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

磁栅尺

Magnetic Railing Ruler

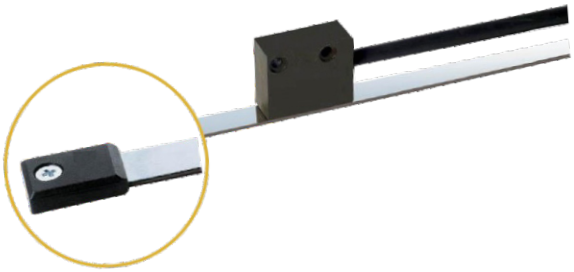












磁栅尺系列（绝对值输出、增量型输出）

Magnetic scale series (with absolute value output and incremental output)

- 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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MR50W微型绝对值式磁栅尺
MR50W Micro Absolute Magnetic Encoder

产品实物图Product Picture

MR50W微型绝对值式磁栅尺（行程0-256mm）
MR50W Micro Absolute Magnetic Encoder (travel range: 0-256mm)





MSW微型绝对值式磁条
MSW Micro Absolute Value Magnetic Strip







产品特点Product Features

1.双码道绝对值磁栅尺编码器。
1. Double-code channel absolute value magnetic scale encoder.

2.小安装尺寸。
2. Small installation size.

3.高精度。
3. High precision.

4.速度可达5m/s。
4. The speed can reach 5 meters per second.

5.支持CAN总线。
5. Supports CAN bus.

产品型号选型Product Model Selection

MR50W微型绝对值式读头选型 MR50W Micro Absolute Value Read Head Model Selection

MR50W – J – □ – □ – 33

- MR50W：微型磁栅尺系列 Micro magnetic scale series
- J：J:绝对值式 J: Absolute type
- □：量程(mm) Range (mm)
- □：输出信号选择 C:can Output Signal Selection C:can
- 33：读头外壳选择 33:长*宽*高(33*15*15) Read head housing selection 33: L* W*H (33*15*15)

例如Example:

MR50W-J-100mm-C-33：米朗科技微型绝对值式磁栅尺，量程为100mm，输出信号can，读头外壳33(L33*W15*H15mm)。

MR50W-J-100mm-C-33: Miran Technology's micro absolute value magnetic encoder, with a measurement range of 100mm, output signal can, and the reading head housing is 33 (L33*W15*H15mm).

MSW微型绝对值式磁条选型 MSW Micro Absolute Value Magnetic Strip Selection

MSW – □ – □

- MSW：磁条型号 Magnetic stripe
- □：量程(mm) Range (mm)
- □：磁条总长度(mm) 默认磁条总长度算法:量程+8mm(8mm为芯片的占用宽度) Total length of magnetic strip (mm) Default magnetic stripe total length algorithm: Measurement range + 8mm (8mm is the occupied width of the chip)

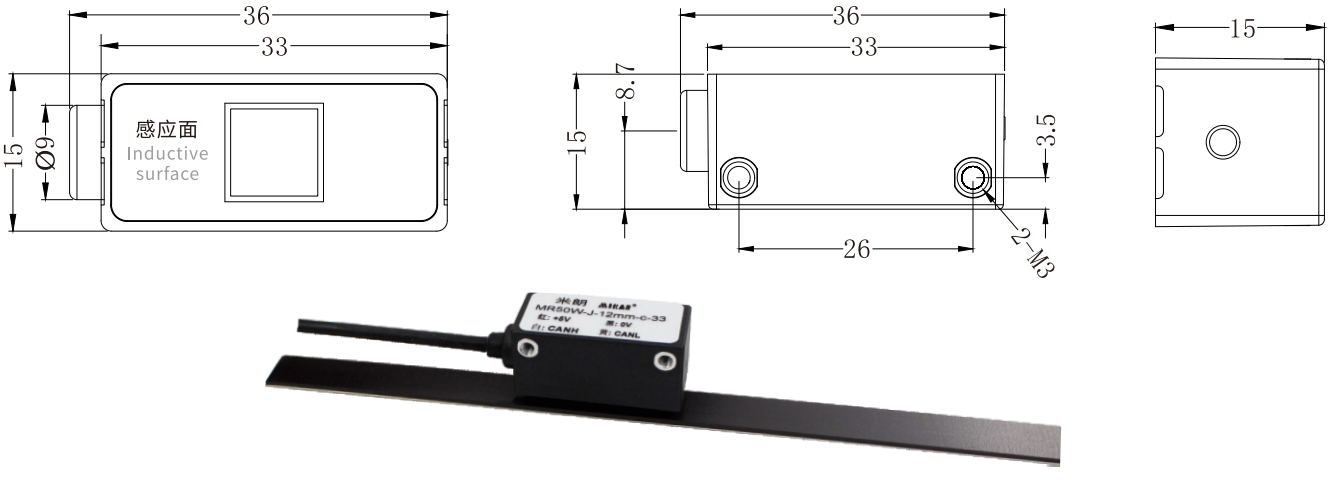
例如Example:

MSW-100mm-108mm：米朗科技微型绝对值式磁条，量程为100mm，磁条总长度为108mm。

MSW-100mm-108mm: Miran Technology's micro absolute value type magnetic strip, with a measurement range of 10mm and a total magnetic strip length of 108mm.

产品尺寸图Product Dimension Drawing

MR50W微型绝对值式磁栅尺 MR50W Micro Absolute Magnetic Encoder



产品概述Product Overview

我厂绝对值磁栅尺为了更能适应各种安装场景，特研发了微型绝对值磁栅尺和长量程绝对值磁栅尺。微型绝对值磁栅尺其最大量程范围为256mm,读头安装尺寸更小（33*15*15mm），更能适应狭小空间作业。而长量程绝对值式磁栅尺其最大量程范围可以做到16.384米，可以选择的量程范围更宽。绝对值磁栅尺是一种用于直线或旋转位置测量的高精度传感器，它的核心工作部件分为两个主要部分，分别是“磁栅尺”尺身上均匀录制有磁性刻度，“读数头”内部装有磁敏元件，在尺上方移动时，可以读取磁信号的绝对位置信息，无需像增量式尺子那样需要先回零找参考点，即使中途断电，位置信息也不会丢失，重新上电后位置依然准确。

其主要优点在于，一、抗干扰性强对油污、灰尘、振动等工业环境不敏感，可靠性高；二、无需回零，节省时间，防止因意外断电导致的生产问题；三、维护简单，通常无需电池保持记忆，结构坚固。广泛应用于需要高可靠性、绝对位置记忆的场合，如：数控机床、精密测量设备、自动化生产线、医疗设备、机器人等。

Our factory has specially developed micro absolute value magnetic scale and long-range absolute value magnetic scale to better adapt to various installation scenarios. The micro absolute value magnetic scale has a maximum measurement range of 256mm, and the installation size of the reading head is smaller (33*15*15mm), which is more suitable for operations in narrow spaces. The long-range absolute value magnetic scale has a maximum measurement range of 16.384 meters, and the selectable measurement range is wider. Absolute value magnetic scale is a high-precision sensor used for linear or rotational position measurement. Its core working components consist of two main parts: "magnetic scale" with magnetic scales uniformly recorded on the ruler body, and "reading head" which contains magnetic sensitive elements. When the ruler moves above, it can read the absolute position information of the magnetic signal, without needing to zero out and find a reference point like incremental scales. Even if there is a power outage in the middle, the position information will not be lost, and it will still be accurate after re-powering.

Its main advantages are as follows: 1. Strong anti-interference ability. It is not sensitive to oil stains, dust, vibration and other industrial environments, and has high reliability; 2. No need for zero return, saving time and preventing production problems caused by unexpected power outages; 3. Simple maintenance, usually no need for battery to maintain memory, and the structure is sturdy. It is widely used in occasions that require high reliability and absolute position memory, such as: CNC machines, precision measuring equipment, automated production lines, medical equipment, robots, etc.

性能参数Performance Parameters

技术参数Technical Specifications

MR50W微型绝对值式磁栅尺 MR50W Micro Absolute Magnetic Encoder	
测量精度 Measurement accuracy	≤10μm
分辨率 Resolution	1μm
磁极宽度 Magnetic pole width	2mm
量程范围 Measurement range	0-256mm
重复精度 Repeatability accuracy	<2μm
供电电压 Power supply voltage	DC5V
位置延迟 Position delay	<1ms
通讯方式 Communication method	CAN总线 CAN bus
供电电流 Power supply current	DC5V <90mA
防护等级 Protection level	IP67
磁头尺寸 Head size	33*15*15 (长*宽*高mm) 33 * 15 * 15 (L * W * H mm)
电缆长度 Cable length	默认2米 Default: 2m
磁条与磁头的表面安装间距 magnetic stripe to magnetic head surface mounting gap	0.4 (mm) ±0.1mm

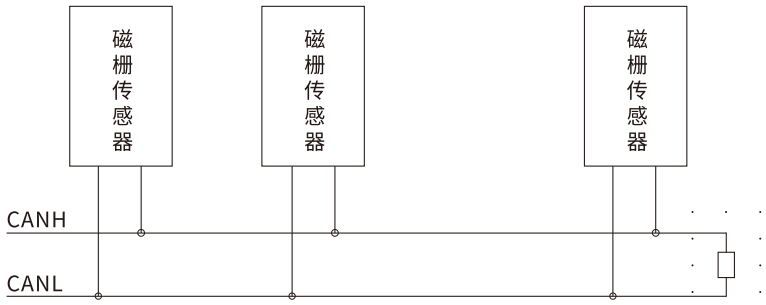
CAN通讯技术参数 CAN communication technical parameters

CAN接口规格 CAN interface specification	标准CAN2.0 Standard CAN 2.0
CAN接口形式 CAN interface form	2PIN接头 2PIN connector
帧类型 Frame type	标准帧，CANID 11bit Standard frame, CAN ID 11 bits
传输速度 Transmission speed	≥500kbps
CAN ID	软件可配置 Software configuration
CAN局域网支持的终端数量 The number of terminals supported by the CAN local area network	≥56个
每个终端的传输周期 The transmission period of each terminal	1~1000ms可配置 1 to 1000 milliseconds configurable

接线定义 Connection definition

红色 RED	黑色 BLACK	白色 WHITE	绿色 GREEN	屏蔽线 Shielding wire
DC5V	0V	CANH	CANL	接大地 CROUNDING

多个读头并联接线示意图
Diagram of multiple read heads connected in parallel



CAN网络最后一端需要加装一个120欧电阻
A 120-ohm resistor needs to be installed at the last end of the CAN network.

指示灯示意图 Indicator Light Schematic



1.绿色：工作正常。

1.Green: working normally.

2.三闪蓝：CAN总线脱离。

2.Three flashes of blue: CAN bus disconnected.

3.一闪蓝二闪红：磁头与磁条安装夹角过大。

3.One flash of blue, two flashes of red: The angle between the magnetic head and the magnetic strip installation is too large.

4.三闪红: 磁头与磁条安装间隙过大。

4.Three flashes of red: The gap between the magnetic head and the magnetic strip installation is too large.

指示灯红色常亮的原因：

The reason for the red indicator light to remain constantly on:

1. 磁头与磁条高度过大 。

1. The height of the magnetic head and the magnetic strip is too large.

2. 磁头与磁条非常不平行 。

2. The magnetic head and the magnetic strip are not parallel to each other.

3. 磁条损坏、例如被强磁磁化、物理断裂等。

3. The magnetic strip is damaged, such as being magnetized by strong magnetism, physically broken, etc.

4. 供电电压过低。

4. The power supply voltage is too low.

MR50L/MSK绝对值式磁栅尺
MR50L/MSK Absolute-Type Magnetic Encoder

产品实物图Product Picture

MR50L长量程绝对值式磁栅尺（行程0-16300mm）
MR50L Long-range Absolute-Type Magnetic Encoder (travel range: 0-16300mm)



带铝制底座
with aluminum base



不带铝制底座
without aluminum base



带铝制底座支架读头
Reader with aluminum base bracket



不带铝制底座支架读头
Reader without aluminum base bracket

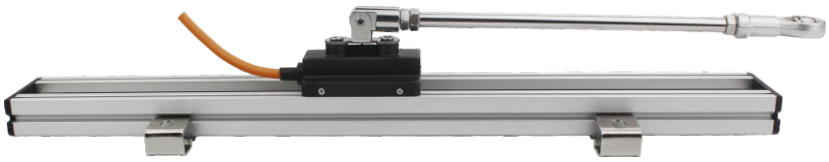
MSL长量程绝对值式磁条选型（不带铝制底座）
MSL Long-range Absolute Value Magnetic Strip Model (without aluminum base)



MSSL长量程绝对值式磁条选型（带铝制底座）
MSSL Long-range Absolute Value Type Magnetic Strip Model (with aluminum base)



MSK长量程绝对值式磁栅尺（行程0-16300mm）
MSK Long-range Absolute-Type Magnetic Encoder (travel range: 0-16300mm)



产品型号选型Product Model Selection

MR50L长量程绝对值式读头选型
MR50L Selection of long-range absolute value type dial indicator

MR50L – J – □ – □ – 57

- MR50L：长量程磁栅尺系列 Long-range magnetic scale series
- J：J:绝对值式 J: Absolute type
- □：量程(mm) Range (mm)
- □：输出信号选择 Output Signal Selection
  - S1:SSI普通Ordinary
  - S2:SSI增强Enhance
  - B:BISS-C
  - R:RS485
- 57：读头外壳选择
  - 57:长*宽*高(57*15.5*17.5)
  - 57Z:长*宽*高(74*16.5*18.5)
  - Head housing selection
  - 57:L*W*H (57*15.5*17.5)
  - 57Z: L*W*H (74*16.5*18.5)

注:S1:SSI普通,SSI位数25位,不包含错误位,分辨率1um。S2:SSI增强,SSI位数32位,包含1位错误位,分辨率0.1um。
Note: S1: SSI standard version SSI has 25 bits, without error bits, and the resolution is 1 micron.
S2: SSI enhanced version SSI has 32 bits, including 1 bit for error, and the resolution is 0.1 micron.

例如Example:

MR50L-J-5000mm-S2-57Z: 米朗科技长量程绝对值式磁栅尺,量程为5000mm,输出信号为S2:SSI增强,带读头安装支架,长*宽*高(74*16.5*18.5)。
MR50L-J-5000mm-S2-57Z: Miran Technology's long-range absolute value type magnetic scale ruler has a measurement range of 5000mm. The output signal is S2: SSI enhanced, with a reading head installation bracket. Dimensions: L* W*H (74*16.5*18.5).

MSL长量程绝对值式磁条选型(不带铝制底座)
MSL Long-range absolute value type magnetic strip selection (without aluminum base)

MSL – □ – □

- MSL：长量程磁条(不带铝制底座) Long-range magnetic strip (Without aluminum base)
- □：量程(mm) Range (mm)
- □：磁条总长度(mm)
  默认磁条总长度算法:量程+55mm(55mm为芯片的占用宽度)
  Total length of magnetic strip (mm)
  Default magnetic stripe total length algorithm:
  Measurement range + 55mm
  (55mm is the occupied width of the chip)

例如Example:

MSL-5000mm-5055mm: 米朗科技长量程绝对值式磁条(不带铝制底座),量程为5000mm,磁条总长度为5055mm。
MSL-5000mm-5055mm: Miran Technology's long-range absolute value type magnetic strip (without aluminum base), with a measurement range of 100mm and a total magnetic strip length of 5055mm.

MSSL长量程绝对值式磁条选型（带铝制底座）
MSSL Long-range absolute value type magnetic strip selection (with aluminum base)

MSSL – □ – □

- MSSL：长量程磁条（带铝制底座）Long-range magnetic strip (With aluminum base)
- 第一个□：量程（mm）Range (mm)
- 第二个□：磁条总长度（mm）默认磁条总长度算法：量程+55mm（55mm为芯片的占用宽度）Total length of magnetic strip (mm) Default magnetic stripe total length algorithm: Measurement range + 55mm (55mm is the occupied width of the chip)

例如Example:

MSSL-5000mm-5055mm：米朗科技长量程绝对值式磁条（带铝制底座），量程为5000mm，磁条总长度为5055mm。

MSSL-5000mm-5055mm: Miran Technology's long-range absolute value type magnetic strip (with aluminum base), with a measurement range of 5000mm and a total magnetic strip length of 5055mm.

MSK长量程绝对值式磁栅尺选型
Selection of MSK Long-range Absolute-Type Magnetic Encoder

MSK – J – □ – □ – 49

- MSK：长量程磁栅尺系列 Long-range magnetic scale series
- J：J:绝对值式 J: Absolute type
- 第一个□：量程（mm）Range (mm)
- 第二个□：输出信号选择 Output Signal Selection
  - S1:SSI普通Ordinary
  - S2:SSI增强Enhance
  - B:BISS-C
  - R:RS485
- 49：读头外壳选择 49：长*宽*高（49*34*22.1）Read head housing selection 49: L*W*H (49*34*22.1)

注：S1：SSI普通，SSI位数25位，不包含错误位，分辨率1um。S2：SSI增强，SSI位数32位，包含1位错误位，分辨率0.1um。

Note: S1: SSI standard version SSI has 25 bits, without error bits, and the resolution is 1 micron.
S2: SSI enhanced version SSI has 32 bits, including 1 bit for error, and the resolution is 0.1 micron.

例如Example:

MSK-J-5000mm-S2-49：米朗科技长量程绝对值式磁栅尺，量程为5000mm，输出信号为S2：SSI增强，读头外壳为49（L 49*W34*H22.1mm）。

MSK-J-5000mm-S2-49: Miran Technology's long-range absolute magnetic scale, with a measurement range of 5000mm, and the output signal is S2: SSI enhanced, the reading head housing is 49 (L49*W34*H22.1mm).

产品特点Product Features

1.双码道绝对值磁栅尺编码器。

1.Double-code channel absolute value magnetic scale encoder.

2.周期编码长度16384mm。

2. The cycle encoding length is 16,384 mm.

3.速度可达5m/s。

3. The speed can reach 5 meters per second.

4.支持SSI, BISS-C, RS-485“Modbus-RTU”。

4. Supports SSI, BISS-C, and RS-485 "Modbus-RTU".

接线定义 Connection definition

RS485输出信号 RS485 output signal

红色 RED	黑色 BLACK	蓝色 BLUE	白色 WHITE	黄色 YELLOW	绿色 GREEN	屏蔽线 Shielding wire
DC5V~DC30V	0V	A	B	NC	NC	接大地 CROUNDING

SSI输出信号 SSI output signal

红色 RED	黑色 BLACK	蓝色 BLUE	白色 WHITE	黄色 YELLOW	绿色 GREEN	屏蔽线 Shielding wire
DC5V~DC30V	0V	D+	D-	C+	C-	接大地 CROUNDING

BISS输出信号 BISS output signal

红色 RED	黑色 BLACK	蓝色 BLUE	白色 WHITE	黄色 YELLOW	绿色 GREEN	屏蔽线 Shielding wire
DC5V~DC30V	0V	MA+	MA-	SLO+	SLO-	接大地 CROUNDING

指示灯示意图 Indicator Light Schematic



1.绿色常亮：工作正常。

1.Green light on continuously: Everything is working properly.

2.红色闪亮与常亮: 工作异常。

2.Red flashing and constant illumination: Work abnormal.

指示灯红色闪亮的原因：

The reason for the red indicator light to flash:

1. 磁条与磁头安装180度反向。

1.The magnetic strip and the magnetic head are installed 180 degrees in opposite directions.

2.运行速度太快。

2. The speed is too fast.

指示灯红色常亮的原因：

The reason for the red indicator light to remain constantly on:

1.磁头与磁条安装间隙过大 。

1.The gap between the magnetic head and the magnetic strip is too large.

2.磁头与磁条非常不平行 。

2. The magnetic head is not parallel to the magnetic strip at all.

3.磁条损坏、例如被强磁磁化、物理断裂等。

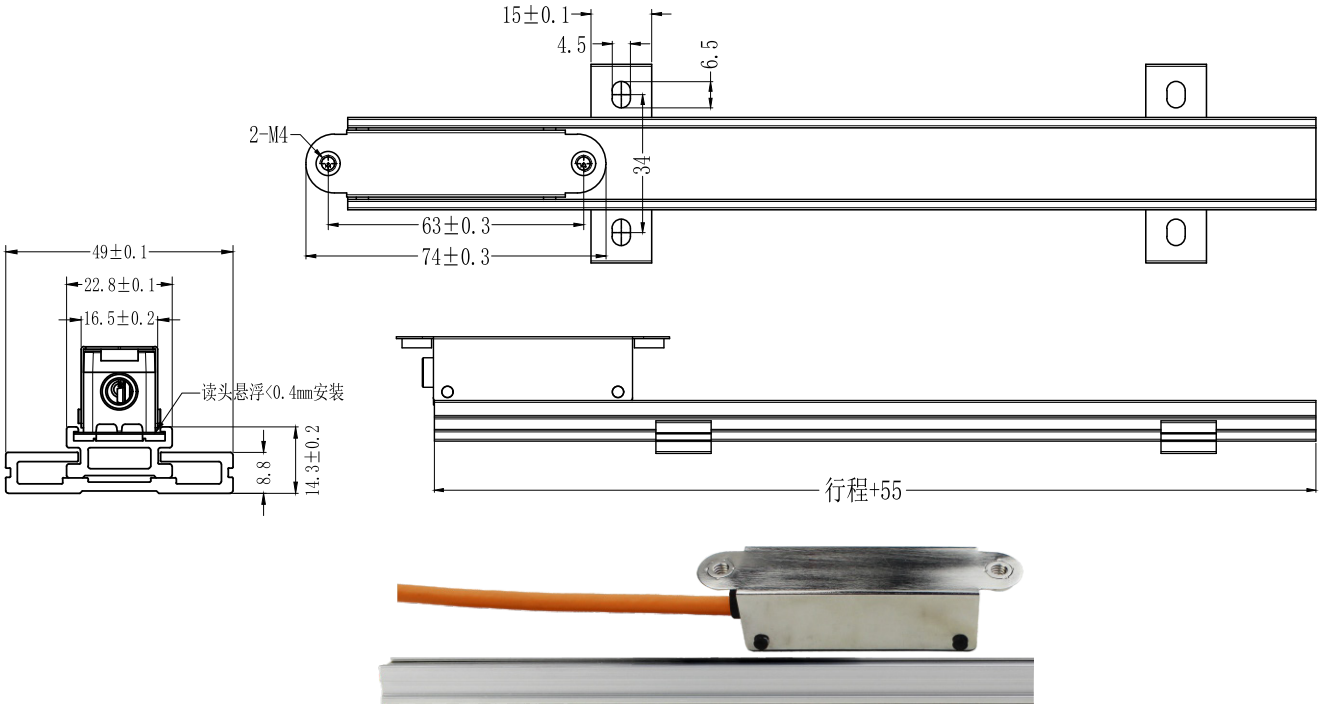
3. Magnetic strip damage, such as being magnetized by a strong magnet, physically broken, etc.

4.供电电压过低。

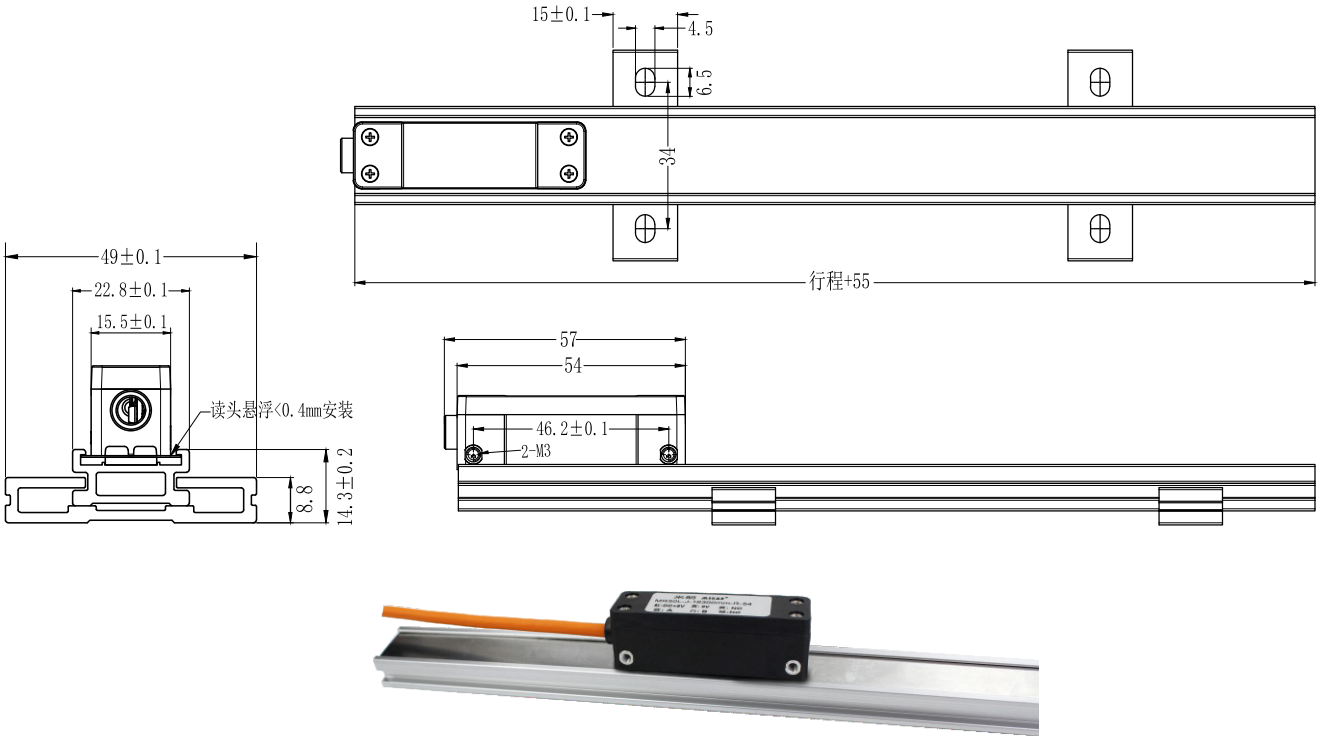
4. The power supply voltage is too low.

产品尺寸图Product Dimension Drawing

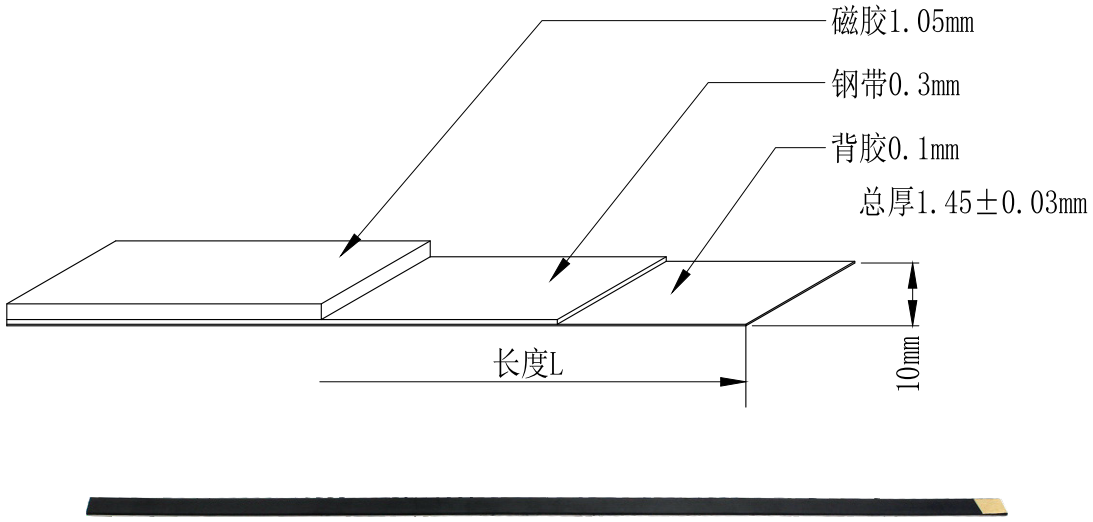
MR50L-57Z长量程绝对值磁栅尺(带铝制底座)
MR50L-57Z Long-range Absolute Magnetic Encoder (with aluminum base)



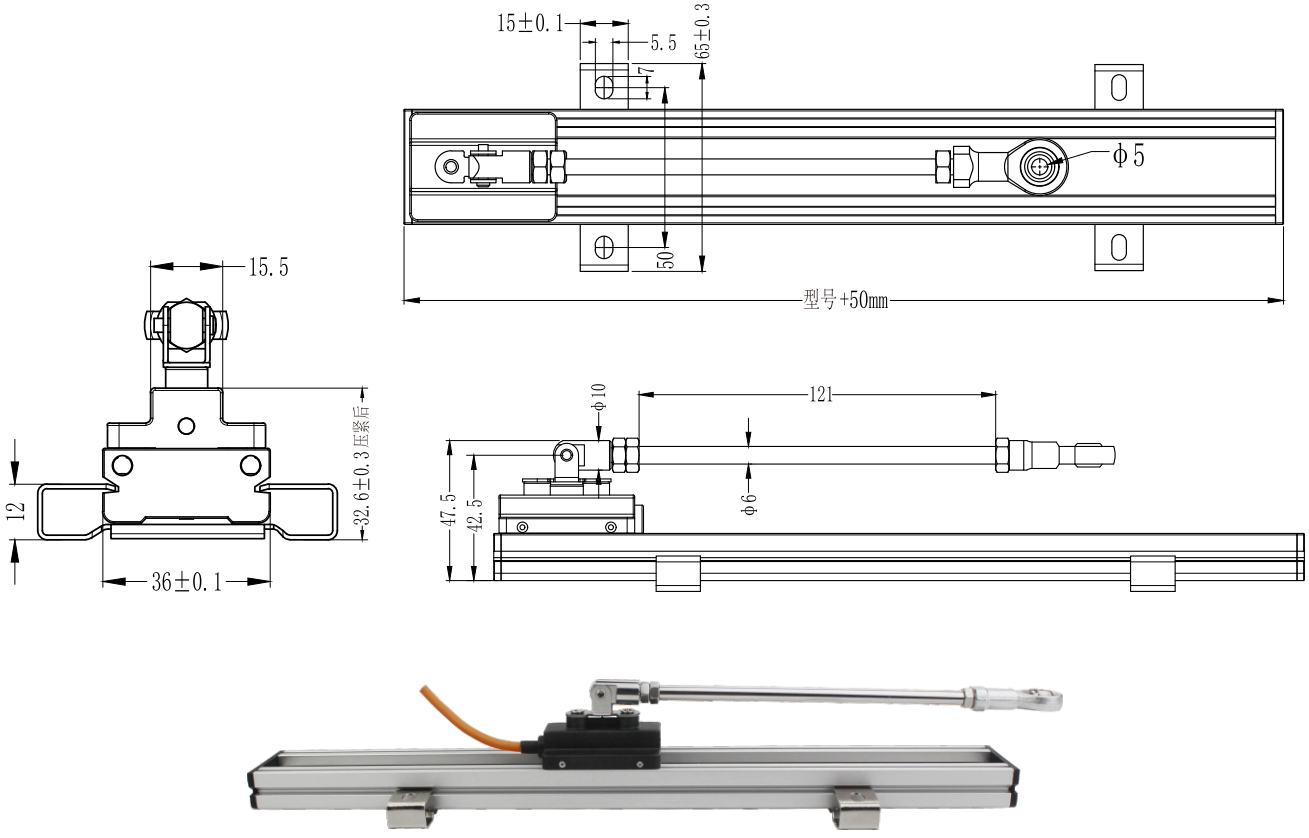
MR50L-57长量程绝对值磁栅尺(带铝制底座)
MR50L-57 Long-range Absolute Magnetic Encoder (with aluminum base)



长量程绝对值式磁条
Long-range Absolute Value Magnetic Strip



MSK长量程绝对值式磁栅尺
MSK Long-range Absolute-Type Magnetic Encoder



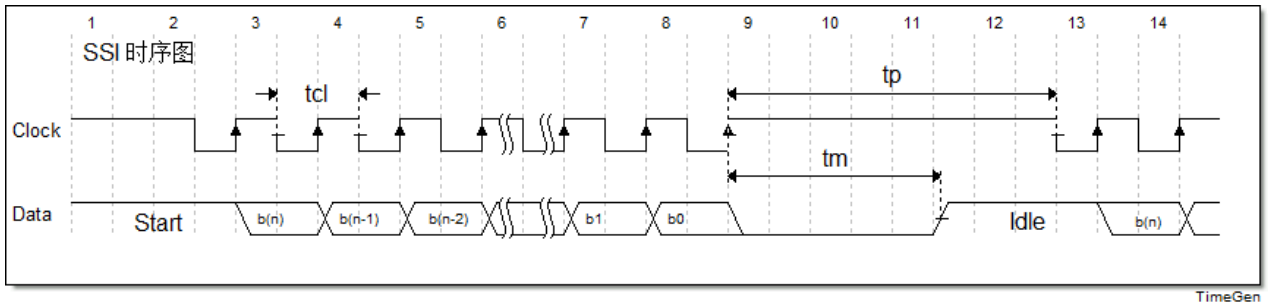
性能参数Performance Parameters

技术参数Technical Specifications

MR50L/MSK长量程绝对值式磁栅尺 MR50L/MSK Long-range Absolute-Type Magnetic Encoder	
分辨率 Resolution	0.1μm
磁极宽度 Magnetic pole width	2+2mm
量程范围 Measurement range	0-16.3m (可选) 0 - 16.3 m (optional)
重复精度 Repeatability accuracy	<2μm
供电电压 Power supply voltage	DC5V~DC30V
供电电流 Power supply current	DC5V/125mA, DC12V/56mA, DC24V/32mA
磁条精度 Magnetic stripe accuracy	±20um
位置数据接口 Position data interface	RS485“Modbus-RTU”; SSI; BISS-C(可选) RS485“Modbus-RTU”; SSI; BISS-C (optional)
参数配置接口 Parameter configuration interface	RS485
防护等级 Protection level	IP67
SSI时钟频率输入 SSI clock frequency input	≤750KHz(取决于电缆长度) ≤ 750 KHz (depending on the cable length)
最大速度 Maximum speed	5m/s
抗震性 Seismic resistance	300m/s²
电缆长度 Cable length	默认2米(最长10米) Default: 2m (Max 10m)
磁条与磁头的安装间距 The installation distance between the magnetic strip and the magnetic head	0.4(mm) ±0.1mm

MR50L磁栅尺SSI BISS-C协议 MR50L SSI & BiSS-C Protocol Specification

SSI时序要求 SSI Timing Requirements



SSI技术要求 SSI technical requirements

型号 Type	频率 Frequency	位数 Digits	码制 Code system	分辨率 Resolution	备注 Note
普通型 Standard type	125khz-2.5Mhz	25位 25 people	格雷码 Gray code	1um	出厂默认 Factory default
增强型 Enhanced type	125khz-2.5Mhz	31位 31 people	格雷码 Gray code	0.1um	出厂默认 Factory default

SSI时序参数 SSI timing parameters

参数Parameters	符号Symbol	最小值Min value	典型值Typical value	最大值Max value
时钟频率 Clock frequency	tcl	8us	0.8us	0.4us
时钟频率 Clock frequency	tcl	125Khz	1.25Khz	2.5Mhz
传输超时 Transmission timeout	tm		10us	
暂停时间 Pause time	tp	64us	128us	

SSI数据格式 SSI data format

普通型25位 Standard type25 people

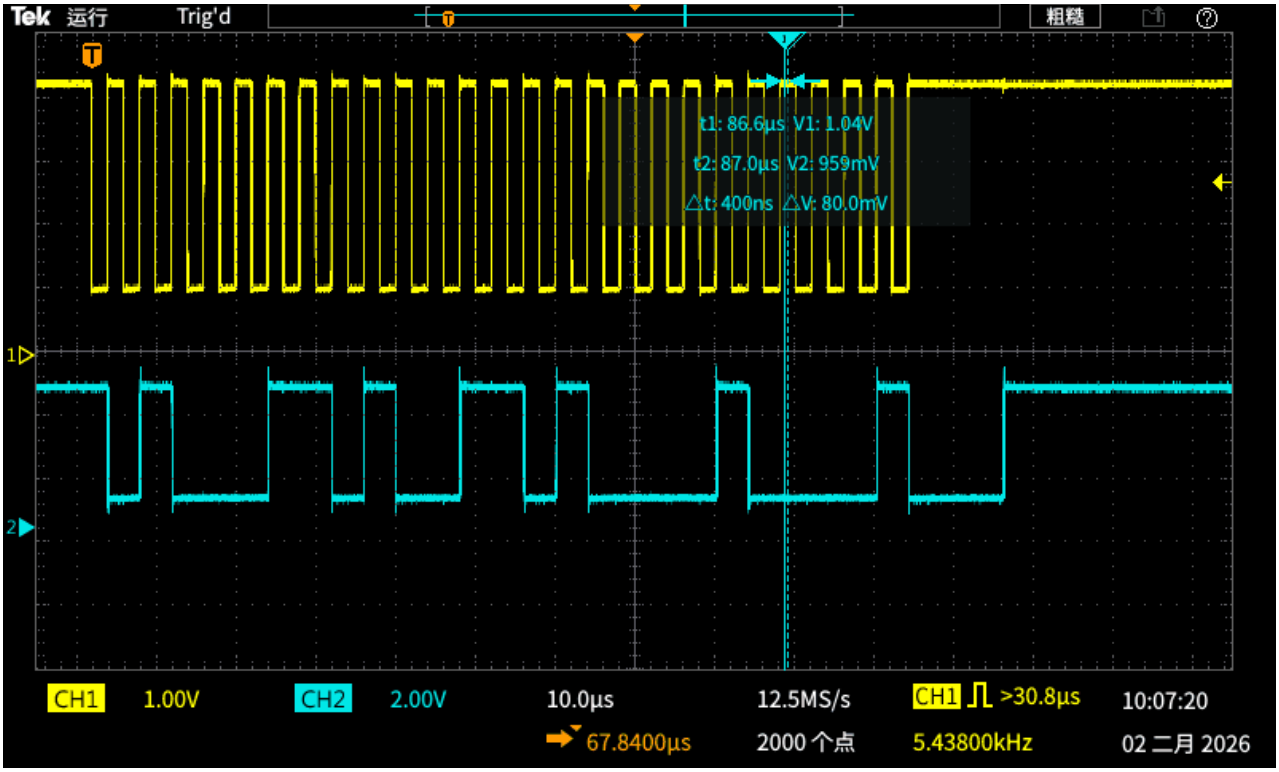
位Position	b24-b0
长度Length	25bits
数据Data	位置 单位1um Position Unit: 1 um
码制Code system	格雷码Gray code

增强型32位 Enhanced type32 people

位Position	b31-b1	B0
长度Length	31bits	1bit
数据Data	位置 单位0.1um Position Unit: 0.1um	错误位 Error position
码制Code system	格雷码Gray code	二进码 Binary code

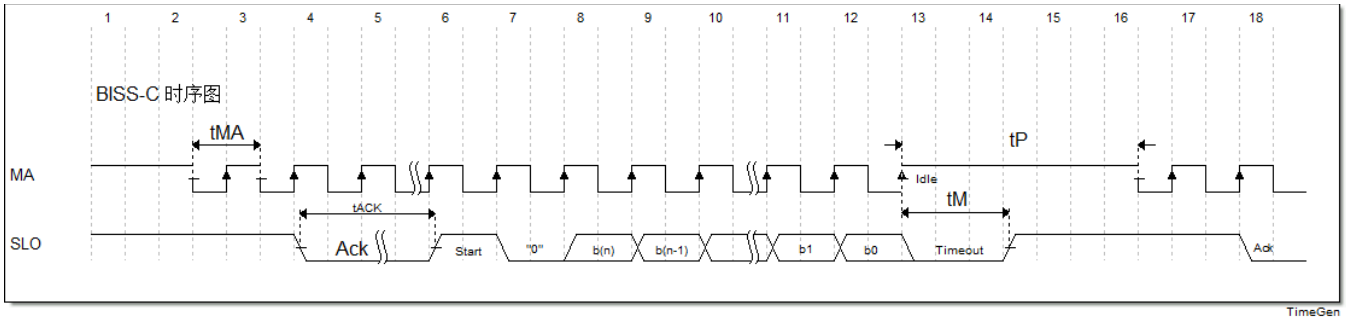
注：增强型32位处理。
二进制 = 格雷码转二进制(Data>>1);
错误位 = (Data&0x00000001);
错误位为1时有错误。

Note: Enhanced-type 32-bit processing.
Binary = Gray code to binary (Data>> 1);
Error bit = (Data & 0x00000001);
An error occurs when the error bit is 1.



SSI普通型25位 实采波形黄色CLK信号，蓝色 DATA信号。
SSI Standard-type, 25-bit, Natural Binary Code output. Actual captured waveform: Yellow-CLK, Blue-DATA.

BISS-C时序要求 BISS-C Timing Requirements



BISS-C技术要求 BISS-C technical requirements

频率Frequency	数据位数 number of data bits	码制Code system	分辨率Resolution	备注Note
125khz-2.5Mhz	32bit	二进制 Binary	0.1um	出厂默认 Factory default

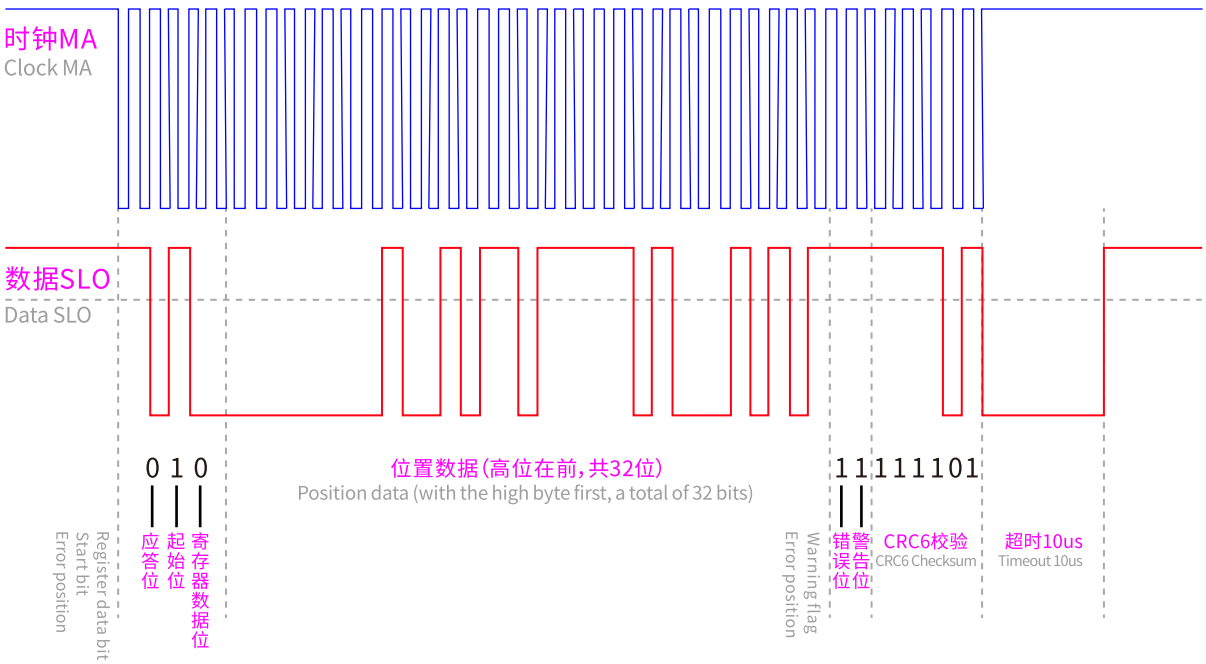
BISS-C时序参数 BISS-C timing parameters

参数Parameters	符号Symbol	最小值Min value	典型值Typical value	最大值Max value
时钟频率 Clock frequency	tma	8us	0.8us	0.4us
时钟频率 Clock frequency	f	125Khz	1.25Khz	2.5Mhz
ACK长度 ACK length	tack		1bit	
传输超时 Transmission timeout	tm		10us	
暂停时间 Pause time	tp		64us	

BISS-C数据格式 BISS-C data format

位 Position	b43	b42	b41	b40	b39-b8	b7	b6	b5:b0
长度 Length	1bit	1bit	1bit	1bit	32bits	1bit	1bit	6bits
数据 Data		应答位 Error position	起始位 Start bit	CDS	位置单位0.1um Position Unit: 0.1 um	错误位 Error position	警告位 Warning flag	CRC

BISS-C时序示图 BISS-C Timing Diagram



(1) 应答位“ACK”固定为0，持续1个时钟或多个时钟，图1为持续1个时钟时间。
(2) 起始位固定为1，持续1个时钟。
(3) 寄存器数据位（CDS位），持续1个时钟。
(4) 位置数据（32bit位置数据，高位在前）。
(5) 错误位1或0，低电平有效。
(6) 警告位1或0，低电平有效。
(7) CRC6校验（6bit 数据，高位在前）。

(1) The "ACK" response bit is fixed at 0 and remains for 1 clock cycle or multiple clock cycles. Figure 1 shows it remaining for 1 clock cycle.
(2) The start bit is fixed at 1 and remains for 1 clock cycle.
(3) The register data bit (CDS bit), remains for 1 clock cycle.
(4) Position data (32-bit position data, with the high-order bits first).
(5) Error bit 1 or 0, with low level as the valid state.
(6) Warning bit 1 or 0, with low level as the valid state.
(7) CRC6 check (6-bit data, with the high-order bits first).

CRC6 C语言计算方法:

m_u8errcrc = Crc6_Calc64(m_u64temp,34-1);
注 34 = 32 + 1 + 1 “32bit数据位 1bit 错误位 1 bit 警告位”

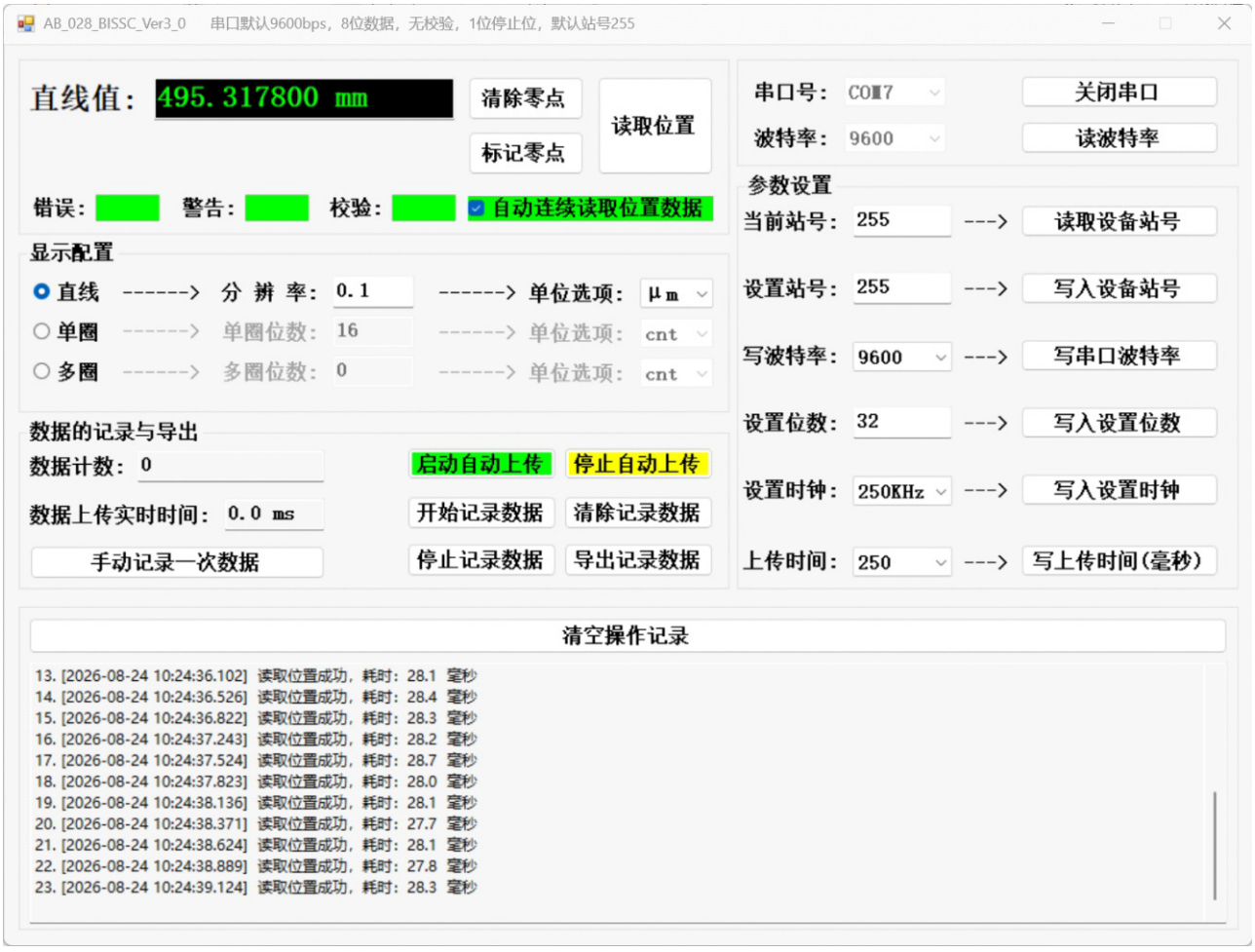
```
/**
 * @brief 计算BISS-C CRC-6（64位数据版本）
 * @param Dat  64位输入数据（有效位在低 Len 位）
 * @param Len  数据有效位数（1~64）
 * @return uint8_t 6位CRC值
 */
unsigned char Crc6_Calc64(uint64_t Dat, uint8_t Len)
{
  uint8_t i;
  // 将数据最高有效位对齐到 bit63
  Dat <<= (64 - Len);

  for (i = 0; i < Len; i++) {
    if (Dat & 0x8000000000000000ULL)  // 检查当前最高位
      Dat ^= 0x8600000000000000ULL; // 多项式 0x43 对齐到 bit63
    Dat <<= 1;                    // 左移处理下一位
  }

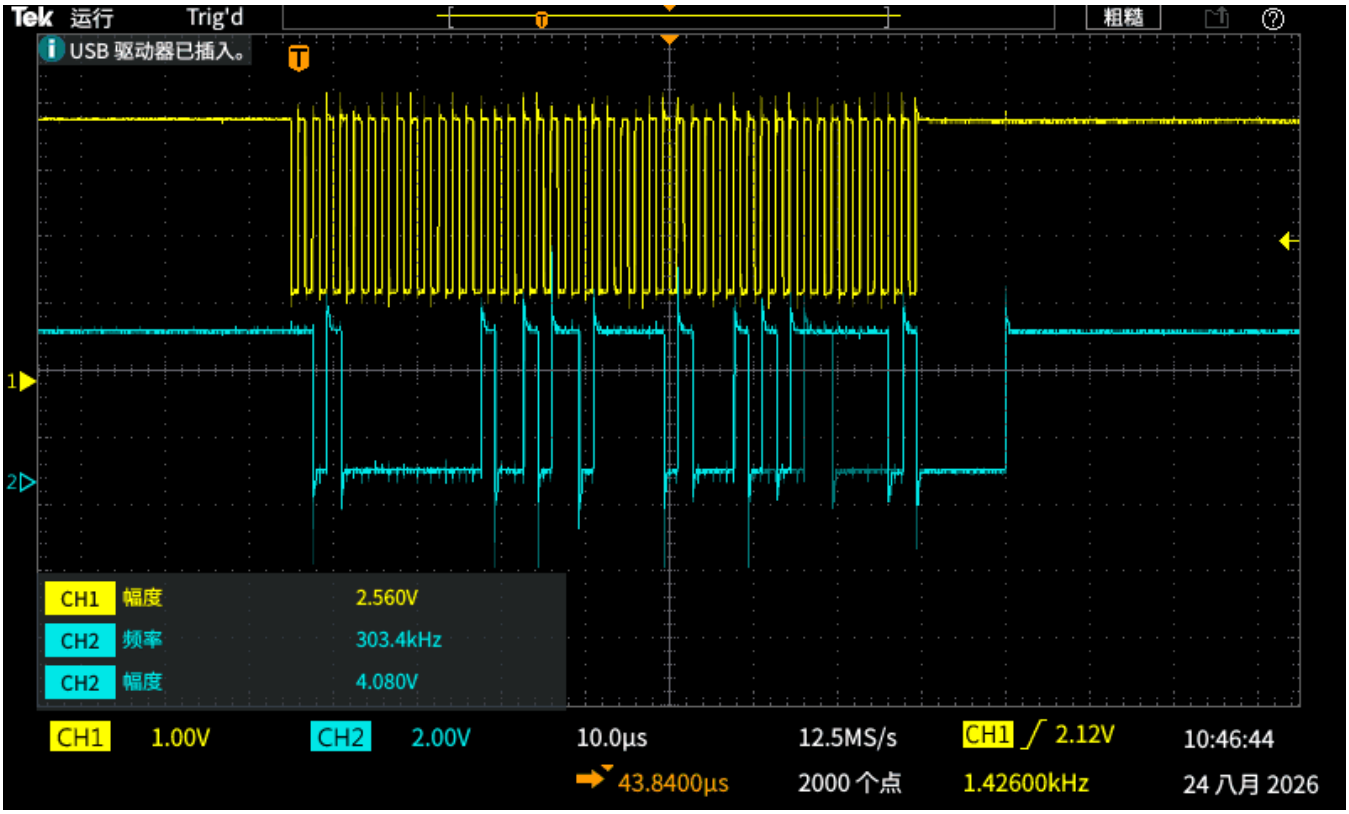
  Dat = ~Dat;           // 按位取反（BISS-C 要求）
  Dat >>= 58;           // 右移58位，提取高6位（bit63~bit58）
  return (unsigned char)Dat;
}
```

> CRC6 C language calculation method:
m_u8errcrc = Crc6_Calc64(m_u64temp,34-1);
Note: 34 = 32 + 1 + 1, "32-bit data bits, 1-bit error bit, 1-bit warning bit”/**
@brief Calculate BiSS-C CRC-6 (64-bit data version)
@param Dat 64-bit input data (valid bits are located in the lower Len bits)
@param Len Valid bit length of data (1~64)
@return uint8_t 6-bit CRC value> */
 // Align the most significant bit of data to bit63
 // Check the current most-significant bit
 // Polynomial 0x43 aligned to bit63
// Left-shift to process the next bit
 // Bitwise inversion (BiSS-C requirement)
// Right-shift 58 bits to extract the upper 6 bits (bit63~bit58)

串口BISS-C 采集器PC操作界面：
PC Operation Interface for Serial BiSS-C Collector



BISS-C 数据32位 实采波形黄色CLK信号，蓝色 DATA信号。
BiSS-C 32-bit data. Actual captured waveform: Yellow = CLK signal, Blue = DATA signal.



安装与使用 Installation and Usage

1.安装磁条：
1.Install the magnetic strip:

首先将磁条背部的3M胶纸的保护纸撕掉如图1（如果磁条比较长建议不要一次性撕完，可以边贴边撕），然后将磁条固定在平台的表面或者开好的槽内如图2（固定磁条的表面必须平整不能凹凸不平，否则会影响测量精度）。

First, remove the protective paper on the back of the magnetic strip as shown in Figure 1 (if the magnetic strip is long, it is recommended not to remove it all at once. You can peel it off while attaching it). Then, fix the magnetic strip on the surface of the platform or in the opened slot as shown in Figure 2 (the surface where the magnetic strip is fixed must be flat and cannot be uneven; otherwise, it will affect the measurement accuracy).



图1 Figure 1



图2 Figure 2

2.磁头安装：

2.Head installation:

首先将磁头固定在安装支架上如图3，注意磁头出线的方向和磁条上面的箭头的方向要一致如图 4，否则将无法测量。

First, fix the magnetic head onto the mounting bracket as shown in Figure 3. Pay attention to the direction of the magnetic head's output line and the arrow direction on the magnetic strip, which should be consistent as shown in Figure 4. Otherwise, measurement will not be possible.



图3 Figure 3



图4 Figure 4

3.调整磁条和磁头之间的安装间距为0.4MM(±0.1MM)：

3.Adjust the installation distance between the magnetic strip and the magnetic head to 0.4mm (±0.1mm):

为了方便操作我们特提供一片0.4mm的塑料垫块作为基准。具体操作步骤如下：移动固定好的磁头位于磁条的正上方，将塑料垫块放在磁条上如图5所示，然后上下移动磁头使磁头刚好压在塑料垫块表面上此时固定好磁头抽出塑料垫块，安装间距调整完毕。

To facilitate the operation, we specially provide a 0.4mm plastic spacer as a reference. The specific operation steps are as follows: Move the fixed magnetic head directly above the magnetic strip, place the plastic spacer on the magnetic strip as shown in Figure 5, then move the magnetic head up and down so that the magnetic head just presses on the surface of the plastic spacer. At this point, remove the fixed magnetic head and install the spacing adjustment.

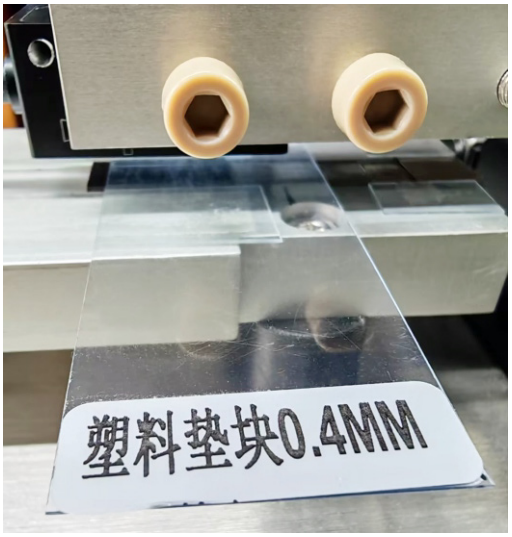


图5 Figure 5

4.绝对值磁栅尺MR50W要求磁条与磁头必须配对使用。

4.The absolute value magnetic scale MR50W requires that the magnetic strip and the magnetic head must be used in pairs.

互换后会产生互换误差，互换误差≤0.05mm。

After the interchange, there will be interchange error, and the interchange error is ≤ 0.05mm.

MSK/MR50增量式磁栅尺
MSK/MR50 Incremental Magnetic Encoder

产品实物图Product Picture

MSK增量式磁栅尺 MSK Incremental Magnetic Encoder

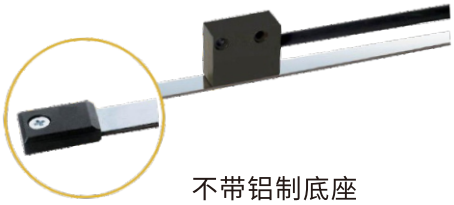




MR50增量式磁栅尺 MR50 Incremental Magnetic Encoder



带铝制底座
with aluminum base



不带铝制底座
without aluminum base

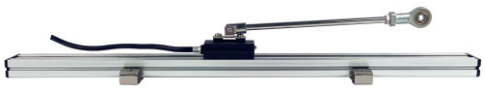
产品型号选型Product Model Selection

MSK增量式磁栅尺 MSK Incremental Magnetic Encoder

MSK - □ - □

代表电线长度
（单位：米/M）
Represents wire length
(in meters/M)

代表有效行程长度
（单位：毫米/MM）
Represents effective
stroke length
(in mm/MM)



MR50增量式磁栅尺 MR50 Incremental Magnetic Encoder

MR50 - □

读头
Reading head

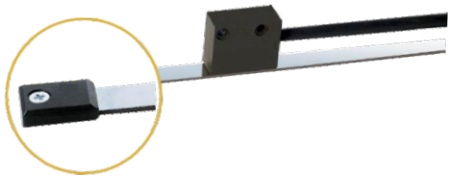
读头电缆长度
（单位：米/M）
Readhead cable length
(in meters/M)



MS50 - □

磁尺
(不带铝制底座)
Magnetic ruler
(without
aluminum base)

磁尺长度
(单位:毫米/MM)
Magnetic scale
length
(in mm/MM)



MSS50 - □

磁尺
(带铝制底座)
Magnetic ruler
(with
aluminum base)

磁尺长度
(单位:毫米/MM)
Magnetic scale
length
(in mm/MM)



产品概述Product Overview

磁栅尺测量的工作原理是利用与录音技术相似的方法，通过录磁头在磁性尺(或盘)上录制出间隔严格相等的磁波这一过程称为录磁。已录制好磁波的磁性尺称为磁栅尺。磁栅尺上相邻栅波的间隔距离称为磁栅的波长，又称为磁栅的节距(栅距)。栅的一个重要特点是磁栅尺与磁头处于接触式的工作状态。磁栅的工作原理是磁电转换，为保证磁头有稳定的输出信号幅度，考虑到空气的磁阻很大，故磁栅尺与磁头之间不允许存在较大和可变的间隙，最好是接触式的。

MSK/MR50增量式磁栅尺均根据磁感应的原理进行工作。当读磁头在磁尺的磁场空间中做直线运动时(MR50磁栅尺中MR是读磁头、MS是磁尺)，读磁头会根据运动的相关位移量实时的输出符合标准的位置脉冲。MSK/MR50增量式磁栅尺内置LED状态指示灯可提示工作电源和磁尺信号是否正常，并不能保证安装后的测量精度，如果需要提高精度请在安装时尽量将读磁头靠近磁尺。MR50磁栅尺分为磁条安装式和铝制底座安装式，适用于较大量程测量范围，可根据现场安装环境选择。

MSK/MR50增量式磁栅尺主要用于木工、石材加工、锯切、金属切削、纺织、印刷、包装、塑料加工、自动化系统、切割设备、电子组装设备、测量/检测设备等。

Magnetic scale measurements work on the principle that, using a method similar to the recording technique, magnetic waves at strictly equal intervals are recorded on a magnetic

scale (or disk) by means of a recording head in a process known as magnetic recording. The magnetic tape that has recorded the magnetic waves is called the magnetic scale. Magnetic scale on the distance between neighboring grating wave interval is called the wavelength of the magnetic grating, also known as the pitch of the magnetic grating (grating pitch). An important feature of the grid is that the magnetic scale and the magnetic head is in contact with the operating state. The working principle of the magnetic grid is magnetoelectric conversion, in order to ensure that the magnetic head has a stable output signal amplitude, taking into account the air's magnetoresistance is very large, so the magnetic scale and the magnetic head does not allow the existence of a large and variable gap between the head, it is best to be in contact.

The MSK/MR50 incremental magnetic scale both operate based on the principle of magnetic induction. When the reading head moves linearly in the magnetic field space of the scale (in the MR50 magnetic scale, MR represents the reading head and MS represents the scale), the reading head will output position pulses that conform to the standard in real time according to the corresponding displacement during the movement. The MSK/MR50 incremental magnetic scale is equipped with an LED status indicator light that can indicate whether the working power supply and magnetic scale signal are normal. However, it cannot guarantee the measurement accuracy after installation. If higher accuracy is required, please try to position the reading head close to the scale during installation. The MR50 magnetic scale is divided into a magnetic strip installation type and an aluminum base installation type, and is suitable for a larger measurement range. It can be selected according to the on-site installation environment.

The MSK/MR50 incremental magnetic scale ruler is mainly used in woodworking, stone processing, sawing, metal cutting, textile, printing, packaging, plastic processing, automation systems, cutting equipment, electronic assembly equipment, measurement/inspection equipment, etc.

产品特点Product Features

- 非接触式 Non-contact
- 高速测量 High-speed measurement
- 高分辨率 High resolution
- 抗油抗污 Oil and dirt resistant
- 安装简易 Easy installation
- 性价比高 Quality-price ratio

性能参数Performance Parameters

关于分辨率About resolution

一般磁栅尺读数头的分辨率标识为：

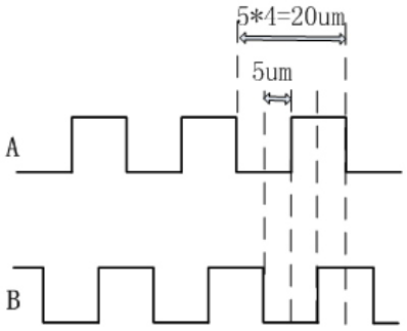
The resolution of a typical magnetic scale readhead is identified as:

将一个完整的脉冲周期4分频后的数值。

the value after dividing a complete pulse period by 4.

例如常说的5um磁头的分辨率，分辨率示意图如图：

For example, it is often said that the resolution of 5um magnetic head, resolution schematic diagram as shown:



性能指标Performance indicators

参数 Parameters / 产品 Offerings	MSK增量式磁栅尺 MSK Incremental Magnetic Encoder	MR50增量式磁栅尺 MR50 Incremental Magnetic Encoder
精度指标(20°C) Accuracy Index (20°C)	±50μm/m	±50μm/m
重复精度 Repeatability	Max. ±1个单位分辨率（单方向） Max. ±1 unit resolution (unidirectional)	Max. ±1个单位分辨率（单方向） Max. ±1 unit resolution (unidirectional)
测量长度 Measuring Length	用户指定（无限制） User-specified (unlimited)	用户指定（无限制） User-specified (unlimited)
移动速度 Travel Speed	Max. 25m/s	Max. 25m/s
频　率 Frequency	1.25MHZ	1.25MHZ
Ab信号每1mm脉冲个数 Number of pulses per 1mm of Ab signal	50个(分辨率为5μm时，每0.02mm,1个脉冲；分辨率为1μm时，每0.004mm,1个脉冲) 50 (When the resolution is 5 μm, 1 pulse every 0.02 mm; when the resolution is 1 μm, 1 pulse every 0.004 mm)	
Z信号每5mm脉冲个数 Z signal pulses per 5mm	1个 1pcs	1个 1pcs
抗干扰(EMC) Anti-interference (EMC)	Electrostatic discharge(ESD: EN61000-4-2); Radio-frequency(EN61000-4-3, EN61000-4-6); Electrical fast transient(EFT: EN61000-4-4); Surge(EN61000-4-5); Power frequency magnetic field(EN61000-4-8);	Electrostatic discharge(ESD: EN61000-4-2); Radio-frequency(EN61000-4-3, EN61000-4-6); Electrical fast transient(EFT: EN61000-4-4); Surge(EN61000-4-5); Power frequency magnetic field(EN61000-4-8);

产品指标Product Indicators

参数 Parameters / 产品 Offerings	MSK增量式磁栅尺 MSK Incremental Magnetic Encoder	MR50增量磁栅尺 MR50 Incremental Magnetic Encoder
读头 Reading head	/	MR50
配套磁尺（不带铝制底座） Matching magnetic tape (without aluminum base)	/	MS50
配套磁尺（带铝制底座） Matching magnetic ruler (with aluminum base)	该产品是一体的，不具体区分 The product is all-in-one and does not specifically differentiate	MSS50

注：MSK增量式磁栅尺为一体式，不具体区分读头和配套磁尺，产品本身自带铝制底座，一般情况下只选型电线长度及有效行程长度，有特殊情况可联系沟通。

Note: The MSK incremental magnetic scale is an integrated type. There is no distinction between the reading head and the matching magnetic scale. The product itself comes with an aluminum base. Generally, only the wire length and the effective travel length need to be selected. In special cases, please contact for further communication.

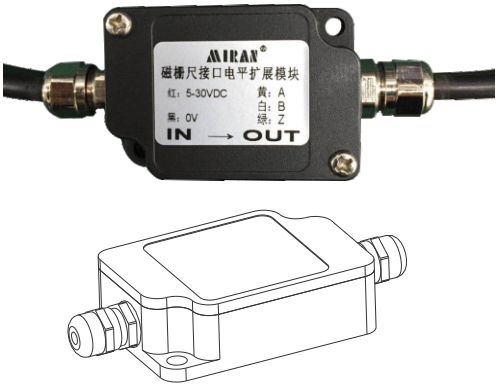
电气指标Electrical indicators

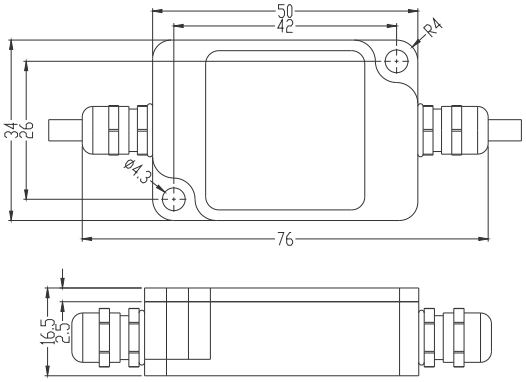
参数 Parameters / 产品 Offerings	MSK/MR50增量式磁栅尺 MSK/MR50 Incremental Magnetic Encoder
分辨率 Resolution	1μm（默认）/5μm 1 μm (default) / 5 μm
工作电压 Operating Voltage	标准供电电压5VDC (最高24VDC) standard supply voltage 5VDC (up to 24VDC)
输出信号 Output Signal	脉冲单端信号A/B/Z(默认)；脉冲差分信号A+/B+/Z+/A-/B-/Z-(可选) pulse single-ended signal A/B/Z (default); pulse differential signal A+/B+/Z+/A-/B-/Z- (optional)
安装间隙 Mounting Clearance	Max. 2.5mm
空载电流 No-load Current	Max. 30mA
输出电流 Output Current	Max. 50mA（每路信号） Max. 50mA (per signal)
工作温度 Operating Temperature	-20°C~+85°C
保护等级 Protection Level	IP68（IEC60529:2001）

注：MSK增量式磁栅尺默认是5V供电最稳定，属于TTL信号，24V供电也可以；如果客户需要24V供电HTL信号格式的，那么就需要配电平扩展模块，需要确认客户现场支持TTL信号格式还是HTL信号格式。

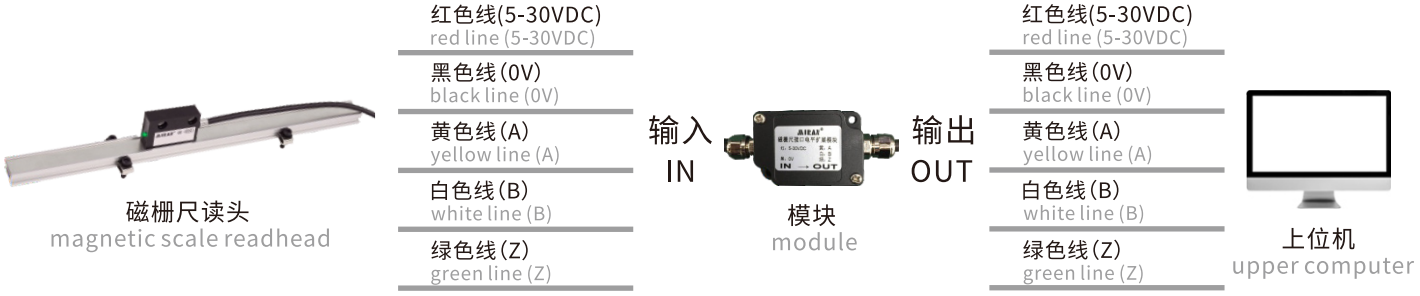
Note: The MSK incremental magnetic encoder is most stable when powered by 5V. It operates in a TTL signal format. 24V power supply is also possible. If the customer requires a 24V power supply with an HTL signal format, then a power distribution expansion module will be needed. It is necessary to confirm whether the customer's site supports the TTL signal format or the HTL signal format.

磁栅尺接口电平扩展模块
Magnetic Scale Interface Level Expansion Module





模块接线示意图module wiring diagram



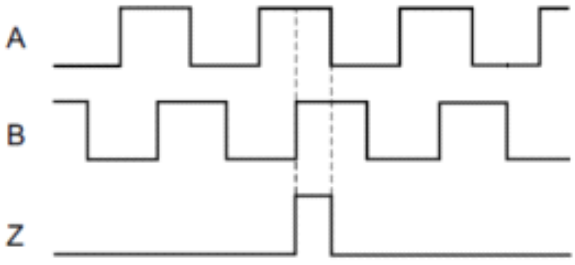
指示灯示意图Indicator Light Schematic



绿 色:工作正常
Green: working normally
红绿色:磁信号太弱,需检查
Red-green: magnetic signal
Too weak, need to check

注:指示灯只能提示工作电源和磁尺信号是否正常,并不能保证安装后的测量精度,如果需要提高精度请在安装时尽量将读磁头靠近磁尺。
Note: The indicator light can only indicate whether the working power supply and the signal of the magnetic scale are normal or not, it does not guarantee the measurement accuracy after installation, if you need to improve the accuracy please try to put the reading head as close as possible to the magnetic scale when installing.

时序图chronology

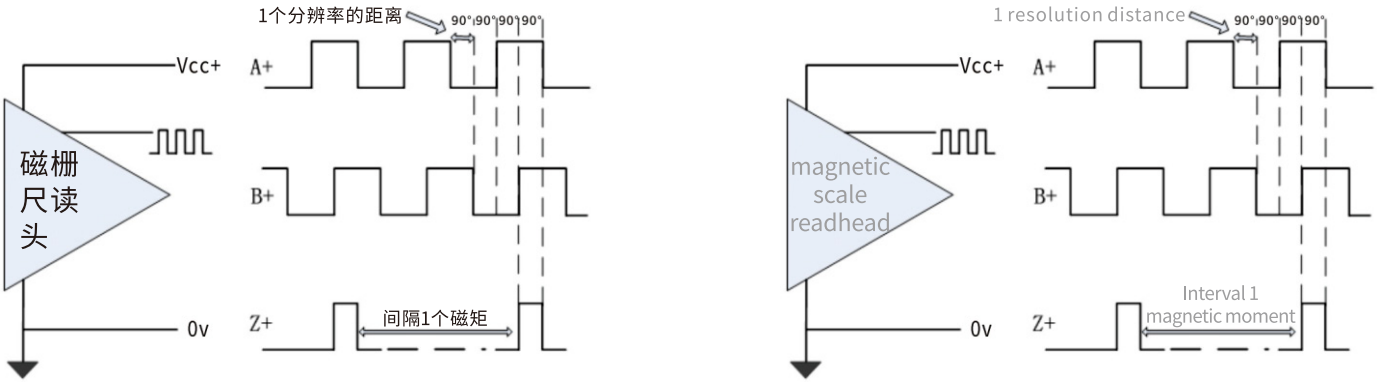


注:Z信号每5mm有一个脉冲。
Note: Z signal has one pulse every 5mm.

脉冲信号输出定义Pulse signal output definition

接线定义 wiring definition	红色 RED	黑色 BLACK	黄色 YELLOW	白色 WHITE	绿色 GREEN
	+VCC	OV	A	B	Z

单端输出模式single-ended output mode



注：输出信号默认为脉冲A/B/Z，如果需要差分输出信号下单需备注。

Note: The output signal is pulse A/B/Z by default, if you need differential output signal, you need to make a note.

差分信号输出定义Differential Signal Output Definition

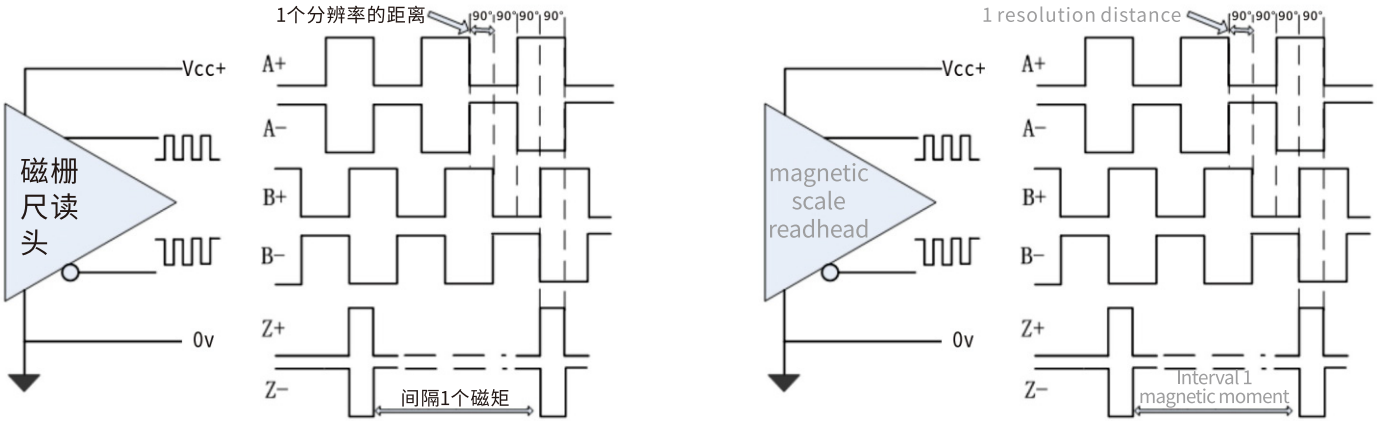
接线定义 wiring definition	红色 RED	黑色 BLACK	黄色 YELLOW	白色 WHITE	绿色 GREEN
	+VCC	OV	A+	B+	Z+

棕色 BROWN	蓝色 BLUE	灰色 GRAY
A-	B-	Z-

对于需要长距离传输或强干扰的环境，建议选择RS422差分传输方式，并使用差分屏蔽专用线材进行延长连接。

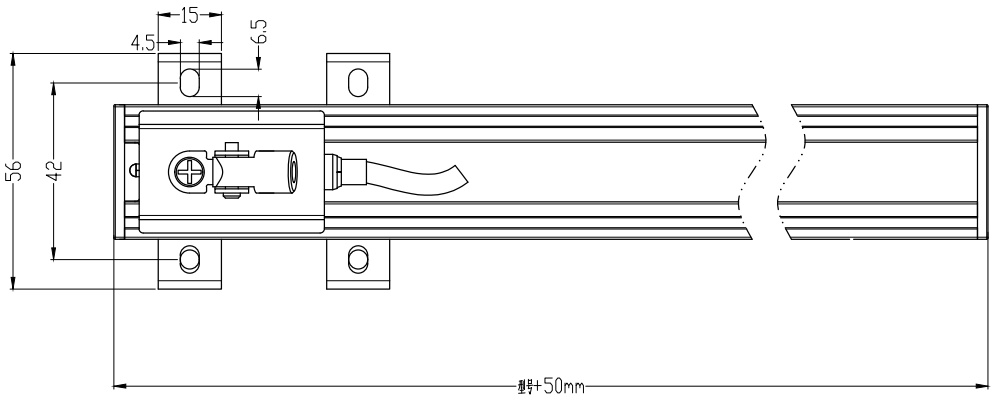
For long distance transmission or strong interference environment, it is recommended to choose RS422 differential transmission method, and use differential shielding special cable for extension connection.

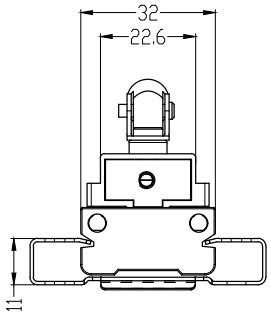
RS422模式RS422 mode

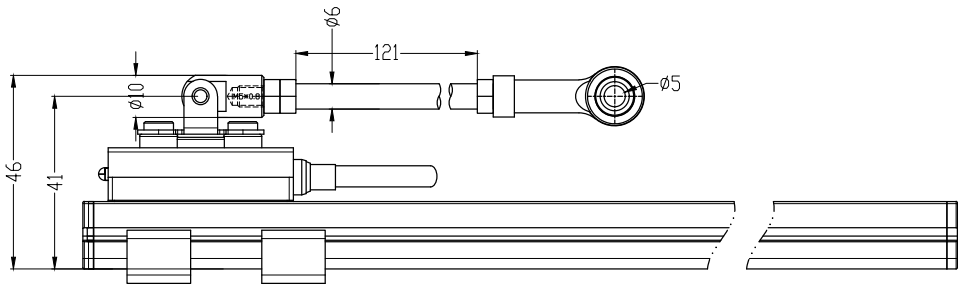


产品尺寸图Product Dimension Drawing

MSK增量式磁栅尺
MSK Incremental Magnetic Encoder



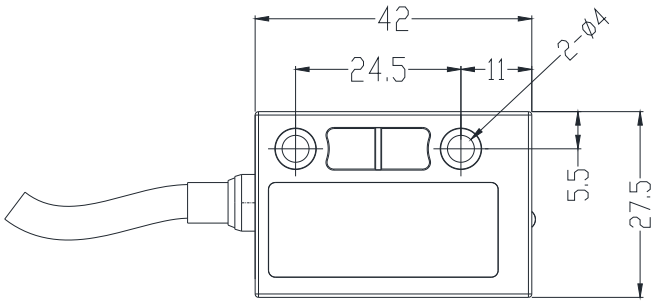






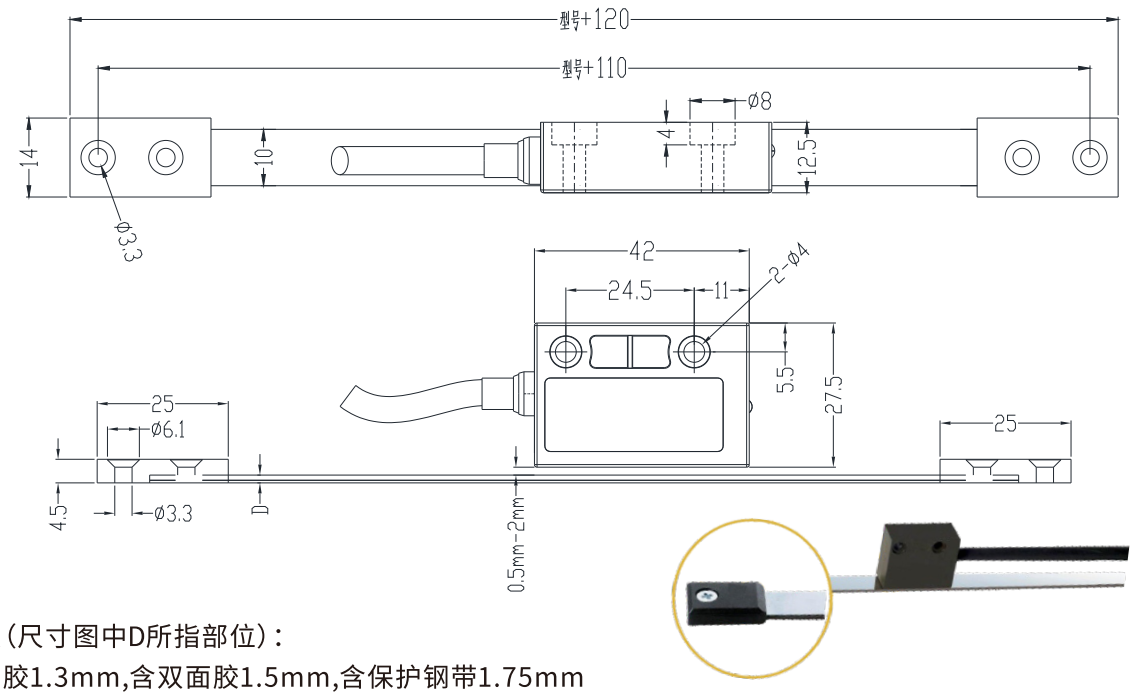
MR50增量式磁栅尺
MR50 incremental magnetic scale

读头Readhead



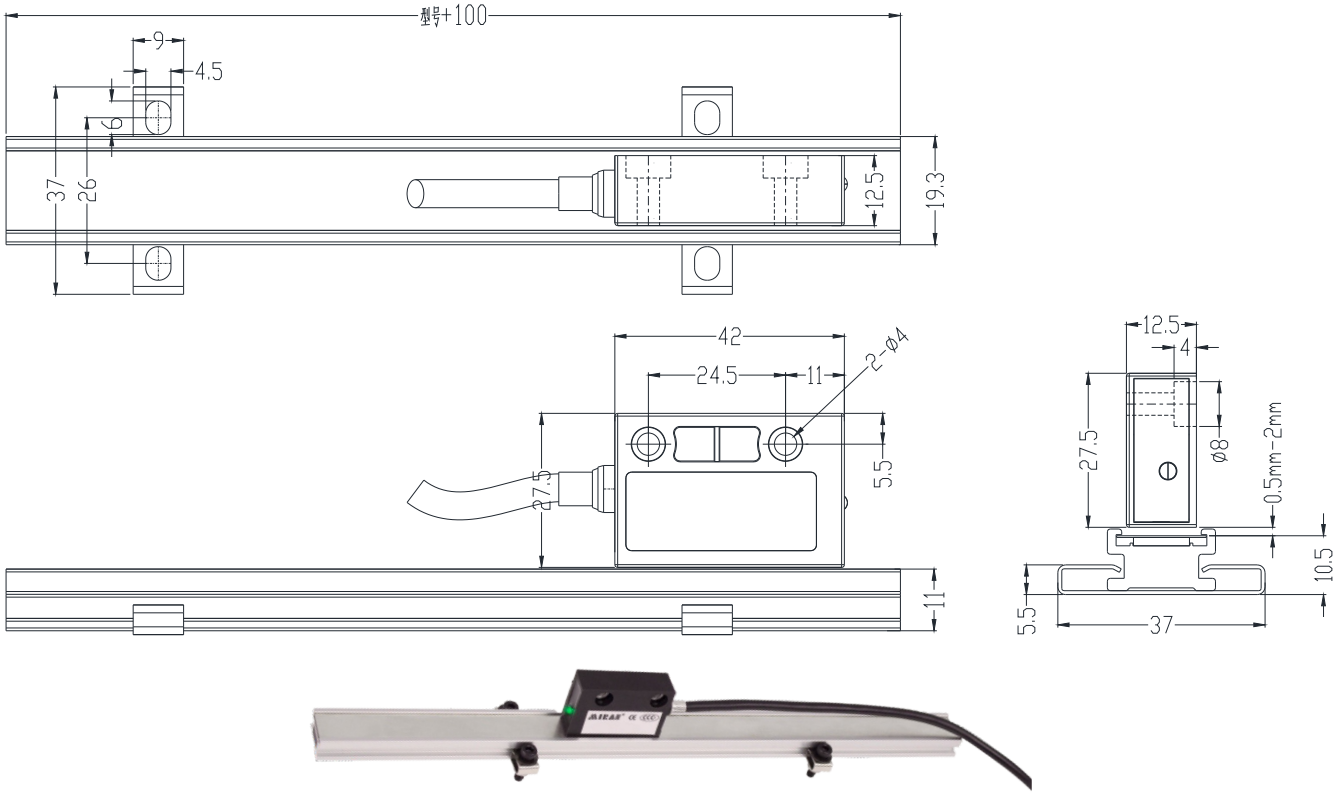


磁尺(不带铝制底座)MS50
Magnetic Scale (without Aluminum Base) MS50



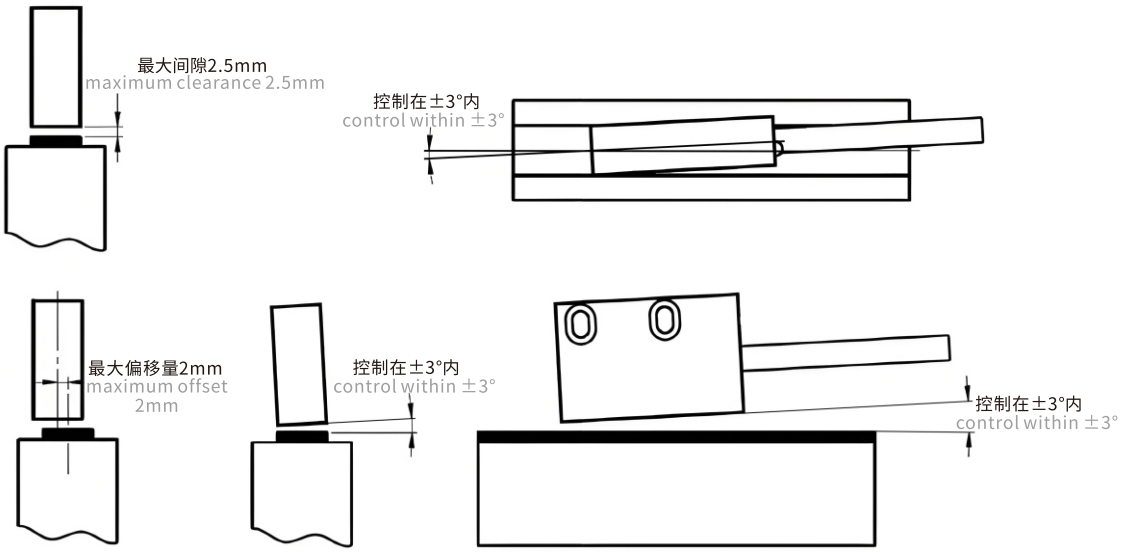
磁尺厚度(尺寸图中D所指部位):
不含双面胶1.3mm,含双面胶1.5mm,含保护钢带1.75mm
Thickness of magnetic tape (the part pointed out by D in the dimension drawing):
1.3mm without double-sided tape, 1.5mm with double-sided tape, 1.75mm with protective steel tape

磁尺(带铝制底座)MSS50
Magnetic Scale (with Aluminum Base) MSS50



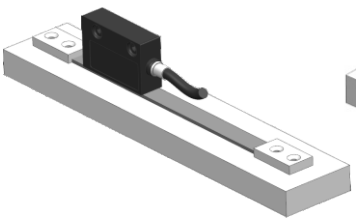
安装要求Installation Requirements

MR50磁栅尺安装要求
MR50 Magnetic Scale Installation Requirements

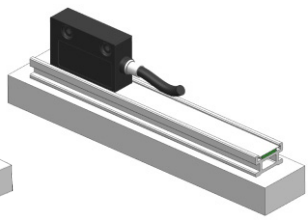


磁尺(不带铝制底座)MS50安装：
Magnetic Scale (without aluminum base) MS50 mounting:

平面固定方式
flat fixing method

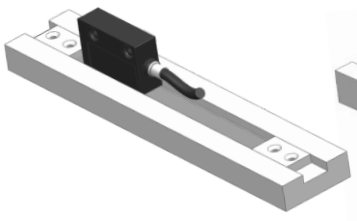


不带铝制底座
without aluminum base

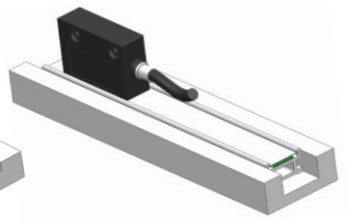


带铝制底座
with aluminum base

安装槽固定方式
mounting slot fixing method

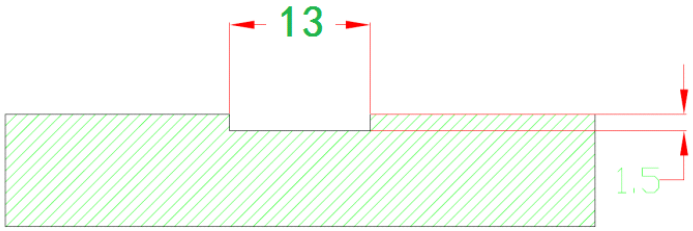


不带铝制底座
without aluminum base



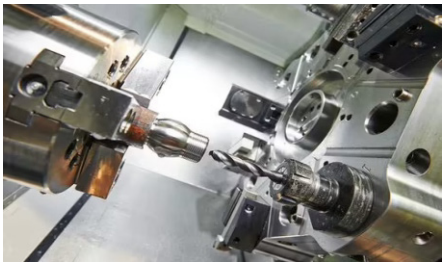
带铝制底座
with aluminum base

采用安装槽方式进行安装时，预先开设的安装槽的尺寸如下图。
When mounting by the mounting slot method, the dimensions of the pre-opened mounting slot are shown below.

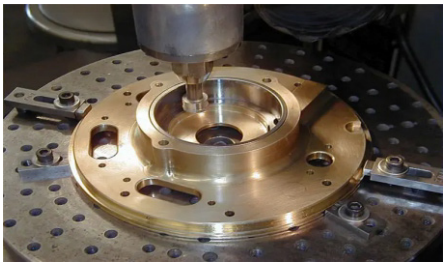


磁尺可以水平安装和侧装，但尽量避免倒置安装。
The magnetic tape can be mounted horizontally and sideways, but try to avoid mounting it upside down.

应用领域Areas of application



• 设备位移监测
Equipment displacement monitoring



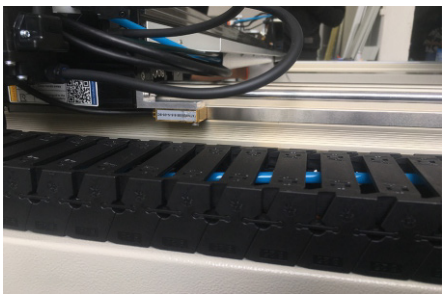
• 金属加工定位
Positioning for metal processing



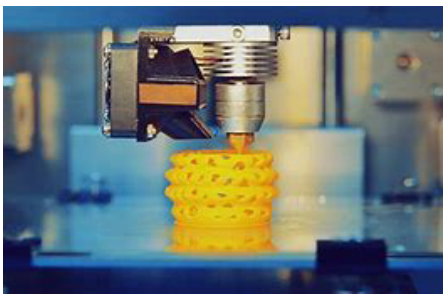
• 机床监测定位
Machine monitoring and positioning



• 工业自动化
Industrial automation



• 激光切割机
Laser cutting machine



• 印刷设备检测
Printing equipment testing



• 塑料加工检测
Plastic processing inspection



• 电子组装设备
Electronic assembly equipment

• • •

磁栅尺位移传感器应用场所极多，随着核心技术的发展，磁栅尺位移传感器得到越来越广泛的应用。
Magnetic scale displacement sensors are used in a wide variety of applications, and with the development of core technology, magnetic scale displacement sensors are becoming more and more widely used.

适合应用于木工、石材加工、锯切、金属切削、纺织、印刷、包装、塑料加工、自动化系统、切割设备、电子组装设备、测量/检测设备等。
Suitable for applications in woodworking, stone processing, sawing, metal cutting, textiles, printing, packaging, plastics processing, automation systems, cutting equipment, electronic assembly equipment, and measuring/inspection equipment.



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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。）

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

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20261001-磁栅尺彩页
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