

1. PGK50 Incremental Optical Encoder (Through shaft)

1.1 Introduction:

PGK50 is an ultra-thin through shaft, all stainless steel design with a variety of electrical interfaces and resolutions available. The highest protection grade is IP67. It has a compact structure, sturdy and high safety, commonly used in industrial automation fields under harsh environments.

1.2 Feature:

- Encoder external diameter Ø50mm、thickness 27mm、diameter of shaft up to Ø15mm;
- The shaft is installed with encircling locking and fixed with flexible spring plates;
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 48000PPR.

1.3 Application:

Outdoor electromechanical, industrial and mining, textile, motor, CNC, and other automation control fields.

1.4 Connection:

- Cable connection (standard length 1000mm)

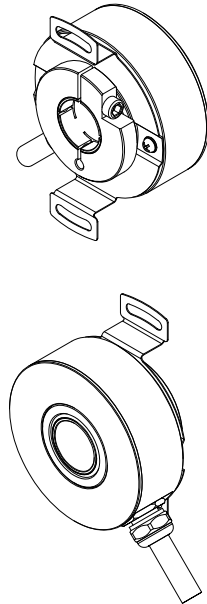
1.5 Protection:

IP67

1.6 Weight:

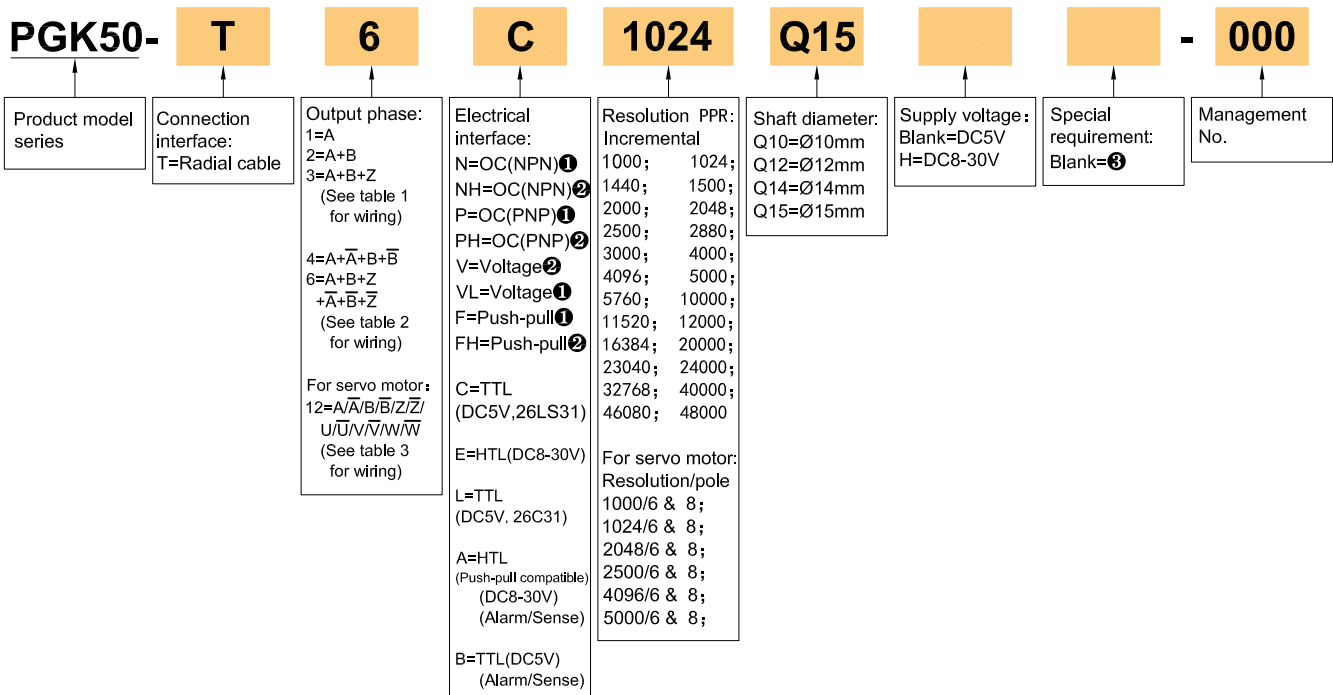
About 150g

PGK50-T



2. Model Selection Guide

2.1 Model composition(select parameters)



2.2 Note

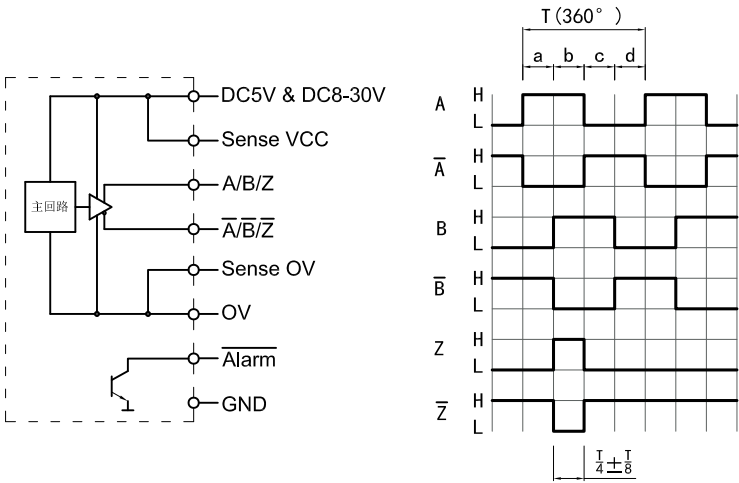
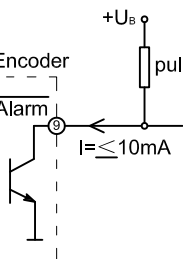
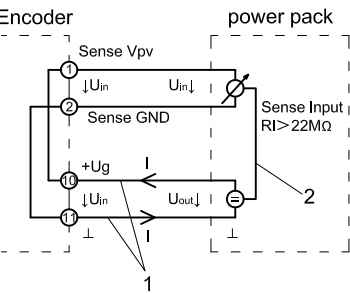
- Z signal is low level active.
- Z signal is high level active.
- None indicated for IP67, cable length of 1m, if need to change the length C+number, the longest is 100m (expressed by C100). For the specific length of use, pls refer to page 2 and 3 of the provision of output circuit.

3. Output Method

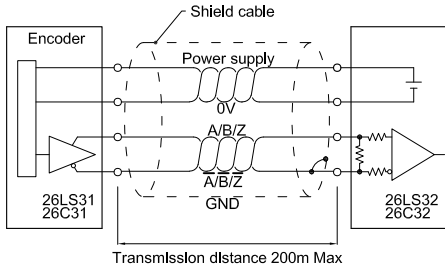
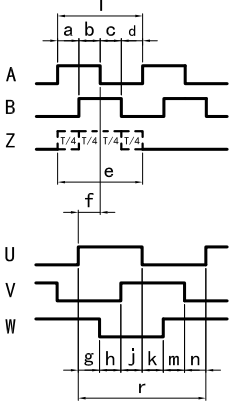
3.1 Incremental signal

Electrical interface	Output circuit	Output wave form
<p>OC NPN open collector circuit</p>		<p>a.b.c.d=$\frac{I}{4} \pm \frac{I}{8}$</p> <p>Phase A is ahead of B by $\frac{I}{4} \pm \frac{I}{8}$, 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>Z signal is high level active</p>
<p>Push-pull</p>		<p>Z signal is high level active</p>
<p>Voltage</p>		
<p>TTL (DC5V)</p> <p>HTL (DC8-30V)</p>		<p>a.b.c.d=$\frac{I}{4} \pm \frac{I}{8}$</p> <p>Phase A is ahead of B by $\frac{I}{4} \pm \frac{I}{8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p>

3.2 Incremental signal (continued)

Electrical interface	Output circuit
<p>HTL(DC8-30V) (with Alarm/Sense)</p>	 <p style="text-align: right;">a. b. c. d = $\frac{T}{4} \pm \frac{T}{8}$</p> <p style="text-align: right;">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)</p> <p style="text-align: right;">CW direction \rightarrow</p>
<p>Push-Pull (DC8-30V) (with Alarm/Sense)</p>	 <p>Output NPN-Open collector Output load max 5mA/24V at UB=DC10-24V Output level Output active(failure condition): $L \leq DC0.7V$ Output inactive: high impedance(if necessary: get H-level by an external pull-up resistor)</p> <p>Malfunction indication time $\geq 20ms$ Function -Overtemperature +85°C -Overload (e.g.current at 500mA due to short circuit) -Voltage range $\pm 10\%$(for DC5V only) -Voltage drop on the supply lines</p>
<p>TTL(DC5V) (with Alarm/Sense)</p>	 <p>The sense wires enable measuring of the actual encoder supply voltage(compensates for voltage drops due to supply current and cable resistance).</p> <p>Due to the voltage drop in the cables and the voltage supply, the encoder input voltage U_{in} is less than the power pack output voltage U_{out}. The present input voltage U_{in} is now output to the Sense Vcc and Sense GND cables and returns as data to the power pack. The input resistance R on the power pack should amount to at least 22MΩ,so that no voltage drop occurs on these cables. In case of power packs with sense input,it is now possible to readjust the output voltage U_{out} automatically.</p> <p>1. Voltage drop due to long cable lengths 2. Automatic readjustment of the output voltage (only for power packs with sense input)</p>

3.3 For servo motor(with UVW)

Electrical interface	Output circuit	Output wave form									
<p>TTL (DC5V)</p>		 <p>Reverse signal not shown</p> <table border="1" data-bbox="1169 920 1414 1003"> <thead> <tr> <th>pole</th> <th>g.h.j.k.m.n</th> <th>r</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>20±1°</td> <td>120°</td> </tr> <tr> <td>8</td> <td>15±1°</td> <td>90°</td> </tr> </tbody> </table> <p> $a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$ $e = T \pm \frac{T}{2}$ f: center of phase Z to rise point of phase U, that is ±1° </p> <p>CCW direction →</p> <p>Viewed from shaft end when installing. (See dimensional drawings)</p>	pole	g.h.j.k.m.n	r	6	20±1°	120°	8	15±1°	90°
pole	g.h.j.k.m.n	r									
6	20±1°	120°									
8	15±1°	90°									

4. Electrical Parameters

Parameter Item	Output type	OC	Voltage	Push-pull	TTL	HTL	
Supply voltage		DC+5V±5%; DC8V-30V±5%			DC+5V±5%	DC8-30V±5%	
Consumption current		100mA Max			120mA Max		
Allowable ripple		≤3%rms					
Top response frequency		100KHz			500KHz	800KHz	
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	Ø10mm、Ø12mm、Ø14mm、Ø15mm(Stainless steel, through shaft)
Starting torque	Less than $9.8 \times 10^{-3} \text{N}\cdot\text{m}$
Inertia moment	Less than $6.5 \times 10^{-6} \text{kg}\cdot\text{m}^2$
Shaft load	Radial 50N; Axial 30N
Slew speed	$\leq 3000 \text{ rpm}$
Bearing Life	1.5×10^9 revs at rated load(100000hrs at 2500RPM)
Shell	Stainless steel
Weight	About 150g

6. Environmental Parameters








Environmental temperature	Operating: $-40 \sim +95^\circ\text{C}$ (repeatable winding cable: -10°C); Storage: $-40 \sim +95^\circ\text{C}$
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)	490m/s^2 11ms three times for X,Y,Z direction individually
Protection	IP67

7. Wiring Table








7.1 OC/Voltage

Wire color	Supply voltage		Signal		
	Red	Black	White	Green	Yellow
Function	Up	Un	A	B	Z

7.2 TTL/HTL(Push-Pull compatible)

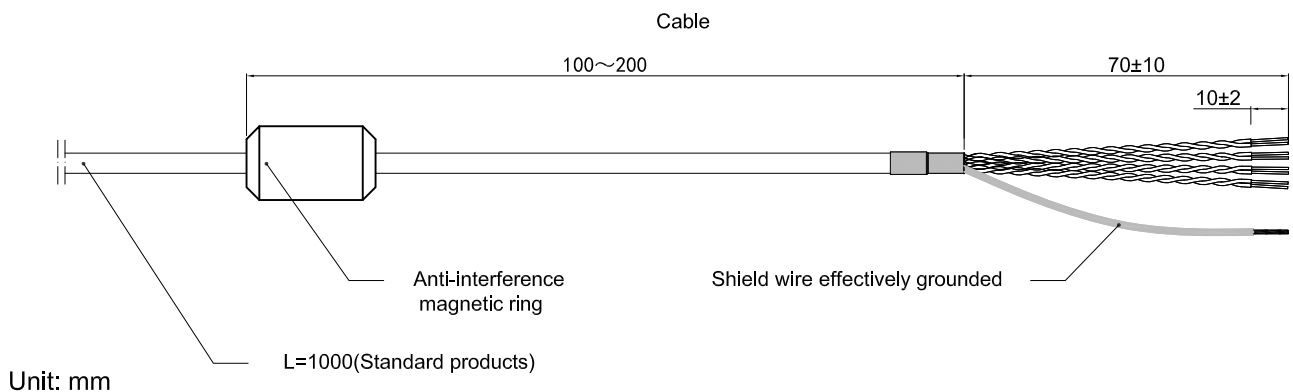
Wire color	Supply voltage		Signal								
	Red	Black	White	White/BK	Green	Green/BK	Yellow	Yellow/BK	Blue	Pink	Gray
Function	Up	Un	A+	A-	B+	B-	Z+	Z-	Alarm	Sense VCC	Sense 0V
Twisted-paired cable											

7.3 Cable connection wiring table for servo motor

Wire color	Supply voltage		Incremental signal											
	Red	Black	White	White/BK	Green	Green/BK	Yellow	Yellow/BK	Blue	Blue/Bk	Grey	Grey/Bk	Pink	Pink/Bk
Function	Up	Un	A+	A-	B+	B-	Z+	Z-	U+	U-	V+	V-	W+	W-
Twisted-paired cable														

Up=Supply voltage.

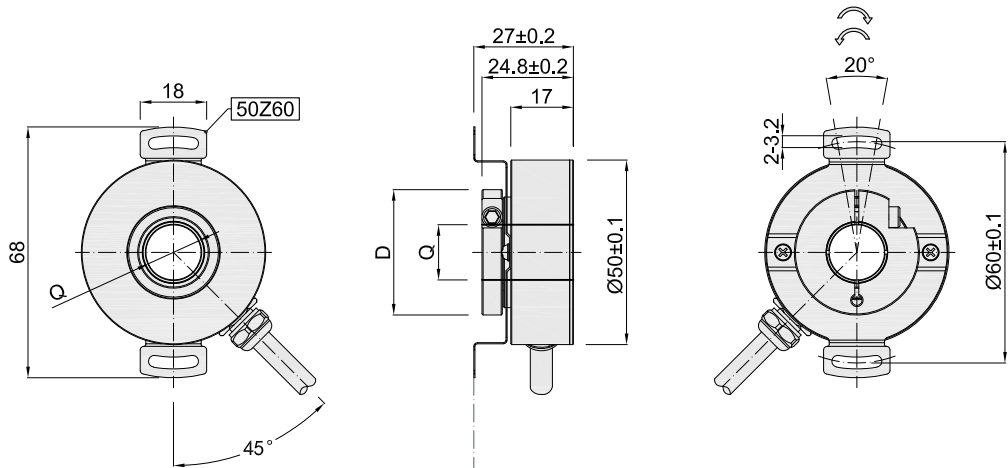
Shield wire is not connected to the internal circuit of encoder.



8. Basic Dimensions

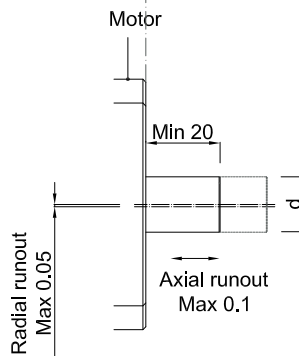
8.1 Dimensions

Q	D
$\varnothing 10^{G7}_{+0.006}^{+0.024}$	$\varnothing 32$
$\varnothing 12^{G7}_{+0.006}^{+0.024}$	$\varnothing 32$
$\varnothing 14^{G7}_{+0.007}^{+0.028}$	$\varnothing 34$
$\varnothing 15^{G7}_{+0.007}^{+0.028}$	$\varnothing 34$



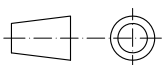
8.2. Mounting shaft requirements

Mounting screws
Inner hexagon bolt +flat washer Specification: M3*6 Material: stainless steel Quantity: 2



d
$\varnothing 10_{g4}^{(-0.006)}_{(-0.011)}$
$\varnothing 12_{g4}^{(-0.006)}_{(-0.011)}$
$\varnothing 14_{g4}^{(-0.006)}_{(-0.011)}$
$\varnothing 15_{g4}^{(-0.006)}_{(-0.011)}$

Unit: mm



50Z60 = Model of installation spring plate

- ↻ = Shaft rotation direction of incremental signal output
- ↻ = Shaft rotation direction of servo motor dedicated signal

9. Caution

9.1 Caution for operation

- The working temperature shall not exceed the storage temperature.
- The working humidity shall not exceed the storage humidity.
- Do not use where the temperature changes dramatically and have fog.
- Do not close to corrosive and flammable gas.
- Keep away from dust,salt and metal powder.
- Keep away from places where you will use water, oil, or medicine.
- Undue vibration and shock will impact the encoder.

9.2 Caution for Installation

- Electrical components should not be subjected to excessive pressure, etc., and electrostatic assessment of the installation environment should be conducted.
- Do not close the cable of the motor power to the encoder.
- The FG wire of the motor and mechanical device should be grounded.
- The shielding wire must be effectively grounded since the shielding is not connected to the encoder.

9.3 Caution for wiring

- Use the encoder under the specified supply voltage. Please note that the supply voltage range may drop due to the wiring length.
- Do not put the encoder wiring and other power lines through the same duct, and do not use them by bundling in parallel.
- Please use twisted pair wires for the signal and power wires of encoder.
- Please do not apply excessive force to the cable of encoder, or it will may be damaged.