

## 1. KH58 Ultra-high Resolution Incremental Optical Encoder (Through Shaft)

### 1.1 Introduction:

This product is a through shaft rugged design, ultra-high resolution, compact and safe encoder commonly used in industrial automations.

### 1.2 Feature:

- Encoder external diameter Ø58mm、thickness 37mm、diameter of shaft up to Ø15mm, rugged type;
- Ring locking mounting structure;
- Adopt non-contact photoelectric principle;
- With short circuit protection;
- With zero position LED display;
- Various electrical interfaces available;
- Resolution per turn up to 24Bits.

### 1.3 Application:

Servo motor, elevator, CNC and other automation control fields.

### 1.4 Connection:

- Radial socket (M12 8pin male socket)
- Radial socket (M23 12pin male socket)
- Radial cable (standard length 1000mm)

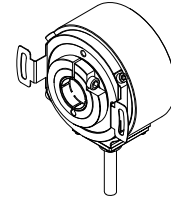
### 1.5 Protection:

IP65

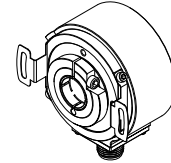
### 1.6 Weight:

About 200g

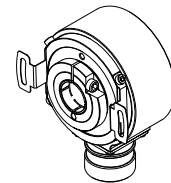
KH58-T



KH58-C

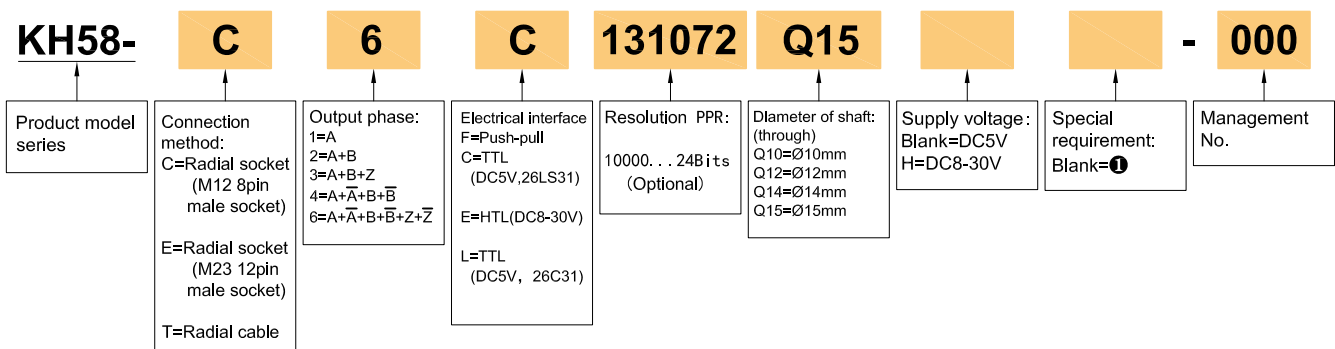


KH58-E



## 2. Model Selection Guide

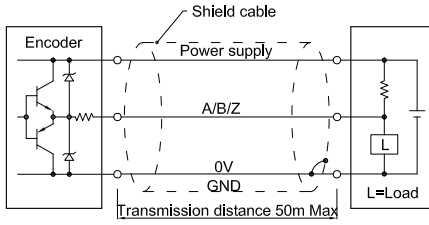
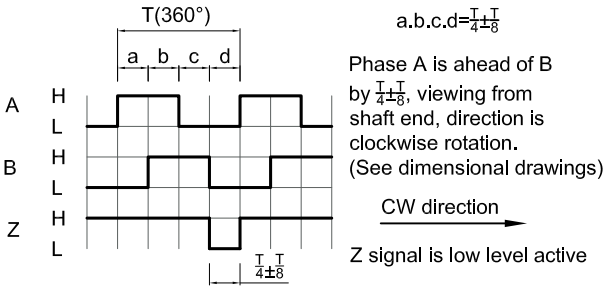
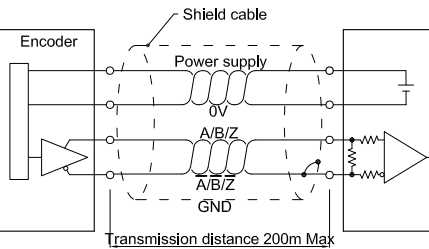
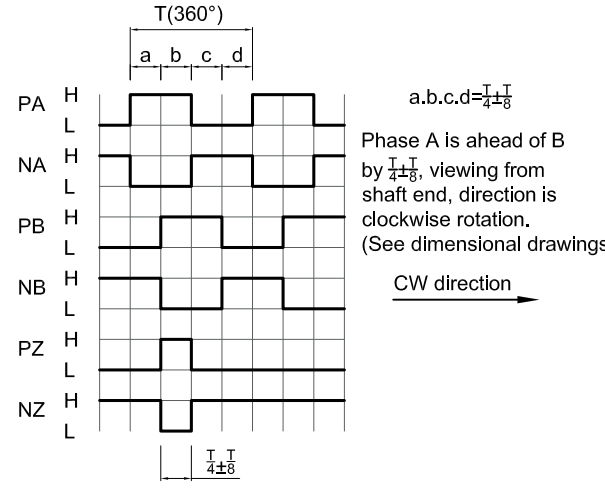
### 2.1 Model composition(select parameters)



### 2.2 Note

- None indicated for the 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 Method

Electrical interface	Output circuit	Output wave form
<p>Push-pull</p>		
<p>TTL (DC5V)</p> <p>HTL (DC8-30V)</p>		

## 4. Electrical Parameter

Parameter Item	Output type	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	300KHz	500KHz	
Output capacity	Output current	Input	≤30mA		
		Output	≤10mA	≤±20mA	≤±50mA
	Output voltage	"H"	≥[(Supply voltage)-2.5V]	≥2.5V	≥V <sub>cc</sub> -3 V <sub>bc</sub>
		"L"	≤0.4V(30mA)	≤0.5V	≤ 1V V <sub>bc</sub>
Load voltage	—				
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%				
Short-circuit protection	✓①				
Phase shift between A & B	90°±10° ( frequency in low speed)				
	90°±20° ( frequency in high speed)				
GND	Not connect to encoder				

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

## 5. Mechanical Characteristic

Diameter of shaft	Ø10mm; Ø12mm; Ø14mm; Ø15mm available
Shaft material	Stainless steel
Starting torque	≤1.0 Ncm (at 20°C)
Operating torque	≤0.8 Ncm (at 20°C)
Permissible movement static	±0.3mm (radial) ; ±0.5mm (axial)
Permissible movement dynamic	±0.05mm (radial) ; ±0.1mm (axial)
Max.angular acceleration	≤500,000 rad/s <sup>2</sup>
Operating speed	5000min <sup>-1</sup> ❶
Bearing lifetime	3.6x10 <sup>9</sup> ❷
Housing material	Aluminum alloy
Weight	Approx.200g

❶ Allow for self-heating of approx.3.0K per 1000rpm regarding the permissible operating temperature.

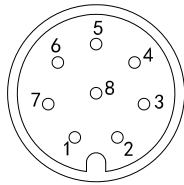
❷ At maximum speed and maximum temperature.

## 6. Environmental Specification

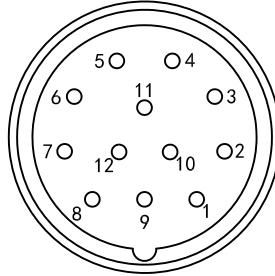
Environmental temperature	Operating: -20~+85°C(repeated cable bending: -10°C); Storage: -20~+90°C
Environmental humidity	Operating and storage: 35~85%RH(no condensation)
Vibration(Endurance)	Amplitude 0.75mm,5~55Hz,2h for X,Y,Z direction individually
Shock(Endurance)	490m/s <sup>2</sup> 11ms three times for X,Y,Z direction individually
Protection	IP65

7. Wiring Table

M12 8pin male socket pin distribution diagram



M23 12pin male socket pin distribution diagram



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

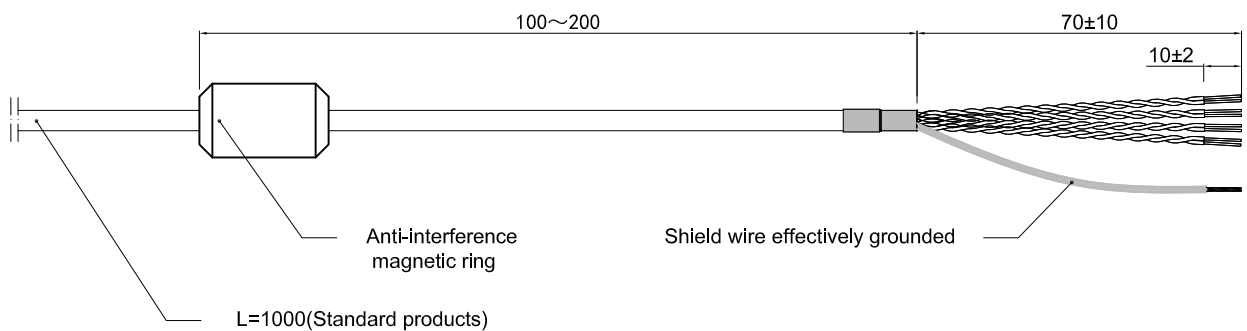
	Supply voltage		Incremental signal					
Socket pin definition	1	2	3	4	5	6	7	8
Wire color	Red	Black	White	/	Green	/	Yellow	/
Function	Up	0V	A	/	B	/	Z	/

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

	Supply voltage		Incremental signal					
Socket pin definition	1	2	3	4	5	6	7	8
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.

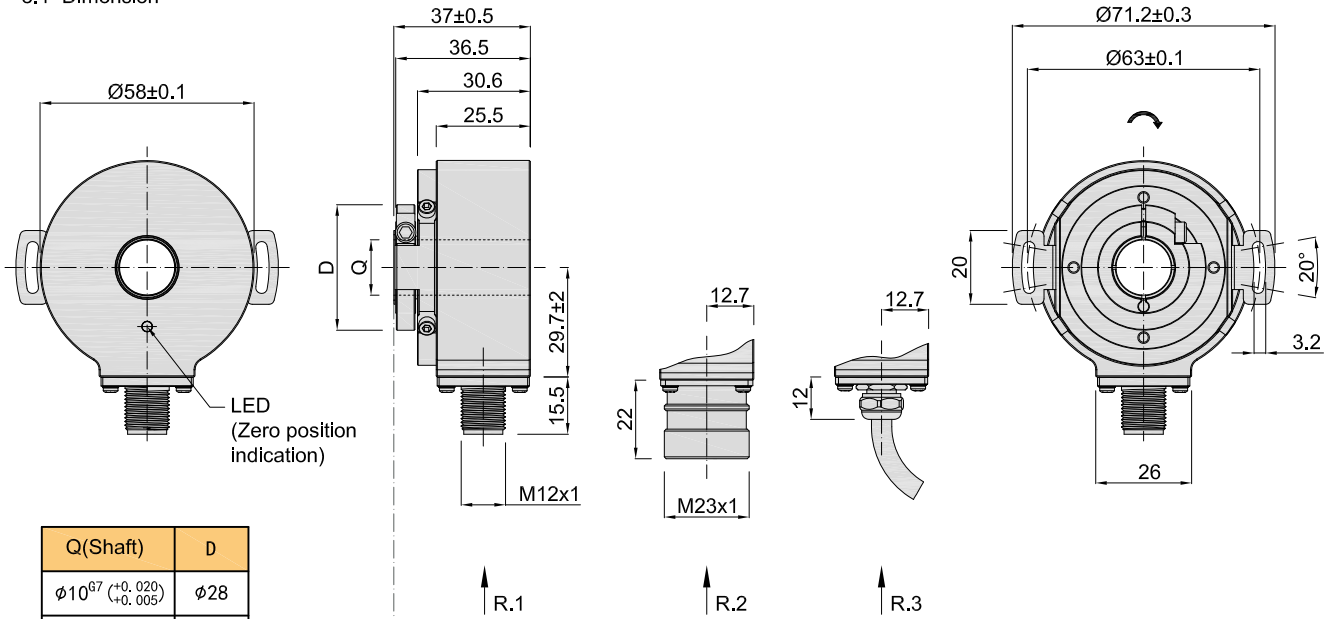
7.3 Radial cable schematic



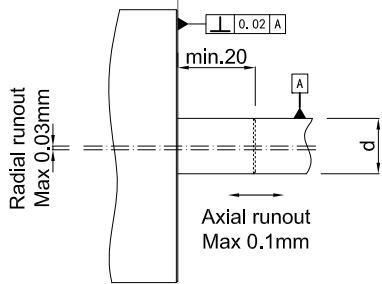
Unit: mm

8. Basic Dimension

8.1 Dimension



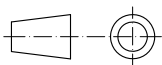
8.2 Mounting shaft requirement



d
$\phi 10_{g6}^{-0.005}$ $(-0.014)$
$\phi 12_{g6}^{-0.006}$ $(-0.017)$
$\phi 14_{g6}^{-0.006}$ $(-0.017)$
$\phi 15_{g6}^{-0.006}$ $(-0.017)$

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

Unit: mm






- ↻ = Shaft rotation direction of incremental signal output
- R.1 = Radial connector(M12x1 8pin male connector)
- R.2 = Radial connector(M23x1 12pin male connector)
- R.3 = Radial cable(Standard length 1000)

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

Plug and cable	Brief description	No.	Order No.
	C2C=Connection type head A: M12, 8-pin female straight connector; Connection type head B: M12, 8-pin male straight connector; Cable length: 2M 8-core with shield,halogen-free PUR	K77C2C	44400001
	C5C=Connection type head A: M12, 8-pin female straight connector; Connection type head B: M12, 8-pin male straight connector; Cable length: 5M 8-core with shield,halogen-free PUR	K77C5C	44400002
	C1=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 1M 8-core with shield,halogen-free PUR	K77C1	44400003
	C2=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 2M 8-core with shield,halogen-free PUR	K77C2	44400004
	C5=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 5M 8-core with shield,halogen-free PUR	K77C5	44400005
	E1=Connection type head A: M23, 12-pin female straight connector; Connection type head B: Bare wire end; Cable length: 1M 8-core with shield,halogen-free PUR	KH58E1	44400014
	E2=Connection type head A: M23, 12-pin female straight connector; Connection type head B: Bare wire end; Cable length: 2M 8-core with shield,halogen-free PUR	KH58E2	44400015
	E5=Connection type head A: M23, 12-pin female straight connector; Connection type head B: Bare wire end; Cable length: 5M 8-core with shield,halogen-free PUR	KH58E5	44400016