

ATO

ATO-LMD

Incremental magnetic gate encoder
system specification



Application field

Linear motor module manufacturer, screw module manufacturer, system integrator, automation equipment manufacturer, regional generation. New energy, automotive, industrial robots, semiconductor equipment manufacturers, machine tool equipment manufacturers, multi-acting torque converter motors, etc.

Introduction

Thank you for choosing our products. In order for you to better use our products, please read this manual carefully before installing and using the product, so that you have a preliminary understanding of the product and follow the necessary operating specifications. As the product is updated or upgraded, the content of this manual will be modified accordingly. Our company reserves the right to modify the content of this manual without prior notice. The copyright of this manual belongs to our company, and the content of this manual shall not be copied or copied in any form or means without permission.

Usage specification

In order to keep the equipment in the best condition and extend the service life, please read this manual carefully before use. Note the following:

1. Comply with all warnings marked on the equipment;
- 2, away from the environment easy to produce static electricity;
- 3, the use of matched power supply voltage range;
- 4, do not use the same AC power socket with high-power or electrical equipment that is easy to cause voltage fluctuations;
- 5, do not disassemble this product, to prevent damage to the equipment, electric shock or other dangers, if you need to repair, please contact the service provider.
- 6, during the installation process, it is recommended that the installation personnel wear gloves to prevent scratching the high-precision induction surface;
- 7, in the process of use, if there are other abnormal conditions, please record the current equipment status in detail, and contact the service provider.

LMD incremental magnetic gate encoder system specification

Product overview

The LMD incremental magnetic grating encoder is a displacement sensor that measures by the magnetic interaction between a magnetic grating scale and magnetic resistance. It is mainly applied in various fields. A kind of automated motion control scenario. As an advanced position and speed control feedback unit, this encoder integrates a conversion module and data. The non-contact measurement with digital signal output, combined with the magnetic ruler, forms an open and robust magnetic measurement system. This code. The device is exquisite, compact, economical and practical. It is an excellent choice for enterprises to achieve cost reduction and efficiency improvement.



Product highlights

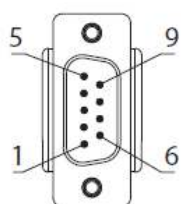
- High system accuracy and high repeatability accuracy
- High clearance tolerance, arbitrary measurement length
- It is small in size and suitable for small installation Spaces
- High resolution (magnetic pitch 2+2mm, resolution up to 1um)
- The intelligent error warning indicator light shows the working status of the encoder
- Customizable maximum output frequency (maximum output frequency up to 8000KHz)
- Industrial standard digital signals (A+,A-,B+,B-,Z+,Z-), standard RS422 differential signal
- It has a high protection level and is resistant to contamination from oil, dust, lubricants, etc
- High-quality connection wires, braided shielded wires, resistant to bending, wear-resistant and anti-interference
- Non-contact measurement, dust-resistant, wear-resistant, shock-resistant, vibration-resistant and magnetic field interference-resistant

Mechanical and electrical characteristics of the encoder

Mechanical characteristics	Power supply voltage	5V +/-5%
• Metal aluminum shell • Two M3 threaded holes are fixed • $\varnothing 5.0 \pm 0.1$ mm, TPU high flexibility, shielded 8-wire cable; Durability.	Magnetic pitch	2+2mm
	Resolution	1 μ m
	Repetition accuracy	$\pm 1\mu$ m
	Maximum output frequency	8000KHz
Electrical characteristics	Speed	4m/S
• The cable is flexible and wear-resistant. • The signal has good stability. • A zero position signal is periodically generated every 2mm of magnetic pole distance • Operating temperature: -10℃ to 70℃ • Storage temperature: -20℃ to 80℃.	Cable	8-core shielded wire
	Wiring method	Qualify directly
	Output form	RS422
	LED status indication	Red/Green
	Electric current	Less than 50mA
	Parameters can be customized	Resolution, output frequency, counting direction, cable length
	Protection grade	IP67

Encoder pin definition

Wire material color	red	grey	white	black	brown	yellow	green	black	Compilation line
Signal	+5V	0V	A+	A-	B+	B-	Z+	Z-	Shielding
Gaochuang SM	11	24	1	14	2	15	3	16	Shell
DB9 male	5	9	4	8	3	7	2	6	Shell
EN terminal SM	1	2	7	8	5	6	9	10	Shell
DB15 male	7,8	2,9	14	6	13	5	12	4	Shell



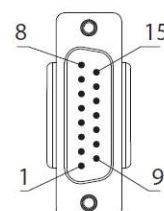
DB9 male



Gaochuang SM

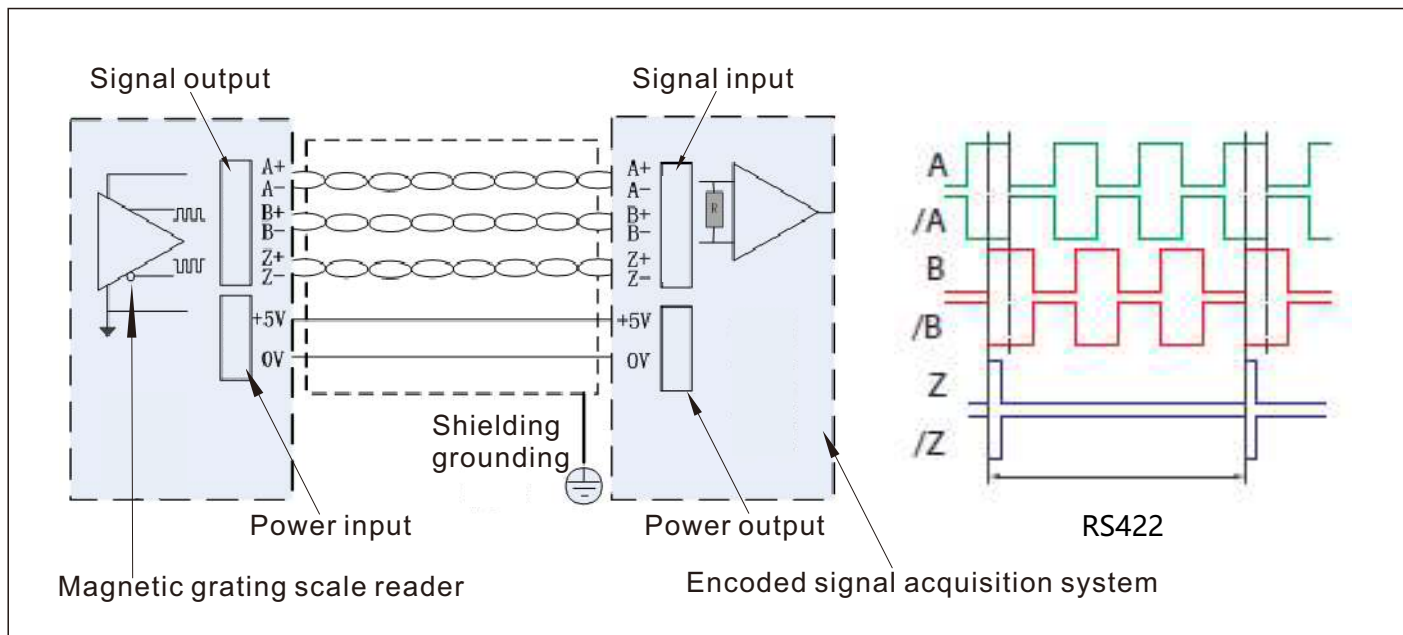


EN terminal SM

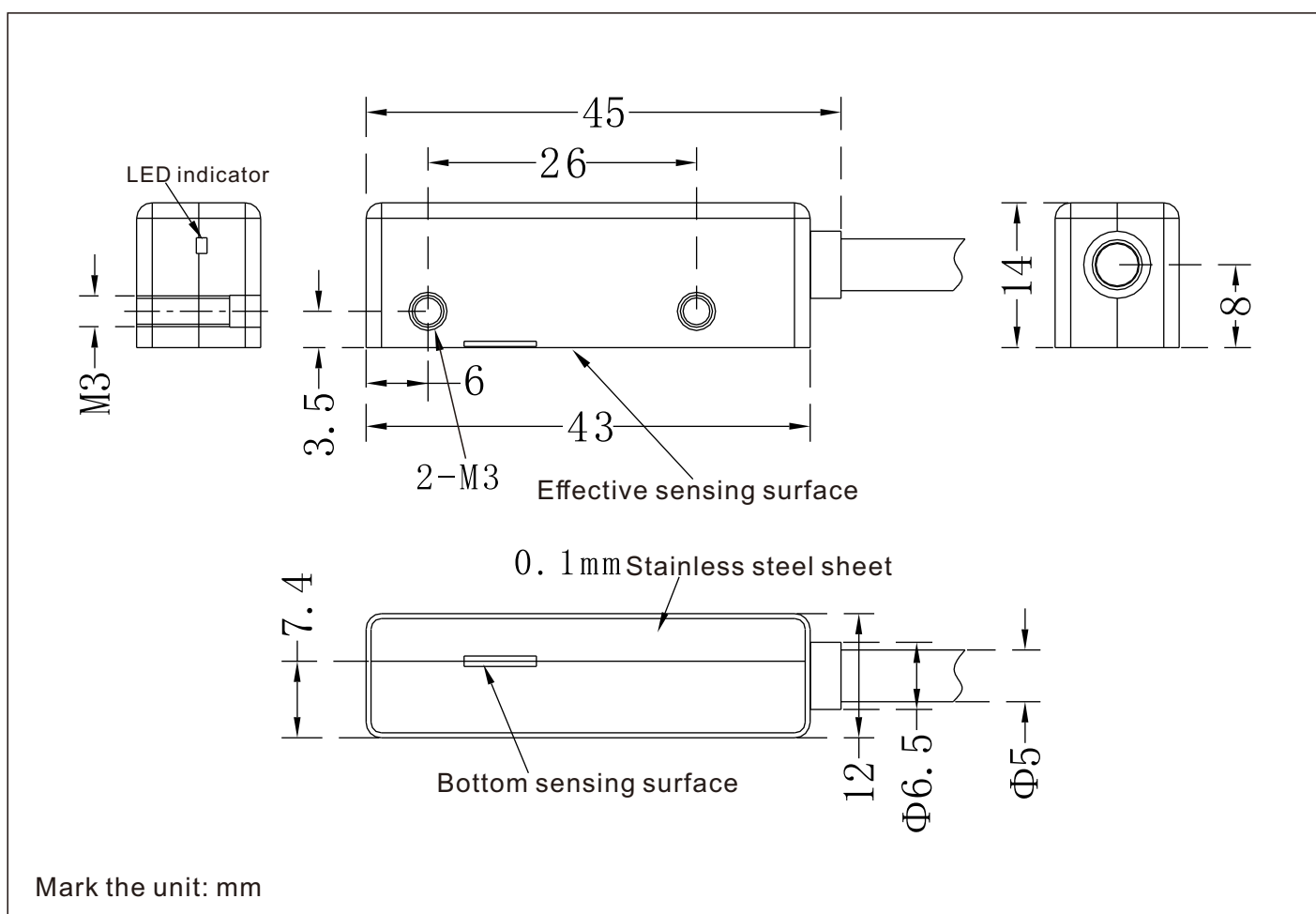


DB15 male

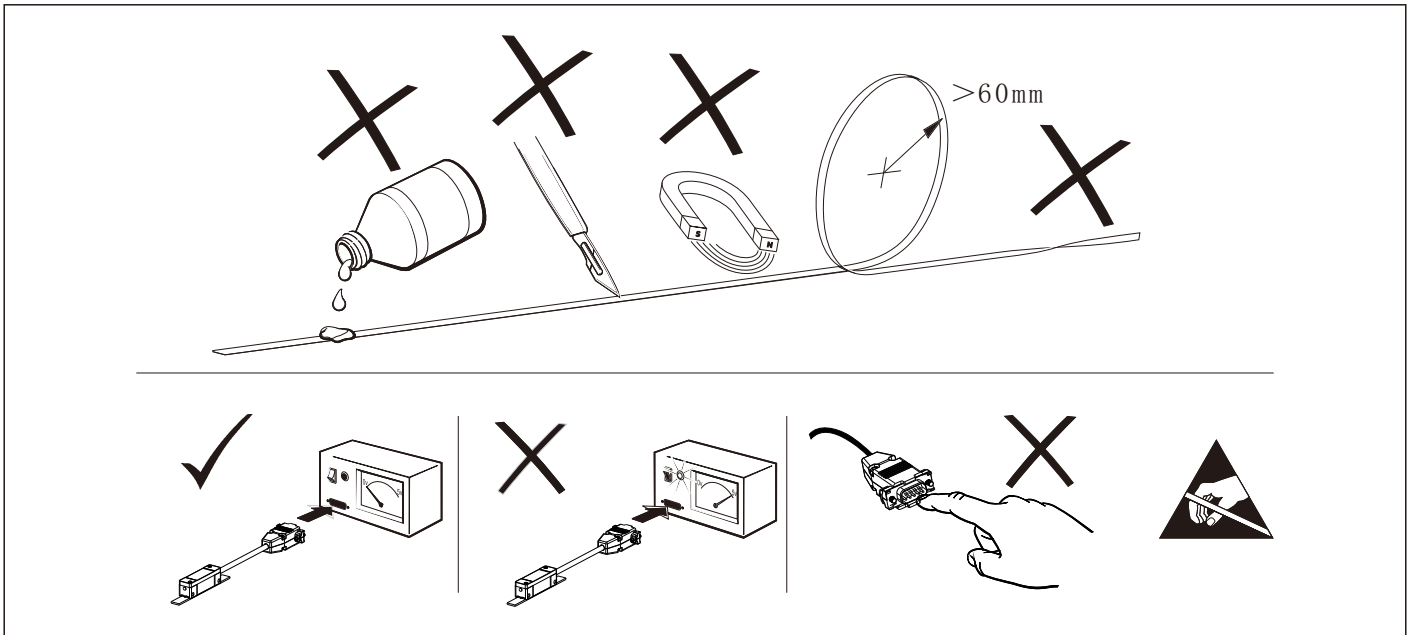
Schematic diagram of the encoder output signal



Encoder structure and guide diagram

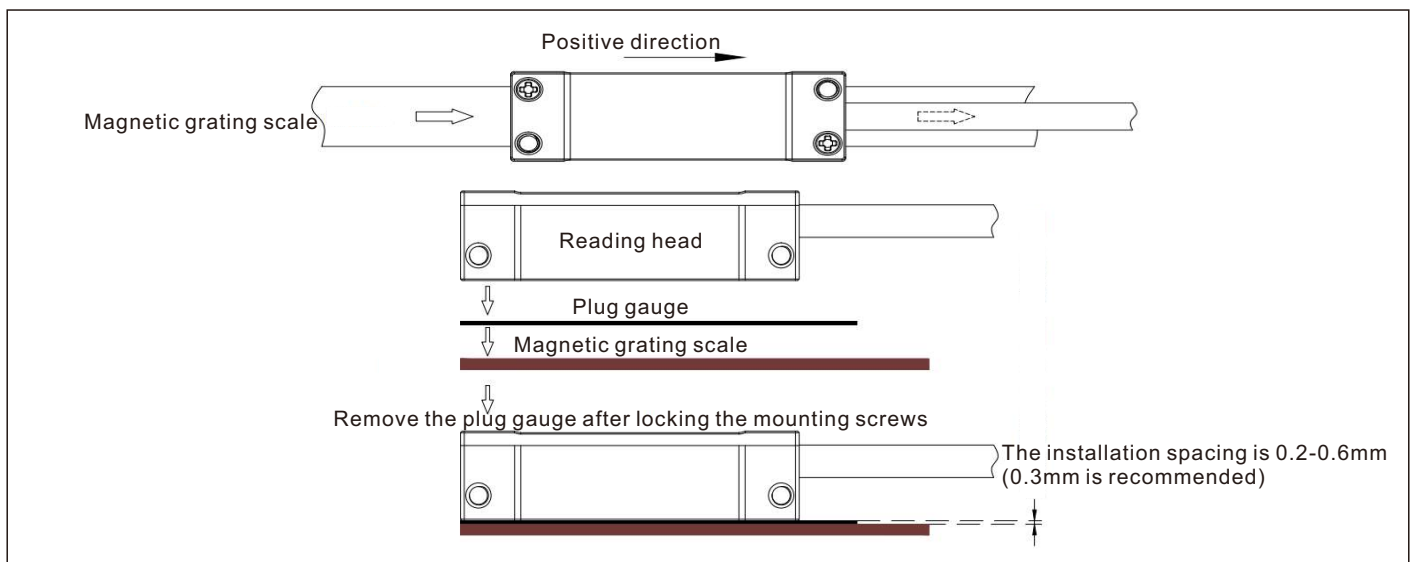


Storage and precautions



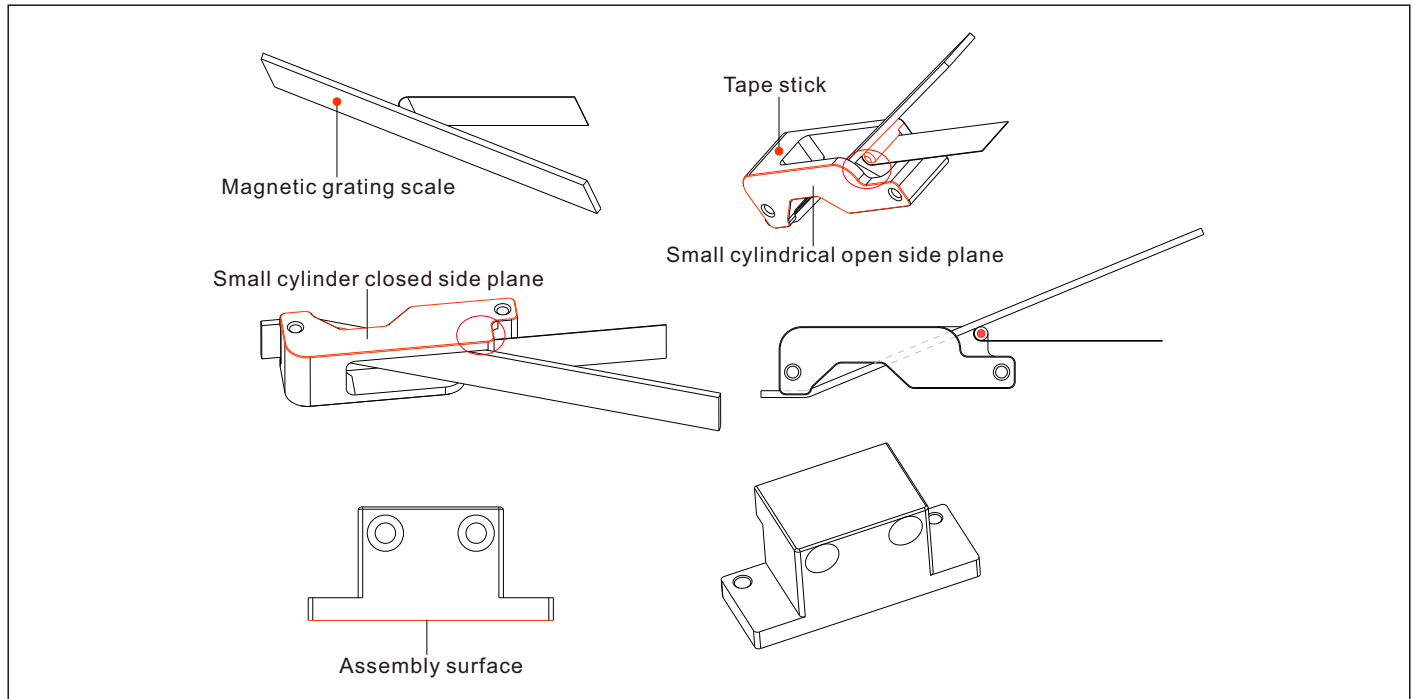
Installation instructions

1. The magnetic grid ruler must be installed using a magnetic stick to ensure that the magnetic grid ruler is parallel after installation, so as to ensure that the magnetic grid ruler and the encoder are centered.
2. The output direction of the encoder should be consistent with the direction of the magnetic grid ruler arrow. If the direction is reversed, the encoder will be steady red.
3. The installation deviation must be within the installation tolerance range. It is recommended that the encoder be installed with a limit hole to avoid tilting the reading head after locking the screw.
4. After the encoder is installed for the first time, the yellow light will be steady on when it is powered on. At this time, the encoder is in the calibration state 100mm, after the calibration is completed, the encoder will be steady green. At this time, please move the encoder back and forth to ensure that the whole process is green before running. If all the way there is a flashing light, check whether there is an installation problem.
5. The subsequent calibration needs to use the RS485 communication cable and the debugging tool to complete (see the debugging tool instructions).

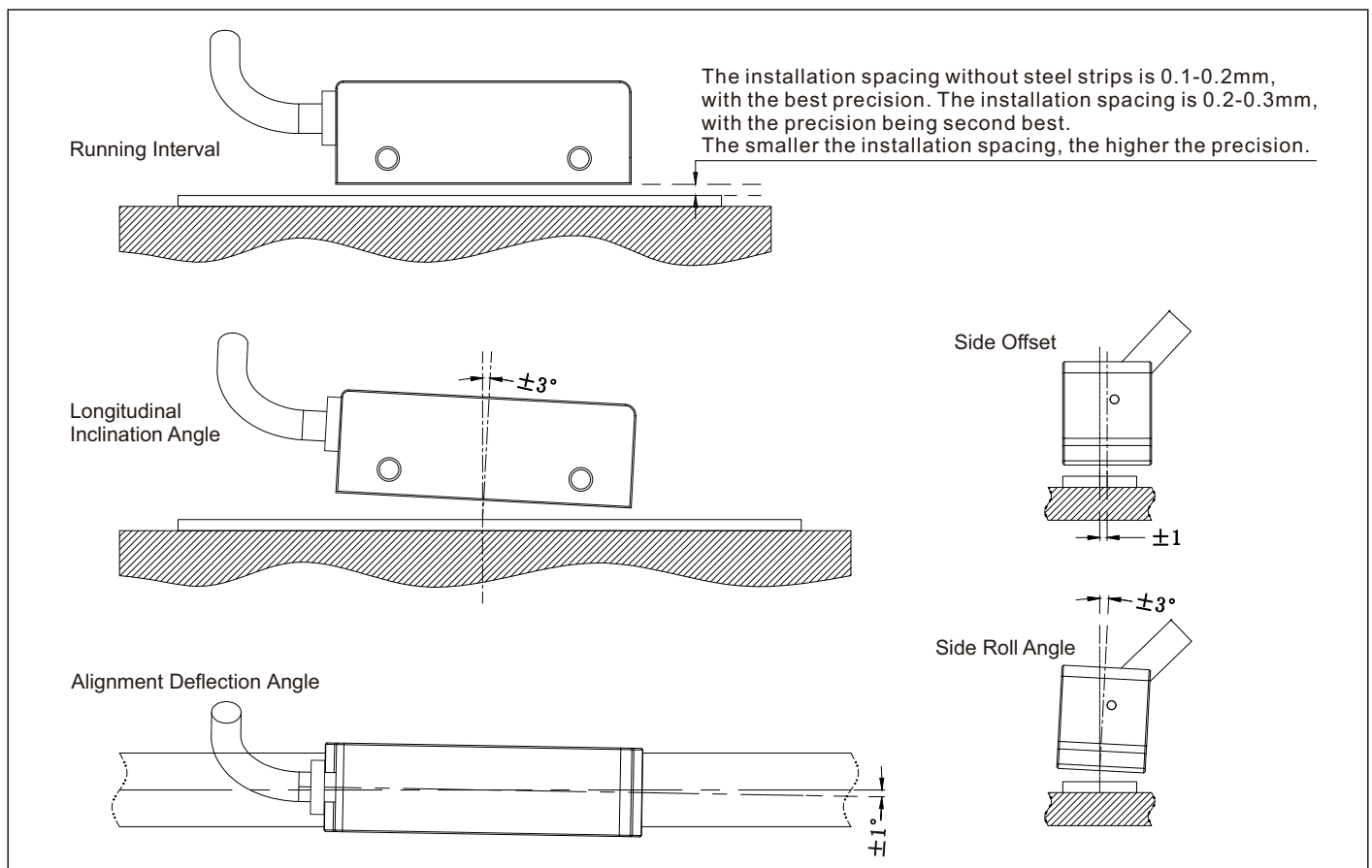


Tape guide mounting instructions

When mounting, as shown in the figure, close the closed side plane of the small cylinder to the mounting bracket assembly surface in place, and then lock the screw, and use the actuator to drive the magnet to mount the magnetic grid ruler from left to right.

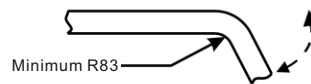
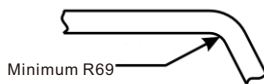
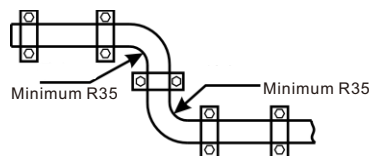


Installation tolerance



Cable installation and bending radius requirements

The cable needs sufficient strain bending capacity to avoid possible damage to the cable.

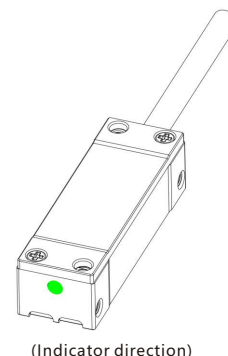


Matters needing attention

1. The distance between the encoder and the magnetic grid ruler should be within the marked range. If the distance is too far, the encoder will report errors or flash lights. Too close a distance will cause contact friction, which will cause damage to the magnetic grid ruler or encoder.
2. The Incremental magnetic grid encoder system must be used in accordance with the allowed protection range. The following factors must be considered: IP protection level, operating temperature, external magnetic field, mechanical load, and EMC compatibility.
3. The Incremental magnetic grid encoder system is very sensitive to the external magnetic field, and the degree of influence depends on the size and direction of the external magnetic field. In particular, rapidly changing stray magnetic fields can affect the system and even alter its function. The magnetic field intensity within 1mT will reduce the accuracy of the system, and the magnetic field intensity greater than 1mT will easily lead to system failure, and even the encoder will report wrong absolute position information. The magnetic field strength greater than 25mT will cause irreversible damage to the magnetic grid ruler and must be replaced.

Set-Up LED status indicator

- After the encoder is installed, the internal state of the encoder can be determined according to the display of the LED indicator.
- The slow blinking of the LED light indicates that power is being provided to the encoder, and at this time, communication between the encoder and the controller has not been established.
- The error status has a higher priority than the warning status in the LED signal.
- The LED signal may differ from the internal state of the encoder displayed by the driver.
- When the sensor moves too fast, is too far from the magnetic scale, or fails to sense the magnetic scale, the red LED flashes as an alarm. During normal operation, the green LED lights up.
- When powering on, the reader must not leave the magnetic strip; otherwise, it will cause the LED light to indicate incorrectly.



LED indicator	status	Description
● Green light	Normal operation	Data validity
● Red light	mistake	Invalid location data Cause: The distance between the read head and the magnetic stripe is too large. The reading direction of the read head is inconsistent with the direction marked on the magnetic stripe. The magnetic stripe is degaussed or damaged. Procedure
● Orange lamp	The light stays on	When the encoder connects to the software on the PC or the encoder enters the verification.
● >>> ●	Orange to green	The power-on initialization is complete.
● >>> ● >>> ● >>> ●	Red to orange flashing	If an error message is generated during movement, stop the pending status after the error is reported.

Order code

LMD	2	R001	V5	L1	C0	F00
A	B	C	D	E	F	G

Order details

Name	Purchase parameter	Specification	Remark
A	LMD	Direct cable output method	
B	2	A magnetic grating scale with a magnetic pitch of 2mm	
C	R001	The resolution is 0.001mm	Customer optional
D	V	V5, the power supply voltage is 5V	
E	L	The default length of the cable for L1 is 1 meter	Customer optional
F	C0	C0 is the direct output line, and C1 is the DB9 male interface	Customer optional
G	F00	Customization requirements: F00 is the standard, and F01 is the customized method for the customer	

Common faults and troubleshooting methods

A. The repetition error is relatively large

1. Is the installation distance between the sensor and the magnetic scale too far? (If there is a steel band attached, it is recommended to remove it.)
2. Is the sensor installed horizontally on the magnetic scale?

B. The sensor keeps the red light constantly on

1. Check the installation spacing of the sensors.
2. Check if the wiring definition is correct?
3. Check if the sensor has any collision or damage?

C. The sensor traffic lights are flashing

1. Check the installation spacing of the sensors.
2. Check if the pitch of the magnetic scale is 2mm?
3. Check whether the magnetic scale has polarization or demagnetization?
4. Are there any metal shavings adhering to the magnetic scale?
5. The reader enters the calibration mode.

D. The indicator light is not on

1. Check if the power connection definition is correct?
2. Check if the connection socket is properly connected?