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Selection Guide

上海前卫爱福蒙 / 选型指南



Encoder Manual 编码器

[www.qwifm.com](http://www.qwifm.com)

前卫爱福蒙  
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# BRIEF INTRODUCTION

## 企业简介

上海前卫爱福蒙电气有限公司是一家集设计开发、生产、销售于一体的专业的开关电源制造商。我公司拥有独立的研发部门，专业的研发团队，并吸取众家之长，所设计的产品在品质、外观方面均可与任何厂家媲美。

我们拥有各类先进的生产和检测设备，具备小中大功率规格开关电源，产品涵盖 AC/DC 和 DC/DC 的标准品、防水 LED 电源、防雨电源、导轨安装式电源及特殊定制品。我们一直致力于通过不断研发和质量管理，以高质量和多种类型的产品及可靠的服务来满足用户的需要。

公司已全面通过 ISO90001:2000 国际质量体系认证，大部分产品通过欧共体 CE 认证，并始终贯彻执行“今天的质量，明天的市场”的质量方针，使企业得到了飞速的发展。

**qwifm** 在中国已被业界公认为开关电源行业的领导品牌，并日益成为全球开关电源领域的知名品牌。

Shanghai QWINWELL IFM Electric Company is a switching power supply manufacturer, specialized in research and development, production and marketing. We have independent department and technical office for research and development. We also manage to accumulate other companies' strong points so that the products could compare with others about both the quality and the outward appearances.

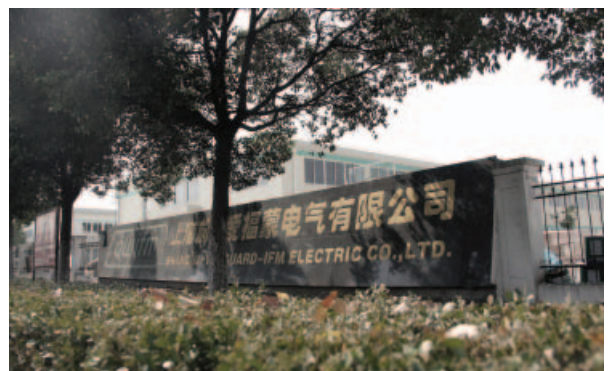
Equipped with various advanced devices for products manufacturing and quality inspecting, we have been able to provide switching power products with wide range of wattages. And the products we can supply includes standard AC/DC supply, Din-rail power supply and some other special items. We have also been dedicated to improving the management systems of both technical and quality development as well as our services.

By sticking to the quality guideline that Today's Quality Should be the Assurance of Tommorrow's Market and with the efforts of the whole staff, our company has got the international quality approvals by ISO9001:2000 system and has developed the products into the advanced standard of the world with majority of them having gained CE approvals by European Community.

QWIFM, has been the leading brand in switch power supply market and gradually gained its global reputation among industrial areas.



Shanghai QWINWELL IFM Electrics Company  
[www.qwifm.com](http://www.qwifm.com)





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### 原理

旋转编码器是集机、光、电技术于一体的位移传感器，通过光电转换，可将角位移、角速度等机械位移量转换成相应的电脉冲或数字信号输出的位移传感器。它采用了光电扫描原理，其读数系统是基于径向分度盘的旋转，该分度盘是由交替的透光窗口与不透光窗口构成的，此系统用红外光源垂直照射。当编码器轴带动分度盘旋转时，发光器件发出的光经旋转的分度盘、指示盘遮掩，形成变化的光信号并被感光器件感受，感光器件将感受到的光信号变化转换成电信号变化，产生初始信号，该信号经后续电路处理后，输出脉冲（或代码）信号。

要使编码器输出信号上升到较高电平，具有信号强、反差高的特点，并产生没有任何干扰的方波脉冲，读数系统就必须采用差分方式的电子电路处理，即将两个同类信号但电气上相位差  $180^\circ$  的信号行比较，以便提高输出信号的质量和稳定性。

### WORKING PRINCIPLE

Rotary encoder is displacement transducer composed of optic mechanical electric technology, a displacement transducer converts mechanical displacement of angular displacement angular speed, etc into relevant electrical pulse or digital signals output by photoelectric conversion, It applies photoelectric scanning principle, its reading system is based on rotation of radial index plate, this index plate is consisted of alternate nonopaque window and opaque window, This system used in vertical irradiation of infrared source, when encoder axis drives the index plate's rotation, light from luminescent device through the rotating index plate, indicator plate's cover, to form varied optical signal and be felt by sensitive device, this sensitive device transfers received optical signal variation to electrical signal variation, produce initial signal, this signal will be disposed by following circuit, output pulse (code) signal.

If made encoder's output signal rising to upper electrical level, has the features of strong signal and high contrast, produces square wave pulse without any interference, Reading system must apply the disposal if electronic circuit in differential mode, this means to compare two signal lines that having generic signal but phase quadrature  $180^\circ$  in electricity, in order to improve to improve the quality and stability of output signals.

### 特点

旋转编码器具有体积小、重量轻、品种多、成本低、力矩小、耗能低、分辨率高、精度高、频响高、安装方便、承载力大、抗干扰能力强、性能稳定、使用寿命长等特点：

- 使用温度范围广：  $-10^\circ\text{C} \sim 70^\circ\text{C}$ ；
- 最高转速可达： 12000rpm；
- 耐震动强度可达：  $100\text{mm/s}^2$  ( 5~200Hz ) ；
- 抗冲击强度可达：  $1000\text{m/s}^2$  ( 10ms ) ；
- 频率响应最高可达： 300KHz；
- 分辨率从： 10~18000P/R
- 精度范围从：  $10'' \sim 0.1''$  ；
- 使用寿命可达 100,000 小时，平均无故障工作时间可至 10,000 小时；广泛应用于空间位置测量、线位移测量、角位移测量、速度位移测量、自动控制等行业。

### FEATURES

Rotary encoder has series features, such as compact volume, light weight, more variety, low cost, small torque, low wasted energy, high resolution ratio, high precision, high frequency, easy installation big bearing capacity, strong anti-interference Performance, stable capability, long service life ect.

- Widely using temperature range:  $-10^\circ\text{C} \sim 70^\circ\text{C}$  ;
- The highest revolution can reach: 12000 rpm;
- Oiseismatic strength can reach:  $100\text{mm/s}^2$  ( 5~200Hz ) ;
- Impacttrenchth can reach:  $1000\text{m/s}^2$  ( 10ms ) ;
- Highest frequency response can reach: 300KHz;
- Resolution ratio: 10~18000P/R
- Precision range:  $10'' \sim 0.1''$ ;
- Service life can reach 100,000 hours, average failure-free working time can reach 10,000 hours; Widely applicable for the industries of spacial location's measurement, linear displacement's measurement, angular displacement's measurement, speed measurement and automatic control.

## 旋转编码器订货须知

在选择旋转编码器的型号时，请注意以下几点：

- 分辨率：与位置精度的关系；
- 外观尺寸：与安装空间的关系；
- 轴允许负载：与寿命、安装状况的关系；
- 允许最高转速（最高响应频率）：马达等驱动轴的转数与分辨率的关系；
- 输出相位差：与 NC 机械等用的控制部分的匹配情况；
- 对环境的适应性：与使用环境的关系；
- 增量型、绝对值型；考虑到成本、是否需要在切断电源时能检测绝对值位置，有无计数器、抗噪音性能等。

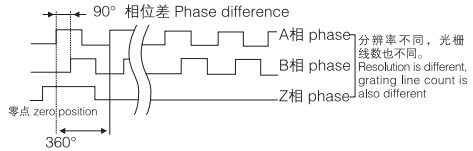

## ROTARY ENCODERS'ORDER NOTICE

When select rotary encoder's type, please notice the following points:

- Resolution ratio: the relation with location precision;
- Size appearance: the relation with installation space;
- Axial allowable load: the relation with service life installation conditions;
- The allowable highest revolution (the highest responses frequency): the relation with revolution and resolution ratio of motor.
- Output phase difference: match condition of control of control section used same as NC machine;
- Adaptability to Ambient: the relation with operating ambient.
- Incremental export type absolute type: consider the cost whether or not need detect absolute value position when cut off power supply, with or without counter noise abatement capability etc.

## 增量型与绝对型比较

### COMPARE INCREMENTAL EXPORT TYPE WITH ABSOLUTE TYPE

类别 Category	增量型 Incremental export type	绝对型 Absolute type
特征 Feature	<p>转轴旋转时，有相应的脉冲输出，其旋转方向的判别和脉冲量的增减需借助后部的判向电路和计数器来实现，其计数起点可任意设定，并可实现多圈的无限累加和测量，还可把每转发出任何一个脉冲的 Z 信号作为参考机械零位。还可以通过倍频电路利用 AB 信号 90° 相差进行 2 倍、4 倍的倍频。</p> <p>When the rotor shaft is rotating, it has relevant pulse output, this rotation direction's distinguish and pulse count's regulation should be achieved by retail directional interpreting circuit and counter, this count starting point can set freely can effect infinite accumulation and measurement of multiturn even regard a pulse signal Z sent out ever turn as referential mechanical zero position. It still can go on double or fourfold frequency doubling making using of 90° discrepancy between signals A, B through frequency doubling circuit.</p>	<p>转轴旋转时，有与位置——对应的代码（二进制、格雷码、BCD 码等）输出，从代码大、小的变更，可判别正反方向和位移处的位置，无需判向电路，有一绝对零位代码，停电重新开机仍可读出当前绝对位置，许可准确找到零位代码，无须另加掉电保护。一般测量范围为 0~360°，特殊的也可实现多圈测量。</p> <p>When the rotor shaft is rotating, it has the codes (binary system array code BDC code etc) corresponding to position output. To distinguish the position of positive and negative direction and displacement section by code size's alteration, need not directional interpreting circuit, exist a absolute zero position code, still could read out current absolute position when powering cut to start up newly and permission to find zero position code exactly, need not plus power fail safeguard additionally measuring range is 0~360° , some special also could effect measurement of multiturn.</p>
结构 Structure	<p>当写入黑白图案的光栅盘随着轴的旋转耐旋转时，相应通过两处指示窗，光就会要么穿过，要么被遮断，这种光被用于各自的指示窗相对的光电管变成电流，通过波形整形后作为两个矩形列输出。另两处的指示窗配置在与矩形波列输出的相位相差 90° 节距处。</p> <p>When the grating plate recorded black and white pattern into rotated following the rotation of axis, corresponding to through two indicator widow, either the light will be permeated, or be shut off, this light used for photoelectric cell relative to respective indicator window, output as two recurrence pattern by waveform shaping. Another two indicator window configure in the position differing 90° with the phase output by recurrence pattern.</p>	<p>码盘旋转时，通过指示盘的光依据图案有的透过，有的被遮断，通过的光被光电管变为电流，通过波形整形电路变成完的数字信号。</p> <p>When code plate is rotating, according to pattern, some light through indicator dial are permeated, some are shut off. The light are permeated turn to current by photoelectric cell, become full digit signal through waveform shaping circuit.</p>
输出波形 Output waveform	 <p>90° 相位差 Phase difference</p> <p>A相 phase</p> <p>B相 phase</p> <p>Z相 phase</p> <p>分辨率不同，光栅线数也不同。 Resolution is different, grating line count is also different</p> <p>零点 zero position</p> <p>360°</p>	 <p>第4码道 NO.4 code path</p> <p>第3码道 NO.3 code path</p> <p>第2码道 NO.2 code path</p> <p>第1码道 NO.1 code path</p> <p>分辨率不同，光栅线数也不同。 Resolution is different, grating line count is also different</p> <p>节距 pitch</p>

## 订货须知

- 用户订货时，一定要注明所需编码器的型号，每转输出脉冲，电源电压，信号输出方式等，如有特殊尺寸或性能要求，请注明并经双方商定。
- 旋转编码器非常方便地适用多种接口，如：光电耦合器、TTL 门、二态门、各种电压比较器等放大整形电路。用户在选择信号输出方式时，请注意与后部电路的匹配，如选用长线驱动器输出方式时，请选用匹配的接受器，以便后部电路接受，用户可参照驱动器与接收器相关匹配表。

## ORDER NOTICE

- When the customer place an order, please mark the encoder type we required, every turn output pulse, circuit voltage, signal output way and so on. If requiring special size or capability demand, please mark and agree on both sides.
- Rotary encoder conveniently is applicable for various interfaces, such as enlarge plastics circuits of enlarge photoelectric coupler, TTL door, Dimorphic door. ALL kinds of voltage comparers etc when customers select the signal output way, please notice the match with retral circuit, For example when select output way of line driver, please use the suitable device, so thet to make retral circuit's receiving, customers can consult related match list of driver and device.

- 增量型编码器每转输出脉冲数的多少，应根据公式选择：  
每转输出脉冲数 ( P/R ) =

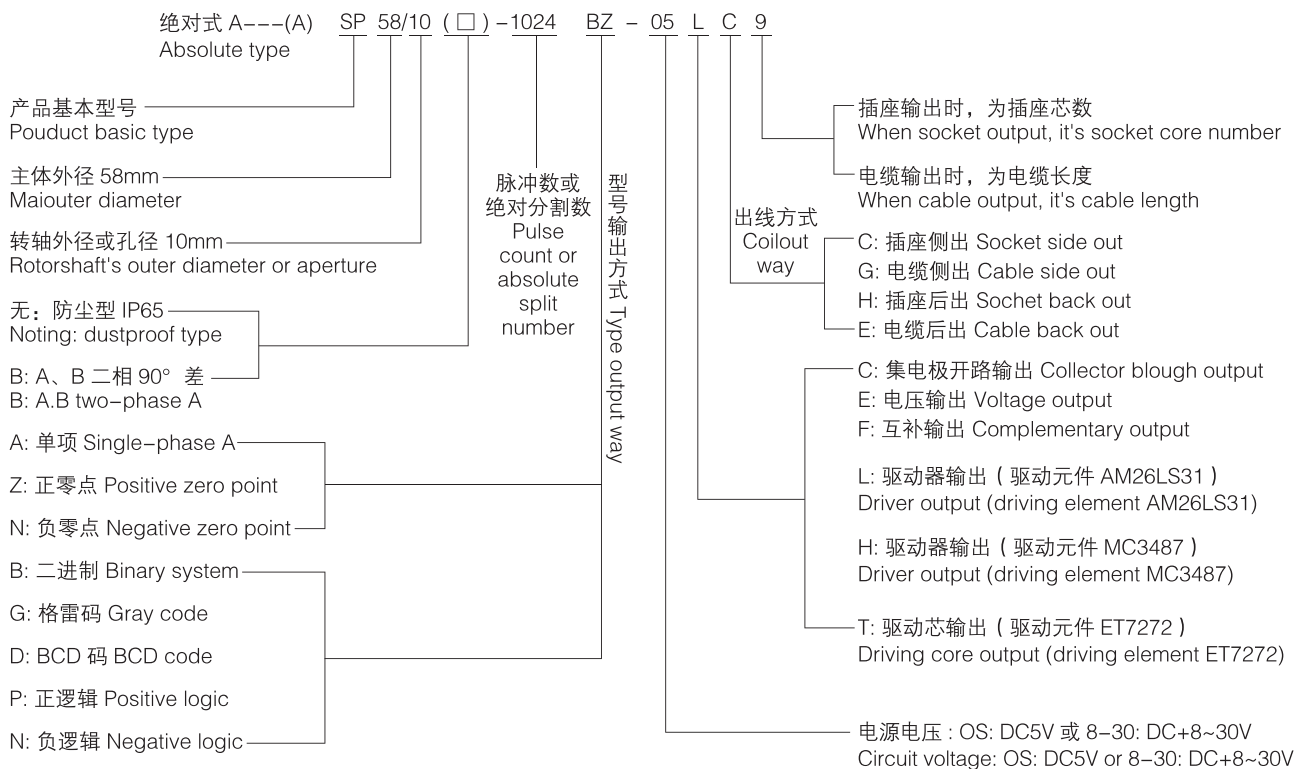
$$\frac{\text{编码器每转的位移量 Encoder offset every turn}}{\text{设计分辨率 Design resolution ratio}}$$

- The number of increamental export type encoder's output pilse count every turnselect by formula output pulse count(P/R)=

- 绝对型编码器的分割数 ( 或位数 ) 的选择，可参照公式：
- The selection of absolute encoder's split number (digit), consult formula:
- 请注意选用的绝对型编码器的输出码制和输出方式要与用户后部处理电路相对应。
- Please notice selected out code system of absolute encoder and output way must corresponding with consumer's retral processing circuit.

$$\text{分割位数 Split digit} = \frac{360^\circ}{\text{设计分辨率 Design resolution ratio}}$$

## 型号规格说明 TYPE SPECIFICATION INSTRUCTION



- 说明：1、产品基本型号是根据产品安装连接的特性而制定，如：SP- 实心轴普通型 SF- 实心轴法兰型 HB- 空心轴半空型 SY- 实心轴嵌压型 HT- 空心轴通孔型。
- 2、如用户选购的编码器是绝对型还须在产品代号加“A”并注明分割数和正负逻辑代号。如：编码器型号为 SP58/10-1200RZ-05LC，其代表意义是：SP 为实心轴普通型，主体外径为 10mm，每转脉冲数为 1200P/R，两相带原点正动作信号，电源电压为 DC+5V，输出电路长线驱动器 AM26LS31，出线方式为 10 芯插座侧出。
- Instruction: 1) basic models of products are constituted according to the features of product's installation and connection: such as: sp-solid shaft conventional type is SF-shaft flange type SY-shlid shaft wedge pressure type HT-hollow shaft through-hole type.
- 2) If the encoder that the consumer selected is absolute type, we must add "A" in the product code and mark partition value and positive negative logic code such as encoder type is sp 58/10-1200RZ-05LC, It signified that: SP is solid shaft conventional type, main outer diameter is 58mm, rotor shaft's outer diameter is 10mm, every turn pulse count is 1200P/R, biphas bring original positive actuating signal supply voltage is DC+5V, output circuit's line driver AM26LS31, coilout way is ten core socket out.

### 可供选用光栅规格数

#### OPTIONAL GRATING SPECIFICATION NUMBER

每转输出 脉冲数 p/r Every turn output pules count p/r	10 20 30 40 50 60 80 100 120 125 150 200 225 240 250 256 300 360 400 450 480 500 512 600 625 720 750 800 900 1000 1024 1080 1200 1250 1440 1500 1600 1800 2000 2048 2160 2400 2500 3000 3600 4000 4096 4500 4800 5000 5400 或按客户要求 Or according to customer's requirement.
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### 编码器防护等级说明

编码器外壳防护等级 (IP) 代码 (EN60529), 由字母 IP 和后续的两为特征数字表示, 描述 IP 等级 - 编码器防尘、防水性, 对简称 "IP" 及后接的两为数字解释说明: 第一位数字定义为灰尘颗粒的大小, 数值越高颗粒的小, 第二位数字定义为抗水性, 数值越高抗水压越大。以下表概述 I 等级:

#### ENCODER'S PROTECTION GRADE INSTRUCTION

Encoder shell protection grade (IP) code (EN60529), expressed by alphabet IP and the following two characteristic numbers, describes IP grade encoder's features of dust proof, water proof, Account for short title "IP" and thefollowing two numbers: The first number means the size of dust mites, the higher the number is, the tinier the mites are, the second number means water resistant, the higher the number is, the stronger water pressure reststance is. The following list summarized IP grade:

第一位数字 The first number	防微尘颗粒保护 Dustproof protection	第二位数字 The second number	防水保护 Water proof protection
0	无防护 Non-protection	0	无防护 Non-protection
1	防尘颗粒 ≥ 50mm Dustproof grain ≥ 50mm	1	对垂直滴水的防护 Protection against certical dropping water
2	防尘颗粒 ≥ 12mm Dustproof grain ≥ 12mm	2	对偏垂直方向 15° 滴水的保护 Protection against leaning15° to verticality dropping water
3	防尘颗粒 ≥ 2.5mm Dustproof grain ≥ 2.5mm	3	对偏垂直方向 60° 喷溅水的防护 Protection against leaning15° to verticality spray water
4	防尘颗粒 ≥ 1.0mm Dustproof grain ≥ 1.0mm	4	对全向喷溅水的防护 Protection against spray water fromall direction
5	防尘保护 Dustproof protection	5	对全方向低压喷射水的防护 Protection against low voltage spray water
6	防尘认证 Dustproof identification	6	对高压喷射水的防护 Protection against high voltage spray water
		7	对浸入水 15cm 到 1cm 之间短时间的防护 Short time protection for soakingbetween 15cm and 1m
		8	对承压时长期浸入的防护 Protection for long time soaking when bearing pressure

目前本公司的编码器防护等级 IP66 级, 有此要求, 订货时请说明。

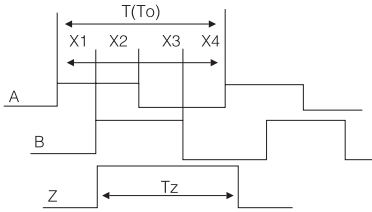
At present our company's encoder protection grade could reach IP66, If you have this requirement, please notice when placing an order.



## 增量型输出波形与信号位置精度

### INCREMENTAL EXPORT OUTPUT WAVEFORM AND SIGNAL POSITION'S PRECISION

90° 相位差两信号与零位信号 90° Phase difference two signals and zero signal



波形比 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$

$X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$  (n=1, 2, 3, 4)

零位信号 Zero signal:  $TZ=1T \pm 0.5T$

信号位置精度 Signal position's precision: 准确度 Accuracy  $\leq 0.2T$

周期误差 Period error  $0.01T$

脉冲周期 Pulse period:  $T=360^\circ / N$

(N 为每转输出脉冲数 Is output pulse count every turn)

A、B 相与 Z 相的位置关系不做规定。

Position relation of A、B phase and Z phase makes on provision.

从轴端看，顺时针旋转 (CW) 时的波形图

The waveform illustration of clockwise (CW) rotation seeing from wellenenden

## 编码器信号输出方式、代号、电路及波形

### ENCODER SIGNAL OUTPUT WAY CODE NUMBER CIRCUIT AND WAVEFORM

信号输出方式 Signal output way	代号 Code number	电路说明 Circuit explanation	输出电路 Output circuit	波形输出 (顺时针) Output wave pattern (CW)
集电极开路输出 Collector plough output	C	直接从晶体管的集电极输出的电路 The circuit that output directly form collector of transistor.		接上负载电阻，如下图 E 型所示电路及波形 Connect load resistance, as model E shown in the following circuit and waveform
电压输出 Voltage output	E	晶体管发射极接地，集电极带负载电阻输出的电路 The circuit that transistorized emitter grounded and collector output with load resistance.		
互补输出 Complementary output	F	从两只晶体管发射极对接后输出的电路。这种电路反应速度快，也可以长距离传送。 The output circuit after two transistorized emitters butt-joint this circuit has fast reaction rate and also can convey in the long distance.		
长线驱动器输出 Line driver output	L	输出信号由专用的 IC 长线驱动器输出，接收器也必须用与之相匹配的器件。	 IC: AM26C311 ET7272	
	T	Output signal output by special IC long line drives, receiver must use the device which are well-matched.		
测 AC 马达磁极位置的 U、V、W 信号输出 Measure U, V, W signal output in the hole position of AC motor	L	电机无电刷化的相位差 120° 的 3 路信号 (电角度)。 3 Way signal (electric degrees) of electrical engineering nonbrush's phase 120° difference		

注：从轴端看编码器，顺时针为正转，信号 A 超前信号 B 90°，逆时针旋转时相反，信号 B 超前信号 A 90°。

Note: seeing the encoder from wellenenden, when clockwise is positive rotation, signal A is ahead 90° to signal B, when counter-clockwise is tating, in a contrary, signal B is ahead 90° to signal A.

## 电气参数 ELECTRIC PARAMETERS

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V ± 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	≤ 150mA	≤ 60mA	≤ 150mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	≥ 2.5V	≥ VCC*70%	≥ VCC*70%
信号低电平 Signal low electrical level	≤ 0.5V	≤ 0.5V	≤ 0.5V
上升 / 下降时间 Rise / down time	≤ 100ns	≤ 1us	≤ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

## 安装使用注意事项

注意：光电编码器乃精密仪器，安装使用不当会影响编码器的性能和使用周期。

## INSTALLATION AND OPERATION ATTENTIONS

Notice: photoelectric encoder is precision instrument, installation or operation attentions

## 机械方面

- 编码器与用户输出轴间的连接驱动，应采用弹性联轴器、尼龙齿或同步带连接，切忌采用刚性连接，以避免因用户轴的串动、跳动，造成编码器轴系和码盘的损坏。
- 编码器安装时应轻轻推入被套轴，严禁用锤敲击和摔打碰撞，以免损坏轴系和码盘。
- 安装时请注意允许的轴负载，不得超过其极限负载。
- 应保证编码器轴与用户输出轴的不同轴度 <0.2mm，与轴线的偏角 <2°
- 注意不要超过其电气极限转速，如超过编码器所允许的极限转速时，电气信号可能会丢失。

## MACHINE ASPECT

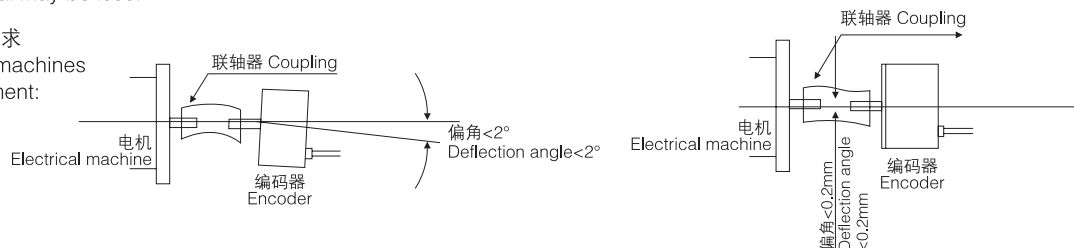
- Connecting driver between encoder and customer output axis should use elastic coupling nylon teeth of synchronization with connection, avoid using rigidity connection, so that cause the damage of encoder shafting and code plate by reason of customer axis' float and pulsation.
- When encoder installs, you should push in the tied up axis lightly, forbid knocking by hammer and collision, in order to avoid damaging encoder shafting and code plate.
- When installing, please take notice that allowable axis load, can't exceed the limit load.
- Should guarantee encoder axis and customer output axis' misalignment <0.2mm, declination angle with axes <2° .
- Take notice that it should not exceed this electric limit rotate speed, if it exceed the limit rotate speed allowable by encoder, electric signal may be lose.

$$N_{max} = (\text{最高响应频率} / L) \times 60 \text{ r/min} \quad (L \text{ 为光栅脉冲数})$$

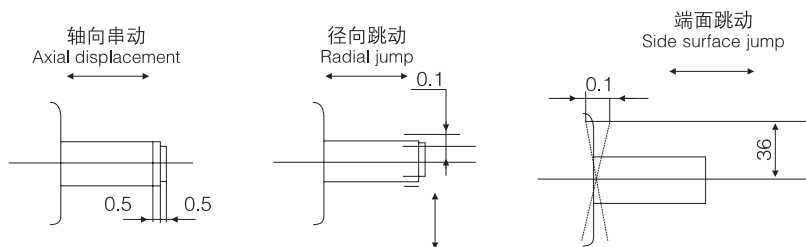
$$N_{max} = (\text{highest response frequency} / L) \times 60 \text{ r/min} \quad (L \text{ is grating pulse count})$$

- 长期使用时，请检查与编码器座体相连部分、以及固定螺钉等是否松动，以防影响设备的正常使用。
- If long-time service, please examine the parts connected with encoder found ationmass and whether clamping screw become flexible, electric signal may be lose.

- 实心轴类机械连接要求
- Solid shaft species machines connection requirement:

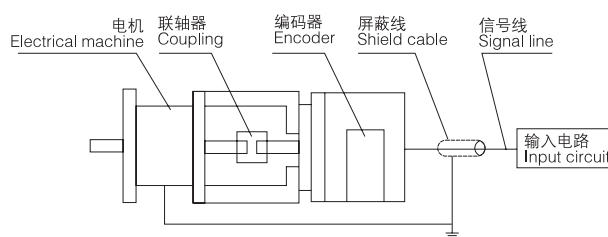


- 空心轴类安装轴机械要求:
- Hollow shaft species installing axel machine' requirement:



## 电气方面

- 请不要将编码器的输出线与动力线等绕在一起或同一管道传输, 也不宜在配电盘附近使用, 以防干扰。
- 配线时应采用屏蔽电缆。(可采用如右连接方式: )
- 安装开机前, 应仔细检查, 产品说明书与编码器型号是否相符, 接线是否正确, 错误接线会导致内部电路损坏。
- 长距离传输时, 应考虑信号衰减因素, 选用输出阻抗低, 抗干扰能力强的输出方式。
- 脉冲信号的传送距离与下列因素有关: 频率、输出电路、输入电路、传输线, 发送频率。



## ELECTRIC ASPECT

- Please don't let encoder output line and power line etc twist together or transfer in the same pipeline, also not suitable to use near the switchboard to avoid interference.
- When wiring, should apply shielded cable (can use connection mode as right)
- Before installing and powering on, should attentively check whether product instruction conform to encoder type or not, whether or not the connection is correct, the wrong connection will lead internal circuit to fault.
- When transferring in long distance, should consider signal signal decrease factor, select output way of low output impedance and strong anti-interference performance.
- Pulse signal's convection distance is related to the following factor: frequency, output circuit, input circuit, transmission line, delivery frequency.

## 环境方面

- 因为编码器乃精密仪器, 使用时要注意周围无振源。
- 编码器不是防漏结构时, 不要溅上水、油等, 必要时要加上防护罩。
- 请注意环境温度、湿度是否在编码器使用范围内。

## AMBIENT ASPECT

- Because the encoder is precision instrument, please notice having no earthquake source all around.
- If encoder is not leakage proof structure, don't splash water, oil etc, cover the protecting hood when necessity.
- Please notice if or not ambient temperature, humidity in range of encoder's operating requirement.

注意: 安装或使用不当会影响编码器的性能和使用寿命。

Notice: installation or operating unsuitable will impact the capability and service life of encoder.

## SP25/4 系列 SERIES



## 特征与用途

- 外径  $\Phi 25$ , 厚度仅 32, 轴径  $\Phi 4$ 。
- 微型化, 精密型, 性能稳定。
- 多种输出电路可选, 出线方式为后出。
- 适用于工业机械、自动化控制等行业。

## FUNCTION AND USE

- Outer diameter is  $\Phi 25$ , thickness is only 32, axes diameter is  $\Phi 4$ .
- Micromation and precision type, steady capability.
- Many output circuit can select, out form is socket, back out.
- Apply for industry machine, automatic control and so on.

## 型号说明 TYPE INSTRUCTION

SP	25	/	4	-	200	BZ	-	05	C	E	1
基本型号 Basis type	主体外径 Main diameter		轴径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage	输出电路形式 Output circuit form C: 集电极开路 Open-collector	出线方式 Out form E: 电缆后出 Cable back out	电缆长度 Cable length
	25mm		4mm					DC+5V			1m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resistand inrush-resist, and glass code wheel with high precision.)

100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000  
或根据用户要求制定 Or according customer request

## 型号说明 TYPE INSTRUCTION

输出电路 OUtput circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

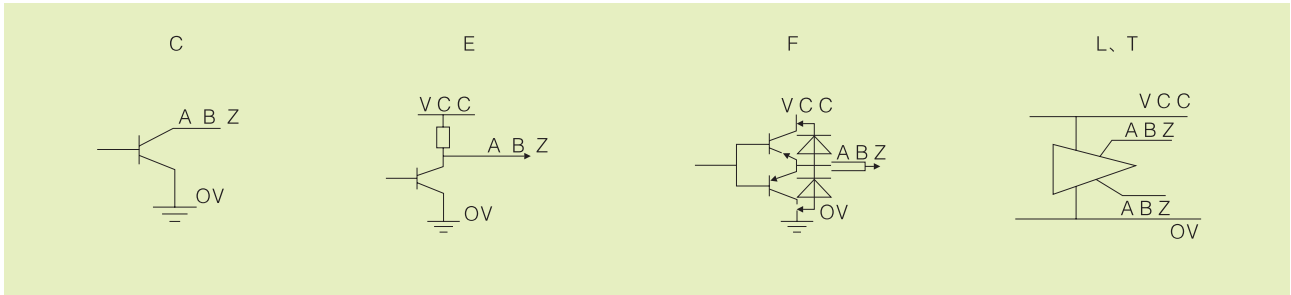
## 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 20N
轴向负荷 Axial load	$\leq$ 10N
起动力矩 Storque	$\leq$ $1 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	3000r/min
转动惯量 Runing inertia	10g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.1kg

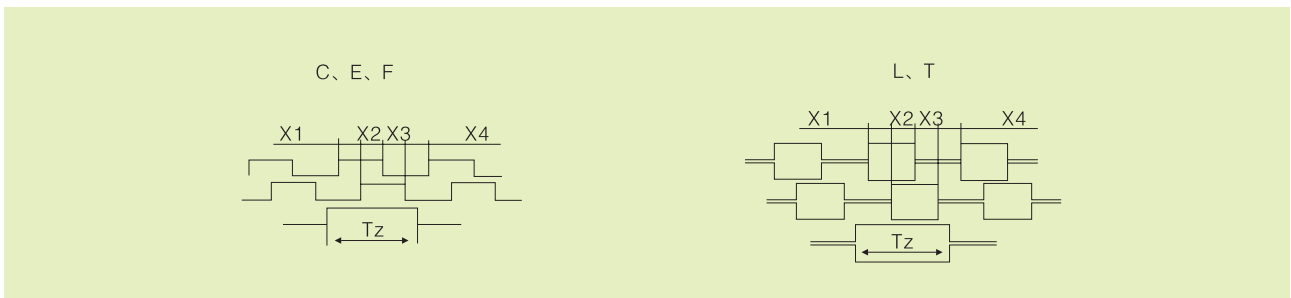
## 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	-20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	

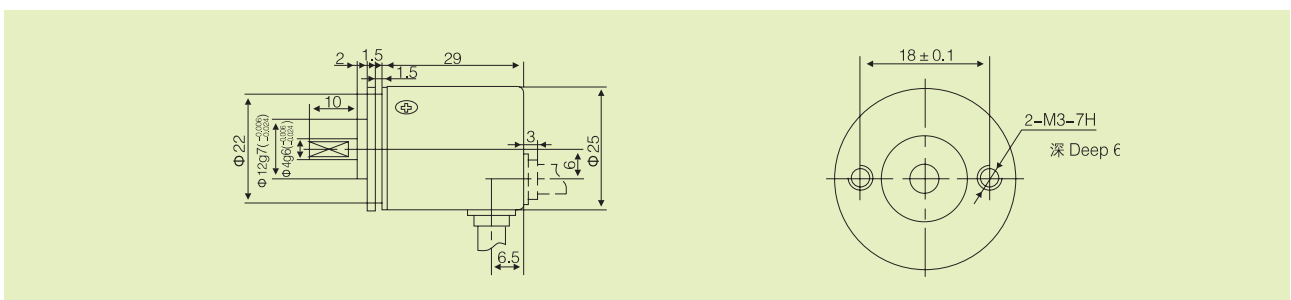
注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)





## SP30/4 系列 SERIES



## 特征与用途

- 外径  $\Phi 30$ , 厚度仅 32, 轴径  $\Phi 4$ 。
- 微型化, 精密型, 安装方便, 性能稳定, 实用经济。
- 多种输出电路可选, 出线方式为后出。
- 适用于安装空间有限的小型设备、工业自动化等行业。

## FUNCTION AND USE

- Outer diameter is  $\Phi 30$ , thickness is only 32, axes diameter is  $\Phi 4$ .
- Micromation and precision type, easy installation, steady capability and economical practicality.
- Many output circuit can select, out form is socket, back out.
- Apply for the minitype equipment which has the limit inmit install space, industry automation and so on.

## 型号说明 TYPE INSTRUCTION

SP	30	/	4	-	360	BZ	-	05	L	E	2
基本型号 Basis type	主体外径 Main diameter		轴径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage	输出电路形式 Output circuit form	出线方式 Out form	电缆长度 Cable length
	30mm		4mm					DC+5V	L: 长线驱动 Line driver	E: 电缆后出 Cable side out	2m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resistand inrush-resist, and glass code wheel with high precision.)

100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024  
或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

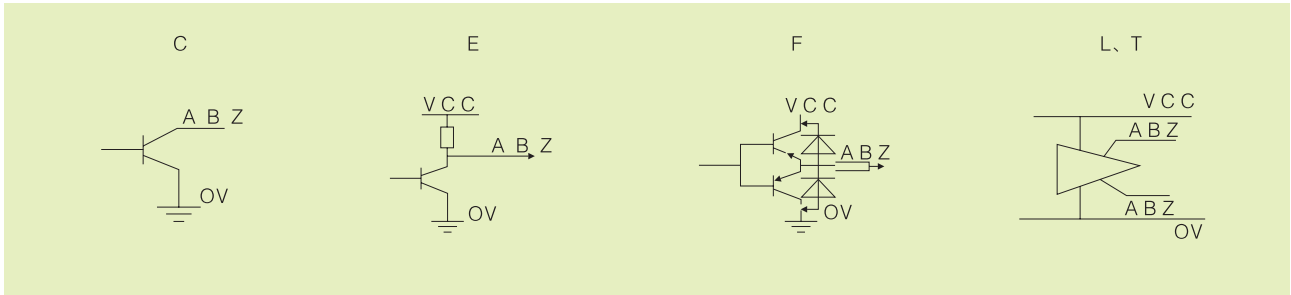
## 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 20N
轴向负荷 Axial load	$\leq$ 10N
起动力矩 Storque	$\leq$ $1 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	3000r/min
转动惯量 Runing inertia	10g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.1kg

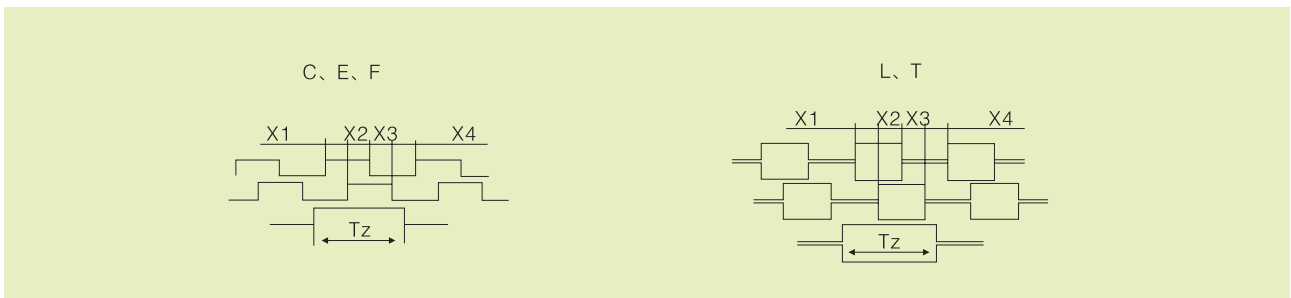
## 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	-20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $X_n \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	

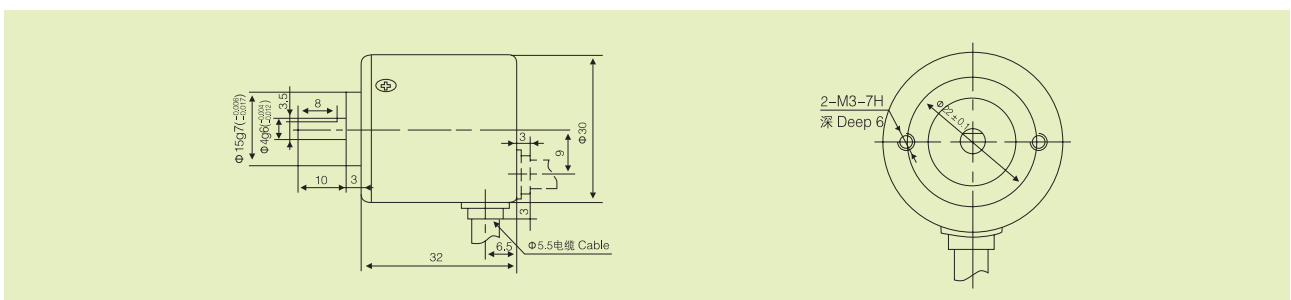
注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



## SP38/6 系列 SERIES



## 特征与用途

- 外径  $\Phi 38$ , 厚度仅 35, 轴径  $\Phi 6$ 。
- 小型化, 经济型, 性能稳定, 安装方便。
- 多种输出电路可选, 出线方式为电缆侧出与后出。
- 适用于工业机械、自动化控制等行业。

## FUNCTION AND USE

- Outer diameter is  $\Phi 36$ , thickness is only 35, axes diameter is  $\Phi 6$ .
- Minitype-economization, steady capability, convenience installation.
- Many output circuit can select, out form is socket cable side out and back out.
- Apply for the industry machine, automatimic control and so on.

## 型号说明 TYPE INSTRUCTION

SP	38	/	6	-	360	BZ	-	8-30	F	G	2
基本型号 Basis type	主体外径 Main diameter		轴径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage	输出电路形式 Output circuit form F: 推挽输出 push-pull output	出线方式 Out form G: 电缆侧出 Cable side out	电缆长度 Cable length 2m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 耐高温的金属码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

10 20 30 50 60 100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250  
1500 1800 2000 2048 2400 2500 3000 3600 5000  
或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

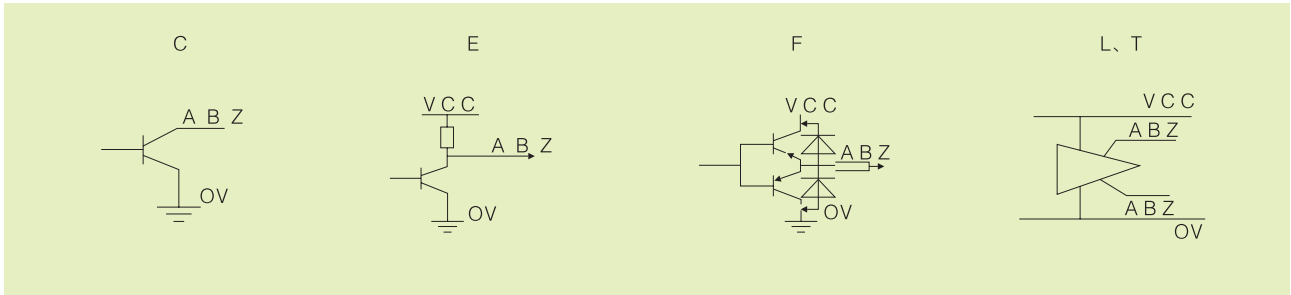
## 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 30N
轴向负荷 Axial load	$\leq$ 20N
起动力矩 Storque	$\leq 1 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	6000r/min
转动惯量 Runing inertia	20g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.1kg

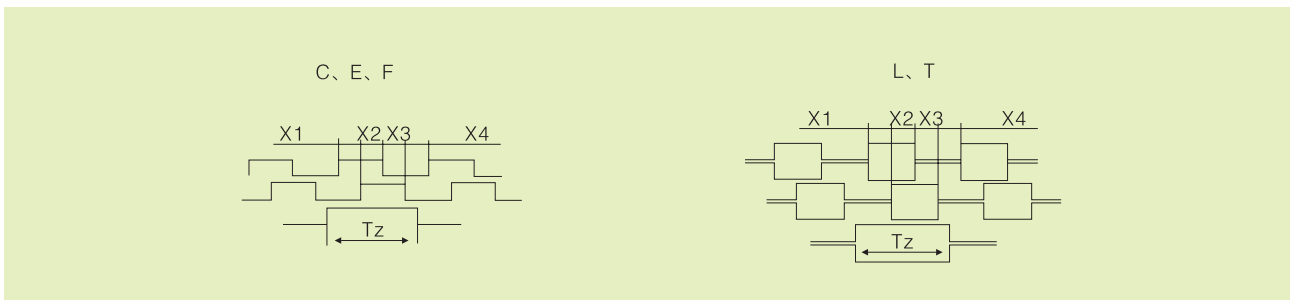
## 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	-20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	

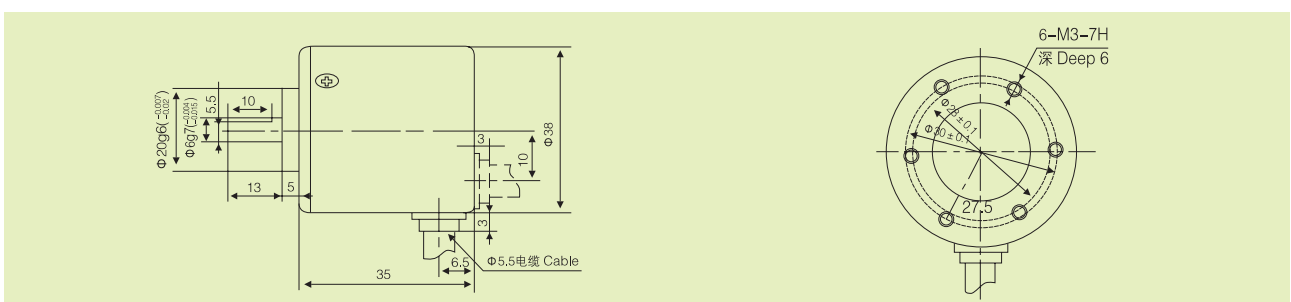
注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



## SP40/6 系列 SERIES



## 特征与用途

- 外径  $\Phi 40$ , 厚度仅 32, 轴径  $\Phi 6$ 。
- 小型化, 低价格, 高性能设计, 抗干扰强。
- 多种输出电路可选, 出线方式为电缆侧出与后出。
- 适用于工业机械、自动化控制等行业。

## FUNCTION AND USE

- Outer diameter is  $\Phi 40$ , thickness is only 32, axes diameter is  $\Phi 6$ .
- Minitype, low price, high capability design, strong interference resist.
- Many output circuit can select, out form is socket cable side out and back out.
- Apply for the industry machine, automatimic control and so on.

## 型号说明 TYPE INSTRUCTION

SP	40	/	6	-	100	BZ	-	8-30	F	G	2
基本型号 Basis type	主体外径 Main diameter		轴径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage	输出电路形式 Output circuit form	出线方式 Out form	电缆长度 Cable length
	40mm		6mm					+8V~+30V	F: 推挽输出 push-pull output	G: 电缆侧出 Cable side out	2m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 耐高温的金属码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

10 20 30 50 60 100 120 125 150 180 200 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250  
1500 1800 2000 2048 2400 2500

或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

## 机械参数 MACHINE PARAMETER

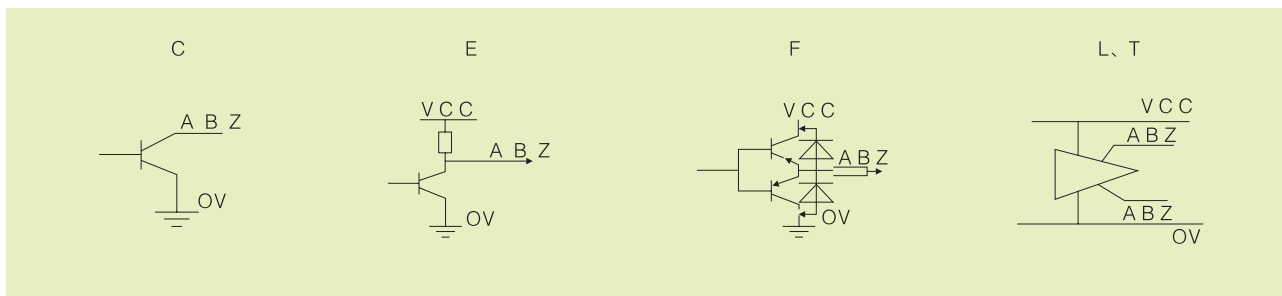
径向负荷 Radial load	$\leq$ 30N
轴向负荷 Axial load	$\leq$ 20N
起动力矩 Storque	$\leq 2 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	6000r/min
转动惯量 Runing inertia	20g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.1kg

## 环境参数 ENVIROMENT PRARMETER

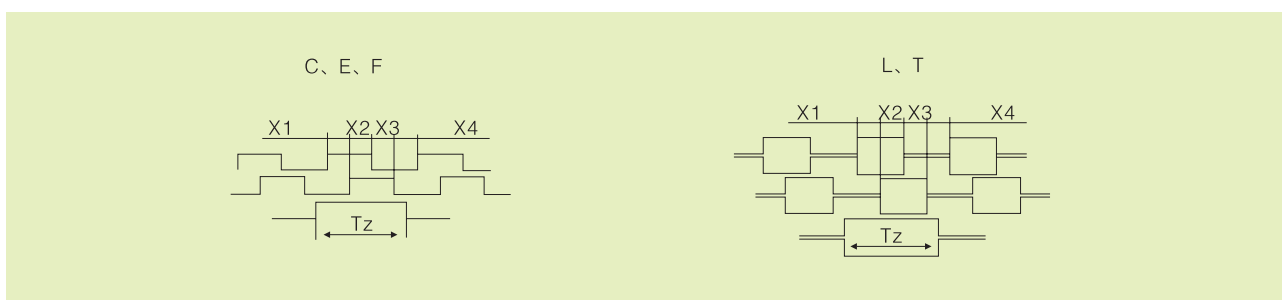
抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50



## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	

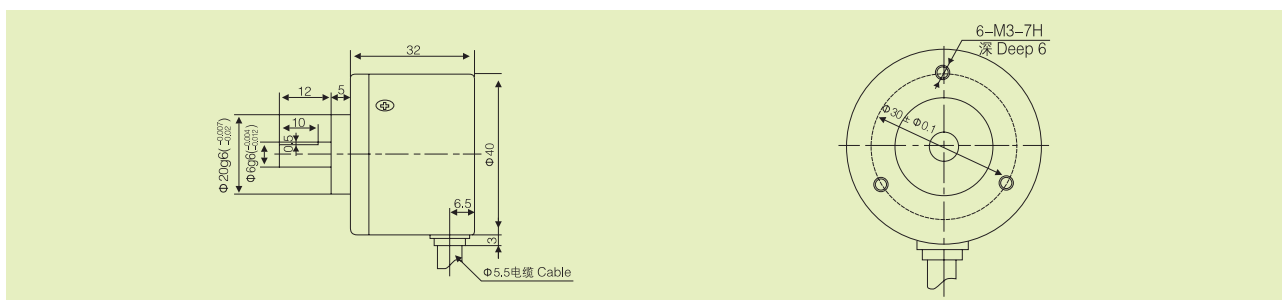
注：(1) 信号按表中所示的电缆线颜色连接，屏蔽网已接编码器的外壳，实际接线按编码器标配接线。

(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



## SP50/8 系列 SERIES



## 特征与用途

- 外径  $\Phi 50$ , 厚度仅 38, 轴径  $\Phi 8$ 。
- 经济型, 结构紧凑, 性能稳定, 抗干扰强。
- 多种输出电路可选, 出线方式为插座, 电缆侧出与后出。
- 适用于工业机械、自动化控制等行业。

## FUNCTION AND USE

- Outer diameter is  $\Phi 40$ , thickness is only 32, axes diameter is  $\Phi 6$ .
- Economization type compact fame, steady capability strong interference resist.
- Many output circuit can select, out form is socket, cable side out and back out.
- Apply for the industry machine, automatimic control and so on.

## 型号说明 TYPE INSTRUCTION

SP	50	/	8	-	100	BZ	-	8-26	F	G	3
基本型号 Basis type	主体外径 Main diameter		轴径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage	输出电路形式 Output circuit form F: 推挽输出 push-pull output	出线方式 Out form G: 电缆侧出 Cable side out	电缆长度 Cable length
	50mm		8mm					+8V~+30V			3m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 耐高温的金属码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

10 20 30 50 60 100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250  
1500 1800 2000 2048 2400 2500 3000 3600 4000 4096 4500 4800 5000  
或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

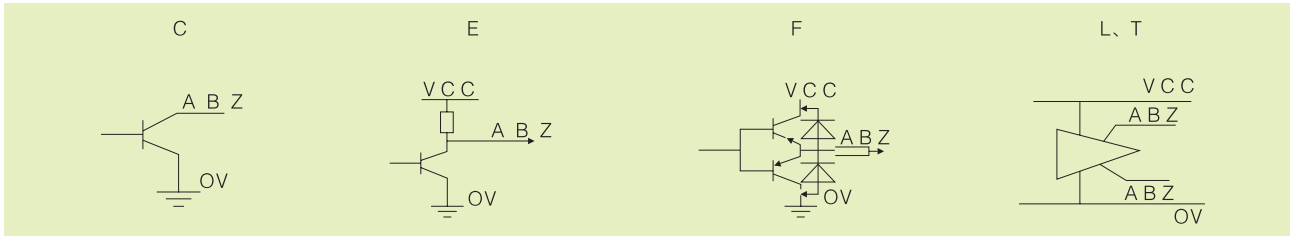
## 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 40N
轴向负荷 Axial load	$\leq$ 30N
起动力矩 Storque	$\leq 2 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	6000r/min
转动惯量 Runing inertia	30g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.1kg

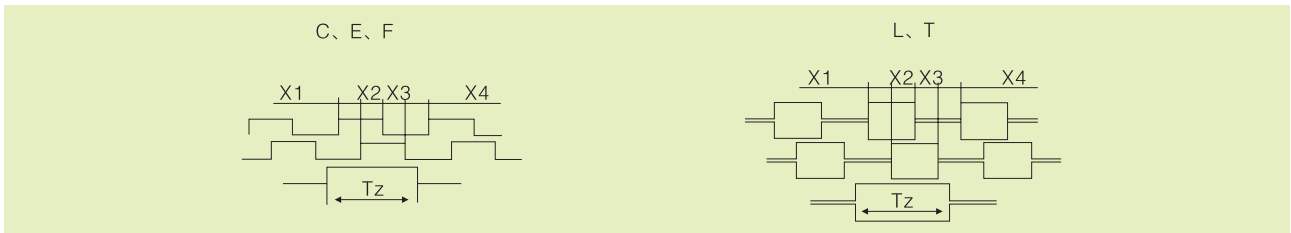
## 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	-20 $^{\circ}$ C ~+50 $^{\circ}$ C
贮存温度 Storing temperature	-20 $^{\circ}$ C ~+80 $^{\circ}$ C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针（CW）旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
	七芯插座 Seven core socket	1	4	3	5	2	-	-	-	7
LHT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	屏蔽网 Shielded Network
	七芯插座 Seven core socket	1	4	5	3	2	7	6	8	9

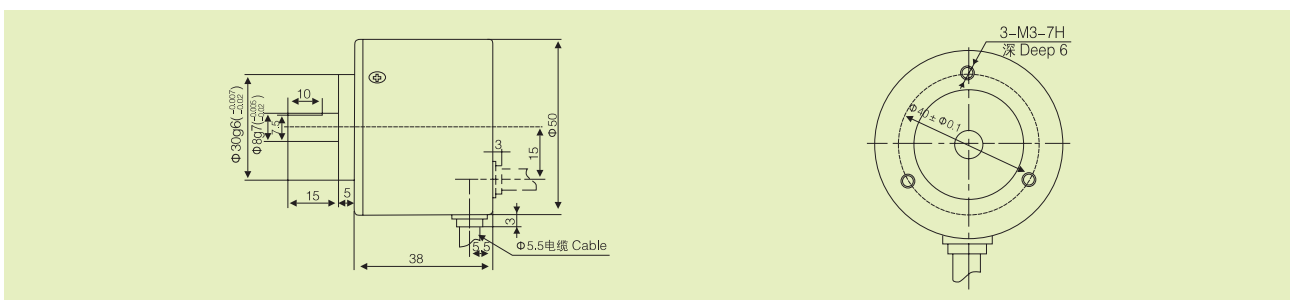
注：（1）信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

（2）输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

## 外形尺寸图（单位：mm） SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



### SP58/10/15 系列 SERIES



### 特征与用途

- 外径  $\Phi 58$ , 厚度仅 42, 轴径  $\Phi 15$ 。
- 经济型, 结构紧凑, 性能稳定, 抗干扰强。
- 多种输出电路可选, 出线方式为插座, 电缆侧出与后出。
- 适用于工业机械、自动化控制等行业。

### FUNCTION AND USE

- Outer diameter is  $\Phi 58$ , thickness is only 42, axes diameter is  $\Phi 15$ .
- Tightness machine frame, strong capability of axes load, steady capability.
- Many output circuit can select, out form is socket cable side out and back out.
- Apply for industry machine, numerical control and so on.

### 型号说明 TYPE INSTRUCTION

SP	58	/	15	-	1200	BZ	-	05	L	G	9
基本型号 Basis type	主体外径 Main diameter		轴径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage DC+5V	输出电路形式 Output circuit form L: 长线驱动 Line driver AM26C311	出线方式 Out form G: 插座侧出 Socket side out	9 芯插座 Nine coil socket

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 耐高温的金属码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

10 20 30 50 60 100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250 1500  
1800 2000 2048 2400 2500 3000 3600 4000 4096 4500 4800 5000 5400 或根据用户要求制定 Or according customer request

### 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

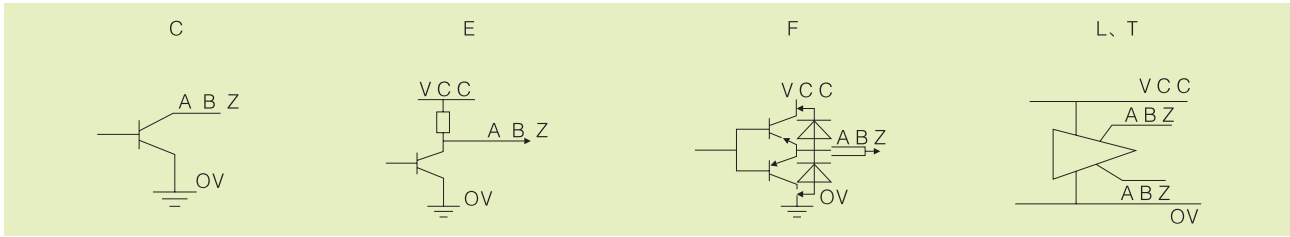
### 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 50N
轴向负荷 Axial load	$\leq$ 30N
起动力矩 Storque	$\leq 2 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	6000r/min
转动惯量 Runing inertia	30g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.3kg

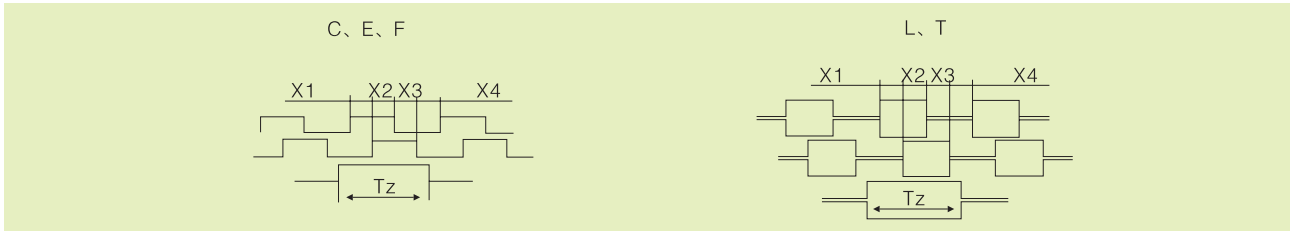
### 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $X_n \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$  N 为每转 A、B 相脉冲数零位信号宽度 N is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
	七芯插座 Seven core socket	1	4	3	5	2	-	-	-	7
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	屏蔽网 Shielded Network
	九芯插座 Nine core socket	1	4	5	3	2	7	6	8	9
	十芯插座 Ten core socket	1	4	5	3	2	7	6	8	10

注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

(2) 输出电缆标准长度为 1m，最长可延长到 50m。

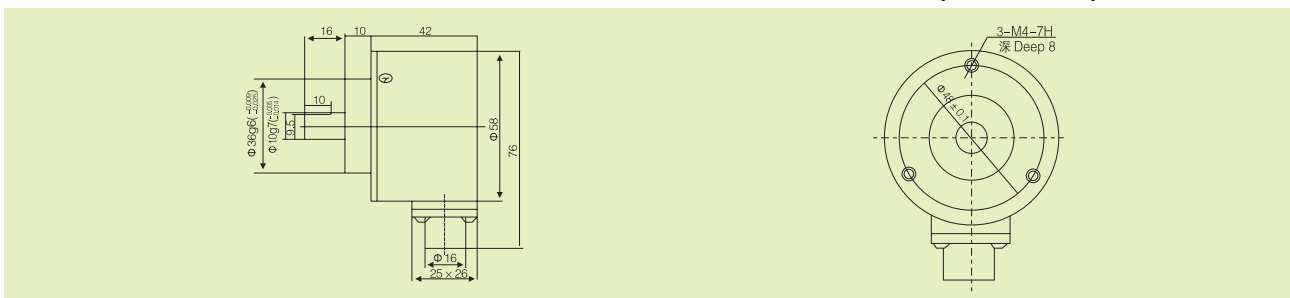
(3) 根据用户需要，可选配其它航空插头，如速拔插头 Y2M-10 等。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

(3) According to customer's demand, also could select other aviation socket, such as quick-drawing socket YZM-10 ect.

## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)





## HB38/8 系列 SERIES



## 特征与用途

- 半空型，外径  $\Phi 38$ ，厚度仅 42。
- 孔径  $\Phi 8$ ，另可加工为  $\Phi 5$ ， $\Phi 6$ ， $\Phi 6.35$  等。
- 采用板簧与中空轴与用户轴直接连接，安装方便可靠。
- 小型化，低价格，高性能设计，抗干扰强。
- 适用于工业机械、自动化控制、纺织机械等行业。

## FUNCTION AND USE

- Half-hollow type, outer diameter  $\Phi 38$ , thickness only 42mm.
- Axes diameter  $\Phi 8$ , can produce to  $\Phi 5$ ,  $\Phi 6$ ,  $\Phi 6.35$ .
- Adopt plate spring and wedge pressure axes and using axes directly connect, install convience.
- Minitype, low proce, high capability design, strong interference resist.
- Many output circuit can select, pattern of outgoing line is cable side out and bank out.
- Apply for the industry machine, automation control and textile machine and other lines.

## 型号说明 TYPE INSTRUCTION

HB	38	/	8	-	1000	BZ	-	05	L	G	1
基本型号 Basis type	主体外径 Main diameter		孔径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage DC+5V	输出电路形式 Output circuit form L: 长线驱动 Line driver AM26C311	出线方式 Out form G: 电缆侧出 Cable side out	电缆长度 Cable length 1m

- 可选脉冲数（注：有抗振动、耐冲击的菲林码盘，耐高温的金属码盘，及高精度的玻璃码盘）
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250 1500 1800 2000 2048  
2400 2500 3000 3600 或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

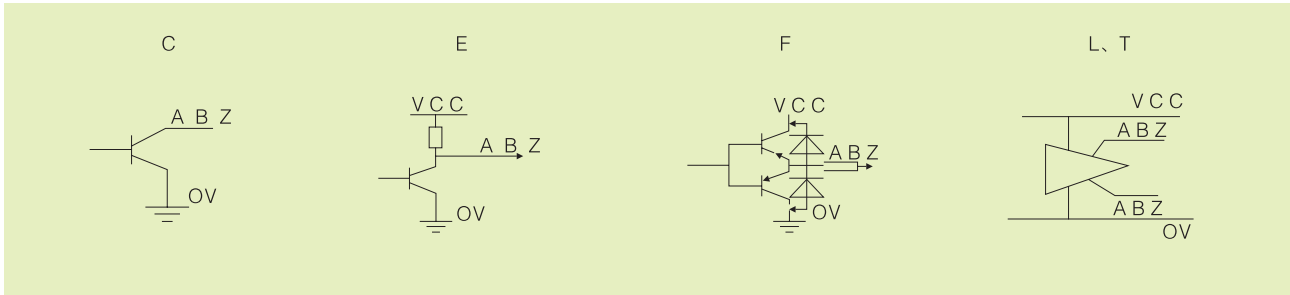
## 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 30N
轴向负荷 Axial load	$\leq$ 15N
起动力矩 Storque	$\leq 2 \times 10^{-3}$ N.m
最高转速 Tiptop rotate speed	6000r/min
转动惯量 Runing inertia	20g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.15kg

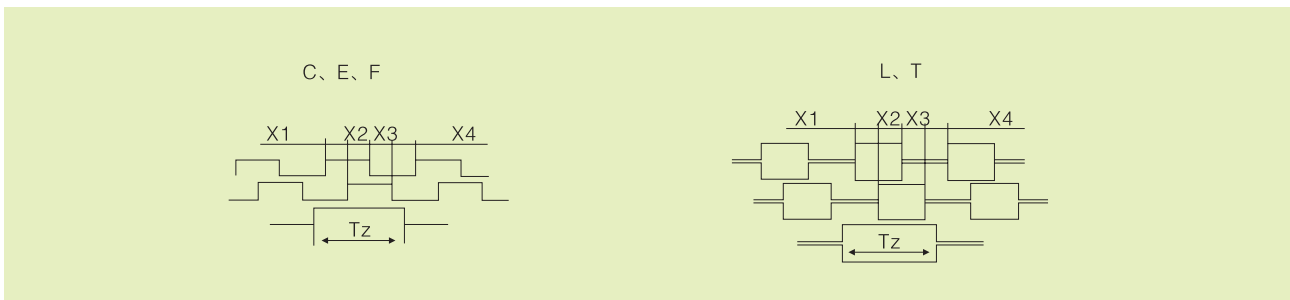
## 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $X_n \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $T_z=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	

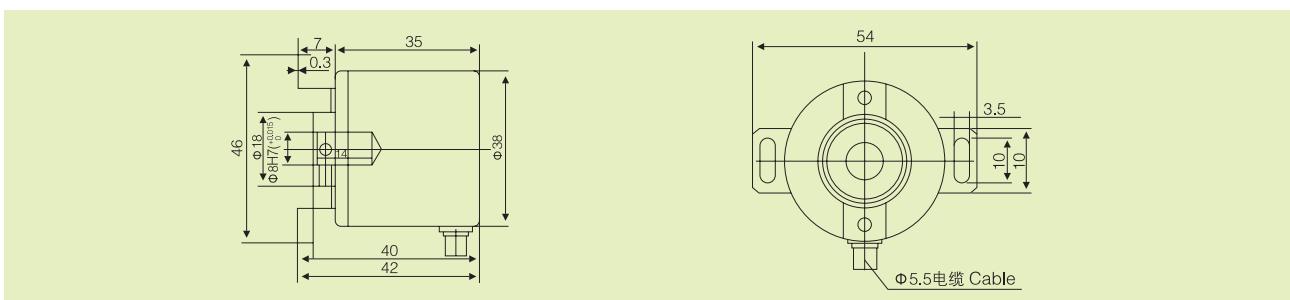
注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



## PD30 系列 SERIES



## 特征与用途

- 采用矩阵读数头，耐冲击强度高，纠错能力强，可靠性高。
- 安装体积小，分辨率范围宽，不要求信号调节。
- 对装配要求极其宽松，对电机轴的径向和轴向窜动补偿能力强。
- 广泛应用于直流电机，具有多种孔径 (ΦD) 供用户选择。

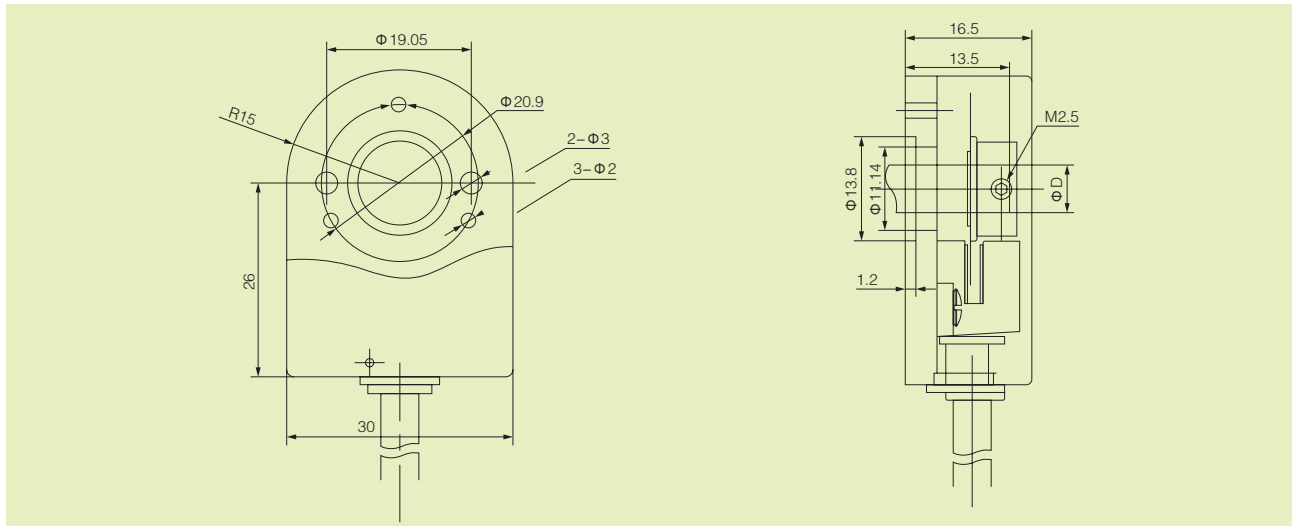
## FUNCTION AND USE

- Half-hollow type, outer diameter Φ38, thickness only 42mm.
- Axes diameter Φ8, can produce to Φ5, Φ6, Φ6.35.
- Adopt plate spring and wedge pressure axes and using axes directly connect, install convience.
- Minitype, low proce, high capability design, strong interference resist.
- Many output circuit can select, pattern of outgoing line is cable side out and bank out.
- Apply for the industry machine, automation control and textile machine and other lines.

## 型号说明 TYPE INSTRUCTION

PD30	06	G	-	400	B	M	-	L	5	C30
外壳尺 /Size Φ30mm	出线方式 /Cable C= 插座侧出 G= 电缆侧出 H= 插座后出 E= 电缆后出 J= 计算机插座侧出 - 针 T= 计算机插座后出 - 针	输出相 Output phase A: 单相输出 A B: 2 相输出 A、B	分辨率 P/R Resoloution	零位信号 Index S= 无 Z 信号 M= 有 Z 信号输出 “1” N= 有 Z 信号输出 “0”	输出方式 Output form T= 电压型输出 NPN+R C=NPN 集电极开路 CP=PNP 集电极开路 P= 互补型电路 PNP+NPN L= 长线驱动器 (26LS31) K= 长线驱动器 (7272) V= 长线驱动器 (7273)	特殊代码: C03	出线方式 Out form G: 电缆侧出 Cable side out			
孔 /Hole 06= Φ06mm 08= Φ08mm 10= Φ10mm										

## 尺寸说明 TYPE INSTRUCTION



## 电气特性 ELECTRIC SPEC

电源电压 Mains voltage		5V 或 7V-12V
输出信号	高电平 High electrical level	$\geq 85\%V_{cc}$
	低电平 Low electrical level	$\leq 0.3$
消耗电流 Current consumption		< 65mA 空载
输出波形		方形
上升 Rise time		200ns
下降时间 Down time		50ns
响应频率 Response frequency		0-100kHz
绝缘阻抗		> 100M $\Omega$

## 机械特性 MACHINE SPEC

每分钟最大转速 r/min	1200	转动惯量 Runing inertia	$4 \times 10^{-8} \text{kgm}^2$
起动扭矩	< 0.05Nm	工作温度 Workingtemperature	-40°C ~85°C
轴最大负荷	径向 25N 轴向 15N	贮存温度 Storing temperature	-40°C ~85°C
抗冲击 Concussion resist	50G/11ms	防护等级 Protect grade	IP50
抗振动 Vibration resist	10G/10-2000Hz	重量 weight	100g

## 输出相位 OUTPUT PHASE SHIFT

波形比:  $X1+X2=0.5T \pm 0.1T$   
 $X3+X4=0.5T \pm 0.1T$   
 相位差:  $Xn \geq 0.15T (n=1, 2, 3, 4)$   
 Z 信号宽:  $Tz=0.5T$   
 信号位置准确度: A、B 相绝对角度误差  $\leq 0.2T$   
 周期误差  $\leq 0.05T$   
 $T=360^\circ / N$  (N 为每转输出脉冲数)  
 周期  $P=360^\circ / N1 \pm 1.5^\circ$  ( $N1=2, 3, 4$ )  
 相位差  $Yn=P/6 \pm 1.5^\circ$  ( $n=1, 2, 3, 4, 5, 6$ )

输出电路

## 接线表 CONNECTION TABLE

屏蔽电缆接线定义									排线接线定义方式									
信号	A	$\bar{A}$	B	$\bar{B}$	Z	$\bar{Z}$	Vcc	OV	输出通道数	排线接线定义方式								
L 电路	绿	棕	白	灰	黄	橙	红	黑	A、B	OV	A	Vcc	B					
T/C 电路	绿		白		黄		红	黑	A、B、Z	OV	Z	A	Vcc	B				
									ABZ A/B/Z/	OV	Vcc	A	$\bar{A}$	$\bar{B}$	B	Z	$\bar{Z}$	

## UK48 系列 SERIES



## 特征与用途

- 应用于交流伺服单元等自动控制领域，适合于伺服电机配套使用。
- 内部采用 ASIC 器件，可靠性高，寿命长，抗干扰性能强。
- 直轴设计，两只 M3×4 凹端内六角螺钉 90° 固定。
- 分辨率范围宽，不要求信号调节。
- 带有 A、B、Z 和 U、V、W 六通道信号输出，可配接标准线驱动器 (26LS31)RS422，并可提供 12 路输出信号，并兼容 TTL。

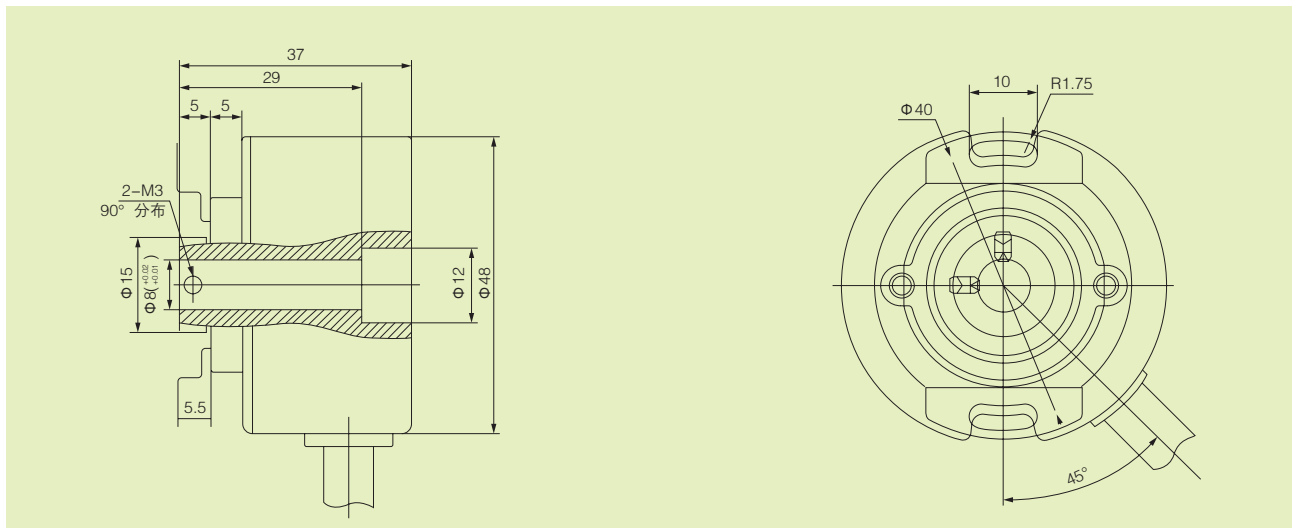
## FUNCTION AND USE

- Half-hollow type, outer diameter  $\Phi 38$ , thickness only 42mm.
- Axes diameter  $\Phi 8$ , can produce to  $\Phi 5$ ,  $\Phi 6$ ,  $\Phi 6.35$ .
- Adopt plate spring and wedge pressure axes and using axes directly connect, install convenience.
- Minitype, low price, high capability design, strong interference resist.
- Many output circuit can select, pattern of outgoing line is cable side out and bank out.
- Apply for the industry machine, automation control and textile machine and other lines.

## 型号说明 TYPE INSTRUCTION

UK48	08G	-	2500	B	M	-	L	5	2P
外壳尺 /Size $\Phi 48\text{mm}$	出轴 /Shaft 06= $\Phi 06\text{mm}$ 08= $\Phi 08\text{mm}$ 10= $\Phi 10\text{mm}$		分辨率 P/R Resolution 1000 1024 1250 2000 2048 2500 4000 4096 5000	输出相 /Output phase B: 2 相输出 A、B			输出方式 /Output form T= 电压型输出 NPN+R C=NPN 集电极开路 CP=PNP 集电极开路 P= 互补型电路 PNP+NPN L= 长线驱动器 (26LS31) K= 长线驱动器 (7272) V= 长线驱动器 OC(7273)		磁极对数 2P=2 对磁极 3P=3 对磁极 4P=4 对磁极 5P=5 对磁极  工作电压 /Voltage 5=+5V 526=+5~+26V
				零位信号 /Index S= 无 Z 信号 M= 有 Z 信号输出“1” N= 有 Z 信号输出“0”					

## 尺寸说明 TYPE INSTRUCTION



## 电气特性 ELECTRIC SPEC

输出电路 Output circuit	长线驱动输出
电源电压 Mains voltage	5 ± 0.25
消耗电流 Current consumption	≤ 60mA
允许负载 Allowable load	60mA
输出高电平 Signal high electrical level	最小 3.4V
输出低电平 Signal low electrical level	最大 0.4V
上升 / 下降时间 Rise / down time	MAX200us
响应频率 Response frequency	500kHz

## 机械特性 MACHINE SPEC

每分钟最大转速 r/min	6000	转动惯量 Runing inertia	$4 \times 10^{-8} \text{kgm}^2$
起动扭矩	< 0.02Nm	工作温度 Workingtemperature	-40°C ~85°C
轴最大负荷	径向 20N 轴向 10N	贮存温度 Storing temperature	-40°C ~85°C
抗冲击 Concussion resist	50G/11ms	防护等级 Protect grade	IP50
抗振动 Vibration resist	10G/10-2000Hz	重量 weight	120g

## 输出相位 OUTPUT PHASE SHIFT

Z信号中心  
U相上升沿

波形比:  $X1+X2=0.5T \pm 0.1T$   
 $X3+X4=0.5T \pm 0.1T$

相位差:  $Xn \geq 0.15T (n=1, 2, 3, 4)$

Z 信号宽:  $Tz=0.5T$

信号位置准确度: A、B 相绝对角度误差  $\leq 0.2T$

周期误差  $\leq 0.05T$

$T=360^\circ / N$  (N 为每转输出脉冲数)

周期  $P=360^\circ / N1 \pm 1.5^\circ$  ( $N1=2, 3, 4$ )

相位差  $Yn=P/6 \pm 1.5^\circ$  ( $n=1, 2, 3, 4, 5, 6$ )

A、B 相与 U、V、W 相位置不做规定

Z 相与 U 相关系:  $C \leq \pm 1^\circ$  (机械角)

90° 相位差信号与零位信号

从轴端 (板弹簧方向)

主轴顺时针旋转 (CW) 的波形图

长线驱动L

Vcc

输出信号

0V

## 接线表 CONNECTION TABLE

信号	A	B	Z	$\bar{A}$	$\bar{B}$	$\bar{Z}$	U	V	W	$\bar{U}$	$\bar{V}$	$\bar{W}$	Vcc	GND
颜色	绿	白	黄	绿/黑	白/黑	黄/黑	棕	灰	橙	棕/黑	灰/黑	橙/黑	红	黑

## HT80/30 系列 SERIES



## 特征与用途

- 外径  $\Phi 80$ , 厚度仅 37, 轴孔径  $\Phi 30$ 。
- 轴孔径另可加工为  $\Phi 25$ ,  $\Phi 28$ ,  $\Phi 32$ ,  $\Phi 35$  等。
- 采用板簧与中空轴与用户轴直接相接, 安装方便可靠。
- 中孔径超薄型, 带载能力强, 抗干扰强, 性能稳定可靠。
- 轴孔连接方式可为: 顶丝锁紧式、抱箍式、或键槽式、订货时请说明。
- 多种输出电路可选, 出线方式为电缆侧出与后出。
- 适用于工业机械、自动化控制插座行业。

## FUNCTION AND USE

- $\Phi 80$  diameter, depth is only 37, axes hole diameter is  $\Phi 30$ .
- Axes hole diameter can be  $\Phi 25$ ,  $\Phi 28$ ,  $\Phi 32$ ,  $\Phi 35$ .
- Adopt plate spring and wedge pressure axes directly connect, install convenience.
- Hole diameter thin type, with strong load capability, and strong interference resist, steady capability.
- Axes hole connect way is socket head screw type holt hoop iron type, din-rail type when order please clearly it.
- Many output circuit can select pattern of outgoing line is cable side out and back out.
- Apply for industry machine automation control lines.

## 型号说明 TYPE INSTRUCTION

HT	80	/	30	-	1024	BZ	-	05	L	G	2
基本型号 Basis type	主体外径 Main diameter		孔径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage DC+5V	输出电路形式 Output circuit form L: 长线驱动 Line driver AM26C311	输出方式 Out form G: 电缆侧出 Cable side out	电缆长度 Cable length 2m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 耐高温的金属码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

10 20 30 50 60 100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250 1500  
1800 2000 2048 2400 2500 3000 3600 4000 4096 4500 4800 5000 5400 或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L、H	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

## 机械参数 MACHINE PARAMETER

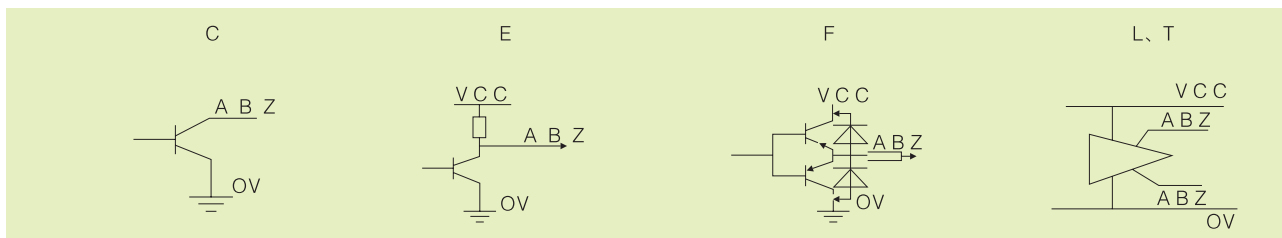
径向负荷 Radial load	$\leq$ 50N
轴向负荷 Axial load	$\leq$ 30N
起动力矩 Storque	$\leq$ $5 \times 10^{-2}$ N.m
最高转速 Tiptop rotate speed	5000r/min
转动惯量 Runing inertia	30g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.4kg

## 环境参数 ENVIROMENT PRARMETER

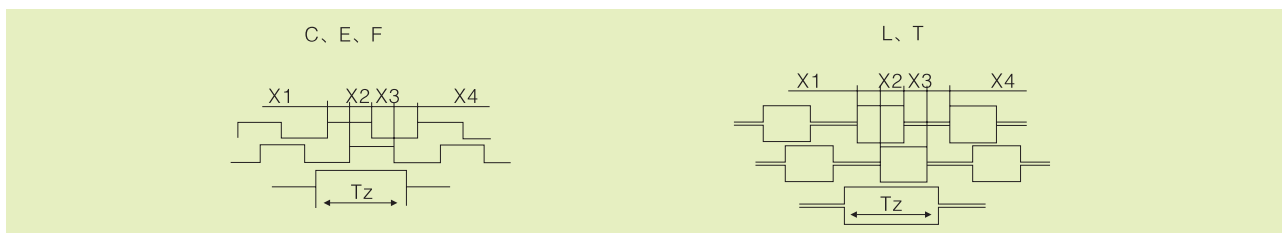
抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50



## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
	DB15 插座 Socket	7	5	4	2	9	-	-	-	8
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	屏蔽网 Shielded Network
	DB15 插座 Socket	6	5	4	2	9	3	1	10	8

注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

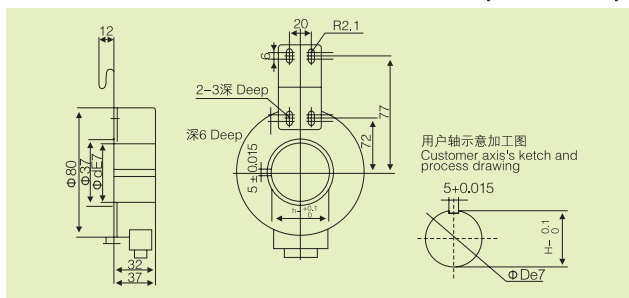
(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

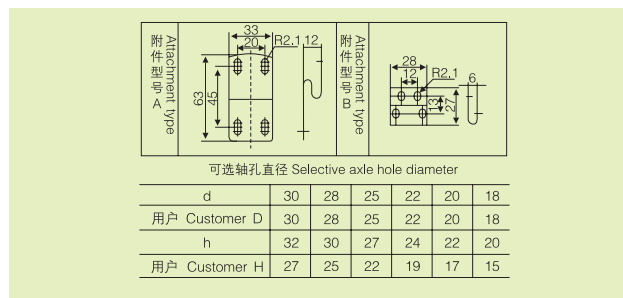
## 外形尺寸图 (单位: mm)

## SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



## 订货时, 请标明附件型号

## WHEN PIACING AN ORDER, PLEASE MARK ATTACHMENT TYPE



## HT100/45 系列 SERIES



## 特征与用途

- 外径  $\Phi 100$ , 厚度仅 43, 轴孔径  $\Phi 45$ 。
- 轴孔径可为  $\Phi 35$ ,  $\Phi 40$ ,  $\Phi 42$  等。
- 采用板簧与中空轴与用户轴直接相接, 安装方便可靠。
- 大孔径超薄型, 带载能力强, 抗干扰强, 性能稳定可靠。
- 轴孔连接方式可为: 顶丝锁紧式、抱箍式、或键槽式、订货时请说明。
- 多种输出电路可选, 出线方式为电缆侧出与后出。
- 适用于工业机械、自动化控制插座行业。

## FUNCTION AND USE

- $\Phi 100$  diameter, depth is only 43, axes hole diameter is  $\Phi 45$ .
- Axes hole diameter can be  $\Phi 35$ ,  $\Phi 40$ ,  $\Phi 42$ .
- Adopt plate spring and wedge pressure axes directly connect, install convenience.
- Hole diameter thin type, with strong load capability, and strong interference resist, steady capability.
- Axes hole connect way is socket head screw type holt hoop iron type, din-rail type when order please clearly it.
- Many output circuit can select pattern of outgoing line is cable side out and back out.
- Apply for industry machine automation control lines.

## 型号说明 TYPE INSTRUCTION

HT	100	/	45	-	1024	BZ	-	05	L	G	2
基本型号 Basis type	主体外径 Main diameter		孔径 Axes diameter		脉冲数 Pulse count	两相带正原点 Two-phase with positive base point		电源电压 Power voltage DC+5V	输出电路形式 Output circuit form L: 长线驱动 Line driver AM26C3FI	出线方式 Out form G: 电缆侧出 Cable side out	电缆长度 Cable length 2m

- 可选脉冲数 (注: 有抗振动、耐冲击的菲林码盘, 耐高温的金属码盘, 及高精度的玻璃码盘)
- Pulse / revolution (Note: the film code plate with vibration resist and inrush-resist, metal code wheel with high temperature resist and glass code wheel with high precision.)

10 20 30 50 60 100 120 125 150 180 200 250 256 300 360 400 500 512 600 720 800 900 1000 1024 1200 1250 1500  
1800 2000 2048 2400 2500 3000 3600 4000 4096 4500 4800 5000 5400 或根据用户要求制定 Or according customer request

## 电气参数 ELECTRIC PARAMETER

输出电路 Output circuit	驱动器 Drivers L	C、E、F	驱动器 Drivers T
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V	+5 或 or +8V~26V
消耗电流 Current consumption	$\leq$ 60mA	$\leq$ 60mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA	20mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V	$\leq$ 0.5V
上升 / 下降时间 Rise / down time	$\leq$ 100ns	$\leq$ 1us	$\leq$ 100ns
响应频率 Response frequency	150KHz	150KHz	150KHz

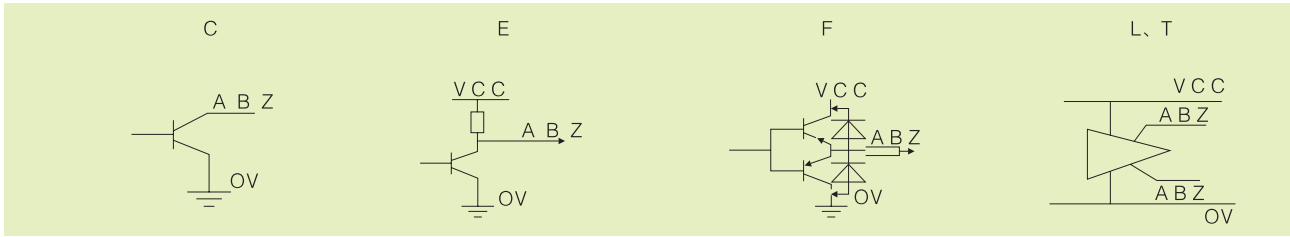
## 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 50N
轴向负荷 Axial load	$\leq$ 40N
起动力矩 Storque	$\leq 5 \times 10^{-2}$ N.m
最高转速 Tiptop rotate speed	5000r/min
转动惯量 Runing inertia	40g/cm <sup>2</sup>
允许角加速度 Allowable acceleration	$1 \times 10^4$ rad/s <sup>2</sup>
重量 weight	约 About 0.5kg

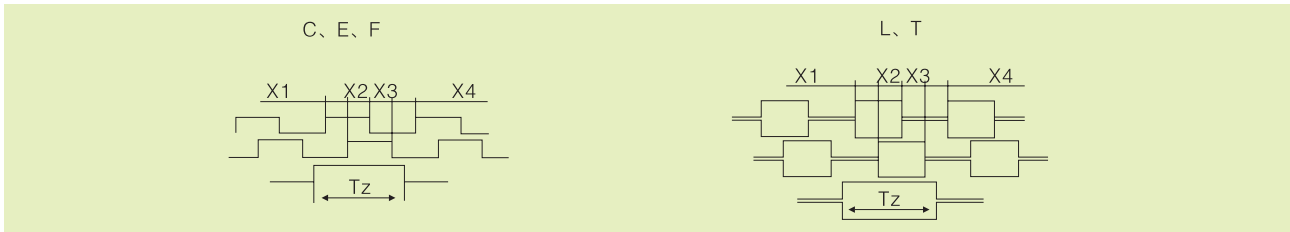
## 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

## 输出电路形式 OUTPUT CIRCUIT MODALITY



## 输出波形 OUTPUT WAVEFORM



本图为从编码器输出轴方向看顺时针 (CW) 旋转的波形

This picture is a clockwise (CW) rotating waveform seeing from the way of encoder output axis.

波形比为 Waveform ratio:  $X1+X2=0.5T \pm 0.1T$   $X2+X3=0.5T \pm 0.1T$

相位差 Phase difference:  $Xn \geq 0.15T$   $n=1, 2, 3, 4$

( $T=360/N$   $N$  为每转 A、B 相脉冲数零位信号宽度  $N$  is the width of A, B pulse zero signal every turn:  $Tz=1T \pm 0.5T$ )

## 接线表 WIRE LIST

输出信号 Output signal		+V	0V	SIG A	SIG B	SIG Z	SIG $\bar{A}$	SIG $\bar{B}$	SIG $\bar{Z}$	G
CEF 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	-	-	-	屏蔽网 Shielded Network
	DB15 插座 Socket	7	5	4	2	9	-	-	-	8
LT 型 Type	电线颜色 Cable color	红 Red	黑 Black	绿 Green	白 White	黄 Yellow	棕 Brown	灰 Grey	橙 Orange	屏蔽网 Shielded Network
	DB15 插座 Socket	7	5	4	2	9	3	1	10	8

注：(1) 信号按表中所示的电缆线颜色连接，屏蔽线已接编码器的外壳，实际接线按编码器标配接线。

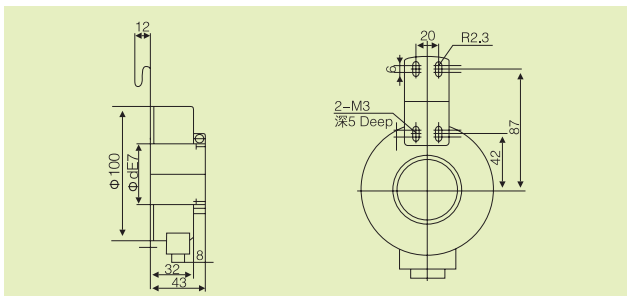
(2) 输出电缆标准长度为 1m，最长可延长到 50m。

Cautions: (1) Signals connect according to the cable color in the list, shield line had connected with encoder shell actual connection connect by encoder mark.

(2) Standard length of output cable is 1m, the longest could extend to 50m.

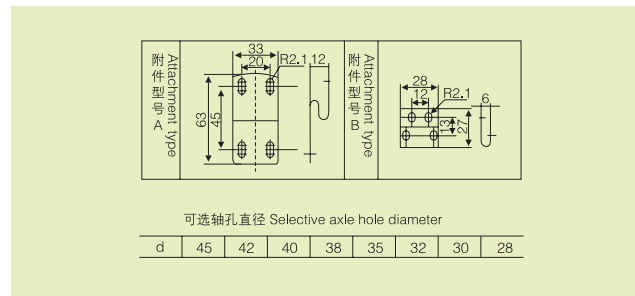
## 外形尺寸图 (单位: mm)

### SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



## 订货时, 请标明附件型号

### WHEN PIACING AN ORDER, PLEASE MARK ATTACHMENT TYPE



### SM60 小型手脉系列 SM60 Minitype han pulse size



### 特征与用途

- 外径  $\Phi 60$ , 厚度仅 25, 小型超薄型设计, 手感极佳。
- 分辨率有 25P/R, 50P/R, 100P/R 等可选, 输出信号为 A、B 两相。
- 多种输出电路可选, 出线方式为接线端子后出。
- 适用于数控机床的零点修正和信号分割等有。

### FUNCTION AND USE

- Diameter  $\Phi 60$ , thickness is only 25, ver thin design.
- The rate of distinguish is 25P/R, 50P/R, 100P/R can select, output signal is A、B two phase.
- Many output circuit can select, pattern of out gong line is connect terminal back out.
- Apply for numerical machine which has zero emendation and signal comminute.

### 型号说明 TYPE INSTRUCTION

SM	60	/	100	-	B	05	L
基本型号 Basis type	主体外径 Main diameter 60mm		脉冲数 Pulse count		两相 Two -phase B	电源电压 Power voltage DC+5V	输出电路形式 Output circuit form L: 长线驱动 Line driver AM26LS31

### 电气参数 ELECTRIC PARAMETER

输出电路 OUtput circuit	驱动器 Drivers L	C、E
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~26V
消耗电流 Current consumption	$\leq$ 100mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V
响应频率 Response frequency	20KHz	20KHz

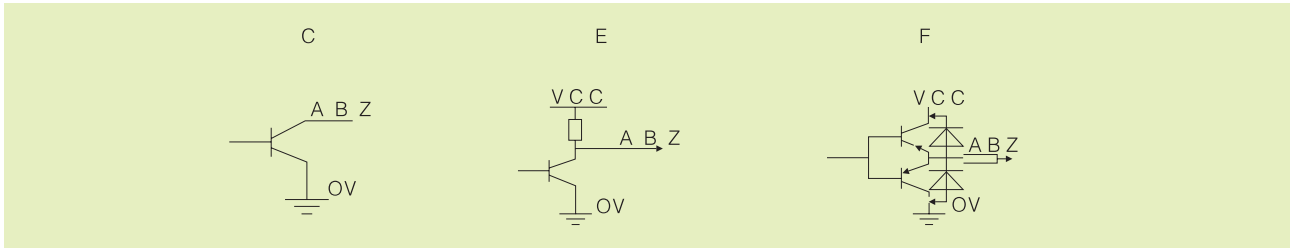
### 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 200r/min
最高转速 Tiptop rotate speed	600r/min
工作寿命 Working life	MTBF $\geq$ 10000H
重量 weight	约 About 0.25kg

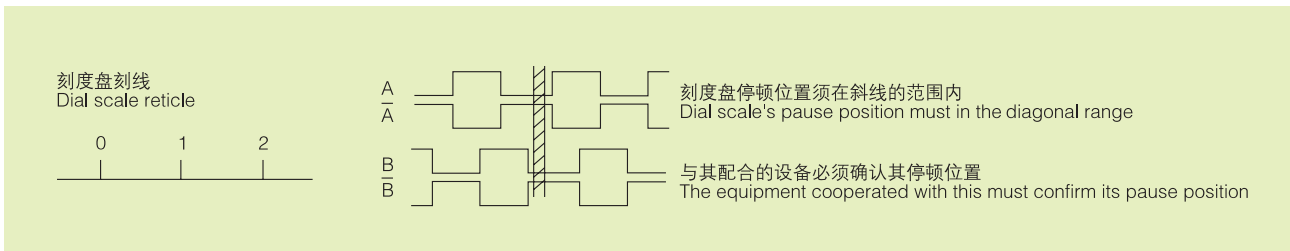
### 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+70°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

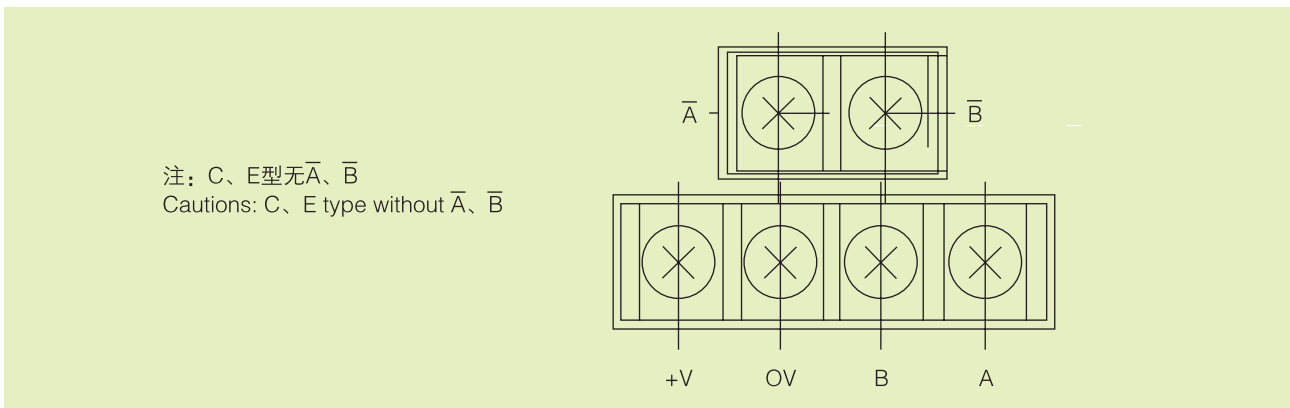
## 输出电路形式 OUTPUT CIRCUIT MODALITY



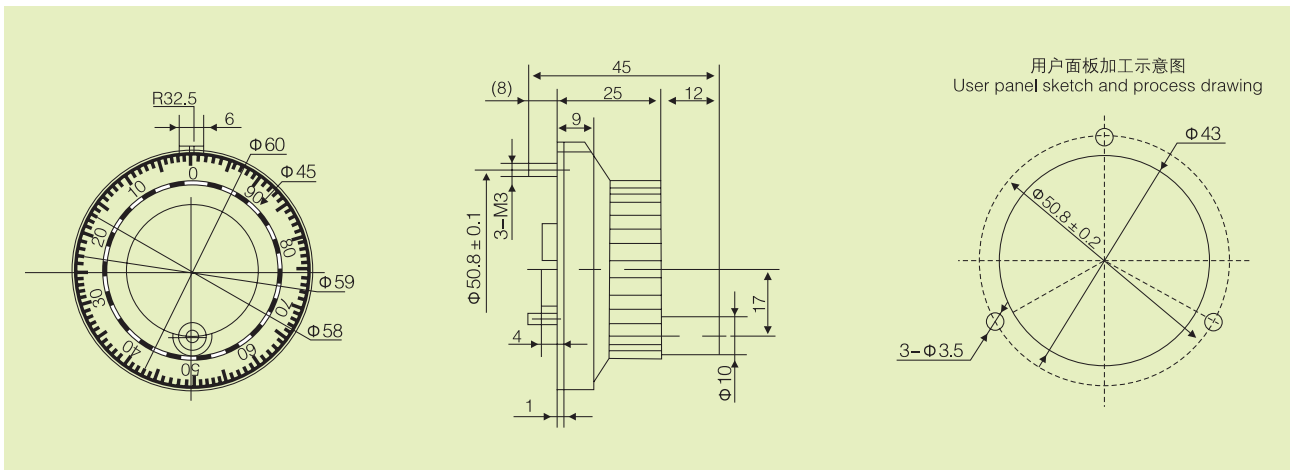
## 输出波形 OUTPUT WAVEFORM



## 接线图 WIRING DIAGRAM



## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)



### SM80 小型手脉系列 SM80 Minitype han pulse size



### 特征与用途

- 外径  $\Phi 80$ , 厚度仅 28, 小型超薄型设计, 手感极佳。
- 分辨率有 25P/R, 50P/R, 100P/R 等可选, 输出信号为 A、B 两相。
- 多种输出电路可选, 出线方式为接线端子后出。
- 适用于数控机床的零点修正和信号分割有等。

### FUNCTION AND USE

- Diameter  $\Phi 80$ , thickness is only 28, ver thin design.
- The rate of distinguish is 25P/R, 50P/R, 100P/R can select, output signal is A、B two phase.
- Many output circuit can select, pattern of out gong line is connect terminal back out.
- Apply for numerical machine which has zero emendation and signal comminute.

### 型号说明 TYPE INSTRUCTION

SM	80	/	100	-	B	05	L
基本型号 Basis type	主体外径 Main diameter 80mm		脉冲数 Pulse count		两相 Two -phase A、B	电源电压 Power voltage DC+5V	输出电路形式 Output circuit form L: 长线驱动 Line driver AM26C311

### 电气参数 ELECTRIC PARAMETER

输出电路 OUtput circuit	驱动器 Drivers L	C、E
电源电压 Mains voltage	+5V $\pm$ 5%	+5 或 or +8V~24V
消耗电流 Current consumption	$\leq$ 100mA	$\leq$ 60mA
允许负载 Allowable load	20mA	30mA
信号高电平 Signal high electrical level	$\geq$ 2.5V	$\geq$ VCC*70%V
信号低电平 Signal low electrical level	$\leq$ 0.5V	$\leq$ 0.5V
响应频率 Response frequency	20KHz	20KHz

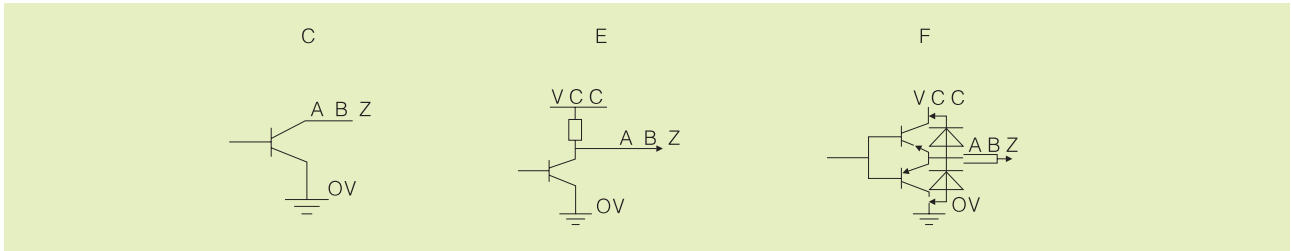
### 机械参数 MACHINE PARAMETER

径向负荷 Radial load	$\leq$ 200r/min
最高转速 Tiptop rotate speed	600r/min
工作寿命 Working life	MTBF $\geq$ 10000H
重量 weight	约 About 0.3kg

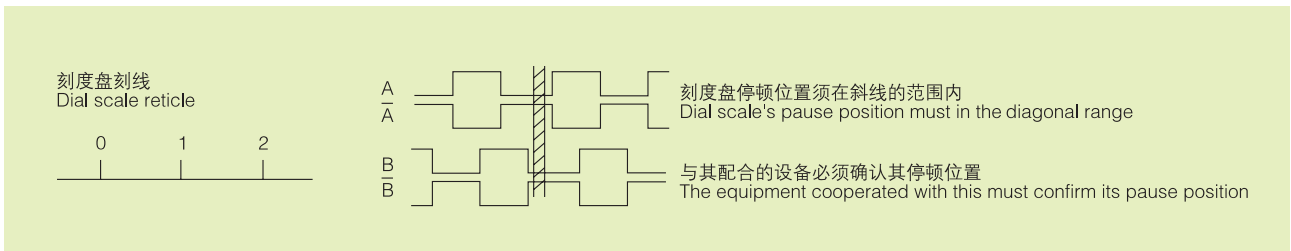
### 环境参数 ENVIROMENT PRARMETER

抗冲击 Concussion resist	1000m/s <sup>2</sup> , 6ms
抗振动 Vibration resist	100m/s <sup>2</sup> , 10~200Hz
工作温度 Workingtemperature	20°C ~+50°C
贮存温度 Storing temperature	-20°C ~+80°C
相对湿度 Relatively humidity	$\leq$ RH85% 无结露 No icing
防护等级 Protect grade	IP50

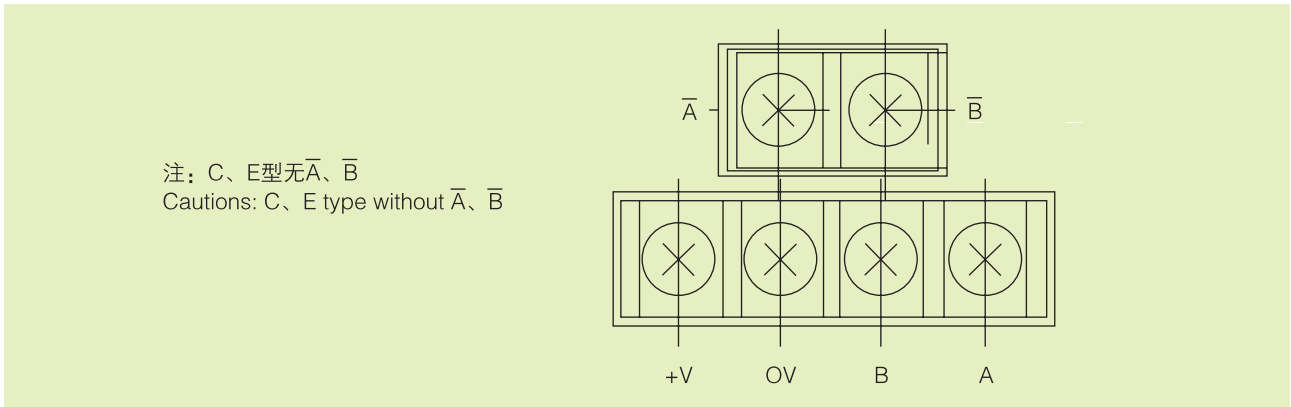
## 输出电路形式 OUTPUT CIRCUIT MODALITY



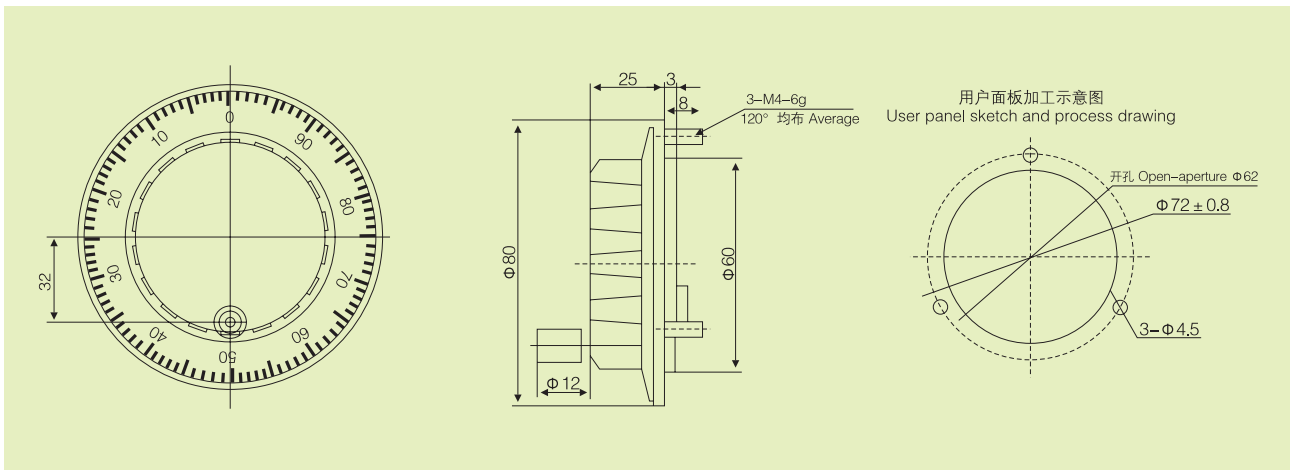
## 输出波形 OUTPUT WAVEFORM



## 接线图 WIRING DIAGRAM



## 外形尺寸图 (单位: mm) SIZE APPEARANCE ILLUSTRATION (UNIT: MM)





## 特征与用途

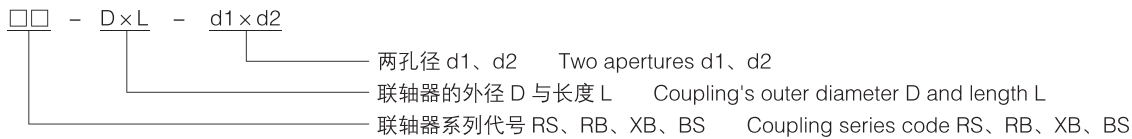
RS、RB、XB、BS 系列弹性联轴器是十分重要的元件，用于把旋转运动传递给编码器轴。

- 抗扭转的刚度好，可以吸收轴的微量轴向窜动，以及径向不同心度。
- 轴的失调小，具有良好的旋转平衡特性，可以和不同轴径间的耦合。
- 弹性联轴器规格说明：

## FUNCTION AND USE

RS、RB、XB、BS series elastic coupling is a very important component, used for rotation motion transferring to encoder axis.

- High torsion resistance stiffness can absorb minim axial moving of axis and radial non-concentricity.
- Axis maladjustment has the feature of good rotating balance and can couple among different shaft diameter.
- Elastic coupling coupling's specification:



例如：联轴器选用 RS 系列，外径 D=22，长度 L=30，两端孔径分别为 Φ8、Φ10；

记为：RS-22×30-8×10

For example: coupling choose RS series, Outer diameter D=22, Length L=30, two extremes of apertures are respectively Φ8、Φ10；

Note: RS-22×30-8×10

型号 Type	RS 绕性锁紧式 RS reelability lock-tightened type	RB 绕性抱箍式 RB reelability holt hoop iron type	XB 橡胶抱箍式 XB Rubber holt hoop iron type	BS 板簧锁紧式 BS plate spring lock-tightened type
实物图 Illustration				
外形尺寸 Size appearance				
外径 mm Outer diameter	Φ 15~Φ 32	Φ 18~Φ 35	Φ 25~Φ 80	Φ 32~Φ 42
长度 mm Length	20、25、30、35、40	20、25、30、35、40	20、25、30、35、40	28、38
适用轴径 Suitable axes diameter	Φ 3~Φ 20H7	Φ 3~Φ 15H8	Φ 3~Φ 25H8	Φ 5~Φ 20H7
传动力矩 Drive torque	0.02~2N.m	0.02~2.5N.m	0.02~5N.m	0.02~3N.m
径向偏移 radial deviation	0.2mm	0.2mm	0.2mm	0.2mm
轴向移动 Axial movement	± 0.2mm	± 0.2mm	± 0.2mm	± 0.2mm
角度偏移 Angle motion	2°	2°	2°	2°
最大转速 Max revolution	20000rpm	20000rpm	20000rpm	25000rpm
材料 Material	LY12	LY12	LY12	不锈钢与 LY12 stainless steel

- 用户订货时，须注明联轴器的型号；如无特殊说明，外径 D=MAX(d1、d2)+10
- 顶丝锁紧式孔公差为 H7，抱紧式孔公差为 H8。
- 对于非标准尺寸的要求，可根据用户要求制定。
- When the customer place an order, must mark coupling's type, if no special instruction, outer diameter D=MAX(d1、d2)+10
- Socket head screw's lock-tightened type bore tolerance is H7, Close-tightened type bore tolerance is H8.
- For demand of non-standard dimension, we can produce according to customers' requirements.

