1. K58 Incremental Optical Encoder (Hollow shaft)

1.1 Introduction：
K58 is an ultra-thin multiple shaft type encoder, compact and miniaturized, commonly used in servo motors and industrial automations.

1.2 Feature：
• Encoder external diameter Ø58mm、thickness 24 & 29mm、diameter of shaft up to Ø22mm;
• Adopt non-contact photoelectric principle;
• Reverse polarity protection;
• Short circuit protection;
• Multiple electrical interfaces available;
• Resolution per turn up to 57600PPR.

1.3 Application：
Servo motor, underground, elevator, CNC and other automation control fields.
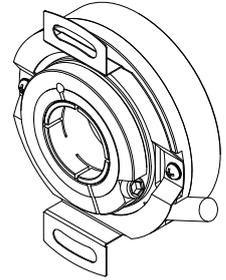
1.4 Connection：
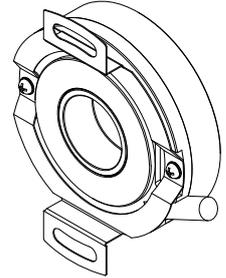• Radial cable (length 1M)

1.5 Protection：
IP50

1.6 Weight：
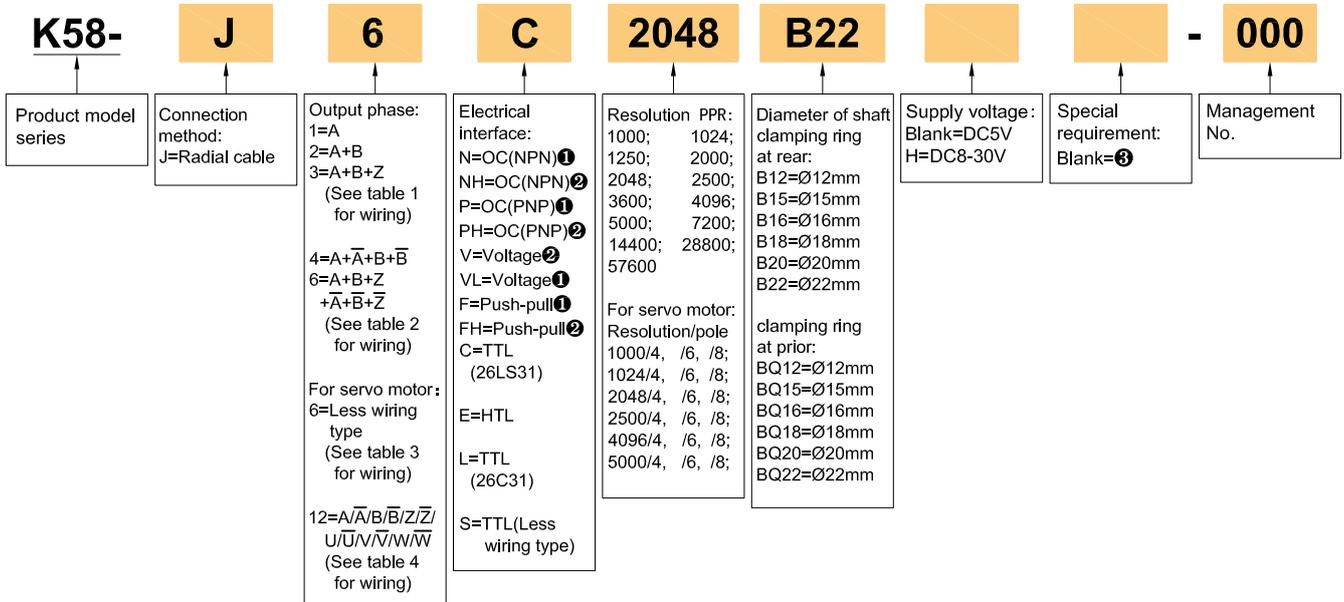about 150g

K58-J
(BQ Clamping ring at prior)

K58-J
(B Clamping ring at rear)

2. Model Selection Guide

2.1 Model composition(select parameters)

K58-	J	6	C	2048	B22			- 000

| Product model series | Connection method: J=Radial cable | Output phase: 1=A 2=A+B 3=A+B+Z (See table 1 for wiring) 4=A+Ā+B+B̄ 6=A+B+Z +Ā+B̄+Z̄ (See table 2 for wiring) For servo motor: 6=Less wiring type (See table 3 for wiring) 12=A/Ā/B/B̄/Z/Z̄/ U/Ū/V/V̄/W/W̄ (See table 4 for wiring) | Electrical interface: N=OC(NPN)❶ NH=OC(NPN)❷ P=OC(PNP)❶ PH=OC(PNP)❷ V=Voltage❷ VL=Voltage❶ F=Push-pull❶ FH=Push-pull❷ C=TTL (26LS31) E=HTL L=TTL (26C31) S=TTL(Less wiring type) | Resolution PPR: 1000; 1024; 1250; 2000; 2048; 2500; 3600; 4096; 5000; 7200; 14400; 28800; 57600 For servo motor: Resolution/pole 1000/4, /6, /8; 1024/4, /6, /8; 2048/4, /6, /8; 2500/4, /6, /8; 4096/4, /6, /8; 5000/4, /6, /8; | Diameter of shaft clamping ring at rear: B12=Ø12mm B15=Ø15mm B16=Ø16mm B18=Ø18mm B20=Ø20mm B22=Ø22mm clamping ring at prior: BQ12=Ø12mm BQ15=Ø15mm BQ16=Ø16mm BQ18=Ø18mm BQ20=Ø20mm BQ22=Ø22mm | Supply voltage: Blank=DC5V H=DC8-30V | 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 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 Mode

3.1 Incremental signal

Electrical interface	Output circuit	Output wave form
OC NPN open collector circuit	 DC5V: R=220Ω DC12V: R=470Ω Shield cable Encoder / Power supply / A/B/Z / 0V / GND / R Transmission distance 50m Max Ic=20mA	$T(360°)$ a b c d $a.b.c.d=\frac{T}{4}\pm\frac{T}{8}$ 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 $\frac{T}{4}\pm\frac{T}{8}$ Z signal is low level active
OC PNP open collector circuit	Shield cable Encoder / Power supply / A/B/Z / 0V / GND Transmission distance 50m Max Ic=20mA	(same as above)
Push-pull	Shield cable Encoder / Power supply / A/B/Z / 0V / GND / L=Load Transmission distance 50m Max	$T(360°)$ a b c d $a.b.c.d=\frac{T}{4}\pm\frac{T}{8}$ 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 $\frac{T}{4}\pm\frac{T}{8}$ Z signal is high level active
Voltage	Shield cable Encoder / Power supply / A/B/Z / 0V / GND / L=Load R=2.2K Transmission distance 2m Max	
TTL (DC5V) HTL (DC8-30V)	Shield cable Encoder / Power supply / 0V / A/B/Z / A/B/Z / GND 26LS31 26C31 / 26LS32 26C32 Transmission distance 200m Max	$T(360°)$ a b c d PA NA PB NB PZ NZ $a.b.c.d=\frac{T}{4}\pm\frac{T}{8}$ 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 $\frac{T}{4}\pm\frac{T}{8}$

3.2 For servo motor(with UVW）

Electrical interface	Output circuit	Output wave form
TTL (DC5V)		
TTL (DC5V) (Less wiring type)		

TTL (DC5V) — Output circuit:

Shield cable
Encoder
Power supply
0V
A/B/Z
A̅/B̅/Z̅
GND
26LS31 26C31
26LS32 26C32
Transmission distance 200m Max

TTL (DC5V) (Less wiring type) — Output circuit:

Main circuit
1
3/5/7
4/6/8
2
0

26LS31, 26C31
Transmission distance 200m Max

Symbol signification

★： indicate position of UVW channel
☆： position to start counting ABZ channel
⊘： non-using zone
HZ： high impedance

No.	Function		Mode		
	Color		1	2	3
3	white		HZ	U	A
4	white/black		HZ	U̅	A̅
5	green		HZ	V	B
6	green/black		HZ	V̅	B̅
7	yellow		HZ	W	Z
8	yellow/black		HZ	W̅	Z̅
1	red		DC+5V		
2	black		OV		
0	shielding		GND		

Output wave form:

Reverse signal not shown

pole	g.h.j.k.m.n	r
4	30±1°	180°
6	20±1°	120°
8	15±1°	90°

$a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$

$e = T \pm \frac{T}{2}$

f: center of phase Z to rise point of phase U,that is ±1°

CCW direction ⟶

Viewed from shaft end when installing.
(See dimensional drawings)

Timing Chart

Supply voltage

Instantaneous power down   Power off

5±0.25
4.25±0.3

Power on

Time(ms)

35MIN   35MIN
7±2   7±2

★ ☆   ★ ☆

Mode   1   2 3   1   2 3

1   1

510±220   22±11   510±220   22±11

4. Electrical Parameters

Parameter \ Output type			OC	Voltage	Push-pull	TTL	TTL (Less wiring type)	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			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		≥Vcc-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)		≤100ns
Insulation strength			AC500V 60s					
Insulation resistance			10MΩ					
Mark to space ratio			45% to 55%					
Reverse polarity protection			✔					
Short-circuit protection			—		✔①			
Phase shift between A & B			90°±10° (frequency in low speed)					
			90°±20° (frequency in high speed)					
Delay motion time ②			—				510±220ms	—
GND			Not connect to encoder					

① Short-circuit to another channel or GND permitted for max 30s．

② Phase A．B．Z are back of phase U．V．W when power on．

5．Mechanical Specifications

Diameter of shaft	Ø12mm；Ø15mm；Ø16mm；Ø18mm；Ø20mm；Ø22mm (optional)
Starting torque	Less than 9.8×10^{-3}N·m
Inertia moment	Less than 6.5×10^{-6} kg·m²
Shaft load	Radial 50N；Axial 30N
Slew speed	≤3000 rpm
Bearing Life	1.5×10^{9} revs at rated load(100000hrs at 2500RPM)
Shell	Aluminium alloy
Weight	about 150g

6．Environmental Parameters

Environmental temperature	Operating：－20～+85°C(repeatable winding cable：－10°C)；Storage：－20～+90°C
Environmental humidity	Operating and storage：35～85％RH(noncondensing)
Vibration(Endurance)	Amplitude 1.52mm,5~55Hz,2h for X,Y,Z direction individually
Shock(Endurance)	980m/s² 11ms three times for X,Y,Z direction individually
Protection	IP50

8. Basic Dimensions
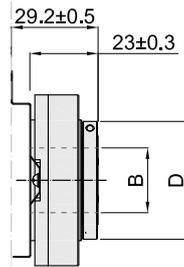
8.1 BQ (clamping ring at prior)
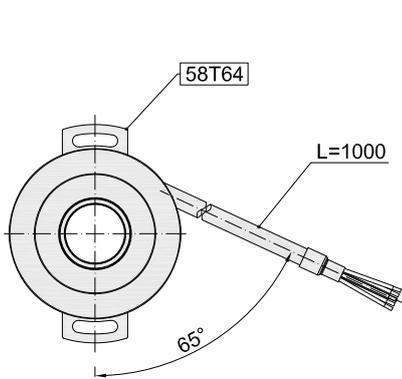
BQ(Shaft)	D
Ø12^{G7}$(^{+0.024}_{+0.006})$	Ø35
Ø15^{G7}$(^{+0.024}_{+0.006})$	
Ø16^{G7}$(^{+0.024}_{+0.006})$	Ø37
Ø18^{G7}$(^{+0.024}_{+0.006})$	
Ø20^{G7}$(^{+0.028}_{+0.007})$	Ø41
Ø22^{G7}$(^{+0.028}_{+0.007})$	
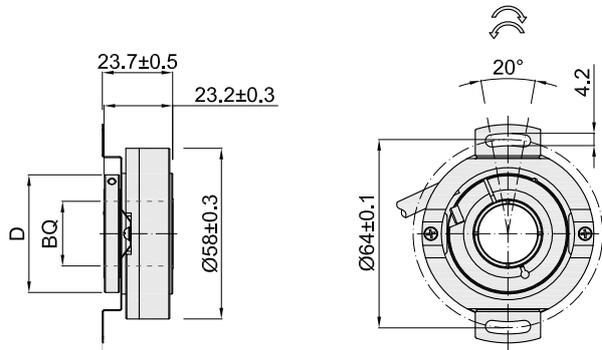
8.2 B (clamping ring at rear)

B(Shaft)	D
Ø12^{G7}$(^{+0.024}_{+0.006})$	Ø35
Ø15^{G7}$(^{+0.024}_{+0.006})$	
Ø16^{G7}$(^{+0.024}_{+0.006})$	Ø37
Ø18^{G7}$(^{+0.024}_{+0.006})$	
Ø20^{G7}$(^{+0.028}_{+0.007})$	Ø41
Ø22^{G7}$(^{+0.028}_{+0.007})$	

9. Mounting Shaft Requirements

Mounting screws
Inner hexagon bolt +flat washer Specification: M4*8 Material: stainless steel Quantity: 2
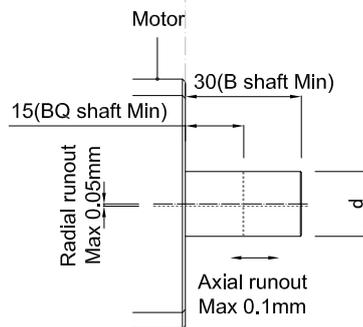
d
Ø12$_{g6}$$(^{-0.006}_{-0.017})$
Ø15$_{g6}$$(^{-0.006}_{-0.017})$
Ø16$_{g6}$$(^{-0.006}_{-0.017})$
Ø18$_{g6}$$(^{-0.006}_{-0.017})$
Ø20$_{g6}$$(^{-0.007}_{-0.020})$
Ø22$_{g6}$$(^{-0.007}_{-0.020})$

Unit：mm
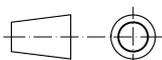
= Direction of shaft rotation for incremental signal output

= Direction of shaft rotation for servo motor-specific signal output

58T64 = Install spring plate

10.　Caution

10. 1 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.

10. 2 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.