米朗 MIRAN®

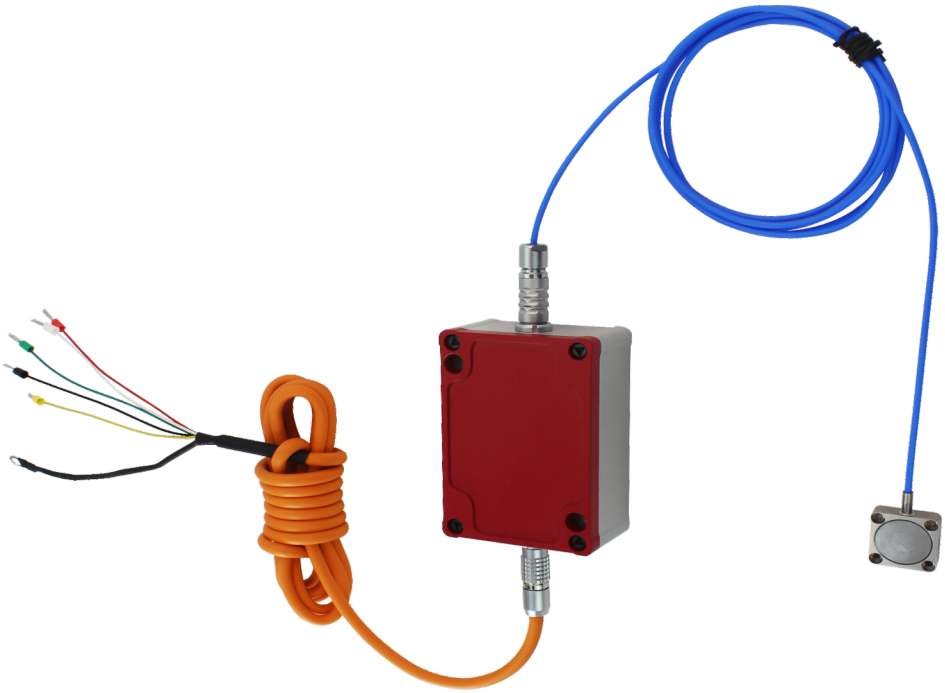
中国工信部高精度传感器一条龙应用计划示范项目

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

高精度电容式位移传感器

High-precision capacitive displacement sensor



高精度电容式位移传感器

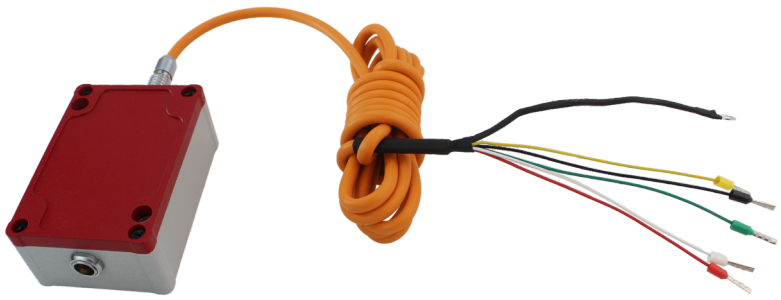
High-precision capacitive displacement sensor

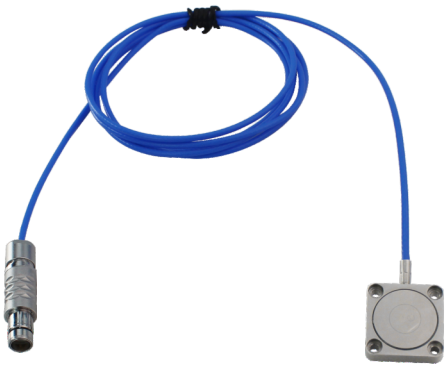
- Demonstration project of one-stop application plan for high-precision sensors of Ministry of Industry and Information Technology of China
- National level specialized and special new "little giant" enterprise, national level high-tech enterprise
- Key products of strong industrial base in China, demonstration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

高精度电容式位移传感器

High-precision capacitive displacement sensor

产品实物图 Product Picture





产品概述 Product Overview

电容式位移传感器具有非接触、高精度、纳米级分辨率、响应快、抗干扰能力强等优势，可对各类导电材料进行检测。它通过感知探头与被测导体间的电容变化，将微小位移与形变转化为电信号，实现亚纳米级分辨率与亚微米级线性度测量，广泛用于位移、位置及厚度检测，是半导体、精密制造、航空航天等领域极端工况下精密测控的关键器件。

Capacitive displacement sensors have the advantages of non-contact, high precision, nanometer-level resolution, fast response, and strong anti-interference ability. They can be used to detect various conductive materials. By sensing the change in capacitance between the probe and the measured conductor, it converts minute displacements and deformations into electrical signals, achieving sub-nanometer resolution and sub-micrometer linearity measurement. It is widely used in displacement, position, and thickness detection, and is a key component for precise measurement and control in extreme conditions of semiconductor, precision manufacturing, aerospace and other fields.

产品特点Product Features

1. 非接触测量：避免对被测物体造成损伤或干扰。
1.Non-contact measurement: Avoid causing damage or interference to the object being measured.

2. 对导电和非导电物体的距离与厚度测量。
2.Measurement of distance and thickness of conductive and non-conductive objects.

3. 无与伦比的高精度和稳定性，分辨率可达纳米级。
3.Unparalleled high precision and stability, with a resolution reaching the nanometer level.

4. 高频响应：适合动态振动测量。
4.High-frequency response: Suitable for dynamic vibration measurement.

5. 适用于工业环境、电磁场和真空环境内。
5.It is applicable in industrial environments, electromagnetic fields and vacuum environments.

6. 对材质敏感：需考虑被测物导电性、环境温湿度及电场干扰。
6.Material sensitivity: The conductivity of the object being tested, environmental temperature and humidity, and electric field interference need to be taken into consideration.

产品型号选型 Product Model Selection

MLC - □□mm - □ - □ - □

- MLC：米朗科技 电容式位移传感器 Miran technology capacitive displacement sensor
- □□mm：可选量程：Optional range: (1mm，2mm，3mm，5mm，10mm)
- □：
  - V1:0-5V 输出 V1:0-5V output
  - V2:0-10V 输出 V2:0-10V output
  - V3:±5V 输出 V3:±5V output
  - V4:±10V 输出 V4:±10V output
  - A:4-20mA 输出 A:4-20mA output
  - R:RS485输出 R:RS485 output
- □：
  - F:方形探头 F:square probe
  - Y:圆柱形探头 Y:cylindrical probe
- □：P:方形电子仓航空插头出线 P:Square electronic cabin aviation plug output

例如Example:

MLC-3mm-V1-F-P：米朗科技电容式位移传感器，量程为3mm，0-5V输出，方形探头，方形电子仓航空插头出线。

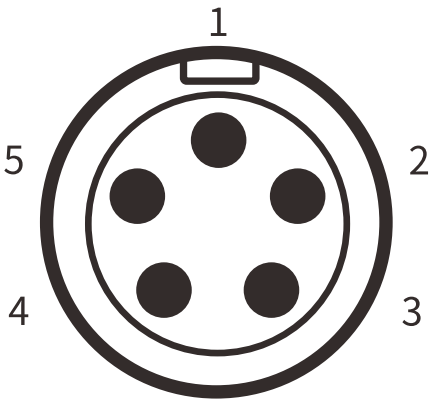
MLC-3mm-V1-F-P: Capacitive displacement sensor from Milang Technology, with a measurement range of 3mm, 0-5V output, square probe, square electronic housing and aviation plug output.

性能参数Performance Parameters

性能指标Performance indicators

型号 Model Number	MLC电容式位移传感器 MLC capacitive displacement sensor				
标准测量量程 Standard measurement range	1mm	2mm	3mm	5mm	10mm
可压缩/扩展量程 Compressible/expandable measurement range	0.5mm/2mm	1mm/4mm	1.5mm/6mm	2.5mm/10mm	5mm/20mm
线性度 Linearity	≤±0.07%FS	≤±0.05%FS	≤±0.03%FS	≤±0.06%FS	≤±0.2%FS
最小目标直径 Minimum target diameter	Φ11mm	Φ17mm	Φ24mm	Φ40mm	Φ60mm
分辨率 Resolution	<0.002%FS / RS485:16bit				
重复性 Repetition	≤±0.005%FS				
温度稳定性 Temperature stability	0.02%/℃				
输出方式 Output method	0-5V/0-10V/±5V/±10V/4-20mA/RS485				
响应频率 Response frequency	1KHz(-3dB)				
工作电压 Working voltage	+9～36VDC				
工作电流 Working current	+24V供电时：电流＜75mA；电压＜55mA；RS485<50mA When powered by +24V: Current < 75mA; Voltage < 55mA; RS485<50mA				
探头工作温度 Probe operating temperature	-50°C～+200°C				
控制器工作温度 Controller operating temperature	-20°C～+80°C				
工作电压 Working voltage	IP65				

电气连接Electrical Connection

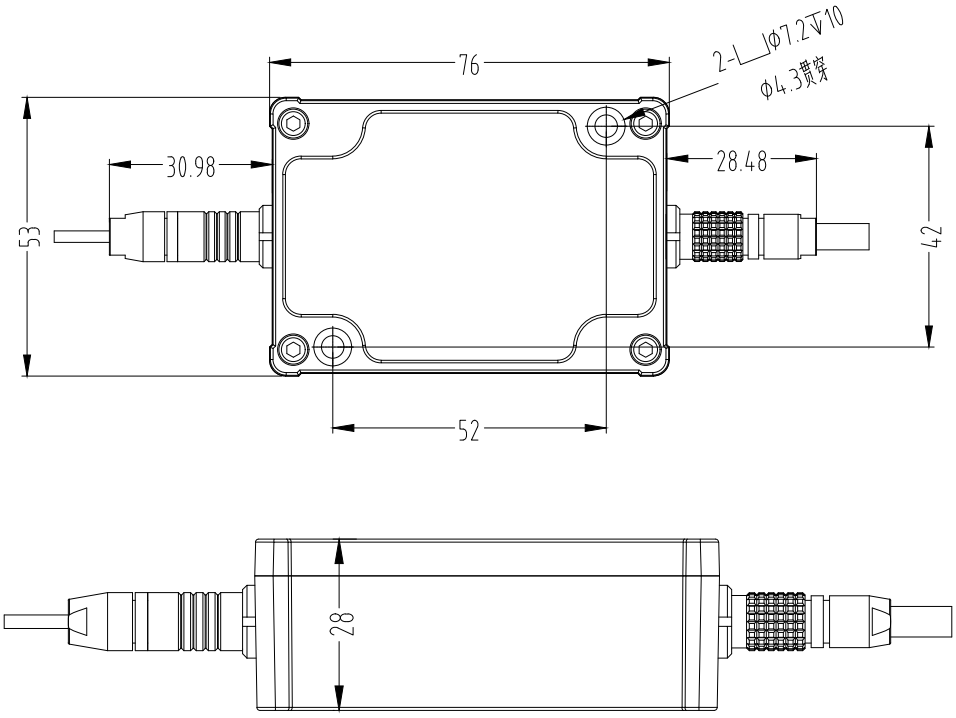


从孔的方向看
From the perspective of the hole

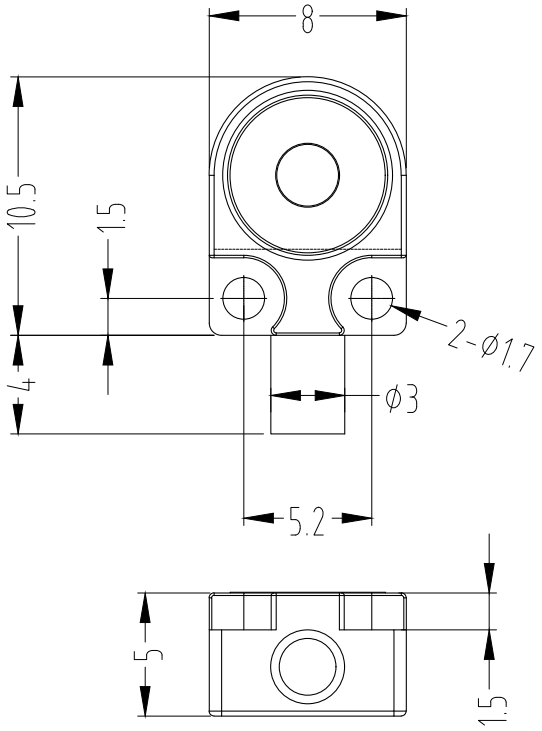
①红色red	电源正极(+) positive pole (+)
②黑色black	电源负极(-) negative pole (-)
③绿色green	RS485 A+
④白色white	RS485 B-
⑤黄色yellow	模拟量输出analog output

产品尺寸图Product Dimension Drawing

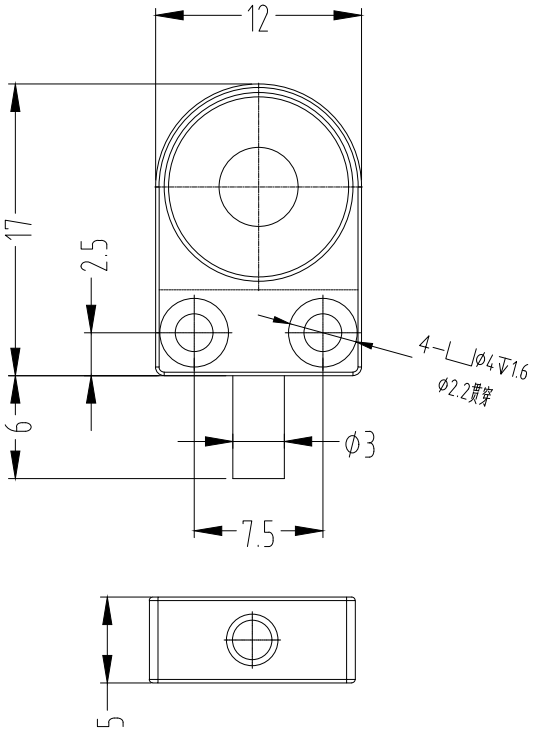
电子仓安装尺寸
Installation dimensions of the electronic warehouse



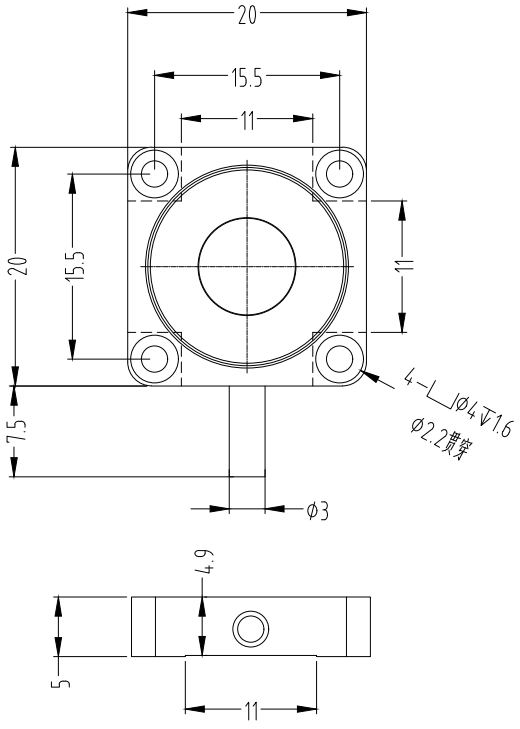
方形探头尺寸
Square probe size



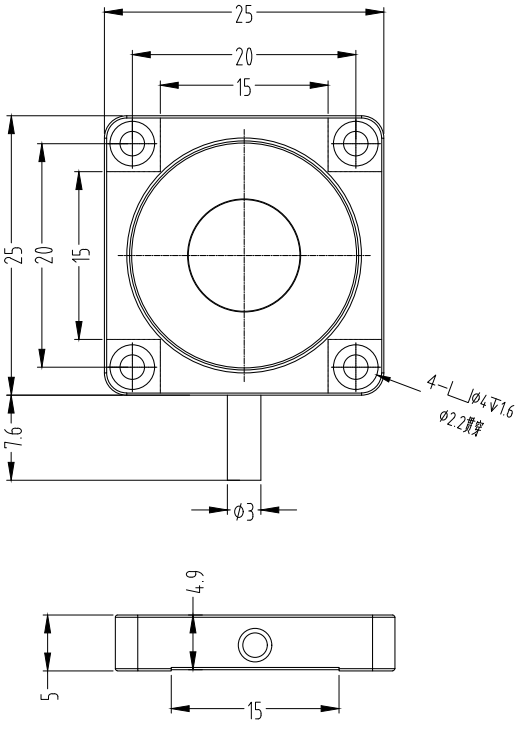
行程0.2mm-0.5mm
Stroke: 0.2mm-0.5mm



行程1mm-1.2mm
Stroke: 1mm-1.2mm

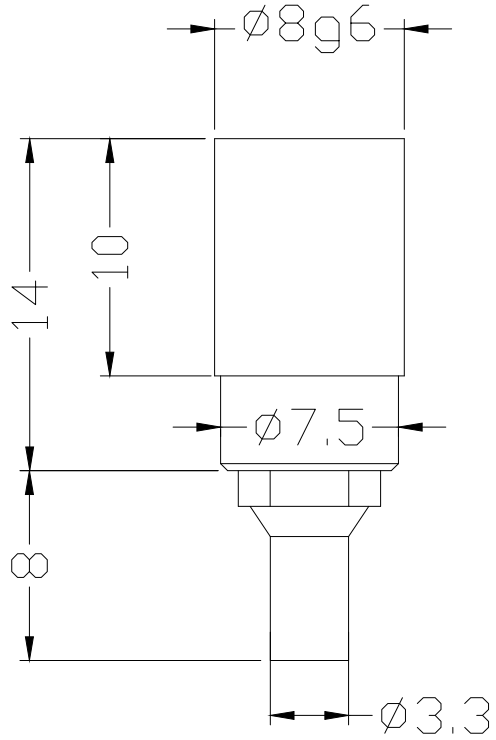


行程2mm
Stroke: 2mm

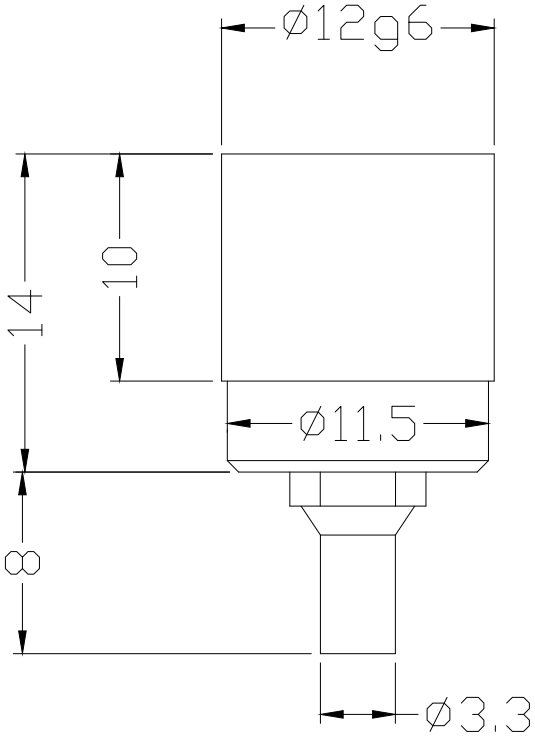


行程3mm
Stroke: 3mm

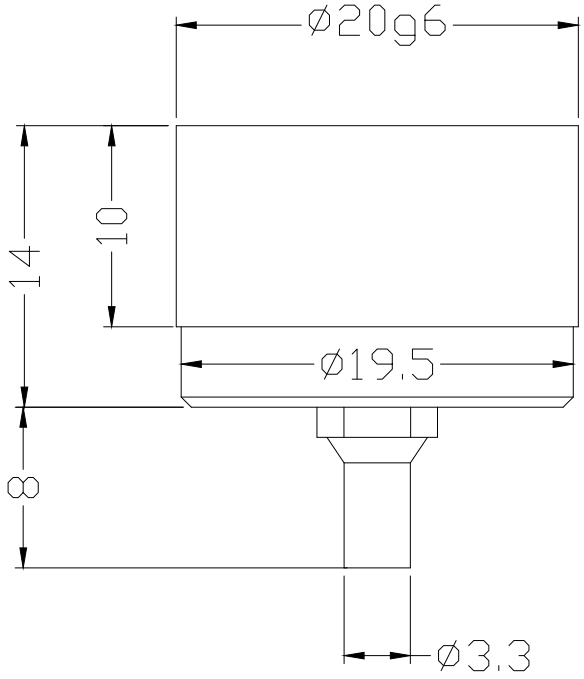
圆柱形探头尺寸
Cylindrical probe size



行程0.2mm-0.5mm
Stroke: 0.2mm-0.5mm

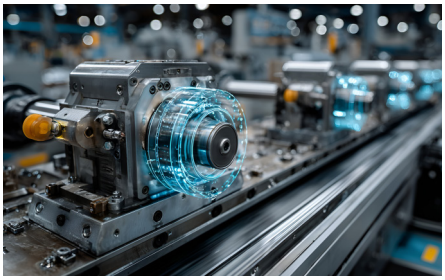


行程1mm-1.2mm
Stroke: 1mm-1.2mm

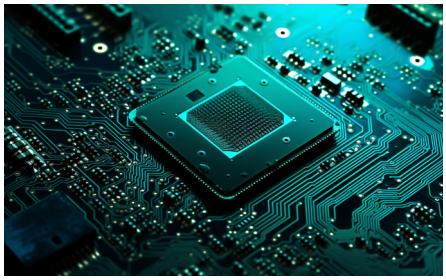


行程2mm
Stroke: 2mm

应用领域Areas of application



• 精密制造与质量检测
Precision manufacturing and quality inspection



• 微电子与MEMS技术
Microelectronics and MEMS technology



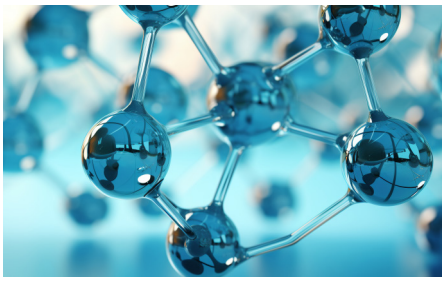
• 科学研究与实验室
Scientific research and laboratory



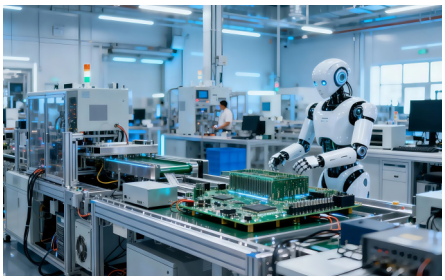
• 航天航空
Aerospace



• 汽车工业
Automobile industry



• 医疗与生物工程
Medical and bioengineering



• 工业自动化与机器人
Industrial Automation and Robotics



• 新能源与重型工业
New energy and heavy industry

• • •

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辐射全国 放眼世界

Radiate to the whole country and see the world

质量第一 Quality First

用户至上 Customer First

诚信为本 Credit First

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（尤其是在尺寸方面要求特别严格的，或者在产品实物没收到之前，就要先在自己设备上加工做好安装孔位和确定安装空间位置的，要特别注意,要在购买前3天内与我们书面再次确认好产品的实际尺寸，以免造成不必要的返工等损失，若没有在购买前3天内与我们书面确认尺寸而造成后续安装困难等损失，我司不予承担，最终尺寸要以产品实物为准。）

将致力于位移、物位、角度等测控领域

Will be committed to the field of displacement, level, angle measurement and control

为客户提供一站式解决方案的产品与服务

Products and services that provide one-stop solutions for our customers

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20260901 - Capacitive displacement sensor brochure

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Main author: Wang designer

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