

LOE10 Series

Optical Encoder

DATA SHEET

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Approved By:

Checked By:

Prepared By:

LOE10 Series are high-performance incremental optical encoders with A and B channel digital outputs. By using very small housing components and thin packages for emitting infrared LED and detecting photo IC, establish both high-quality outputs and compact outline. The Photo-IC uses phase array technology which effectively improves the error correction capability of the signal. LOE10 series also have a variety of resolution options to suit different detection needs.

LOE10 系列是 A 和 B 通道数字输出的高性能增量式光电编码器。通过使用非常小的结构组件和超薄封装的红外 LED 和光电检测 IC，建立起了高质量的信号输出和紧凑的外形。光电检测 IC 使用了相位阵技术，有效的提高了信号的纠错能力。LOE10 系列还拥有多种分辨率可选，以适合于不同检测需求的应用。

FEATURES

- Gap 间隙: 2.0mm
- Height 高度: 7.55mm
- Incremental output 增量输出:
Digital output (A, B 2-Channel)
数字输出(A, B 通道)
- Installation Method 安装方
Standard mounting
标准型安装方式

TYPICAL APPLICATIONS

- Robots 机器人
- FA equipments 工业控制
- OA equipments 办公设备
- Motor control 电机控制

KEY CHARACTERISTICS

Parameter	Value	Unit
Gap 间隙	2.0	mm
Vcc 工作供电电压	2.7~6.0	V
Response freq.响应频率	max.60	kHz



LOE10AF-□□



LOE10A-□□

LIGHT Optical Encoders Overview 莱特光电编码器概览

LOE 10AF-Z36

- LOE LIGHT Optical Encoder Module
- 10 Holder Type
- A Chip Version
- F Forming Lead: F, Straight Lead: Null
- Z ABZ: Z, AB: Null
- 36 Resolution

Resolution 分辨率	45LPI	90LPI	150LPI	180LPI	300LPI	360LPI
LOE10AF-□□	45	09	15	18	30	36

Absolute Maximum Ratings (Ta=25°C)

Parameter		Symbol	Min.	Max.	Unit
Input 输入	Forward Current 正向电流	I_F	---	40	mA
	Reverse Voltage 逆向电压	V_R	---	3	V
Output 输出	Supply Voltage 供电电压	V_{CC}	-0.3	14	V
Operating Temperature 操作温度*1		T_{opr}	0	85	°C
Storage Temperature 储存温度*1		T_{stg}	-40	85	°C
Soldering Temperature 焊接温度*2		T_{sol}	---	260	°C

*1. No ice-bound or dew

无结霜或者露水

*2. Min. 1mm away from resin within 5 seconds

距 LED 胶体至少 1mm，最长 5 秒

Electro-Optical Characteristics (Ta=25°C)

Parameter		Symbol	Conditions	Min.	Typ.	Max.	Unit
Input 输入	Forward current 正向电流	I_F	$I_F=10mA$	---	1.50	---	V
	Peak wavelength 峰值波长	λ_p	$I_F=20mA$	---	850	---	nm
Operating supply voltage 工作供电电压		V_{cc}	---	2.7	---	6.0	V
A,B 相输出 A,B Phase Output	Phase difference 相位差 *3,*4	θ	$I_F=10mA$ $V_{CC}=2.7$ to $6.0V$	45	90	135	deg.
	Duty ratio 占空比 *3,*5	Dt		30	50	70	%
	High level output voltage 高电平输出电压 *3,*4	V_{OH}		$V_{CC} \times 0.8$	---	---	V
	Low level output voltage 低电平输出电压 *3,*4	V_{OL}		---	---	0.4	V
	Response frequency 响应频率	f_{max}		---	---	25 *6	kHz
						60 *7	kHz

*6. Applied to the resolutions of 90LPI and less

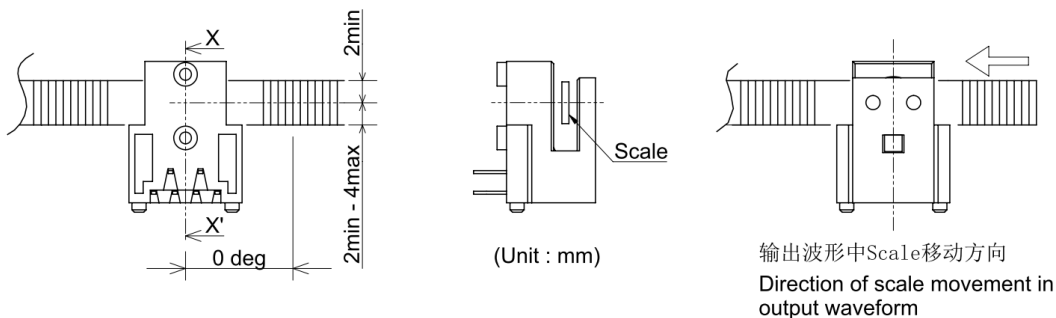
适用于 90LPI 及以下分辨率

*7. Applied to the resolutions of 150LPI and above

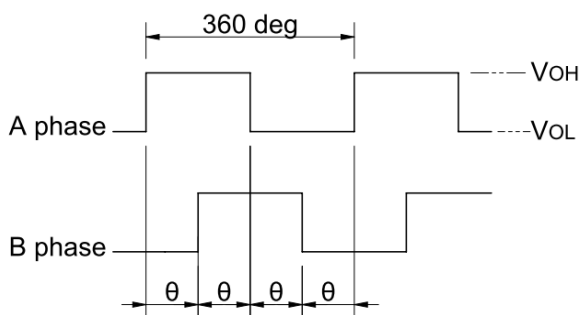
适用于 150LPI 及以上分辨率

Measurement Conditions 测量条件

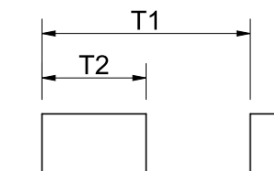
*3.Measurement methods



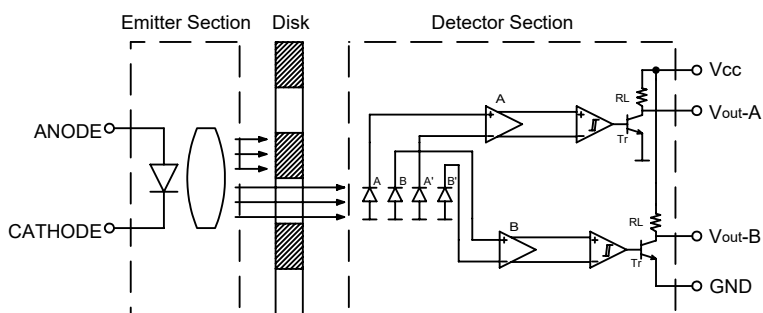
*4.Output waveform



*5.Duty ratio (Dt) $Dt=T2/T1 \times 100$

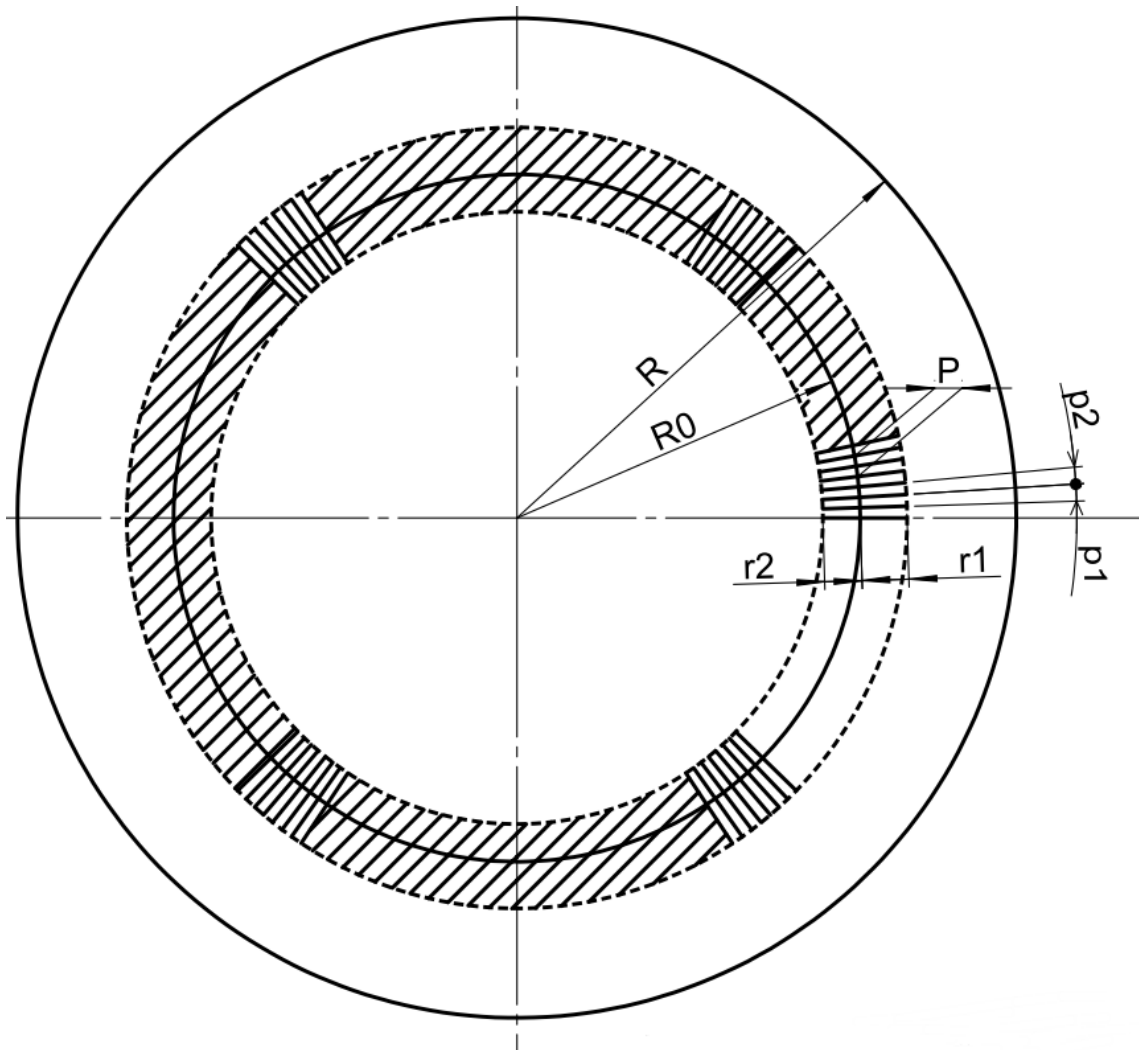


Block Diagram 原理图



Code Disk	RL (Pull Up)
45 LPI	10 K Ω
90 LPI	10 K Ω
150 LPI	5 K Ω
180 LPI	5 K Ω
300 LPI	2.5 K Ω
360 LPI	2.5 K Ω

Disk Design Reference 码盘设计参考



*3.Measurement methods

R0: Rotary Disk Center Radius, 码盘中心半径

P: Slit Pitch on R0, R0 上的狭缝间距 ($p_1=p_2=P/2$)

N: Slit Counts, 狭缝数

Calculate R0, 计算 R0

$$R0 = P * N / 2\pi \quad (P = 25.4 / \text{LPI}[\text{分辨率}])$$

Conditions 限制条件:

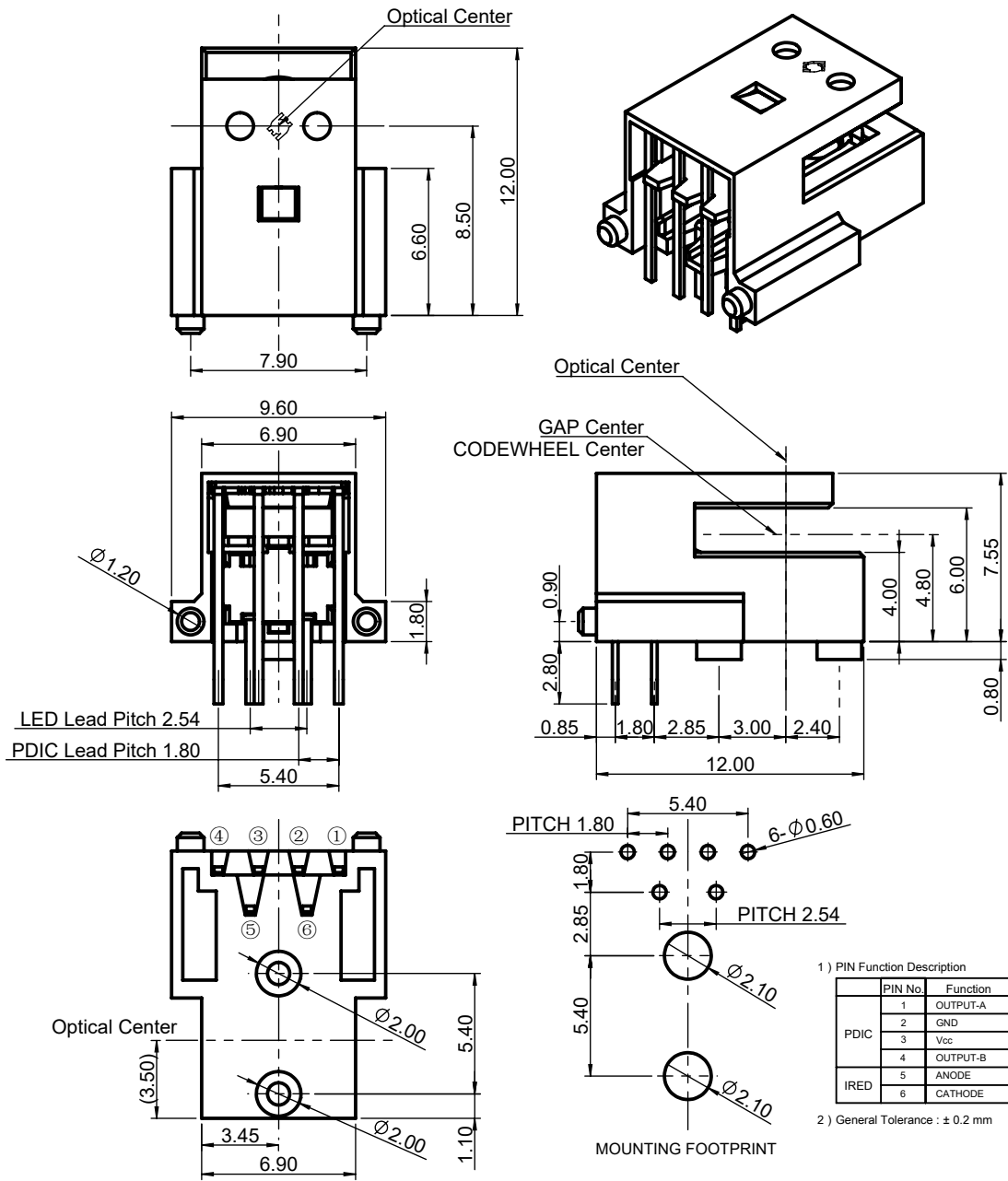
$$-20 \leq R0 \leq \infty \quad (\infty = \text{Linear scale})$$

$$-R0 + 2.5 \leq R \leq R0 + 3.5$$

$$-r1 \geq 1, r2 \geq 1$$

Units: (mm)

Dimensions 外形尺寸 (LOE10AF)

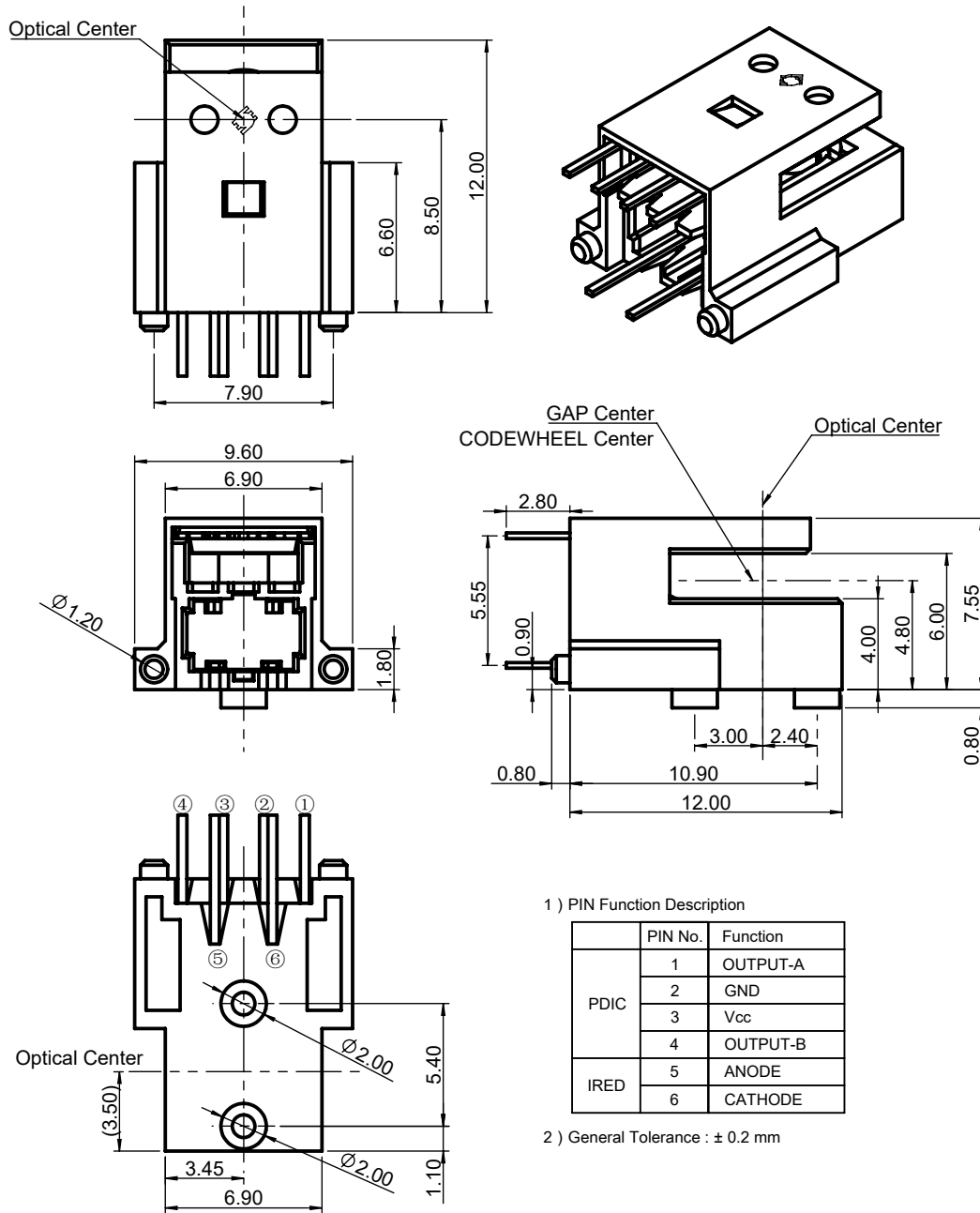


1) PIN Function Description

	PIN No.	Function
PDIC	1	OUTPUT-A
	2	GND
	3	Vcc
IRED	4	OUTPUT-B
	5	ANODE
	6	CATHODE

2) General Tolerance : ± 0.2 mm

Dimensions 外形尺寸 (LOE10A)



Packing Specification 包装规格

1. A number of products are packed in a tray and then piled up together. (Fig.1)
将一定数量的产品放入托盘并捆包 (图 1)

2. A bundle of trays are put in a card board box #1. (Fig.2)
托盘捆包后放入 1 号纸箱 (图 2)

3. An outer box (card board box #2) is used depending on the quantity. (Fig.4)
根据数量使用外箱 (2 号纸箱) 包装 (图 4)

4. Quantity in boxes
装箱的数量

Device Model 产品名称	QTY in a Tray 每托盘数量	QTY in Box #1 1 号箱数量	QTY in Box #2 2 号箱数量
LOE10	170	Max.3,400 最多 3,400	Max.6,800 最多 6,800

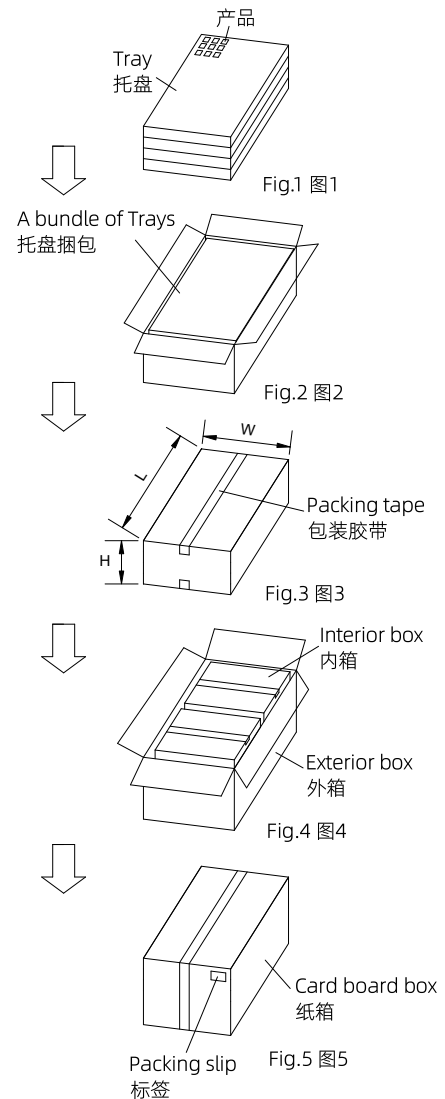
5. Dimensions of boxes
包装箱的尺寸

Card Board Box 纸箱名称	Size (W×L×H) mm 尺寸 (W×L×H) mm	Interior Boxes 内箱
BOX #1	250×360×240	---
BOX #2	380×530×275	BOX #2×2

6. Packing slip information

标签信息

- 产品型号 Model Name
- 数 量 Quantity
- 等 级 Bin
- 包装日期 Packing Date
- 客户料号 Customer P/N
- 生产批次 Lot NO.



深圳莱特光电股份有限公司 Light Electronics CO., LTD.		
产品型号 MODEL NAME:		
数 量 QUANTITY:		
等 级 BIN:		
包装日期 PACKING DATE:		
备注 REMARKS:		
	LOT NO. :	

Soldering Profile 焊接条件

1. Manual Solder 手工焊接

Temperature at iron tip 烙铁头温度	Max. 350°C
Soldering time 焊接时间	Max. 3 secs
Note 注意事项	Min. 1mm away from the bottom of the holder 距离外壳断面 1mm 以上

*After soldering, do not apply stress to the terminals until returning to room temperature.
焊接后，在产品恢复到室温之前不要对灯脚施加外力。

2. Wave Solder 波峰焊接

Pre-heat temperature 预热温度	Max. 90°C
Pre-heat time 预热时间	Max. 70 secs
Soldering temperature 焊接温度	260°C
Soldering time 焊接时间	Max. 5 secs
Note 注意事项	Min. 1mm away from the bottom of the holder 距离外壳断面 1mm 以上

*After soldering, do not apply stress to the terminals until returning to room temperature.
焊接后，在产品恢复到室温之前不要对灯脚施加外力。

Notes for Use 使用上的注意事项

- The products is recommended to use under the conditions at IF=10mA, Vcc=3.3V or 5.0V.
推荐的使用条件：IF=10mA, Vcc=3.3V 或 5.0V。
- In order to stabilize power supply, connect a by-pass capacitor of 0.1uF or more between Vcc and GND.
为使供电更稳定，推荐在 Vcc 和 GND 之间添加 0.1uF 以上的旁路电容。
- Disk: set the printing side of the disk as the light receiving side.
请将码盘的印刷面朝向发光侧使用。
- Please do not share the GND terminal of the encoder with other components such as motor circuits.
请不要把编码器的 GND 管脚和其他电路，如电机，共地使用。
- Do not get dust or dirt blocking the light path.
发光侧和接收侧的光路不可有灰尘堵塞。