

### 1. Absolute Type Parallel Gray Code Output (Hollow shaft, Thru-hole & Blind-hole)

#### 1.1 Introduction:

KJ50 is an economic universal hollow shaft design with compact structure, sturdy and high safety, widely used in industrial automation fields.

#### 1.2 Feature:

- Encoder external diameter  $\varnothing 51\text{mm}$ , thickness 39mm, diameter of shaft up to  $\varnothing 15\text{mm}$ ;
- Adopt non-contact photoelectric principle;
- Multiple electrical interfaces available;
- Gray code parallel output absolute position information;
- Resolution per turn up to 12Bits(4096)

#### 1.3 Application:

Textile, packaging, motor, CNC and other automation control fields.

#### 1.4 Connection:

- Radial cable (STD length 1000mm)
- Radial socket (M23\*1 16P male-connector)
- Radial cable with plug (STD length 1000mm, plug M16F-16K)

#### 1.5 Protection:

IP50 & IP65

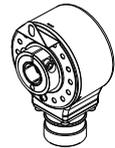
#### 1.6 Weight:

About 310g

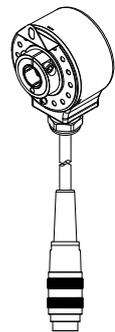
KJ50-T



KJ50-C

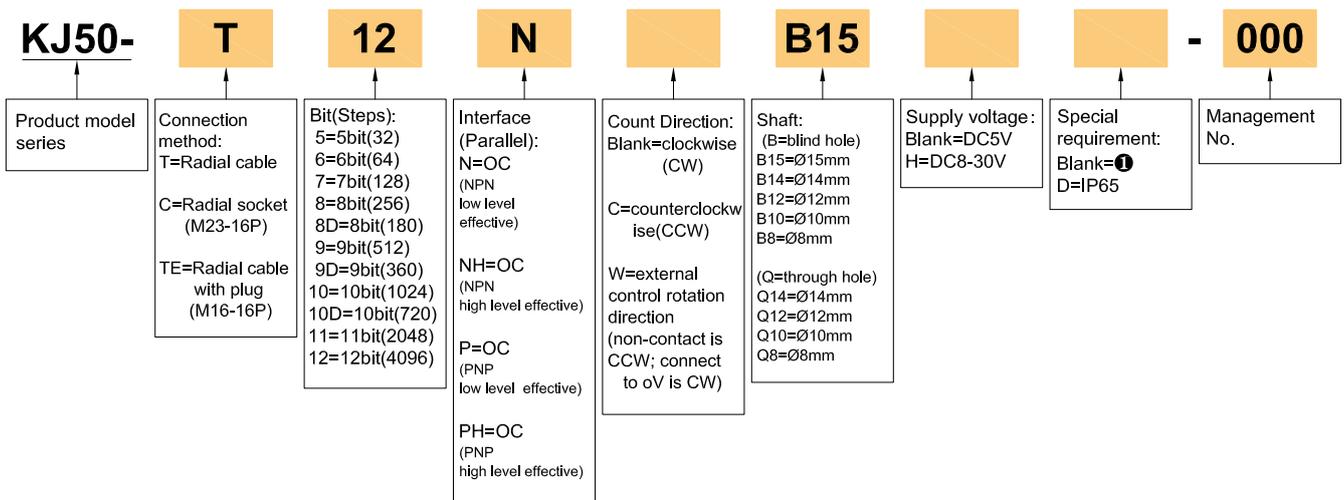


KJ50-TE



## 2. Model Selection Guide

### 2.1 Model composition(select parameters)



### 2.2 Note

- ①. None indicated for IP50 and cable length of 1M, if need to change the length C+number, the longest is 20M (expressed by C20).

3. Resolution Output Table

	bit											
	12	11	10	9	8	7	6	5	4	3	2	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	1	1
...	...	...	...	...	...	...	...	...	...	...	...	...
31	0	0	0	0	0	0	0	1	0	0	0	0
32	0	0	0	0	0	0	1	1	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
37	0	0	0	0	0	0	1	1	0	1	1	1
38	0	0	0	0	0	0	1	1	0	1	0	1
...	...	...	...	...	...	...	...	...	...	...	...	...
63	0	0	0	0	0	0	1	0	0	0	0	0
64	0	0	0	0	0	1	1	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
75	0	0	0	0	0	1	1	0	1	1	1	0
76	0	0	0	0	0	1	1	0	1	0	1	0
...	...	...	...	...	...	...	...	...	...	...	...	...
127	0	0	0	0	0	1	0	0	0	0	0	0
128	0	0	0	0	1	1	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
151	0	0	0	0	1	1	0	1	1	1	0	0
152	0	0	0	0	1	1	0	1	0	1	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
217	0	0	0	0	1	0	1	1	0	1	0	1
218	0	0	0	0	1	0	1	1	0	1	1	1
...	...	...	...	...	...	...	...	...	...	...	...	...
255	0	0	0	0	1	0	0	0	0	0	0	0
256	0	0	0	1	1	0	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
435	0	0	0	1	0	1	1	0	1	0	1	0
436	0	0	0	1	0	1	1	0	1	1	1	0
...	...	...	...	...	...	...	...	...	...	...	...	...
511	0	0	0	1	0	0	0	0	0	0	0	0
512	0	0	1	1	0	0	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
871	0	0	1	0	1	1	0	1	0	1	0	0
872	0	0	1	0	1	1	0	1	1	1	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
1023	0	0	1	0	0	0	0	0	0	0	0	0
1024	0	1	1	0	0	0	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
2046	0	1	0	0	0	0	0	0	0	0	0	1
2047	0	1	0	0	0	0	0	0	0	0	0	0
...	...	...	...	...	...	...	...	...	...	...	...	...
4094	1	0	0	0	0	0	0	0	0	0	0	1
4095	1	0	0	0	0	0	0	0	0	0	0	0

5bit Resolution32
6bit Resolution64
7bit Resolution128
8bit Resolution256(180)
9bit Resolution512(360)
10bit Resolution1024(720)
11bit Resolution2048
12bit Resolution4096

4. Output Mode

Interface(Parallel)	Output circuit	Output wave form
<p>OC (NPN)</p>		<p>Position: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21.....4095 View from shaft end, rotate direction is clockwise(CW)</p>
<p>OC (PNP)</p>		<p>Position: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21.....4095 View from shaft end, rotate direction is clockwise(CW)</p>

## 5. Electrical Parameters

Parameter Item	Interface (Parallel)		OC(NPN)	OC(PNP)
	Supply voltage	DC5V±5%; DC8V-30V±5%		
Allowable ripple	≤3%rms			
Consumption current	100mA Max			
Encoding type	Gray code			
Precision	[360/(resolution×4)]°			
Top response frequency	100kHz Max			
Output capacity	Output current	Input	≤30mA	
		Output	—	
	Output voltage	"H"	—	
		"L"	≤0.4V	
Load voltage	≤DC30V			
Rise & Fall time	Less than 2us (Load resistance 1KΩ、cable length: 2m)			
Output level	Low level available		High level available	
Insulation strength	AC500V 60s			
Insulation resistance	10MΩ			
GND	Not connect to encoder			

## 6. Mechanical Parameters

Diameter of shaft	Ø15mm(blind hole); Ø14mm; Ø12mm; Ø10mm; Ø8mm(stainless steel)
Starting torque	Less than $9.8 \times 10^{-3}$ N·m
Inertia moment	Less than $6.5 \times 10^{-6}$ kg·m <sup>2</sup>
Shaft load	Radial 40N; Axial 30N
Slew speed	≤4000 rpm; IP65≤3000 rpm; IP65≤2000 rpm (Through hole)
Bearing Life	$1.5 \times 10^9$ revs at rated load(10000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	About 310g (With package)

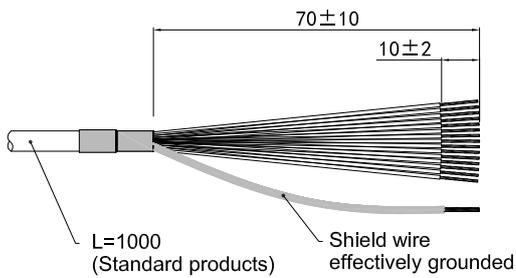
## 7. Environmental Specifications

Environmental temperature	Operating: -20~+85°C(repeatable winding cable: -10°C); storage: -25~+90°C
Environmental humidity	Operating and storage: 35~85%RH(noncondensing)
Vibration(Endurance)	Amplitude 0.75mm, 10~50Hz, 1h for X,Y,Z direction individually
Shock(Endurance)	49m/s <sup>2</sup> , three times for X,Y,Z direction individually
Protection	IP50 & IP65

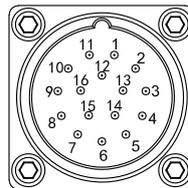
8. Wiring Table

Socket Pin No. & Color	Resolution4096	Resolution2048	Resolution1024 (720)	Resolution512 (360)	Resolution256 (180)	Resolution128	Resolution64	Resolution32
15=R=pink /black	bit1(2 <sup>0</sup> )	Not connect	←	←	←	←	←	←
14=P=gray /black	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )	Not connect	←	←	←	←	←
13=O=blue /black	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )	Not connect	←	←	←	←
12=N=yellow /black	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )	Not connect	←	←	←
11=M=green /black	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )	Not connect	←	←
10=L=white /black	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )	Not connect	←
9=K=pink	bit7(2 <sup>6</sup> )	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )	Not connect
8=I=gray	bit8(2 <sup>7</sup> )	bit7(2 <sup>6</sup> )	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )	bit1(2 <sup>0</sup> )
7=H=blue	bit9(2 <sup>8</sup> )	bit8(2 <sup>7</sup> )	bit7(2 <sup>6</sup> )	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )	bit2(2 <sup>1</sup> )
6=G=yellow	bit10(2 <sup>9</sup> )	bit9(2 <sup>8</sup> )	bit8(2 <sup>7</sup> )	bit7(2 <sup>6</sup> )	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )	bit3(2 <sup>2</sup> )
5=F=green	bit11(2 <sup>10</sup> )	bit10(2 <sup>9</sup> )	bit9(2 <sup>8</sup> )	bit8(2 <sup>7</sup> )	bit7(2 <sup>6</sup> )	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )	bit4(2 <sup>3</sup> )
4=E=white	bit12(2 <sup>11</sup> )	bit11(2 <sup>10</sup> )	bit10(2 <sup>9</sup> )	bit9(2 <sup>8</sup> )	bit8(2 <sup>7</sup> )	bit7(2 <sup>6</sup> )	bit6(2 <sup>5</sup> )	bit5(2 <sup>4</sup> )
3=D=brown	W (outside control direction: non-contact is CCW; connect to 0V is CW)							
2=C=black	OV							
1=B=red	DC5V & DC8-30V							
0=A=shielding	GND							

Cable connection

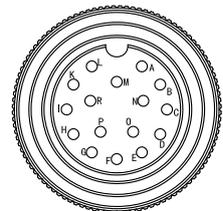


Radial socket connection



M23\*1 16P Male-connector pin Assignment

Radial cable with plug



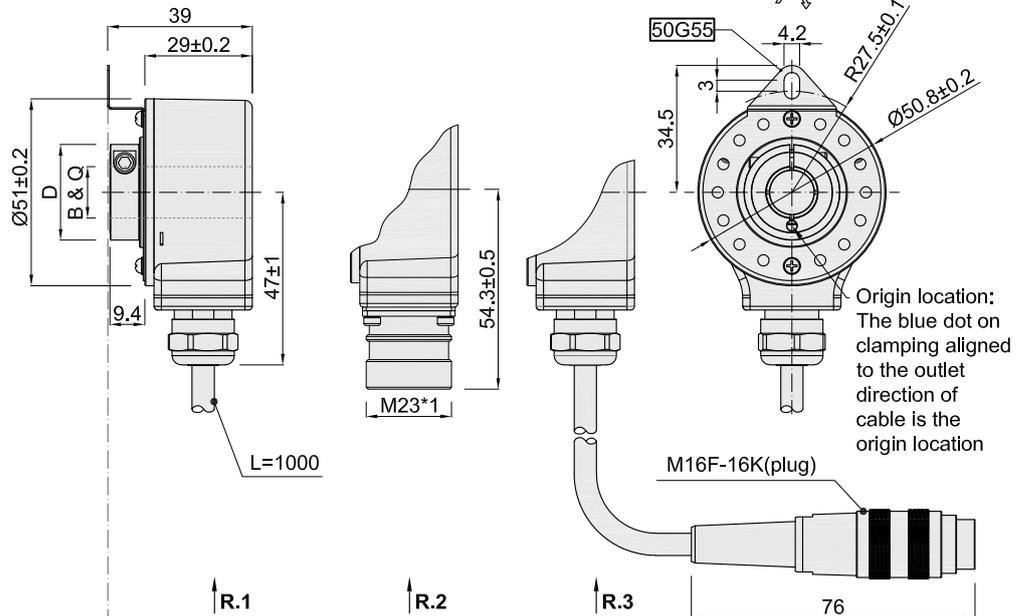
M16F-16K Male-head pin Assignment

**KJ50 PARALLEL ABSOLUTE**

9. Basic Dimensions

9.1 Dimensions

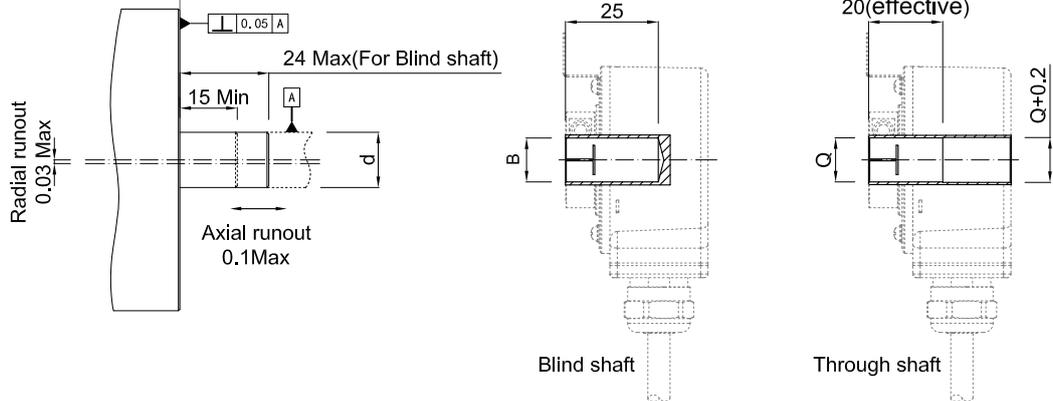
B(Blind-Shaft)	Q(Thru-shaft)	D
Ø8 <sup>G7(+0.020/+0.005)</sup>		Ø24
Ø10 <sup>G7(+0.024/+0.006)</sup>		Ø24
Ø12 <sup>G7(+0.024/+0.006)</sup>		Ø26
Ø14 <sup>G7(+0.024/+0.006)</sup>		Ø28
Ø15 <sup>G7(+0.024/+0.006)</sup>	-	Ø28



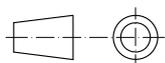
9.2 Assembling requirements

d
Ø8 <sub>g6</sub> <sup>(-0.005/-0.014)</sup>
Ø10 <sub>g6</sub> <sup>(-0.005/-0.014)</sup>
Ø12 <sub>g6</sub> <sup>(-0.006/-0.017)</sup>
Ø14 <sub>g6</sub> <sup>(-0.006/-0.017)</sup>
Ø15 <sub>g6</sub> <sup>(-0.006/-0.017)</sup>

**Mounting screws**  
 Inner hexagon bolt +flat washer  
 Specification: M4\*8  
 Material: stainless steel  
 Quantity: 1



Unit: mm



- ↻ = Shaft rotation direction of the signal output
- R.1 = Radial cable (Standard length 1000mm)
- R.2 = Radial socket (M23x1 16P Male-connector)
- R.3 = Radial cable with plug (Standard length 1000mm, plug M16F-16K)

50G55 = Standard spring plate(pls refer to Page 7 for more options)

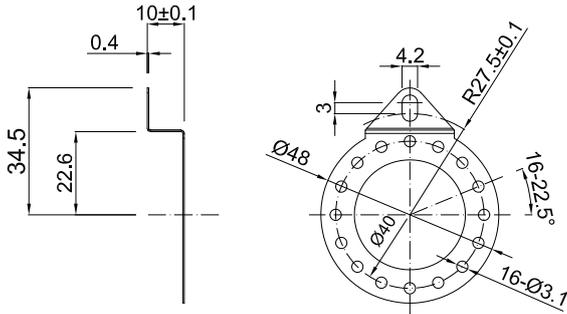
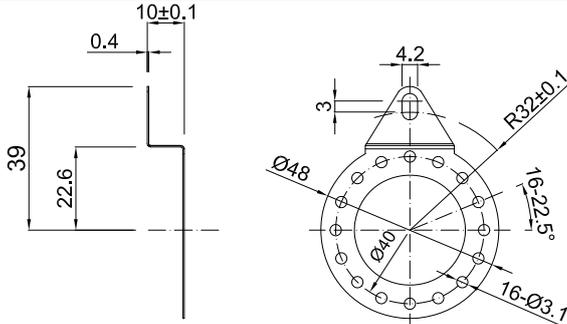
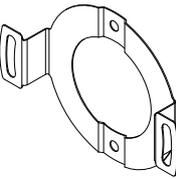
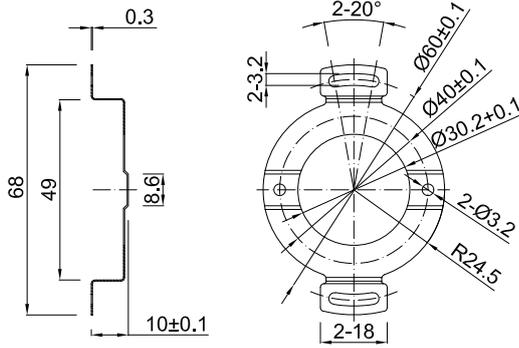
**KJ50 PARALLEL ABSOLUTE**

10. Accessories(Recommended purchase)

10.1 Plug connection

Plug and cable	Brief description	Model	Order No.
	C1=Connection type head A: M23, 16-pin female straight connector; Connection type head B: Bare wire end; Cable length: 1M 15-core with shield,halogen-free PUR	SJ50C1	44400027
	C2=Connection type head A: M23, 16-pin female straight connector; Connection type head B: Bare wire end; Cable length: 2M 15-core with shield,halogen-free PUR	SJ50C2	44400028
	C5=Connection type head A: M23, 16-pin female straight connector; Connection type head B: Bare wire end; Cable length: 5M 15-core with shield,halogen-free PUR	SJ50C5	44400029

10.2 Accessories(Spring plate option)

Shape	Basic Dimensions	Model	Order No.
Standard type  Mounting screws Specification: M4*8 Material: stainless steel Quantity: 1		50G55	03700137
Optional type  Mounting screws Specification: M4*8 Material: stainless steel Quantity: 1		50G64	03700150A
Optional type  Mounting screws Specification: M3*6 Material: stainless steel Quantity: 2		50Z60	03700165

## 11. Caution

### 11.1 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.

### 11.2 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.

