就是显示数字跳动；高频干扰时其现象也一样。验证是不是静电干扰，用一段电源线将电子尺的封盖螺丝与机器上某一点金属短接即可，只要一短接，静电干扰立即消除。但高频干扰就难以用上述办法消除，而且机器手、变频节电器多出现高频干扰，可以用停止机器手或变频节电器的办法验证。

3. There should be no external interference, including electrostatic interference and high-frequency interference. Therefore, the strong current line of the equipment and the signal line of the electronic ruler should be separated from the line slot. The electronic ruler should use a forced grounding support, and make the electronic ruler shell (can measure the resistance between the end cap screw and the support, should be less than 1Ω resistance) well grounded, the signal line should use a shielded wire, and the shielded wire should be grounded or connected to the negative terminal of the DC power supply at one end of the electrical box. When electrostatic interference, the voltage measurement of the general multimeter is very normal, but it is the display of digital jumping; The same is true of high frequency interference. Verify that it is not electrostatic interference, use a section of power cord to short connect the cover screw of the electronic ruler with a certain point of metal on the machine, as long as a short connection, electrostatic interference is immediately eliminated. However, high-frequency interference is difficult to eliminate with the above method, and there are more high-frequency interference in robotic hands and frequency conversion electrical appliances, which can be verified by stopping robotic hands or frequency conversion electrical appliances.

4. 不能接错电子尺的三条线，1#、3#线是电源线，2#是输出线，除1#、3#线电源线可以调换外，2#线只能是输出线。上述线一旦接错，将出现线性误差大，控制精度差，容易显示跳动等现象。如果出现控制非常困难，就应该怀疑是接错线。若将电源正极接到2#上，电子尺拉杆又在最里面或最外面，此时电子尺将瞬间损毁，请严格注意这点。

4. Can not be connected to the wrong three lines of the electronic ruler, 1#, 3# line is the power line, 2# is the output line, in addition to 1#, 3# line power line can be exchanged, 2# line can only be the output line. Once the above line is connected incorrectly, the linear error will be large, the control accuracy is poor, and the phenomenon of jumping is easy to display. If the control is very difficult, you should suspect a wrong connection. If the positive electrode of the power supply is connected to 2#, the electronic ruler rod is in the innermost or outermost, at this time the electronic ruler will be instantly damaged, please pay strict attention to this.

5.安装对中性要好,角度容许 $\pm 12^\circ$ 误差,平行度偏差容许 $\pm 0.5\text{mm}$,是指某一误差,如果角度误差和平行度误差都偏大,就会导致显示数字跳动。在这种情况下,一般可以用万用表的电压档测出电压的波动。一定要作角度和平行度的调整。请特别注意:在现场将电子尺的铝合金支架更换成不锈钢支架后,同时应将拉杆牵引安装位升高 2mm 。否则,接地问题解决了,又形成了不对中的问题,必须同时解决。

5.The installation is better for neutral, the Angle allows $\pm 12^\circ$ error, the parallelism error allows $\pm 0.5\text{mm}$, which refers to a certain error, if the Angle error and parallelism error are too large, it will cause the display figure to jump. In this case, the voltage fluctuations can generally be measured with the voltage file of the multimeter. Make sure to adjust the Angle and parallelism. Please pay special attention to: after replacing the aluminum alloy bracket of the electronic ruler with a stainless steel bracket in the field, the drawbar traction installation position should be raised by 2mm . Otherwise, the grounding problem is solved, and the wrong problem is formed, which must be solved at the same time.

6.对于使用时间很久的电子尺,由于前期产品密封老化,可能有很多杂质,并有油、水混合物,影响电刷的接触电阻,导致显示数字跳动,可以认为是电子尺已经损坏。

6.For the electronic ruler that has been used for a long time, due to the aging of the previous product seal, there may be a lot of impurities, and there is a mixture of oil and water, which affects the contact resistance of the brush, resulting in the display digital jumping, which can be considered that the electronic ruler has been damaged.

7.电子尺显示故障的处理简单。设备上只要一只数字式万用表,一段电线即可,只要综合分析,判断问题和解决问题不是很困难。

7.Electronic ruler shows that the fault is simple to deal with. As long as a digital multimeter on the equipment, a piece of wire can be, as long as the comprehensive analysis, judge the problem and solve the problem is not very difficult.

注意:按上述方法故障排除不了,请联系送至米朗检修。

Note: If the fault cannot be removed by the above method, please contact and send it to Milang for repair.



二、“MIRAN米朗” KTC拉杆型电子尺结构简介

Second, "MIRAN" KTC pull-rod electronic ruler structure introduction

1. 拉杆：材质，不锈钢，无磁性，永不生锈，表面经无芯研磨及抛光处理，光滑耐磨。外径尺寸 $\phi 6\text{mm}$ ，确保拉杆与前端盖内 $\phi 6.00\text{mm} \times 3.80\text{mm}$ 的尘封与 $\phi 6.00\text{mm} \times 4.00\text{mm}$ 的油封紧密配合，可防止拉杆在往复运动过程中携带杂物或油水进入电子尺内部。拉杆与传感部件的连接采用先进的三爪封闭式卡簧，稳定可靠，轴向承载力大于60kg。

1. Pull rod: Material, stainless steel, non-magnetic, never rust, the surface by coreless grinding and polishing treatment, smooth and wear-resistant. The outer diameter of $\phi 6\text{mm}$ ensures that the tie rod and the dust seal of $\phi 6.00\text{mm} \times 3.80\text{mm}$ in the front end cover are closely matched with the oil seal of $\phi 6.00\text{mm} \times 4.00\text{mm}$, which can prevent the tie rod from carrying debris or oil and water into the electronic ruler during the reciprocating movement. The connection between the tie rod and the sensing part adopts the advanced three-claw closed spring, which is stable and reliable, and the axial bearing capacity is greater than 60kg.

2. 铝管：表面经电泳氧化处理，不会因时间久而变化，内部滑轨采用圆柱式大面积接触型，保证电刷支架在铝管内部能够平稳、高速往复运动，即使在剧烈的震动下，也不会影响电子尺的精确度。铝管带有屏蔽保护功能。整体产品在10g冲击下能正常工作。

2. Aluminum tube: The surface is oxidized by electrophoresis, and it will not change due to a long time. The internal slide adopts cylindrical large-area contact type to ensure that the brush bracket can move smoothly and at high speed inside the aluminum tube, even under severe vibration, it will not affect the accuracy of the electronic ruler. Aluminum tube with shielding protection function. The overall product can work normally under 10g impact.

3. 线路板：采用进口高品质碳膜树脂浆料热压成型，经烧结，电脑线性修刻后，使其耐磨性、线性精确度符合行业标准。所有接线端子经焊接、铆接及银胶固化，可靠性高。

3. Circuit board: The use of imported high-quality carbon film resin paste hot pressing, after sintering, computer linear repair, so that its wear resistance, linear accuracy in line with industry standards. All terminals are welded, riveted and cured with silver glue for high reliability.

4. 电刷：采用银钯合金材料，由精密五金模具冲压而成。厚度为0.08mm，有效弹性长度为7.80mm，电刷触点高度为1.00mm，单位直线触点面积为 0.22mm^2 。该合金材料具有高导电性能，弹性好，耐磨性优良，符合电刷性能要求。经加工成型后的电刷再经点焊加工固定定位支架上，保证电刷与线路板之间工作高度（耐磨使用寿命）、重复精度、分辨率符合行业最高标准。采用单电刷结构可以保证电子尺具有较小的杂波，同时保证电子尺在整个寿命周期内都具有非常高的分辨率（非常适用于注塑机的射胶控制）。采用双电刷结构可以保证电子尺更长寿命，且具有非常高的重复性精度（非常适用于注塑机的开合模控制）。

4. Brush: made of silver and palladium alloy material, stamped by precision metal mold. The thickness is 0.08mm, the effective elastic length is 7.80mm, the brush contact height is 1.00mm, and the unit straight contact area is 0.22mm^2 . The alloy material has high conductivity, good elasticity, excellent wear resistance, and meets the requirements of brush performance. After processing, the brush is fixed on the positioning bracket by spot welding, ensuring that the working height (wear-resistant service life), repeatability and resolution between the brush and the circuit board meet the highest industry standards. The use of a single brush structure can ensure that the electronic ruler has a small clutter, while ensuring that the electronic ruler has a very high resolution throughout the life cycle (very suitable for injection molding machine injection control). The use of double brush structure can ensure a longer life of the electronic ruler, and has a very high repeatability accuracy (very suitable for the opening and closing mold control of injection molding machines).

5. 电刷支架：固定电刷并且在铝管轨道上往复运动。要求其耐磨性、稳定性绝对不能出现丝毫差错，否则电子尺将无法正常工作。电刷支架材料，采用自润滑性耐磨性极为优良的聚四氟乙烯工程材料；结构采用圆柱式大面积接触型滑道，间隙控制在0.05mm，滑道内部有润滑槽，润滑槽内存有高级润滑剂，保证了电刷支架滑道与铝管轨道的磨擦系数降至为最低点。

5. Brush holder: fixed brush and reciprocating motion on aluminum tube track. Require its wear resistance, stability must not appear the slightest error, otherwise the electronic ruler will not work properly. Brush support material, the use of self-lubricating wear resistance of excellent polytetrafluoroethylene engineering material; The structure adopts cylindrical large-area contact slide, the gap is controlled at 0.05mm, and there is a lubrication groove inside the slide, and the lubrication groove is equipped with advanced lubricant, which ensures that the friction coefficient between the brush bracket slide and the aluminum tube track is reduced to the lowest point.

6.前、后端盖：前端盖的结构具有防水、防油、防尘及角度自由转向活动的功能。避免因安装不水平而影响电子尺使用寿命和精确度。前端盖设有三个排油、排水孔，可随时排出拉杆带入端盖内的水或油。后端盖嵌有接地装置，前后端盖面与铝管端面装有耐温、耐油、耐腐蚀性氟橡胶垫，加强了整个产品的密封等级，防护等级达到IP67。

6. Front and rear end cover: The structure of the front end cover has the functions of waterproof, oil proof, dust proof and angular free steering. Avoid affecting the service life and accuracy of the electronic ruler due to uneven installation. The front end cover is provided with three oil discharge and water discharge holes, which can discharge the water or oil brought into the end cover at any time. The rear end cover is embedded with a grounding device, and the front and back end covers and the aluminum tube end faces are equipped with heat-resistant, oil-resistant and corrosion-resistant fluororubbers, which strengthens the sealing grade of the whole product and the protection grade reaches IP67.

7.LC高频吸收电路（可选型、专利产品）：电子尺在工作时，电刷与线路板之间有一定的工作电流，有工作电流就会有电流火花，这种电流火花是肉眼看不到的，只有用100MHz的高频示波器才能检测出来。当工作电流火花频率、幅度过大时，电脑数字会出现快速闪动现象，全闭环控制电脑将无法分辨、取样和有效工作。为了解决这一关键问题，“MIRAN米朗”电子尺后端盖内部设有LC高频吸收回路模块，可以有效地抑制高频杂波，能有效地提高电气控制系统的工作稳定性。此款电子尺在高速、精密型注塑机的应用中可以替代价值不菲的磁致伸缩尺。

7.LC high-frequency absorption circuit (optional, patented products): When the electronic ruler is working, there is a certain working current between the brush and the circuit board, there will be a current spark, this current spark is invisible to the naked eye, only with 100MHz high-frequency oscilloscope can be detected. When the working current spark frequency and amplitude are too large, the computer digital will flash rapidly, and the full closed-loop control computer will not be able to distinguish, sample and work effectively. In order to solve this key problem, the "MIRAN" electronic ruler is equipped with LC high-frequency absorption loop module inside the back end cover, which can effectively suppress high-frequency clutter and effectively improve the working stability of the electrical control system. This electronic ruler can replace the valuable magnetostrictive ruler in the application of high-speed, precision injection molding machine.



三、“MIRAN米朗” KTF滑块型电子尺结构简介

Third, "MIRAN" KTF slider type electronic ruler structure introduction

1. 不锈钢尘封盖：采用强磁型，橡胶磁条材料采用加宽型，且对不锈钢尘封条采用弹性张力系统，保证使用中的密封防护等级。

1. Stainless steel dust cover: The strong magnetic type is used, the rubber magnetic strip material is widened, and the elastic tension system is used for the stainless steel dust strip to ensure the seal protection level in use.

2. 滑盖自带万向头：内部采用张力结构，滑盖能承受侧向牵引力10kg，而且，为避免因对中使滑盖被拉脱，另配备加长杆补偿。

2. The slide cover comes with universal head: the internal tension structure, the slide cover can withstand the lateral traction force of 10kg, and, in order to avoid the slide cover due to the center is pulled off, another extension rod compensation.

3. 铝管：表面经电泳氧化处理，不会因时间长久而变化，内部滑轨采用圆柱式大面积接触型，且整个内接触面全部经过电泳处理，表面坚固光滑，保证电刷支架在铝管内部能够平稳、高速往复运动，即使在剧烈的震动下，也不会影响电子尺的精确度。铝管带有屏蔽保护功能。整体产品在10g冲击下能正常工作。

3. Aluminum tube: The surface is oxidized by electrophoresis, will not change due to a long time, the internal slide adopts cylindrical large-area contact type, and the entire inner contact surface is all electrophoretically treated, the surface is solid and smooth, to ensure that the brush bracket can be stable and high-speed reciprocating movement inside the aluminum tube, even under severe vibration, it will not affect the accuracy of the electronic ruler. Aluminum tube with shielding protection function. The overall product can work normally under 10g impact.

4. 线路板：采用进口高品质碳膜树脂浆料热压成型，经烧结，电脑线性修刻后，使其耐磨性、性线精确度符合行业标准。所有接线端子经焊接、铆接及银胶固化，可靠性高。

4. Circuit board: The use of imported high-quality carbon film resin paste hot pressing, sintering, computer linear repair, so that its wear resistance, line accuracy in line with industry standards. All terminals are welded, riveted and cured with silver glue for high reliability.

5. 电刷：采用银钯合金材料，由精密五金模具冲压而成，厚度为0.08mm，有效弹性长度为7.80mm，电刷触点高度为12.00mm，单位直线触点面积为0.22mm²。该合金材料具有高导电性能，弹性好，耐磨性优良，符合电刷性能要求。经加工成型后的电刷再经点焊加工固定定位支架上，保证电刷与线路板之间工作高度（耐磨使用寿命）、重复精度、分辨率符合行业最高标准。采用单电刷结构可以保证电子尺具有较小的杂波，同时保证电子尺在整个寿命周期内都具有非常高的分辨率（非常适用于注塑机的射胶控制）。采用双电刷结构可以保证电子尺更长寿命，且具有非常高的重复性精度（非常适用于注塑机的开合模控制）。

5. Brush: made of silver and palladium alloy material, stamped by precision metal mold, thickness is 0.08mm, effective elastic length is 7.80mm, brush contact height is 12.00mm, unit linear contact area is 0.22mm². The alloy material has high conductivity, good elasticity, excellent wear resistance, and meets the requirements of brush performance. After processing, the brush is fixed on the positioning bracket by spot welding, ensuring that the working height (wear-resistant service life), repeatability and resolution between the brush and the circuit board meet the highest industry standards. The use of a single brush structure can ensure that the electronic ruler has a small clutter, while ensuring that the electronic ruler has a very high resolution throughout the life cycle (very suitable for injection molding machine injection control). The use of double brush structure can ensure a longer life of the electronic rule, and has a very high repeatability accuracy (very suitable for the opening and closing mold control of injection molding machines).

6. 电刷支架：固定电刷并且在铝管轨道上往复运动。要求其耐磨性、稳定性绝对不能出现丝毫差错，否则电子尺将无法正常工作。电刷支架材料，采用自润滑性耐磨性极为优良的聚四氟乙烯工程材料；结构采用圆柱式大面积接触型滑道，间隙控制在0.05mm，滑道内部有润滑槽，润滑槽内存有高级润滑剂，保证了电刷支架滑道与铝管轨道的磨擦系数降至为最低点。

6. Brush holder: fixed brush and reciprocating motion on aluminum tube track. Require its wear resistance, stability must not appear the slightest error, otherwise the electronic ruler will not work properly. Brush support material, the use of self-lubricating wear resistance of excellent polytetrafluoroethylene engineering material; The structure adopts cylindrical large-area contact slide, the gap is controlled at 0.05mm, and there is a lubrication groove inside the slide, and the lubrication groove is equipped with advanced lubricant, which ensures that the friction coefficient between the brush bracket slide and the aluminum tube track is reduced to the lowest point.

7.前、后端盖：前端盖的结构具有防水、防油、防尘的功能。后端盖嵌有接地装置，前后端盖面与铝管端面装有耐温、耐油、耐腐蚀性氟橡胶垫。加强了整个产品的密封等级，部分型号整体防护等级可达到IP68。

7. Front and rear end cover: The structure of the front end cover has the functions of waterproof, oil-proof and dustproof. The rear end cover is embedded with a grounding device, and the front and rear end covers and the end faces of the aluminum tubes are equipped with heat-resistant, oil-resistant and corrosion-resistant fluororubbers. The sealing grade of the whole product is strengthened, and the overall protection grade of the part model can reach IP68.

四、电子尺安装注意事项

Four, electronic ruler installation precautions

根据电子尺对安装的设计要求，以及在最终客户现场进行售后服务所得到的一些经验，特总结出电子尺安装注意事项如下，与大家分享,初看似似乎复杂，但习惯了就成为自然。

According to the design requirements of the electronic ruler for installation, as well as some experience gained from the after-sales service at the final customer site, the installation precautions of the electronic ruler are summarized as follows, to share with you, it seems complicated at first glance, but it becomes natural to get used to it.

1.选择电子尺规格需留有余量，一般在实际行程的基础上选大一规格的即可。

1. The selection of electronic ruler specifications needs to leave a margin, generally on the basis of the actual travel to choose a large specification.

2.同时注意，1000mm规格以下可选用KTC拉杆系列，大于此行程的规格，或不便于进行对中调整的场所，宜选用KTF滑块结构。

2. At the same time, note that the KTC tie rod series can be selected below the 1000mm specification, which is larger than the specification of this stroke, or is not easy to adjust the occasion, KTF slider structure should be selected.

3.拉杆式电子尺的拉球万向头允许半径1mm的对中性偏差，当然规格越短，建议对中偏差越小。

3. The pull ball universal head of the pull rod type electronic ruler allows the neutral deviation of the radius of 1mm, of course, the shorter the specification, the smaller the recommended deviation.

4.电子尺的安装宜将余量均匀留在两端，未确定极限位置之前不要锁紧固定支架螺丝，待调整行程OK后才能锁紧电子尺固定支架螺丝。

4. The installation of the electronic ruler should be evenly left at both ends, do not lock the fixing bracket screws before determining the limit position, and lock the fixing bracket screws of the electronic ruler after adjusting the travel OK.

5.固定电子尺后，将拉杆（KTC、KTM系列均适用）缩回时，万向球头的圆柱本体应能在四个径向方位有空隙。否则，调整万向头安装位或调整靠近伸出端的安装支架位。

5. After fixing the electronic ruler, when the pull rod (KTC, KTM series are applicable) is retracted, the cylindrical body of the universal ball head should be able to have gaps in four radial directions. Otherwise, adjust the mounting position of the universal head or the mounting support near the extended end.

6.在拉杆拉出时如有很大的不对中，应调整靠近插头那端的安装支架。这可作为一种辅助复查方式。

6. If there is a large misalignment when the pull rod is pulled out, the mounting bracket near the plug should be adjusted. This can be used as an auxiliary review method.

7.拉球万向头安装杆与拉杆允许角度 $\pm 12^\circ$ 的倾斜，但如果安装时对中偏差和倾斜偏差同时都很大将会影响电子尺的稳定性和使用寿命。应予以进一步调整。

7. Pull ball universal head mounting rod and pull rod allow Angle $\pm 12^\circ$ tilt, but if the installation of the deviation of the center and tilt deviation at the same time are very large will affect the stability and service life of the electronic ruler. Further adjustments should be made.

8.滑块电子尺可以减少调整对中性的工作量，但辅助加长杆不能取消，否则，会出现由于对中性不好而导致稳定性和使用寿命，甚至当即致使电子尺失效。

8. The slider electronic ruler can reduce the adjustment of the neutral workload, but the auxiliary extension rod can not be cancelled, otherwise, it will cause stability and service life due to the neutrality is not good, and even immediately cause the electronic ruler to fail.

9.一切调整后，紧固安装螺丝，力度应使接地电阻小于 1Ω 为宜。用万用表 200Ω 档位测量电子尺封盖螺丝与安装支架之间的电阻。

9. After all the adjustments are made, tighten the installation screws and make the grounding resistance less than 1Ω . Use a multimeter at 200Ω to measure the resistance between the cover screw of the electronic ruler and the mounting bracket.

10.使用四线制或带有屏蔽线的配线，电子尺那端接地端应连接，同时将第四端或屏蔽线在电控箱端可靠接地。

10. Using a four-wire system or a shielded wire distribution, the ground end of the electronic ruler should be connected, and the fourth end or shielded wire should be reliably grounded at the end of the electric control box.



五、“MIRAN米朗”—专业的直线位移传感器制造商

Five, "MIRAN" - Professional manufacturer of linear displacement sensors

深圳市米朗科技有限公司是经深圳市政府认定的高新技术企业。公司拥有优秀的生产技术与制造工艺，并斥资千万从国外购进先进仪器和生产设备。米朗公司现已成为中国直线位移传感器行业生产和销售的率先企业，产品在中国市场占有极大的份额，并且远销海外。

Shenzhen Milang Technology Co., Ltd. is a high-tech enterprise recognized by the Shenzhen Municipal government. The company has excellent production technology and manufacturing process, and invests tens of millions of advanced instruments and production equipment from abroad. Milang has now become the first enterprise in the production and sales of linear displacement sensor industry in China, and its products occupy a large share in the Chinese market and are exported overseas.

产品以其优良的性价比、齐全的规格品种，逐渐成为各大品牌厂商的选择。并且成为海天、震德、震雄、力劲、伊之密、东华、仁兴等一些国内知名企业的供应商。公司以其优良的品质、完善的售后服务在业界内获得一致好评，并且在各大厂商中拥有良好的口碑。

Products with its excellent cost performance, complete specifications and varieties, gradually become the choice of major brand manufacturers. And become Haitian, Zhende, Zhenxiong, Lijin, Yizhi, Donghua, Renxing and other well-known domestic enterprises suppliers. With its excellent quality and perfect after-sales service, the company has won unanimous praise in the industry, and has a good reputation among major manufacturers.

随着我国各个工业领域的不断升级，直线位移传感器现正成为各种设备和仪器位移监控的重要手段。产品应用广泛，适用于：各类注塑机、压铸机、橡胶机、液压机、制鞋机、纸品机械、印刷机、纸箱设备、飞机操舵、船舶操舵、五金冲压的送料器、高压开关测试仪、IT设备、张力调节装置等。

With the continuous upgrading of various industrial fields in China, linear displacement sensors are now becoming an important means of displacement monitoring of various equipment and instruments. The products are widely used in: all kinds of injection molding machine, die casting machine, rubber machine, hydraulic press, shoe making machine, paper machinery, printing press, carton equipment, aircraft steering, ship steering, metal stamping feeder, high voltage switch tester, IT equipment, tension adjustment device, etc.

米朗科技公司位于改革开放前沿窗口—深圳市光明区

Shenzhen Miran Technology Co., Ltd is located at the front place in Chinese Economic Reform — Guangming District, Shenzhen

六、“MIRAN米朗”系列直线位移传感器（综述）

Six, "MIRAN" Series Linear Displacement Sensors (Overview)

“MIRAN”电子尺在中国市场已有近20年的销售和使用历史。经过广大客户的长期使用验证，普遍反映良好。综合起来，有如下几大优点：

"MIRAN" electronic ruler has been sold and used in the Chinese market for nearly 20 years. After the long-term use of the majority of customers to verify, generally reflect well. In summary, there are the following major advantages:

- 稳定的质量 Stable quality
- 及时的供货 Timely delivery
- 完善的售后服务 Excellent after-sales service
- 跟踪服务和可追溯性体系 Tracking services and traceability systems
- 不断的持续改进 Continuous continuous improvement

现就上述几点分述如下：

The above points are summarized as follows:

1.稳定的质量。稳定的质量需要先进的设计、先进的设备和先进的制造工艺来保证。因此，在引进国外先进技术的基础上，结合国内的实际情况和严酷的使用环境，不断改进和完善产品的质量性能。首先，从设计上优化，消除了不足。有以下几个方面：

1. Stable quality. Stable quality requires advanced design, advanced equipment and advanced manufacturing process to ensure. Therefore, on the basis of the introduction of foreign advanced technology, combined with the actual situation of the domestic and harsh use of the environment, constantly improve and perfect the quality of the product performance. First of all, from the design optimization, eliminate the shortage. There are the following aspects:

①提升了防护等级，使产品能适应中国工厂的使用环境，并能使电子尺在接近复杂实际工厂的条件下工作，保证电子尺更加可靠长周期的工作。

① The protection level is improved, so that the product can adapt to the use of the Chinese factory environment, and can make the electronic ruler work under conditions close to the complex actual factory, to ensure that the electronic ruler is more reliable and long-term work.

②加强了抗震性能，通过严格控制运动部件间隙，采用吸震含油滑动件，使其能够在设备的震动条件下能长期正常地工作。

② Strengthen the seismic performance, by strictly controlling the clearance of moving parts, the use of shock-absorbing oil-bearing sliding parts, so that it can work normally for a long time under the vibration conditions of the equipment.

③增加了产品的抗拉强度，针对产品在使用中易被意外拉出的现象，改变了拉杆卡簧结构，使拉杆能承受轴向75kg的拉力，并且有较好的缓冲余量。

③ Increase the tensile strength of the product, in view of the phenomenon that the product is easy to be accidentally pulled out in use, change the tie rod circlip structure, so that the tie rod can withstand the axial tension of 75kg, and has a better buffer margin.

④增加了产品电性接地的可靠性，使产品能够抗静电、杂波及其它不良的电磁辐射干扰，不受客户的使用习惯的不良影响。

④ Increase the reliability of the electrical grounding of the product, so that the product can resist static electricity, noise and other adverse electromagnetic radiation interference, not affected by the customer's use habits.

⑤改善了输入、输出线的连结方式，针对国外有些同类产品的连接点易出现故障，我们对连接采用全新（铆接+焊接+银胶）以及(具有超高导电性能的插拔)方式，克服了单一连接方式的不足，可保证产品的长期稳定使用。

⑤ Improve the connection of the input and output lines, for the connection points of some similar products in foreign countries are prone to failure, we use a new connection (riveting + welding + silver glue) and (with ultra-high electrical conductivity plug and plug), to overcome the shortcomings of a single connection, can ensure the long-term stable use of products.

⑥增加了基板的印刷次数,提高了印刷分辨率,有效地抑制了由于运动过程中电阻的不断变化而产生的杂波影响,有效保护电子尺免受意外损坏。

⑥The printing frequency of the substrate is increased, the printing resolution is improved, and the influence of clutter caused by the constant change of resistance during movement is effectively suppressed, and the electronic ruler is effectively protected from accidental damage.

⑦严格控制设计、制造体系和工艺，设计严格遵循科学方法，高标准设计，反复论证；所选用的原材料全部是先进发达国家的名优产品，制造过程中,从原材料的进货到半成品的加工,直到产品的出货检验，均严格按照ISO9001: 2008国际质量体系所确立的标准执行。

⑦Strict control of design, manufacturing system and process, design strictly follow scientific methods, high standard design, repeated demonstration; The selected raw materials are all famous products of advanced developed countries. In the manufacturing process, from the purchase of raw materials to the processing of semi-finished products to the shipment inspection of products, they are strictly implemented in accordance with the standards established by the ISO9001:2008 international quality system.

⑧采用先进的生产设备，保证过程参数的稳定、可靠，辅助以完善的检测手段，对导电膜的厚度、硬度、光洁度、线性度严格要求,保证了产品的品质特征。

⑧ The use of advanced production equipment to ensure the stability and reliability of the process parameters, assisted by perfect testing means, the thickness, hardness, finish and linearity of the conductive film are strictly required to ensure the quality characteristics of the product.

⑨持续追踪服务客户，在为客户提供优质服务的同时,并且到现场收集客户使用情况的一手资料，并据此对产品作出改善。可以看出，“MIRAN米朗”产品推出的十几年，是精益求精不断改进的PDCA循环过程。凡是客户退回的产品,我们都进行严格验证,因此可以推测产品的三年期内故障率低于1‰；根据我们专门回收更换的测评结果，平均无故障运行时间可达十年以上，以这个指标来考核，我公司产品已经完全达到并超越了国外原装进口品牌的标准。而且，我们的产品经过不断的改进，各项指标将会更加提升,进一步的指标考核将在新产品推出后反馈。

⑨Continue to track service customers, while providing customers with quality service, and collect first-hand information about customer use on site, and improve products accordingly. It can be seen that the introduction of "MIRAN Mirang" products for more than ten years is a PDCA cycle process of continuous improvement. All the products returned by customers, we are strictly verified, so it can be inferred that the failure rate of the product within three years is less than 1‰; According to the evaluation results of our special recycling and replacement, the average trouble-free operation time can reach more than ten years. According to this index, our products have fully reached and exceeded the standard of foreign original imported brands. Moreover, after continuous improvement of our products, various indicators will be further improved, and further indicator assessment will be feedback after the launch of new products.

2.及时的供货。为最大程度地为考虑客户所想，对于客户所实施的“零”库存管理模式，公司大力配合，在广大客户的最近点设立办事处，并设立仓库备货，在仓库保持有效库存，能够保证及时将产品送到客户现场，得到客户的认可。

2. Timely delivery. In order to maximize the consideration of customers, for the implementation of the customer's "zero" inventory management model, the company vigorously cooperate, set up an office in the nearest point of the majority of customers, and set up a warehouse to stock up, maintain effective inventory in the warehouse to ensure that the products are sent to the customer site in time, which is recognized by customers.

3.完善的售后服务。公司将产品的售后服务作为产品质量的延伸，经常到客户的安装现场与客户进行讨论、解答客户的疑问，解决实际使用中可能遇到的问题。甚至应客户的要求，对最终用户进行服务，解决问题。因为，我们不希望由于对故障的误判导致客户的损失，而减少误判的有效方法就是在问题现场解决问题。我们也同时希望我们作为客户管理体系中的一个环节，被客户纳入，经常通知我们了解和解决一些现场问题。

3. Perfect after-sales service. The company will be the product after-sales service as an extension of product quality, often to the customer's installation site to discuss with customers, answer customers' questions, to solve the problems that may be encountered in actual use. Even at the request of customers, services to end users and solve problems. Because we do not want to cause the customer's loss due to the misjudgment of the fault, and the effective way to reduce the misjudgment is to solve the problem at the problem site. We also hope that we as a part of the customer management system, be included by customers, often inform us to understand and solve some on-site problems.

4.由于我们与客户的贴近，我们更能跟踪服务，并对所有产品能够进行追溯 我们自2006年8月开始推广普及ISO9001：2000质量认证体系后，又普及了ISO9001:2008质量体系认证，建立了产品的半成品、成品的跟踪档案，更能够与客户的体系进行交流,这是所谓国外品牌所没有的优势,而这一优势也就是我们能够不断进步、持续改善的基础。我们相信，有了这一基础，我们就能够保持我们的优势。

4. Due to our close proximity to customers, we are more able to track services and trace all products We have been promoting ISO9001 since August 2006: 2000 quality certification system, and the popularization of ISO9001:2008 quality system certification, the establishment of products of semi-finished products, finished product tracking files, more able to communicate with the customer's system, this is the so-called foreign brands do not have the advantage, and this advantage is that we can continue to progress, continuous improvement of the basis. We believe that with this foundation, we will be able to maintain our advantages.

5.公司不仅仅满足于目前客户的需要和对于产品的要求，更注重客户未来对产品的要求，公司目前正致力于进一步提高产品的抗振性、最大运行速度、最小杂波的开发工作，期望能进一步满足客户未来对高档次、高精度、高速度注塑机等设备的配置要求，确保在位移传感器行业保持我们的优势。

5. The company not only meets the current needs of customers and requirements for products, but also pays more attention to the future requirements of customers for products. The company is currently committed to further improving the product's vibration resistance, maximum operating speed and minimum noise development work, hoping to further meet the future requirements of customers for high-grade, high-precision, high-speed injection molding machines and other equipment configuration. Ensure we maintain our edge in the displacement sensor industry.

米朗科技工业园鸟瞰图



七、“MIRAN米朗”系列直线位移传感器（综述）

Sever, "MIRAN" Series Linear Displacement Sensors (Overview)

“MIRAN米朗”与其他品牌比较，“MIRAN米朗”具有如下优势：

"MIRAN Miran" Compared with other brands, "MIRAN Miran" has the following advantages:

- ①防护等级高，适应现场的恶劣环境，延长使用寿命。
 - ②抗振性好，对设备的振动具有吸收，保持输出稳定。
 - ③耐高温性能好，耐油抗老化，结构强度高。
 - ④具有限流保护功能，能对因接触电阻引起的杂波起到抑制作用。
 - ⑤输入、输出接线多重固定，避免因振动、老化、腐蚀导致的接点脱落而失效。
 - ⑥售前和售后服务好，并且可以现场解决客户使用过程中遇到的问题，进而不断改善，提高用户产品的整体水平。
 - ⑦质量的各种保障措施：结构设计的保证、工艺设计的保证、参数设计的保证、原材料的保证、过程检测的保证、先进设备的保证、管理体系的保证。
- ① High level of protection, adapt to the harsh environment of the site, extend the service life.
 - ② Good vibration resistance, absorption of equipment vibration, to maintain stable output.
 - ③ Good high temperature resistance, oil resistance and aging resistance, good structural strength.
 - ④ It has the current limiting protection function, which can inhibit the clutter caused by contact resistance.
 - ⑤ The input and output cables are fixed multiple times to avoid failure due to contact loss caused by vibration, aging and corrosion.
 - ⑥ Good pre-sale and after-sales service, and can solve the customer use process on site the problems encountered, and then continue to improve, improve the overall level of user products.
 - ⑦ Various quality assurance measures: structural design assurance, process design assurance, parameter design assurance, raw material assurance, process testing assurance, advanced equipment assurance, management system assurance.

本书主要概述了基于电位计原理的位移传感器（电子尺），如有不详细之处，请联系米朗。另2006年以来，米朗推出的磁致伸缩位移传感器经过不断升级，现在已经达到技术水平先进，如有需求可参照米朗磁致伸缩位移传感器样本进行选型。

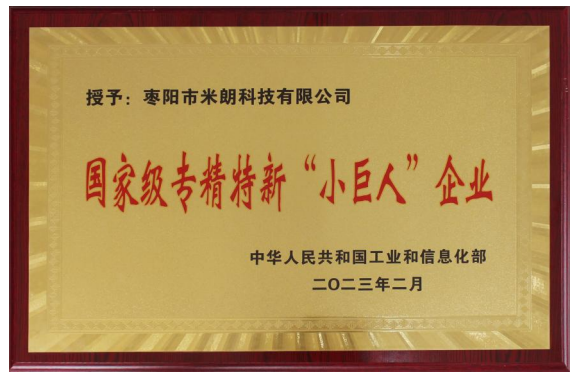
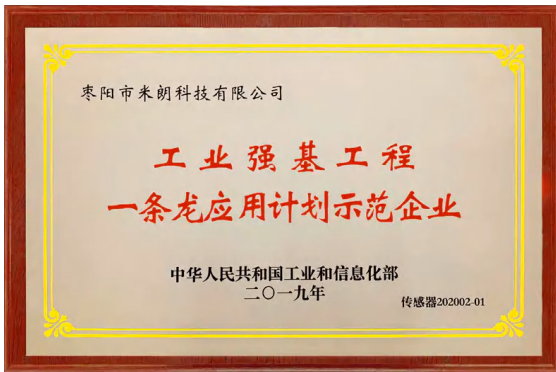
This book mainly Outlines the displacement sensor (electronic ruler) based on the principle of potentiometers, if there is no details, please contact Millan. In addition, since 2006, the magnetostrictive displacement sensor launched by Millan has been continuously upgraded, and now it has reached the advanced level of technology, if there is demand, you can refer to the sample selection of Millan magnetostrictive displacement sensor.



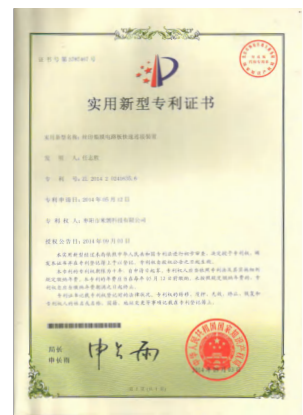
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Radiate nationwide and look around the world

质量第一

Quality First

用户至上

User First

诚信为本

Honesty is the best policy

以技术创新为核心，以客户需求为导向

Centered on technological innovation and guided by customer needs

将致力于位移、物位、角度等测控领域

We will be committed to the measurement and control fields of displacement, level, angle, etc

为客户提供一站式解决方案的产品与服务

Provide customers with one-stop solutions for products and services

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