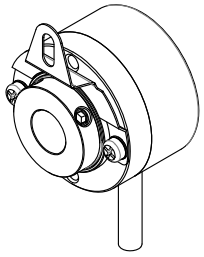
1. Incremental Optical Encoder (Hollow shaft- Blind hole)

1.1 Introduction:
K22 is a micro-compact hollow shaft optical encoder, highly reliable, commonly used in small equipment and industrial automation with space constraints.

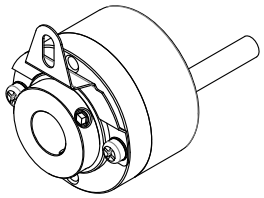
K22-J



1.2 Feature:
- Encoder external diameter Ø22mm、thickness 18mm、Diameter of shaft up to Ø6.5mm;
- Adopt non-contact photoelectric principle;
- Multiple electrical interfaces available;
- Resolution per turn up to 16384PPR.

1.3 Application:
Bill counting machines, printers, micro motors, small instruments and other automation control fields.

K22-L



1.4 Connection:
- Radial cable (standard length 0.5M)
- Axial cable (standard length 0.5M)

1.5 Protection:
IP50

1.6 Weight:
about 35g

2. Model Selection Guide

2.1 Model composition(select parameters)

K22-	J	3	N	1024	B6			-	000
Product model series	Connection interface: J=Radial cable L=Axial cable	Output phase: 1=A 2=A+B 3=A+B+Z 4=A+$\overline{A}$+B+$\overline{B}$ 6=A+B+Z +$\overline{A}$+$\overline{B}$+$\overline{Z}$	Electrical interface: N=OC(NPN)❶ NH=OC(NPN)❷ L=TTL (DC5V, 26C31)	Resolution PPR: 36; 50; 60; 100; 200; 250; 256; 300; 360; 400; 500; 512; 720; 800; 1000; 1024; 1440; 1600; 2000; 2048; 2880; 3200; 4000; 4096; 5760; 6400; 8000; 8192; 11520; 12800; 16000; 16384	Hollow shaft (Blind hole): B4=Ø4mm B5=Ø5mm B6=Ø6mm B6.5=Ø6.5mm	Supply voltage: Blank=DC5V	Special requirement: Blank=❸		Management No.

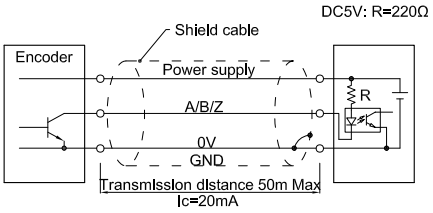
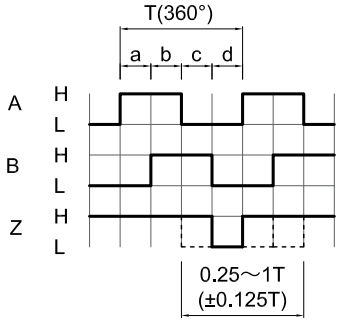
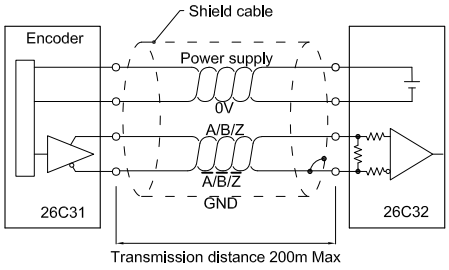
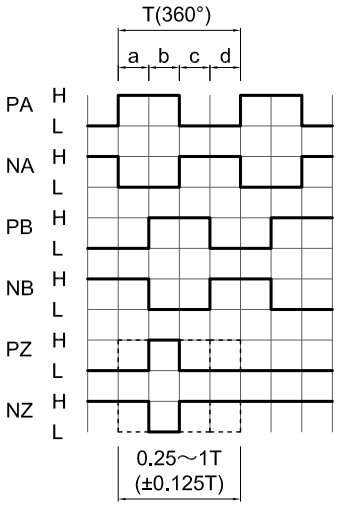
2. 2 Note

❶. Z signal is low level active.

❷. Z signal is high level active.

❸. None indicated for IP50 and cable length of 0.5M, if need to change the length C+number, the longest is 100M (expressed by C100). For the specific length of use, pls refer to page 2 of the provision of output circuit.

3. Output Mode

Electrical interface	Output circuit	Output wave form
OC NPN open collector circuit		 a.b.c.d=$\frac{T}{4}\pm\frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4}\pm\frac{T}{8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction Z signal is low level active
TTL (DC5V)		 a.b.c.d=$\frac{T}{4}\pm\frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4}\pm\frac{T}{8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction

4. Electrical Parameters

Parameter / Output type / Item			OC	TTL
Supply voltage			DC+5V±5%	
Consumption current			100mA Max	
Allowable ripple			≤3%rms	
Top response frequency			100KHz	300KHz
Output capacity	Output current	Input	≤30mA	≤±20mA
		Output	—	
	Output voltage	"H"	—	≥2.5V
		"L"	≤0.4V	≤0.5V
	Load voltage		≤DC30V	—
Rise & Fall time			Less than 2us(cable length：2m)	≤100ns Less than 1us(Cable length：2m)
Mark to space ratio			45% to 55%	
Phase shift between A & B			90°±10° (frequency in low speed)	
			90°±20° (frequency in high speed)	
GND			Not connect to encoder	

5. Mechanical Specifications

Diameter of shaft	Ø4mm; Ø5mm; Ø6mm; Ø6.5mm (Depth 10mm, Stainless steel material)
Starting torque	Less than 5×10^{-4}N·m
Inertia moment	Less than 1×10^{-6} kg·m²
Shaft load	Radial 2N; Axial 2N
Slew speed	≤5000 rpm
Shell	Aluminium alloy
Weight	about 35g

6. Environmental Parameters

Environmental temperature	Operating:—20～+80°C; Storage:—25～+85°C
Environmental humidity	Operating and storage：35～85%RH(noncondensing)
Vibration(Endurance)	Amplitude 0.75mm,5~50Hz,2h for X,Y,Z direction individually
Shock(Endurance)	49m/s² 11ms three times for X,Y,Z direction individually
Protection	IP50

7. Wiring Table

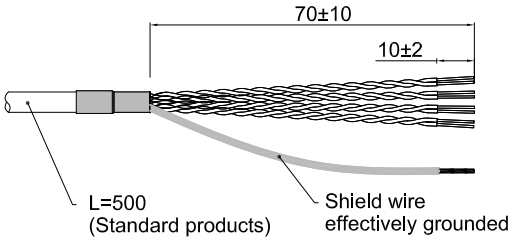
7.1 OC (Wiring table)

	Supply voltage		Incremental signal		
Wire color	Red	Black	White	Green	Yellow
Function	Up	0V	A	B	Z

7.2 TTL (Wiring table)

	Supply voltage		Incremental signal					
Wire color	Red	Black	White	White/BK	Green	Green/BK	Yellow	Yellow/BK
Function	Up	0V	A+	A-	B+	B-	Z+	Z-
Twisted-paired cable								

Up=Supply voltage.
Shield wire is not connected to the internal circuit of encoder.

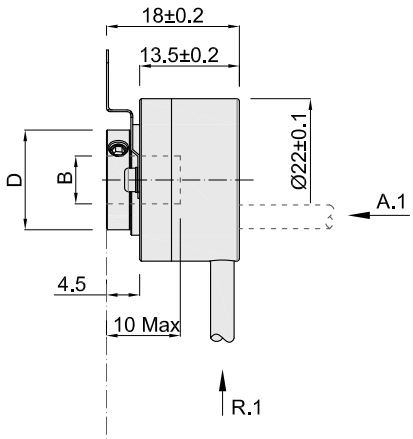


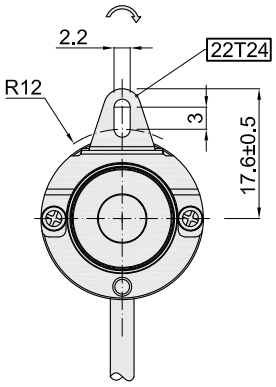
Unit: mm

8. Basic Dimensions

8.1 Dimensions

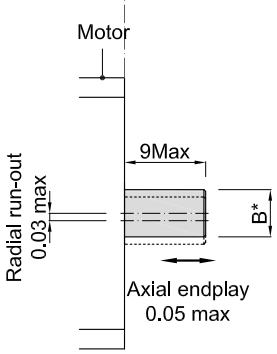
B(Shaft)	D
Ø4 $^{G7}_{(+0.004)}^{(+0.016)}$	Ø13.5
Ø5 $^{G7}_{(+0.004)}^{(+0.016)}$	
Ø6 $^{G7}_{(+0.005)}^{(+0.020)}$	
Ø6.5 $^{G7}_{(+0.005)}^{(+0.020)}$	

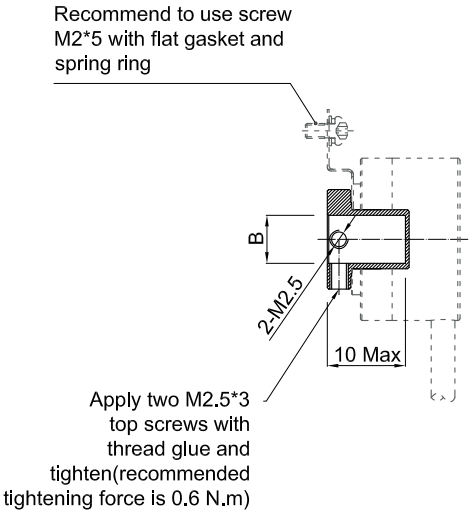




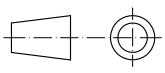
8.2 Installation requirements

B*
Ø4 $_{g6}$
Ø5 $_{g6}$
Ø6 $_{g6}$
Ø6.5 $_{g6}$





Unit: mm



= Shaft rotation direction of incremental signal output
R.1 = Radial cable (standard length 500mm)
A.1 = Axial cable (standard length 500mm)
22T24 = Mounting spring plate model

About vibration

Vibration act on encoder always cause wrong pulse, so we should pay attention to working place.More pulse per revolution, narrower groovy spacing of grating, more effect to encoder by vibration, when rev is low or stop, vibration act on shaft or main body would cause grating vibrating, so encoder might make wrong pulse.

9. Accessories

22T24
No: 03700145