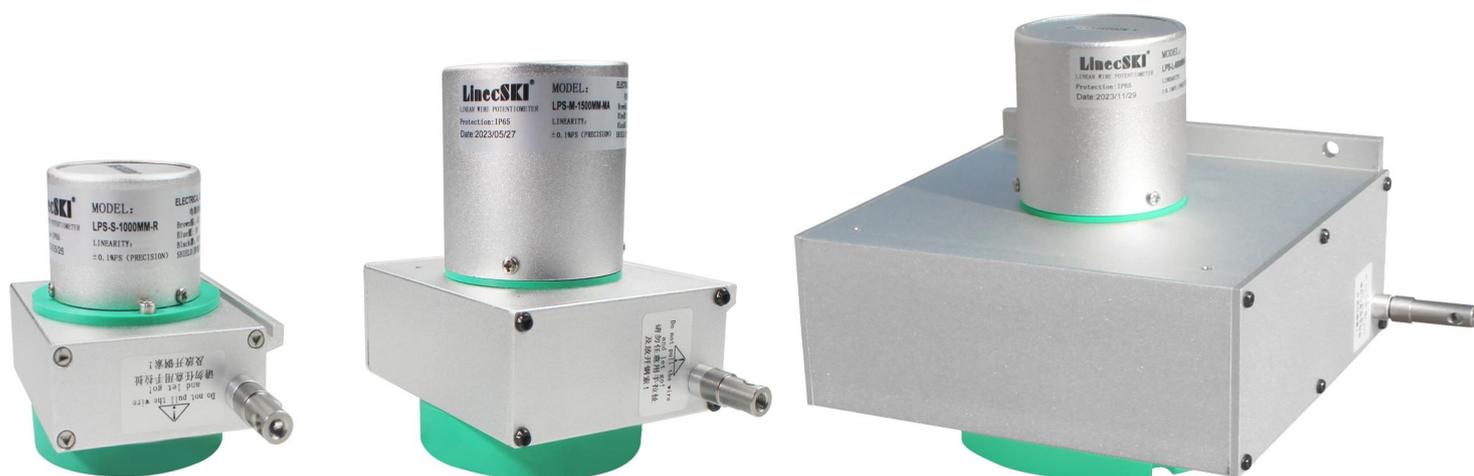


中国工信部高精度传感器一条龙应用计划示范项目
国家级专精特新“小巨人”企业，国家级高新技术企业
中国工业强基重点产品，中国工信部传感器一条龙应用计划示范企业

莱茵系列拉绳位移传感器

LINECSKI SERIES PULL ROPE DISPLACEMENT SENSOR



莱茵系列拉绳位移传感器

LINECSKI SERIES PULL ROPE DISPLACEMENT SENSOR

- 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

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产品选型 Product Selection

LPS - S - 500mm - R - C

其他特殊附加要求:

空白: 默认常规标准, 1米电源线; **EX:** 防爆型 (所有防爆型需要有此后缀); **C:** 磁吸式安装方式 (所有款型都可以做磁吸式); **G:** 标准挂扣式连接头; **G1/G2:** 可选挂扣式连接头; **GL:** 加装隔离电源模块, 4-20mA的加装该模块后, 输出是4-20mA四线制; 0-5V或者0-10V加装之后也是四线制电压输出, 要实现四线制, 由于空间限制, S型需要外加隔离电源模块, S型以上大小的可以内置。 **2m:** 2米电源线; **3m:** 3米电源线, 以此类推; 注意: 以上代码列举在一起的话, 代表以上几者参数同时包含, 如: "C2m"代表磁吸式安装方式并且带2米电源线, 请按照上面的代码先后顺序列出。

其他以上没有列出的附加要求请用文字描述: 如拉绳方向与安装面垂直 (大部分型号的拉绳方向与安装面平行)、外加铝合金防护外壳、外加塑胶防护外壳等。

Other special additional requirements:

Blank: Default conventional standard, 1 meter power cord; **EX:** explosion-proof type (all explosion-proof types need this suffix);

C: magnetic installation mode (all models can be magnetic); **G:** Standard hook type connector; **G1/G2:** Optional hook connector; **GL:** Equipped with isolated power module, 4-20mA After the module is installed, the output is 4-20mA four-wire system; 0-5V or 0-10V after installation is also a four-wire voltage output, to achieve four-wire system, due to space limitations, S type need additional isolation power module, S type above the size can be built in. **2m:** 2m power cord; **3m:** 3m power cord, and so on; Note: If the above code is listed together, it means that the above parameters are included at the same time, such as: "C2m" represents the magnetic installation mode and has a 2 meter power cord, please list it in the order of the above code. **Other additional requirements not listed above should be described in words:** for example, the direction of the cable is perpendicular to the mounting surface (the direction of the cable is parallel to the mounting surface in most models), an aluminum alloy protective shell, and a plastic protective shell.

信号输出方式:

R: 电位器输出/电阻输出(0-5K、0-10K可选); **V1:** 0-5V电压输出, 三线制; **V2:** 0-10V电压输出, 三线制; **A2:** 4-20mA电流输出, 二线制; **A3:** 4-20mA电流输出, 三线制; **FGA4:** 4-20mA电流输出, 非隔离四线制; **GLA4:** 4-20mA电流信号输出, 隔离四线制; **FGV5:** 0-5V电压输出, 非隔离四线制; **GLV5:** 0-5V电压信号输出, 隔离四线制; **FGV6:** 0-10V电压输出, 非隔离四线制; **GLV6:** 0-10V电压信号输出, 隔离四线制; (隔离四线制仅限电位计原理拉绳尺可做。这种型号是传感器内部含隔离电源模块, 该输出信号的抗干扰能力比较强, 此隔离四线制模块可以内置在传感器内部(内置此模块要求安装底座在M型或者以上大小, M型以下安装底座则需要外置MOGLA4N或MOGLA4NR模块), 如需其他隔离四线制模块型号请参照我司隔离四线制模块选型表。 **RS:** RS485数字信号输出(12位分辨率); **RSG:** RS485数字信号输出(16位高分辨率); **P:** 脉冲信号输出; **P1:** 脉冲差分信号输出; 脉冲输出型可以装配各种类型编码器, 输出各种类型的脉冲信号或者绝对值编码器原理的数字信号、模拟信号(常规装配是NPN推挽式, 2000P/R的增量型编码器)。注: S型如果需要四线制电压或者四线制电流输出型, 需要外加电源隔离模块。

Signal output method:

R: Potentiometer output/resistance output (0-5K, 0-10K optional); **V1:** 0-5V voltage output, three-wire system; **V2:** 0-10V voltage output, three-wire system; **A2:** 4-20mA current output, two-wire system; **A3:** 4-20mA current output, three-wire system; **FGA4:** 4-20mA current output, non-isolated four-wire system; **GLA4:** 4-20mA current signal output, isolated four-wire system; **FGV5:** 0-5V voltage output, non-isolated four-wire system; **GLV5:** 0-5V voltage signal output, isolated four-wire system; **FGV6:** 0-10V voltage output, non-isolated four-wire system; **GLV6:** 0-10V voltage signal output, isolated four-wire system; (The isolation four-wire system can only be made by the potentiometer principle pull rope ruler. This model contains an isolated power module inside the sensor, the output signal has a strong anti-interference ability, and the isolated four-wire mold block can be built inside the sensor (the built-in module requires the installation base to be M type or above size, and the installation base below M type requires an external MOGLA4N or MOGLA4NR module). If you need other isolated four-wire mold block models, please refer to our isolated four-wire mold block selection table. **RS:** RS485 digital signal output (12-bit resolution); **RSG:** RS485 digital signal output (16-bit high resolution); **P:** pulse signal output; **P1:** pulse differential signal output; pulse output type can be assembled with various types of encoders, output various types of pulse signals or absolute encoder principle of digital signals, analog signals (conventional assembly is NPN push-pull, 2000P/R incremental encoder). Note: S type if you need four-wire voltage or four-wire current output type, you need additional power isolation module.

有效测量行程: 100-10000mm之间任意量程可选, 单位: mm毫米, 一般建议选100的倍数量程, 或者参照米朗常规量程参考表, 货期会比较快, 特殊情况下也可以选择如658mm、5211mm等任意量程也可以生产, 这些不是常规量程的需要另外加工定做相应的线轮来生产, 货期会稍慢点。

Effective measurement range: Optional range between 100-10000mm, unit: mm mm, it is generally recommended to choose a multiple of 100 measuring range, or refer to the Milan conventional measuring range reference table, the delivery time will be faster, in special cases, you can also choose any measuring range such as 658mm, 5211mm, etc., can also be produced, these are not conventional measuring ranges need to be processed and customized corresponding wire wheels to produce, the delivery time will be slightly slower.

安装基座型号大小(根据基座的大小选择相应范围的有效测量行程)

S: 100-1300mm; **M:** 1000-4000mm; **L:** 4500-10000mm;
超出这些量程范围的, 可以联系我们定制。

Installation base model size (select effective measurement stroke within the corresponding range based on the size of the base)

S: 100-1300mm; **M:** 1000-4000mm; **L:** 4500-10000mm;
Beyond these ranges, you can contact us to customize.

米朗拉绳位移传感器系列:

LPS: 普通标准型, 普通防水, 如: 可以承受短时间溅水, 短时间雨淋等。

Miran rope displacement sensor series:

LPS: ordinary standard type, ordinary waterproof, such as being able to withstand short-term splashing, short-term rain, etc;

注: 以上选型不代表每种组合的都会生产, 具体以实际生产情况沟通为准。

Note: The above selection does not mean that every combination will be produced. The specific production situation shall be subject to communication.

接线方式 Connection Mode

电阻信号 Resistance signal	棕BROWN 电源正 Power Positive DC5~10V	蓝色BLUE 电源负 Power Negative 0V	黑色BLACK 输出 Output	屏蔽线 Shielding wire 接大地 GROUNDING GND		
电压信号 Voltage signal 0-5V 0-10V	棕BROWN 电源正 Power Positive DC12~24V	蓝色BLUE 电源负 Power Negative 0V	黑色BLACK 输出 Output	屏蔽线 Shielding Wire 接大地 GROUNDING GND		
电流信号 Current signal 4-20mA 2线制 2-Wire system	棕BROWN 电源正 Power Positive DC12~24V	黑色BLACK 输出 Output	屏蔽线 Shielding Wire 接大地 GROUNDING GND			
电流信号 Current signal 4-20mA 3线制 3-Wire system	棕BROWN 电源正 Mains positive DC12~24V	蓝色BLUE 电源负 Power Negative 0V	黑色BLACK 输出 Output	屏蔽线 Shielding Wire 接大地 GROUNDING GND		
电流信号 Current signal 4-20mA 4线制 4-Wire system	棕BROWN 电源正 Power Positive DC12~24V	蓝色BLUE 输出 + Output +	黑色BLACK 电源负 Power Negative 0V	白色WHITE 输出 - Output -	屏蔽线 Shielding Wire 接大地 GROUNDING GND	
RS485信号 RS485 signal	红RED 电源正 Power Positive DC12~24V	蓝色/绿色 BLUE/GREEN RS485 A	黑色BLACK 电源负 Power Negative 0V	白色WHITE RS485 B	屏蔽线 Shielding Wire 接大地 GROUNDING GND	
脉冲信号 Pulse signal NPN 标准 Standard	红RED 电源正 Power Positive DC8~30V	白色WHITE 电源负 Power Negative 0V	蓝色BLUE A相 A Phase	绿色GREEN B相 B Phase	黄色YELLOW Z相 Z Phase	屏蔽线 Shielding Wire 接大地 GROUNDING GND
旧款脉冲差分信号 Old pulse differential signal	红RED 电源正 Power Positive 5V	白色WHITE 电源负 Power Negative 0V	蓝色BLUE A相 A Phase	绿色GREEN B相 B Phase	黄色YELLOW Z相 Z Phase	灰色GRAY A- 棕BROWN B- 黑BLACK Z-
新款脉冲差分信号 New pulse differential signal	红RED 电源正 Power Positive 5V	白色WHITE B相 B Phase	橙色ORANG Z- 绿色GREEN A相 A Phase	黄色YELLOW Z相 Z Phase	灰色GRAY B- 棕BROWN A- 黑BLACK 电源负 Power Negative 0V	

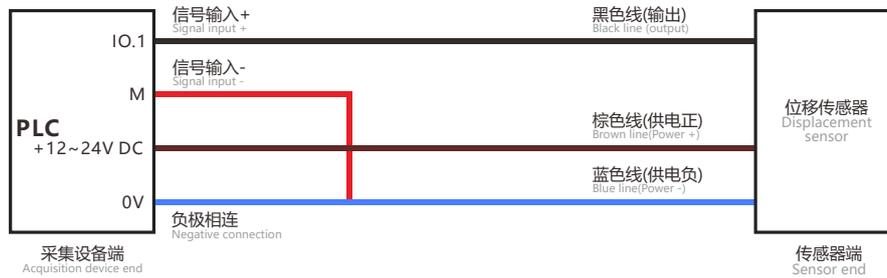
由于脉冲信号输出的拉绳传感器所适配的编码器种类较多，供电电压和产品的分辨率会有所不同。具体供电电压以产品实物标签上标注的电压为准（通常为8-30V宽电压，但也有部分型号为5V电压，接入其他电压可能会导致烧坏）；具体分辨率以产品实物标签上标注的分辨率为准，或者提前咨询我司客户及技术人员确认。

Because there are many types of encoders available for pulse-signal output rope sensors, the supply voltage and product resolution will be different. The specific power supply voltage is subject to the voltage marked on the physical label of the product (usually 8-30V wide voltage, but some models are 5V voltage, access to other voltages may lead to burnout); The specific resolution shall be the resolution marked on the physical label of the product, or consult our customers and technical personnel to confirm in advance.

接线示意图 Schematic Diagram

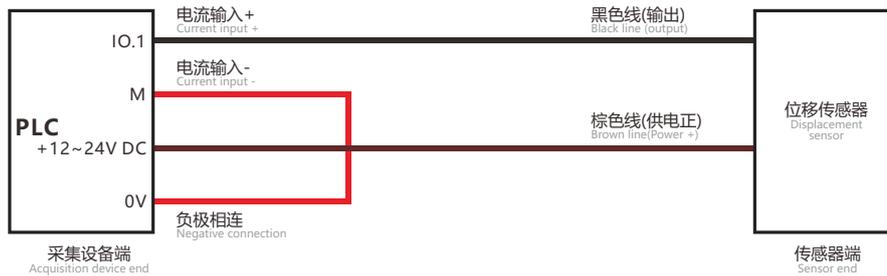
● 电位器原理传感器PLC接入型接线图

Potentiometer principle sensor PLC access wiring diagram



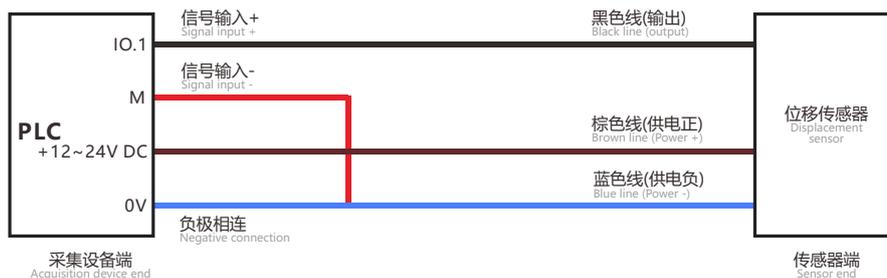
● 二线电流输出PLC接入型接线图

Two wire current output PLC access wiring diagram



● 三线电流/电压输出PLC接入型接线图

Three-wire current/voltage output PLC access wiring diagram



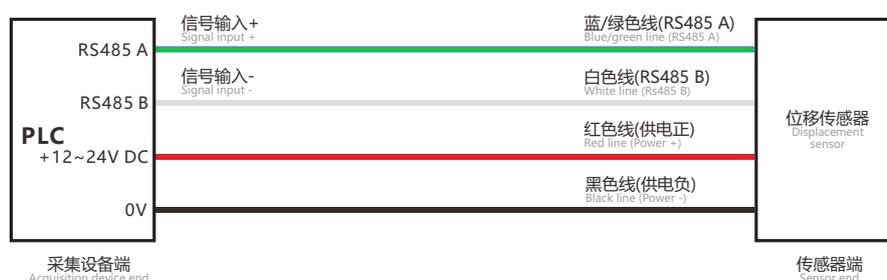
● 四线电流/电压输出PLC接入型接线图

Four-wire current/voltage output PLC access wiring diagram



● RS485输出PLC接入型接线图

RS485 output PLC access wiring diagram



以上仅供参考，具体供电电压及接线定义以产品实物标签上标注为准。

The preceding cables are for reference only. For details about the power supply voltage and cable connection, refer to the labels on the product.

安装注意事项 Installation Precautions

1、电气连接请按照传感器上的接线说明接线，确保传感器正确接线才能通电；利用固定螺丝孔或磁铁，依现场及机器安装空间设施需要，直接安装或另加保护或其他机械使用。

1. Please follow the wiring instructions on the sensor for electrical connections to ensure that the sensor is correctly wired before it can be powered on; The use fixed screw holes or magnets, as required by the site and machine installation space facilities, direct installation or additional protection or other mechanical use.

2、不锈钢钢丝绳安装时，需确保拉线处于平行于出线口拉出，避免钢丝绳被出线口反复摩擦导致断裂；(不锈钢索安装时，使钢索绳由出线口至移动部位机件工作处于平行滑动，保持较小角度(容许偏差正负3度)，以确保测量精度及钢索之寿命)。

2. When installing stainless steel wire ropes, it is necessary to ensure that the pulling wire is pulled out parallel to the outlet to avoid the wire rope being repeatedly rubbed by the outlet and causing it to break; When installing stainless steel cables, the steel cable should slide parallel from the outlet to the moving parts, maintaining a small angle (allowable deviation of plus or minus 3 degrees) to ensure measurement accuracy and the lifespan of the steel cable.

3、确保拉线处于平行于出线口拉出，保持较小角度(容许偏差 $\pm 3^\circ$) 以确保量测精度及钢索之寿命。钢索本体是多股不锈钢钢丝 SUS316 材质，外层为尼龙涂层，请勿让其受外力的割伤、烧损、撞击等不当之事发生：过量的粉尘、积屑或是足以破坏钢索的物品贮留于内部的滑轮或出线口将造成钢索破损，导致运转不顺的故障。

3. Ensure that the cable is drawn parallel to the outlet, and maintain a small Angle (allowable deviation $\pm 3^\circ$) to ensure measurement accuracy and cable life. The steel cable body is multi-strand stainless steel wire SUS316 material, the outer layer is nylon coating, do not let it be cut by external force, burn, impact and other improper things occur: excessive dust, debris accumulation or enough to damage the steel cable stored in the internal pulley or outlet will cause damage to the steel cable, resulting in bad operation of the fault.

4、若使用于非直线运动的机构，请加装适当的滑轮运转转向不同方向拉出；若使用于环境恶劣或特殊场合，请自行加装保护机构。

4. If it is used in the mechanism of non-linear movement, please install the appropriate pulley to run in different directions to pull out; If used in harsh environment or special occasions, please install your own protection mechanism.

5、8米及以上拉绳尺(L型拉绳尺) 为避免运输中传感器内部震动，装有锁止螺丝，使用前需拆除螺丝，拉绳才可顺畅拉出，若不拆除锁止螺丝，强行拉出拉绳，有可能会损坏拉绳尺。

5. In order to avoid the internal vibration of the sensor during transportation, the cable ruler of 8 meters or more (L-shaped cable ruler) is equipped with locking screws. The screws must be removed before use, so that the cable can be pulled out smoothly. If the locking screws are not removed and the cable is pulled out forcibly, the cable ruler may be damaged.

6、M机座及以下系列产品往复运动瞬间加速不可超过1000mm/秒；L机座及以上系列产品往复运动瞬间加速不可超过500mm/秒；否则将导致钢索断裂，恕本公司不承担正常使用范围以外的责任。

6. M frame and the following series of products reciprocating instantaneous acceleration shall not exceed 1000mm/ SEC; L The instantaneous acceleration of the reciprocating motion of the frame and above series products shall not exceed 500mm/ s; Otherwise, the cable will be broken, and the company will not assume the responsibility outside the normal use range.

7、拉绳位移传感器属于精密仪器，请勿敲击或撞击，注意传感器和钢丝绳的清洁，以延长使用寿命；(钢索本体是不锈钢，外覆耐磨防腐塑胶层，请勿让其受外力的割伤、烧损、撞击等不当之事发生；过量的粉尘、积屑会破坏钢索或贮留于内部的滑轮，或将造成钢索破损，导致运转不顺的故障)。

7. The rope displacement sensor is a precision instrument. Do not knock or impact it. Pay attention to the cleanliness of the sensor and wire rope to extend its service life; (The steel cable body is made of stainless steel and covered with a wear-resistant and anti-corrosion plastic layer. Do not let it be cut, burned, or hit by external forces. Excessive dust and debris can damage the steel cable or the pulleys stored inside, or cause damage to the steel cable, resulting in poor operation).

8、未安装于工作台或固定坐前，请勿用手或是其它产品将钢索拉出并让其瞬间自行弹回，此举将造成钢索断裂，伤害本体结构及人身安全；拉线拉出后不要松开，需匀速拉出和缩回。

8. Do not use your hands or other products to pull out the steel cable before installation on the workbench or in front of the fixed seat, and let it instantly rebound on its own. This will cause the steel cable to break, damage the structure and personal safety of the body; After pulling out the cable, do not loosen it. It needs to be pulled out and retracted at a constant speed.

注:若使用于室外或环境比较恶劣等特殊场合，可配置米朗防水防尘出线口和防护外壳，或请自行加装保护机构或与本公司联系定制加装保护机构，否则导致产品损坏，公司不予负责！

Note: If used in outdoor or harsh environments or other special occasions, Mirang waterproof and dustproof outlet and protective shell can be configured, or please install a protective mechanism yourself or contact our company to customize the installation of a protective mechanism. Otherwise, the company will not be responsible for product damage!

安装说明 Installation Instructions

(因公司产品型号较多，安装方式也较多，有滑动支架螺丝安装式、固定螺丝孔安装式、磁吸式等)，以下为常见的滑动支架螺丝安装式举例说明：

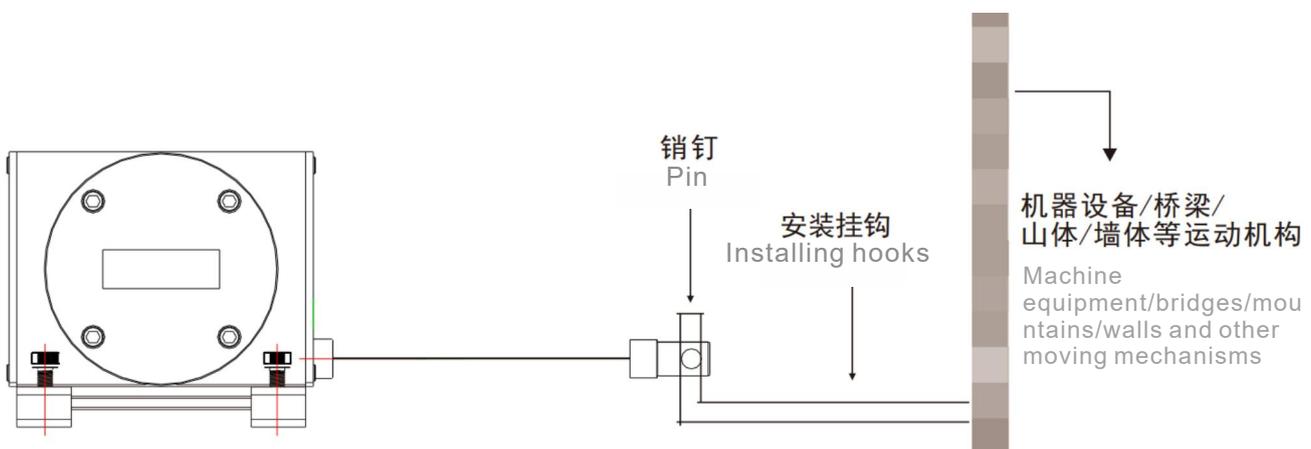
(Due to the variety of product models and installation methods in the company, there are sliding bracket screw installation, fixed screw hole installation, magnetic suction installation, etc.) The following are common examples of sliding bracket screw installation:

1.先固定安装支架：将安装支架顺着传感器底部凹槽滑入，然后调整支架的位置，将螺丝插入安装孔固定在安装面；

1. Fix the mounting bracket first: slide the mounting bracket along the groove at the bottom of the sensor, then adjust the position of the bracket, insert the screw into the mounting hole and fix it on the mounting surface;

2.测量端做L型销钉或者螺丝插入传感器安装头5mm的孔中固定传感器测头（或其它可靠连接方式）

2. Insert an L-shaped pin or screw into the 5mm hole of the sensor mounting head at the measuring end to fix the sensor measuring head (or other reliable connection methods)



产品特性 Product Feature

产品外壳材质大部分为高性能工业铝合金，表面氧化处理，表面氧化的颜色可以定制，美观大方，并且具有防静电，抗干扰，不导电等特点。

The shell material of the product is mostly high-performance industrial aluminum alloy, surface oxidation treatment, the color of surface oxidation can be customized, beautiful and generous, and has the characteristics of anti-static, anti-interference, non-conductive

电阻输出的拉绳位移传感器，600mm及600mm以下量程默认电阻值为5KΩ，600mm以上量程电阻值默认为10KΩ（600mm以上的拉绳位移传感器如果需要电阻值为5KΩ，下单时需提前备注）。拉绳位移传感器所使用的钢丝绳为多股不锈钢钢丝SUS316材质，外层为尼龙涂层，M型及以下外形尺寸默认使用0.8mm线径的钢丝绳，L型及以上尺寸默认使用1.5mm线径的钢丝绳；M型及以下外形尺寸也可以备注使用线径1.5mm的钢丝绳，但是外形尺寸不变的情况下，钢丝绳线径变粗，可做的最大量程也会相应的缩短，以M型拉绳尺举例，使用线径0.8mm的钢丝绳，最大量程可做到4000mm，若使用线径1.5mm的钢丝绳，则最大量程只能做到2000mm。

The default resistance of the cable displacement sensor output resistance is 5KΩ for ranges shorter than 600mm, and 10KΩ for ranges longer than 600mm.(If the resistance of the cable displacement sensor larger than 600mm is 5KΩ, Note in advance when placing an order.)The steel wire rope used by the pull rope displacement sensor is made of multi-strand stainless steel wire SUS316, the outer layer is nylon coated, the steel wire rope of 0.8mm wire diameter is used by default in the shape size of M type and below, and the steel wire rope of 1.5mm wire diameter is used by default in the shape size of L type and above. M type and the following dimensions can also be noted to use wire rope with wire diameter of 1.5mm, but if the outline size remains unchanged, the wire rope diameter becomes thicker, and the maximum measuring range that can be made will be shortened accordingly. For example, using wire rope with wire diameter of 0.8mm, the maximum measuring range can be 4000mm. If wire rope with wire diameter of 1.5mm is used, the maximum measuring range can be 2000mm. The maximum range can only be 2000mm.

不同外形尺寸的拉绳位移传感器，能做的最大量程均有所不同，例如LPS-S型的拉绳尺，量程范围是100-1300mm之间量程任意可选，最小量程可做到100mm，即测量范围是0-100mm；最大量程可做到1300mm，即测量范围是0-1300mm。可以根据客户的需要定做。

Different dimensions of the rope displacement sensor, can do the maximum range are different, such as LPS-S type of rope ruler, the range is 100-1300mm range optional, the minimum range can be 100mm, that is, the measurement range is 0-100mm; The maximum range can be 1300mm, that is, the measuring range is 0-1300mm. Can be customized according to customer needs.

专业术语 Terminology

传感器/编码器的精度主要包含线性精度、分辨率和重复精度这三个参数。这三个参数，一般都是取多次测量之后的最大值为依据。线性精度、分辨率和重复精度是传感器/编码器性能的三个重要指标。高分辨率并不直接等同于高精度，因为高分辨率只是表示传感器/编码器能够区分更多的单位，但并不保证每个单位的测量都准确。

The accuracy of the sensor/encoder mainly includes three parameters: linearity accuracy, resolution and repetition accuracy. These three parameters are generally based on the maximum value after multiple measurements. Linear accuracy, resolution and repeatability are three important indicators of sensor/encoder performance. High resolution is not directly equivalent to high precision, because high resolution simply means that the sensor/encoder can distinguish more units, but does not guarantee that every unit of measurement is accurate.

线性精度:

是指输出值与真实值之间的差异，即传感器/编码器检测到的位置与实际位置之间的偏差。计算方法为：线性精度 = (理论值 - 实际测试值) ÷ 满量程 × 100%。

Linear accuracy : Refers to the difference between the output value and the true value, that is, the deviation between the position detected by the sensor/encoder and the actual position. The calculation method is: linear accuracy = (theoretical value - actual test value) ÷ full scale × 100%.

分辨率:

是指传感器/编码器能够区分的最小单位，例如：一个电位计原理模拟量输出的位移传感器，其分辨率是无限小的；一个磁致伸缩原理输出的位移传感器，其分辨率受波导丝材料、内部芯片和电路处理等因素，其分辨率大概为0.01mm；一个单圈2000个脉冲输出的增量式编码器，那编码器的轴转动一圈输出为2000个脉冲，其分辨率为2000P/R；一个单圈12位的绝对值编码器可以将360度分为4096等份；以12位芯片举例，12位即为 $2^{12}=4096$ ，量程/4096=分辨率，例如2000mm量程RS485信号输出的拉绳位移传感器，分辨率为 $2000/4096=0.48\text{mm}$ 。如果选用16位芯片，16位即为 $2^{16}=65536$ ，量程/65536=分辨率，例如2000mm量程RS485信号输出的拉绳尺位移传感器，分辨 $2000/65536=0.03\text{mm}$ 。拉绳位移传感器默认分辨率为12位，可选16位。

Resolution ratio : Refers to the sensor/encoder can distinguish the smallest unit, for example: a potentiometer principle analog output of the displacement sensor, its resolution is infinitely small; A magnetostrictive principle output displacement sensor, its resolution depends on the waveguide wire material, internal chip and circuit processing and other factors, its resolution is about 0.01mm; An incremental encoder with 2000 pulse output per turn, the shaft of the encoder rotates one turn to output 2000 pulses, and its resolution is 2000P/R; A single-turn 12-bit absolute encoder can divide 360 degrees into 4096 equal parts; Take 12-bit chip as an example, 12-bit is $2^{12}=4096$, range /4096= resolution, for example, 2000mm range RS485 signal output rope displacement sensor, resolution is $2000/4096=0.48\text{mm}$. If the 16-bit chip is selected, the 16-bit is $2^{16}=65536$, range /65536= resolution, for example, the drawstring ruler displacement sensor with 2000mm range RS485 signal output has a resolution of $2000/65536=0.03\text{mm}$. The default resolution of the cable displacement sensor is 12 bits (optional: 16 bits).

重复精度:

是指在同一实际位置，传感器/编码器在后续在这个实际位置时候取得的不同测量值之间的误差。

Repeated accuracy : It refers to the error between different measurement values obtained by the sensor/encoder at the same actual position in the future.

影响传感器/编码器精度的因素:

传感器/编码器的精度不仅仅取决于其自身的精度和分辨率，还受到其他因素的影响。例如，机械结构的设计、伺服电机的性能、伺服驱动器的性能、运动控制器的性能以及环境温度等都会影响传感器/编码器的最终精度。因此，在选择和使用传感器/编码器时，需要综合考虑这些因素，以确保系统的整体性能。

Factors affecting sensor/encoder accuracy : The accuracy of the sensor/encoder depends not only on its own accuracy and resolution, but also on other factors. For example, the design of mechanical structure, the performance of servo motor, the performance of servo driver, the performance of motion controller, and the ambient temperature will affect the final accuracy of the sensor/encoder. Therefore, when selecting and using sensors/encoders, these factors need to be taken into account to ensure the overall performance of the system.

关于脉冲输出 About Pulse Output

由于脉冲信号输出的拉绳传感器所选配的编码器种类较多，供电电压和产品的分辨率会有所不同。具体供电电压及接线定义以产品实物标签上标注为准（通常为8-30V宽电压，但也有部分型号为5V电压，接入其他电压可能会导致烧坏）。

Because there are many types of encoders available for pulse-signal output rope sensors, the supply voltage and product resolution will be different. The specific supply voltage and connection definition are subject to the label of the product (usually 8-30V wide voltage, but some models are 5V voltage, and other voltages may cause burnout).

由于行程不同所以主体尺寸大小会不同，因此其内部的线轮外径也不同，这些线轮转一圈就相当于编码器转一圈，拉绳是盘绕在线轮上的，拉绳拉出一点，线轮就会转动一点，所以拉绳的拉出位移分辨率与拉绳尺尺寸大小和选择装配的编码器种类有关（部分标准请参考下表），拉绳尺具体分辨率以产品实物标签上标注的分辨率为准，或者提前咨询我司业务员及技术人员确认。

Due to the different travel so the main size will be different, so its internal wire wheel outside diameter is different, these wire wheel turn a circle is equivalent to the encoder turn a circle, the rope is coiled on the online wheel, the rope pulls out a little, the wire wheel will turn a little, Therefore, the pull out displacement resolution of the rope is related to the size of the rope ruler and the type of encoder selected for assembly (please refer to the following table for some standards), the specific resolution of the rope ruler is determined by the resolution marked on the product physical label, or consult our salesman and technical personnel in advance to confirm.

编码器每圈脉冲数越高，精度会越好，但并不是越高越实用，具体要看客户的PLC的接收脉冲信号的速度，如果脉冲数过高，拉绳运动速度过快，PLC未必能高速采集到所有脉冲信号，如PLC采集速度较慢，就会导致数据失真，会漏掉脉冲数。所以要选用适当的编码器才行，目前我司的标准默认使用的编码器标准为每圈2000个脉冲的，如有其他需求，也可以更改）。

The higher the number of pulses per turn of the encoder, the better the accuracy, but not the higher the more practical, the specific depends on the speed of the customer's PLC to receive the pulse signal, if the pulse number is too high, the rope movement speed is too fast, the PLC may not be able to collect all the pulse signals at high speed, such as the PLC acquisition speed is slow, it will lead to data distortion, will miss the number of pulses. Therefore, it is necessary to choose the appropriate encoder, the current standard of our company default encoder standard is 2000 pulses per circle, if there are other needs, can also be changed).

拉绳位移传感器（脉冲输出）参数 Rope displacement sensor (pulse output) reference data			
检测方式 Detection	增量型 Incremental	最大响应频率 Maximum response frequency	10kHz~50kHz
输出波形 Output waveform	脉冲方波 Pulse square wave	波形上下时间 Waveform up and down time	≤2
输出相 Output phase	AB相或ABZ相 AB phase or ABZ phase	工作温度 Operating temperature	-10°C~65°C
相位差 Phase difference	A、B相异90° A. B phase 90°		
	C+45°(T/4+T/8), Z相T+T/2 C+45° (T/4+T/8), Z phase T+T/2		

下表为2000脉冲数拉绳位移传感器分辨率参数，其他常用编码器有600、1000、2000、2500、3600等脉冲数，具体参数请联系我们咨询。

计算分辨率的时候，用：(线轮的直径+线的直径)*3.1415926/2000得出的就是分辨率了(其中2000代表采用的编码器每圈脉冲数为2000个脉冲的，如果采用的编码器每圈脉冲数是其他，就将2000改为其他数即可)。

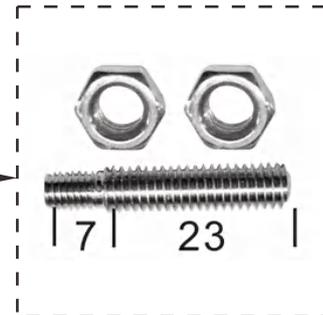
The following table is the resolution parameters of the 2000 pulse number rope displacement sensor, other commonly used encoders have 600, 1000, 2000, 2500, 3600 and other pulse numbers, please contact us for specific parameters. When calculating the resolution, use: (the diameter of the wire wheel + the diameter of the line) * 3.1415926 / 2000 to obtain the resolution (2000 represents the number of pulses per turn of the encoder for 2000 pulses, if the number of pulses per turn of the encoder is other, 2000 can be changed to other numbers).

型号 Model	分辨率/解析 Resolution/resolution
LPS-S型 LPS-S type	0-1000mm: 0.05mm/P; 1000-1300mm:0.065mm/P
LPS-M型 LPS-M type	1000-4000mm:0.1mm/P
LPS-L型 LPS-L type	4000-6000mm: 0.15mm/P; 6000-10000mm:0.2mm/P

⚡ 拉绳尺拉线端接头选择标准 Standard for selection of cable end joint



标配
Standard configuration



可在标配基础上另选配：
M5内牙转M6外牙接头
Available on the basis of standard:
M5 inner tooth to M6 outer tooth connector



选配
(G: 标准挂扣式接头)
Selective assembly
(G: Standard hook connector)



选配
(G1: 挂扣式接头)
Selective assembly
(G1: indicates a hanging connector)

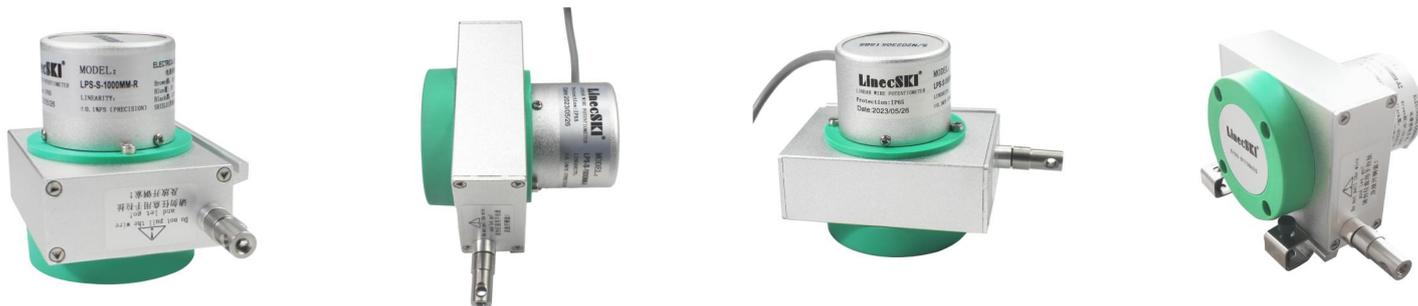


选配
(G2: 挂扣式接头)
Selective assembly
(G2: indicates a hanging connector)

LPS-S/M/L 拉绳位移传感器

产品实物图 Physical Products Pictures

LPS-S



LPS-M



LPS-L



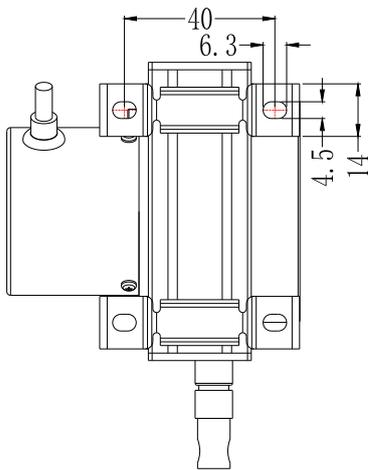
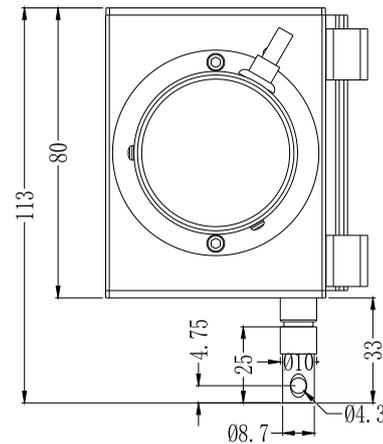
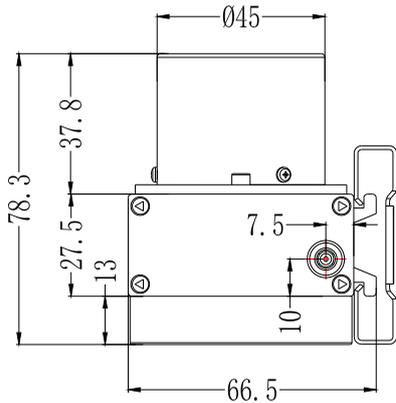
技术参数 Technical Parameter

项目规格 Project specifications	内容 Content	备注 Notes
量程 Measurement range	S:100-1300mm; M:1000-4000mm; L:4500-10000mm	
电源电压 Supply voltage	DC 5V ~ DC 10V (电阻输出型) DC 5V~DC 10V(Resistance output type) DC12V ~ DC24V (电压/电流/RS485) DC12V~DC24V(Voltage/Current/RS485)	波动 5%以下 Fluctuation below 5%
供应电流 Supply current	10mA ~ 35mA	
输出信号 Output signal	电阻输出型: 5kΩ Resistance output type: 5kΩ 电压输出型: 0-5V, 0-10V Voltage output type: 0-5V, 0-10V 电流输出型: 4-20mA (2 线制/3 线制/4线制) Current output type: 4-20mA (2-wire/3-wire/4-wire) 数字信号输出型: RS485 Digital signal output type: Rs485 脉冲输出型: A B Z Pulse output type: A B Z	
线性精度 Linear accuracy	±0.25%FS ~ ±0.3%FS (脉冲信号输出的根据客户选配的不同单圈脉冲数的编码器而定) (The output of the pulse signal is determined by the encoder selected by the customer for different single cycle pulse counts)	
重复性 Repeatability	±0.05%FS	
分辨率 Resolution	无断解析 Uninterrupted parsing (脉冲信号输出的根据客户选配的不同单圈脉冲数的编码器而定) (The output of the pulse signal is determined by the encoder selected by the customer for different single cycle pulse counts)	
线径规格 Wire diameter specification	直径0.8mm的多股不锈钢丝SUS316L材质, 外层为尼龙涂层, 负载为16kg 0.8mm diameter multi strand stainless steel wire SUS316L material, with an outer layer of nylon coating and a load of 16kg	
防护等级 Protection grade	IP65(只适用于外壳) IP65(ENCLOSURE ONLY)	
震动 Vibration	10Hz to 2000Hz	
工作温度 Operation temperature	-20°C ~ +75°C(低温状态下, 需保持无结晶状态; 涂抹防冻液最低工作温度可达-35°C; 脉冲输出工作温度为-10°C~65°C) -20°C~+75°C (at low temperature, it should be kept in a non-crystalline state; The minimum working temperature of applying antifreeze can reach -35°C; Pulse output operating temperature is -10°C~65°C)	

安装尺寸 Installation Dimensions

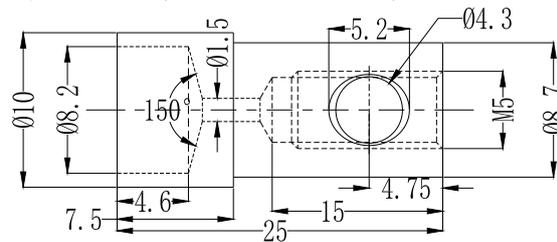
LPS-S

量程范围 Range of measurement (100-1300mm)



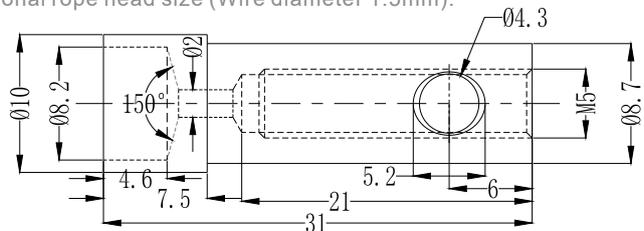
默认拉绳头尺寸 (线径0.8mm) :

Default rope head size (Wire diameter 0.8mm):



可选拉绳头尺寸 (线径1.5mm) :

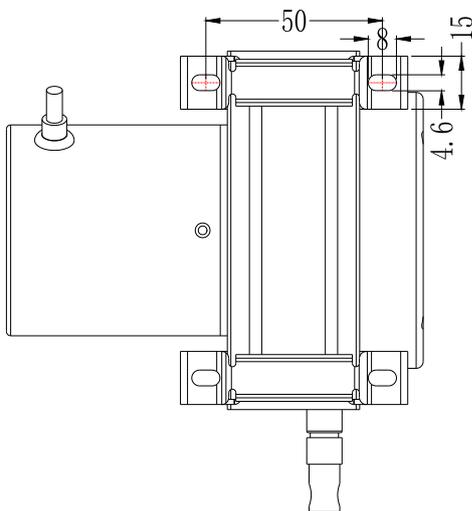
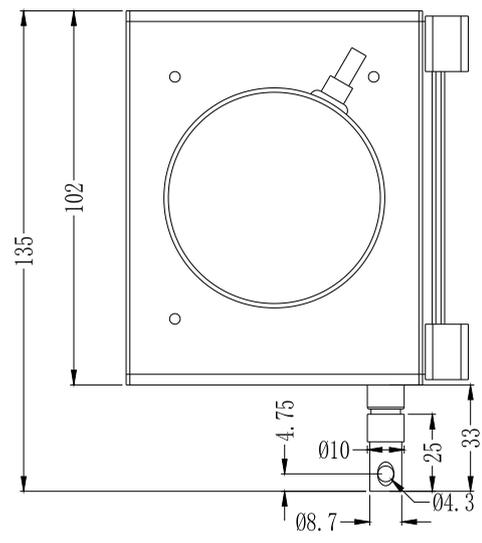
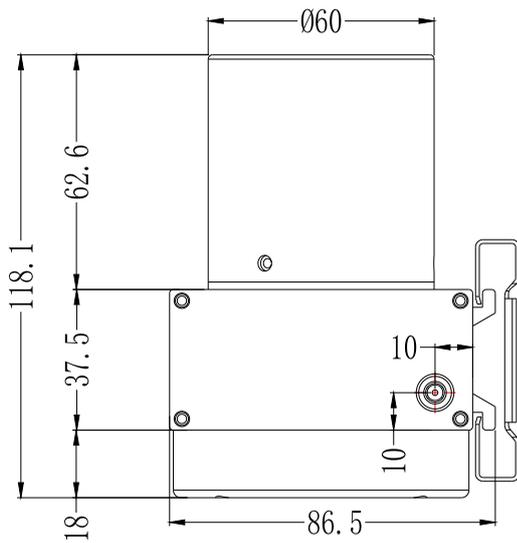
Optional rope head size (Wire diameter 1.5mm):



安装尺寸 Installation Dimensions

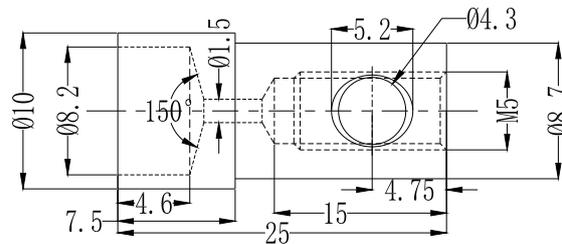
LPS-M

量程范围 Range of measurement (1000-4000mm)



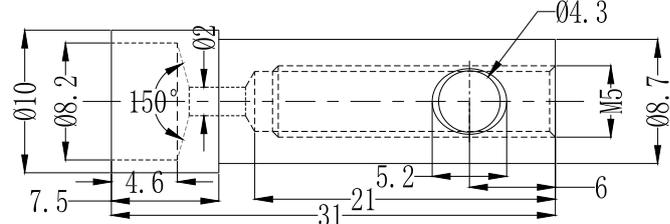
默认拉绳头尺寸 (线径0.8mm) :

Default rope head size (Wire diameter 0.8mm):



可选拉绳头尺寸 (线径1.5mm) :

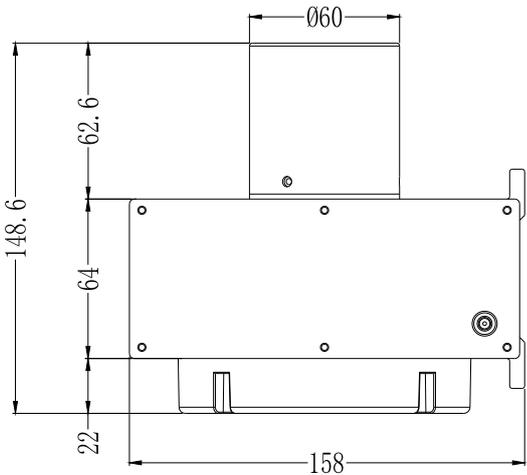
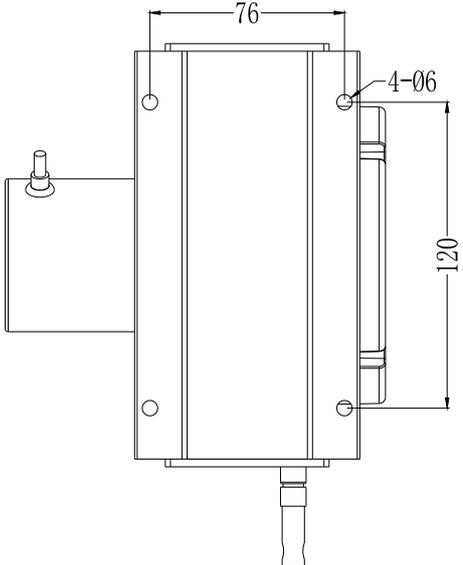
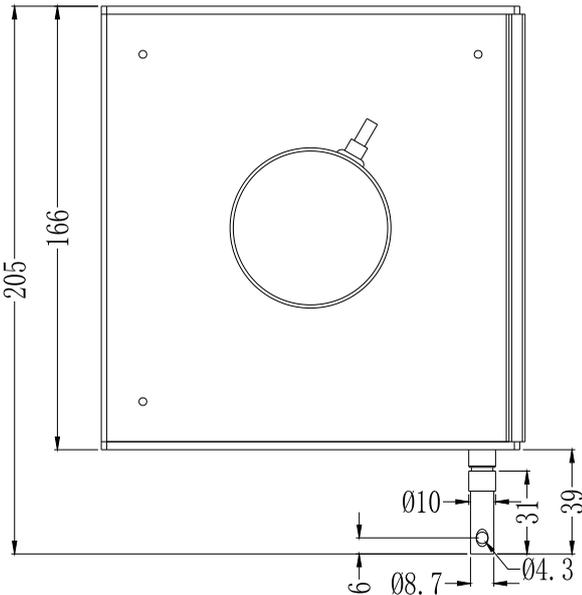
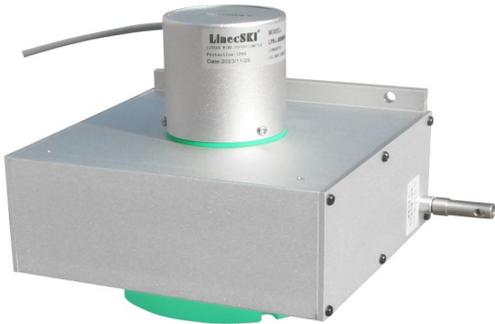
Optional rope head size (Wire diameter 1.5mm):



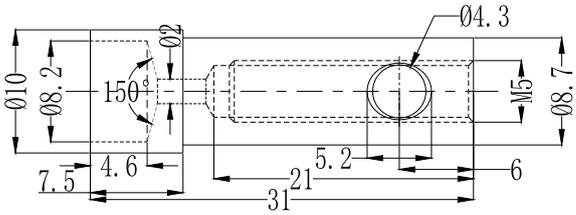
安装尺寸 Installation Dimensions

LPS-L

量程范围 Range of measurement (4500-10000mm)



默认拉绳头尺寸 (线径1.5mm) :
Default rope head size (Wire diameter 1.5mm):



产品概述 Product Overview

拉绳位移传感器，又称拉绳编码器，拉绳尺，拉线尺，拉线编码器，拉线位移传感器，是直线位移传感器在结构上的精巧集成，充分结合了角度传感器和直线位移传感器的优点，成为一款结构紧凑、测量行程长、安装空间尺寸小、具有高精度测量的优良传感器。

该系列产品具有很大的选择空间，行程从 100mm 至 10000mm 不等，具有模拟电流信号 mA: 4-20mA，模拟电压信号 V1: 0-5V, V2: 0-10V，脉冲信号 P: A、B、Z 相数字输出，RS485 数字信号输出等；满足大行程、高精度各种信号需求。S 机座和 M 机座系列产品往复运动的瞬间加速不可超过 1 米/秒；L 机座系列产品往复运动的瞬间加速不可超过 0.5 米/秒；否则将导致钢索断裂。

The rope-pulling displacement sensor, also called the rope-pulling encoder, the rope-pulling ruler, the rope-pulling encoder, the rope-pulling displacement sensor, is the exquisite integration of the linear displacement sensor in the structure, it combines the advantages of angle sensor and linear displacement sensor, and becomes an excellent sensor with compact structure, long measuring stroke, small size of installation space and high precision measurement. The range of products is from 100mm to 10000mm, with analog current signal mA: 4-20mA, analog voltage signal V1:0-5V, V2:0-10V, pulse signal P: A, B, Z phase digital output, RS485 digital signal output. To meet the needs of large-stroke, high-precision signals. The instantaneous acceleration of the reciprocating motion of the S-size and M-size products should not exceed 1 m/s, and the instantaneous acceleration of the reciprocating motion of the L-size and XL-size products should not exceed 0.5 m/s Otherwise the cable will break.

产品细节 Product Details

1米信号专用屏蔽线
One meter signal
dedicated shielded wire



铝合金外壳轻巧美观
防腐防锈,密封性好

The aluminum alloy shell is lightweight, beautiful, anti-corrosion, and rust proof, with good sealing performance



信号稳定抗干扰进口核心元件
Signal stability and anti-interference imported core components

多功能拉绳头可接多种牵引头
The multifunctional drawstring head can be used for various types of traction



高品质钢丝绳
五百万次以上往复
寿命长

High quality wire rope, more than five million times reciprocating, long life



应用范围 Application Scope



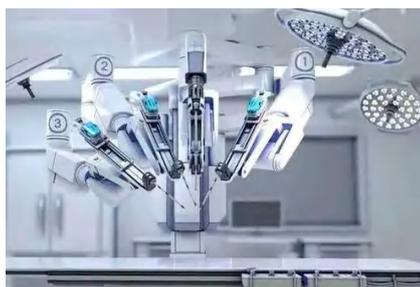
● 闸门开度控制
Gate Opening Control



● 建筑健康监测
Building Health Monitoring



● 液压机
Hydraulic Press



● 工业机器人
Industrial Robots



● 纺织机械
Textile Machinery



● 桥梁与大坝监测
Bridge And Dam Monitoring



● 石油钻井设备
Oil Drilling Equipment



● 空气压缩机
Air Compressor



拉绳位移传感器应用场所极多，随着核心技术的发展，拉绳位移传感器得到越来越广泛的应用。适合应用于工厂、山体、铁路、隧道、船业、机械、建筑业、医疗事业、桥梁铺设、水坝建设、汽车行业、核工业和航空航天事业等。

With the development of the core technology, the rope displacement sensor is used more and more widely. It is suitable for factories, mountains, railways, tunnels, ships, machinery, construction, medical industry, bridge laying, dam construction, automobile industry, nuclear industry and aerospace industry.



辐射全国 放眼世界

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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