

1. K100 Incremental Optical Encoder (Through shaft)

1.1 Introduction:

K100 is a through shaft encoder that can output incremental signals. The structure is compact, durable and widely used in motors, elevators, CNC and other industrial automation fields.

1.2 Feature:

- Encoder external diameter Ø100mm、thickness 38mm、diameter of shaft up to Ø45mm;
- Clamping ring at prior and rear two options available with flexible spring plate installation;
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 100000PPR.

1.3 Application:

Elevator, motor, packaging machinery, CNC and other automation control fields.

1.4 Connection:

- Radial socket
- Radial cable (standard length 1M)

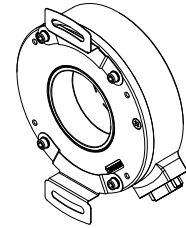
1.5 Protection:

IP50

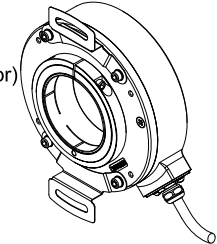
1.6 Weight:

About 670g

K100-C
(B-clamping ring at rear)

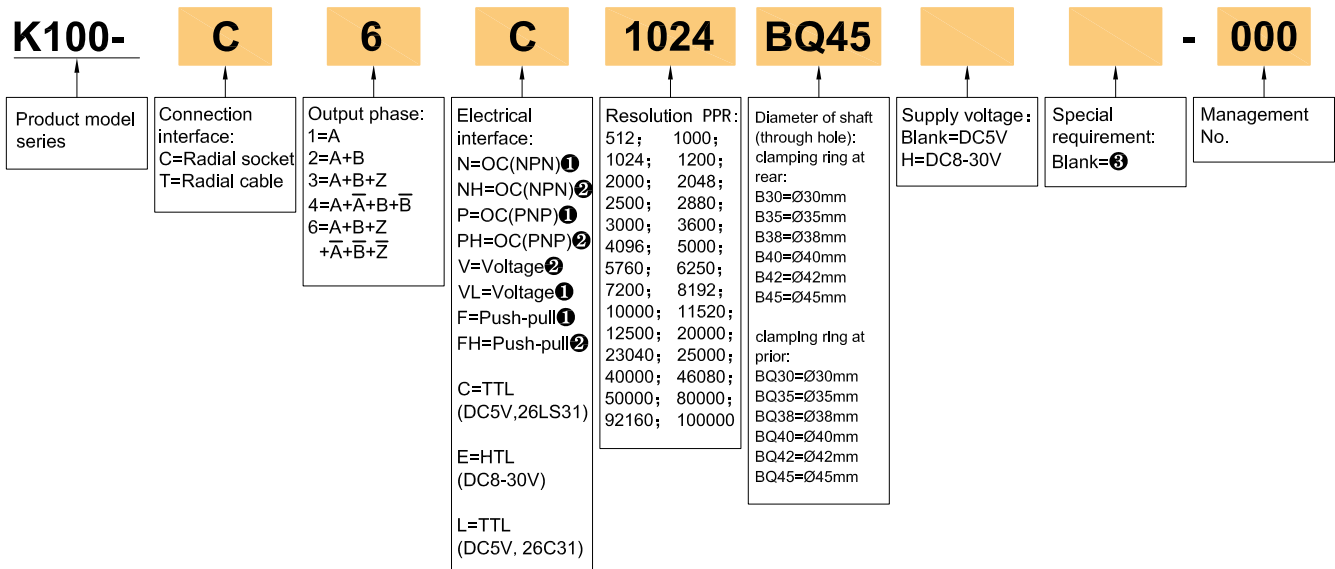


K100-T
(BQ-clamping ring at prior)



2. Model Selection Guide

2.1 Model composition(select parameters)



2.2 Note

- Z signal is low level active.
- Z signal is high level active.
- None indicated for IP50, the cable length is 1m. 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 Method

Electrical interface	Output circuit	Output wave form
<p>OC NPN open collector circuit</p>		<p>Phase A is ahead of B by $\frac{1}{4}T$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p> <p>Z signal is low level active</p>
<p>OC PNP open collector circuit</p>		<p>Phase A is ahead of B by $\frac{1}{4}T$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p> <p>Z signal is low level active</p>
<p>Push-pull</p>		<p>Phase A is ahead of B by $\frac{1}{4}T$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p> <p>Z signal is high level active</p>
<p>Voltage</p>		<p>Phase A is ahead of B by $\frac{1}{4}T$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p> <p>Z signal is high level active</p>
<p>TTL (DC5V)</p> <p>HTL (DC8-30V)</p>		<p>Phase A is ahead of B by $\frac{1}{4}T$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p>

4. Electrical Parameters

Parameter Item	Output type	OC	Voltage	Push-pull	TTL	HTL	
Supply voltage		DC5V±5%; DC8V-30V±5%			DC5V±5%	DC8-30V±5%	
Consumption current		100mA Max			120mA Max		
Allowable ripple		≤3%rms					
Top response frequency		100KHz			300KHz	500KHz	
Output capacity	Output current	Input	≤30mA	Load resistance 2.2K	≤30mA	≤±20mA	≤±50mA
		Output	—		≤10mA		
	Output voltage	"H"	—	—	≥[(Supply voltage)-2.5V]	≥2.5V	≥V _{CC} -3 V _{DC}
		"L"	≤0.4V	≤0.7V(less than 20mA)	≤0.4V(30mA)	≤0.5V	≤ 1V V _{DC}
Load voltage		≤DC30V	—		—		
Rise & Fall time		Less than 2us(cable length: 2m)			Less than 1us(Cable length: 2m)		
Insulation strength		AC500V 60s					
Insulation resistance		10MΩ					
Mark to space ratio		45% to 55%					
Reverse polarity protection		✓					
Short-circuit protection		✓❶					
Phase shift between A & B		90°±10° (frequency in low speed)					
		90°±20° (frequency in high speed)					
GND		Not connect to encoder					

❶ Short-circuit to another channel or GND permitted for max.30s.

5. Mechanical Specifications

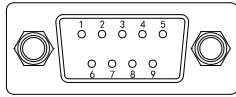
Diameter of shaft	φ30mm; φ35mm; φ38mm; φ40mm; φ42mm; φ45mm; material stainless steel
Starting torque	Less than $98 \times 10^{-3} \text{N}\cdot\text{m}$
Inertia moment	Less than $120 \times 10^{-6} \text{kg}\cdot\text{m}^2$
Shaft load	Radial 90N; Axial 60N
Slew speed	≤3000 rpm
Bearing Life	1.5×10^9 revs at rated load(100000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	about 670g

6. Environmental Parameters

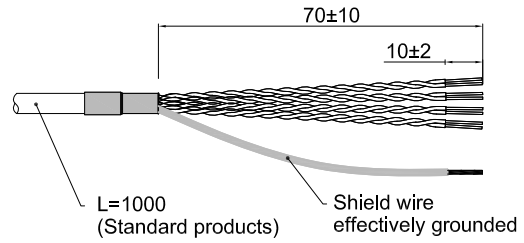
Environmental temperature	Operating: $-20 \sim +85^\circ\text{C}$ (repeatable winding cable: -10°C); Storage: $-25 \sim +90^\circ\text{C}$
Environmental humidity	Operating and storage: 35~85%RH(noncondensing)
Vibration(Endurance)	Amplitude 0.75mm,5~55Hz,2h for X,Y,Z direction individually
Shock(Endurance)	1960m/s^2 11ms three times for X,Y,Z direction individually
Protection	IP50

7. Wiring Table

DB-9P male socket
pin distribution diagram



Cable connection



7.1 OC/Voltage/Push-pull (Wiring table for socket connection and cable connection)

Socket pin definition	Supply voltage		Incremental signal						
	1	2	3	4	5	6	7	8	9
Wire color	Red	Black	White	Green	Yellow	/	/	/	/
Function	Up	Un	A	B	Z	/	/	/	/

7.2 TTL/HTL(Wiring table for socket connection and cable connection)

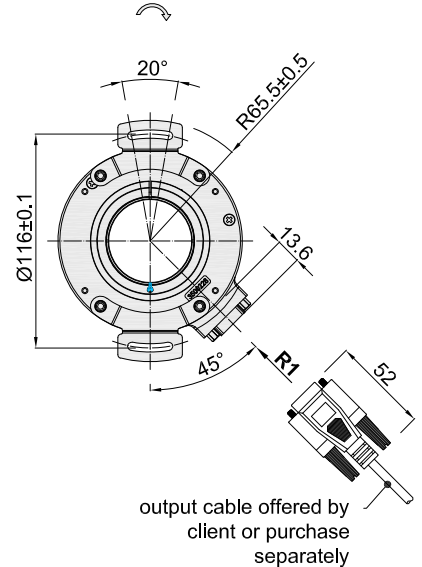
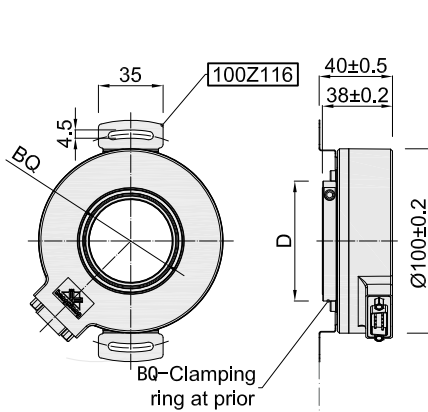
Socket pin definition	Supply voltage		Incremental signal						
	1	2	3	6	4	7	5	8	9
Wire color	Red	Black	White	White/BK	Green	Green/BK	Yellow	Yellow/BK	/
Function	Up	Un	A+	A-	B+	B-	Z+	Z-	/
Twisted-paired cable									

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

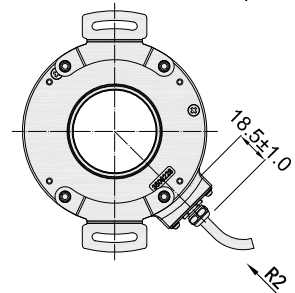
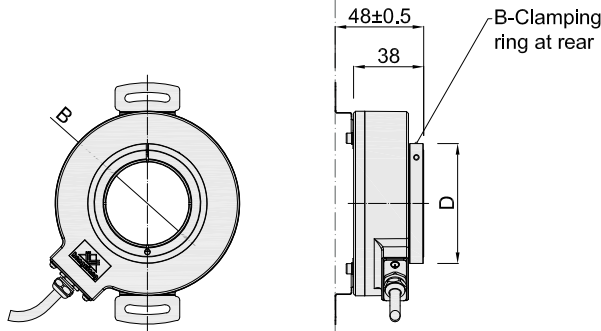
8. Basic Dimensions

8.1 Dimensions

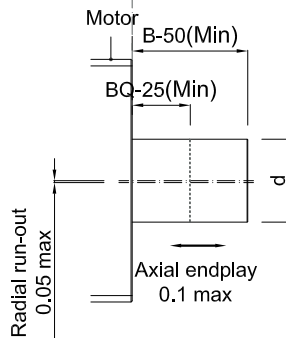
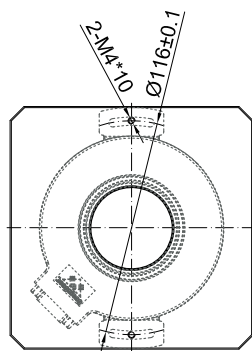
BQ(Shaft)	D
φ30 ^{G7} (+0.034 / +0.009)	φ46
φ35 ^{G7} (+0.034 / +0.009)	φ55
φ38 ^{G7} (+0.034 / +0.009)	φ58
φ40 ^{G7} (+0.034 / +0.009)	φ60
φ42 ^{G7} (+0.034 / +0.009)	φ62
φ45 ^{G7} (+0.034 / +0.009)	φ65



B (轴孔径)	D
φ30 ^{G7} (+0.034 / +0.009)	φ46
φ35 ^{G7} (+0.034 / +0.009)	φ55
φ38 ^{G7} (+0.034 / +0.009)	φ58
φ40 ^{G7} (+0.034 / +0.009)	φ60
φ42 ^{G7} (+0.034 / +0.009)	φ62
φ45 ^{G7} (+0.034 / +0.009)	φ65



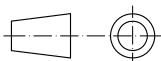
8.2 Mounting shaft requirements



d
φ30 _{g6} (-0.009 / -0.025)
φ35 _{g6} (-0.009 / -0.025)
φ38 _{g6} (-0.009 / -0.025)
φ40 _{g6} (-0.009 / -0.025)
φ42 _{g6} (-0.009 / -0.025)
φ45 _{g6} (-0.009 / -0.025)

Mounting screws
Inner hexagon bolt +flat washer
Specification: M4*8
Material: stainless steel
Quantity: 2

Unit: mm



↻ = Shaft rotation direction of the incremental signal output

R.1 = Radial socket (DB-9P 9pin male socket)
 R.2 = Radial cable (standard length 1M)

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. Recommended Accessories

9.1 Spring plate options

<p>Standard model 100Z116</p>	
<p>Optional model 100T178</p>	

9.2 Recommended plugs and cables

Plug and cable	Brief description	No.	Order No.
	<p>C1=Connection type head A: DB-9P female straight connector; Connection type head B: Bare wire end; Cable length: 1M 8-core with shield,halogen-free PUR</p>	K100C1	44400048
	<p>C2=Connection type head A: DB-9P female straight connector; Connection type head B: Bare wire end; Cable length: 2M 8-core with shield,halogen-free PUR</p>	K100C2	44400049
	<p>C5=Connection type head A: DB-9P female straight connector; Connection type head B: Bare wire end; Cable length: 5M 8-core with shield,halogen-free PUR</p>	K100C5	44400050