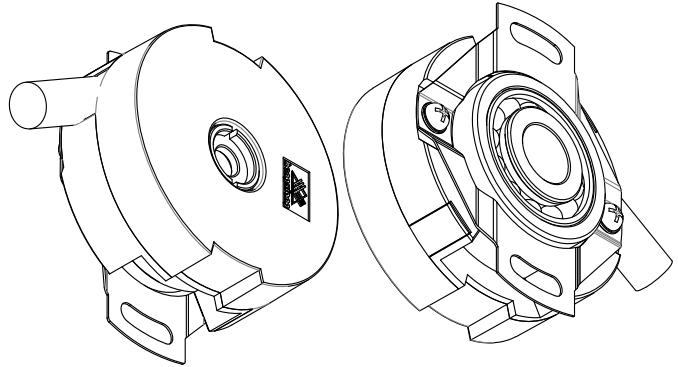


# KN40

## Specifications 1/7

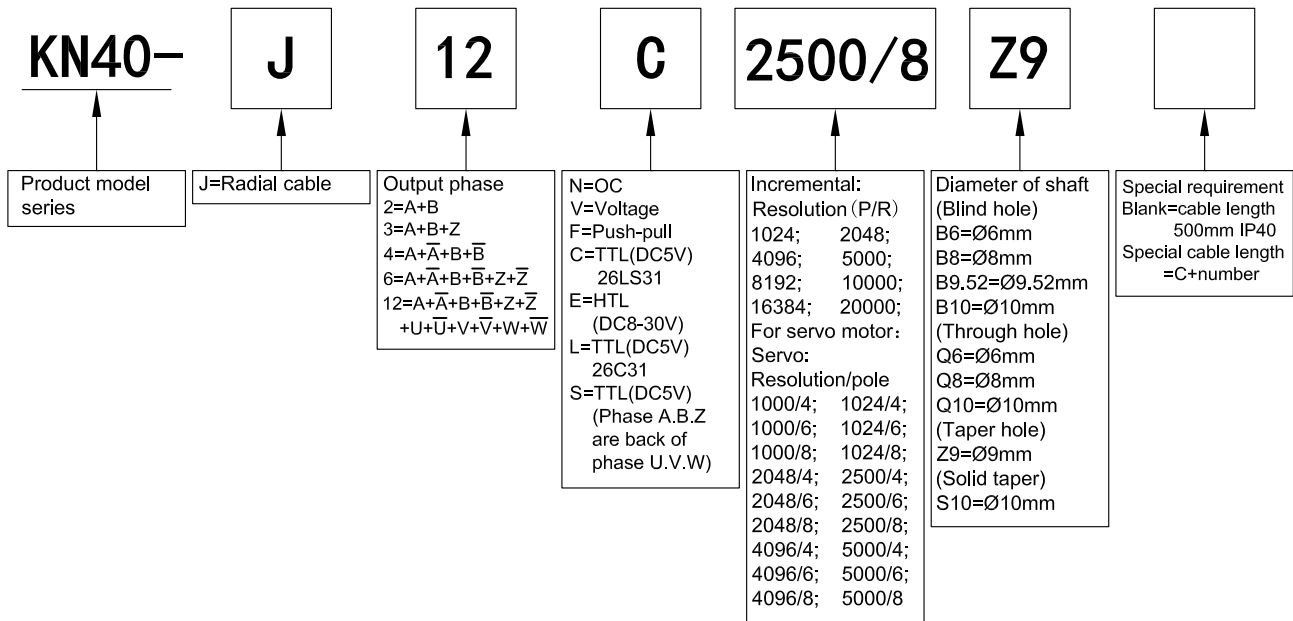
■ Incremental Type (Hollow shaft)

- Feature: Small size, thin, optional circuit outputs
- Application: Automation control for servo motor, textile industry, packing machinery, robot, small instrument, etc.
- External dimensions: External diameter  $\varnothing 40\text{mm}$ , thickness 20mm, various shaft size
- Resolution: Up to 20000P/R
- Supply voltage: DC5V; DC8-30V
- Protection: IP40
- Cable length: 500mm
- Weight: About 90g



■ Model Guide

- Model form (filled required parameters in the box as following)



- Must choose supply voltage: DC5V; DC8-30V
- Must choose leaf spring 40T34、40T40、40Z40、40G40(Please refer to accessory at specifications7/7)

# KN40

## Specifications 2/7

### Output Mode

Output type	Output circuit	Output wave form	Connection
OC		<p> <math>a.b.c.d = \frac{T}{4} \pm \frac{T}{8}</math>                      Phase A is ahead of B by <math>\frac{T}{4} \pm \frac{T}{8}</math>, rotate direction CW (View from shaft end, direction is clockwise rotation)                      CW direction <math>\rightarrow</math> </p>	0=GND 1=red=DC5V; DC8-30V 2=black=OV 3=white=A 4=green=B 5=yellow=Z
Push-Pull		<p> <math>a.b.c.d = \frac{T}{4} \pm \frac{T}{8}</math>                      Phase A is ahead of B by <math>\frac{T}{4} \pm \frac{T}{8}</math>, rotate direction CW (View from shaft end, direction is clockwise rotation)                      CW direction <math>\rightarrow</math> </p>	
Voltage		<p> <math>a.b.c.d = \frac{T}{4} \pm \frac{T}{8}</math>                      Phase A is ahead of B by <math>\frac{T}{4} \pm \frac{T}{8}</math>, rotate direction CW (View from shaft end, direction is clockwise rotation)                      CW direction <math>\rightarrow</math> </p>	
TTL HTL		<p> <math>a.b.c.d = \frac{T}{4} \pm \frac{T}{8}</math>                      Phase A is ahead of B by <math>\frac{T}{4} \pm \frac{T}{8}</math>, rotate direction CW (View from shaft end, direction is clockwise rotation)                      CW direction <math>\rightarrow</math> </p>	

# KN40

## Specifications 3/7

● Output Mode

Output type	Output circuit	Output wave form	Connection																																																																	
TTL		<p> <math>a, b, c, d = \frac{T}{4} \pm \frac{T}{8}</math>  <math>e = T \pm \frac{T}{2}</math>                      f: center of phase Z to rise point of phase U, that is <math>\pm 0.3^\circ</math> </p> <p>CCW direction → (Viewed from shaft end when installing)</p> <p>A.B.Z.U.V.W  <math>\bar{A}, \bar{B}, \bar{Z}, \bar{U}, \bar{V}, \bar{W}</math></p>	0=shielding=GND 1=red=DC5V 2=black=OV 3=white=A 4=green=B 5=yellow=Z 6=white/black= $\bar{A}$ 7=green/black= $\bar{B}$ 8=yellow/black= $\bar{Z}$ 9=blue=U 10=grey=V 11=pink=W 12=blue/black= $\bar{U}$ 13=grey/black= $\bar{V}$ 14=pink/black= $\bar{W}$																																																																	
TTL (phase A.B.Z are back of phase U.V.W)	<table border="1" style="margin-top: 10px;"> <thead> <tr> <th>pole</th> <th>g, h, j, k, m, n</th> <th>r</th> </tr> </thead> <tbody> <tr> <td>4</td> <td><math>30 \pm 1^\circ</math></td> <td><math>180^\circ</math></td> </tr> <tr> <td>6</td> <td><math>20 \pm 1^\circ</math></td> <td><math>120^\circ</math></td> </tr> <tr> <td>8</td> <td><math>15 \pm 1^\circ</math></td> <td><math>90^\circ</math></td> </tr> </tbody> </table>	pole	g, h, j, k, m, n	r	4	$30 \pm 1^\circ$	$180^\circ$	6	$20 \pm 1^\circ$	$120^\circ$	8	$15 \pm 1^\circ$	$90^\circ$	<p> <math>a, b, c, d = \frac{T}{4} \pm \frac{T}{8}</math>  <math>e = T \pm \frac{T}{2}</math>                      f: center of phase Z to rise point of phase U, that is <math>\pm 0.3^\circ</math> </p> <p>CCW direction → (Viewed from shaft end when installing)</p> <p>A.B.Z.U.V.W  <math>\bar{A}, \bar{B}, \bar{Z}, \bar{U}, \bar{V}, \bar{W}</math></p>	<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th rowspan="2">Function Color</th> <th colspan="3">Mode</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>white</td> <td>HZ</td> <td>U</td> <td>A</td> </tr> <tr> <td>6</td> <td>white/black</td> <td>HZ</td> <td><math>\bar{U}</math></td> <td><math>\bar{A}</math></td> </tr> <tr> <td>4</td> <td>green</td> <td>HZ</td> <td>V</td> <td>B</td> </tr> <tr> <td>7</td> <td>green/black</td> <td>HZ</td> <td><math>\bar{V}</math></td> <td><math>\bar{B}</math></td> </tr> <tr> <td>5</td> <td>yellow</td> <td>HZ</td> <td>W</td> <td>Z</td> </tr> <tr> <td>8</td> <td>yellow/black</td> <td>HZ</td> <td><math>\bar{W}</math></td> <td><math>\bar{Z}</math></td> </tr> <tr> <td>1</td> <td>red</td> <td colspan="3">DC+5V</td> </tr> <tr> <td>2</td> <td>black</td> <td colspan="3">OV</td> </tr> <tr> <td>0</td> <td>shielding</td> <td colspan="3">GND</td> </tr> </tbody> </table>	No.	Function Color	Mode			1	2	3	3	white	HZ	U	A	6	white/black	HZ	$\bar{U}$	$\bar{A}$	4	green	HZ	V	B	7	green/black	HZ	$\bar{V}$	$\bar{B}$	5	yellow	HZ	W	Z	8	yellow/black	HZ	$\bar{W}$	$\bar{Z}$	1	red	DC+5V			2	black	OV			0	shielding	GND		
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<p>Timing Chart</p> <p>                     Supply voltage: <math>5 \pm 0.25</math>, <math>4.25 \pm 0.3</math>                      Power on: 35MIN, 7±2                      Instantaneous power down                      Power off: 35MIN, 7±2                      Mode: 1, 2, 3                      Time(msec): 510±220, 22±11                 </p> <p>                     Symbol signification                      ★: indicate position of UVW channel                      ☆: position to start counting ABZ channel                      □: non-using zone                      HZ: high impedance                 </p>																																																																				

## ■ Electrical Characteristics

Parameter Item	Output type	OC		Voltage		Push-pull		TTL(26LS31)	TTL(26C31)	TTL(26C31) (Phase A,B,Z are back of phase U,V,W)	HTL(HD7)
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				200KHz				300KHz	
Output volume	Output current	Input	≤30mA	Load resistance 2.2K	≤30mA	≤±20mA				≤±50mA	
		Output	—		≤10mA						
	Output voltage	"H"	—	—	≥[ (Supply voltage) -2.5V]	≥2.5V				≥V <sub>cc</sub> -3 V <sub>DC</sub>	
		"L"	≤0.4V	≤0.7V(less than 20mA)	≤0.4V(30mA)	≤0.5V				≤ 1V V <sub>DC</sub>	
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%									
Phase shift between A & B		90°±10° ( low speed,frequency ≤1000Hz )									
		90°±20° ( high speed,frequency >1000Hz )									
Origin motion		Low level available	High level available	Low level available	—				Low level available	—	
Delay motion time *		—				510±220ms				—	
GND		not connect to encoder									

\* Phase A,B,Z are back of phase U,V,W when power on.

## ■ Mechanical Characteristics

Shaft	∅6mm; ∅8mm; ∅7mm (optional)
Starting torque	Less than $5.9 \times 10^{-3} \text{N} \cdot \text{m}$
Inertia moment	Less than $1.5 \times 10^{-6} \text{kg} \cdot \text{m}^2$
Shaft load	Radial 30N; Axial 20N
Slew speed	≤5000 rpm
Bearing Life	$1.5 \times 10^9$ revs at rated load(100000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	about 90g

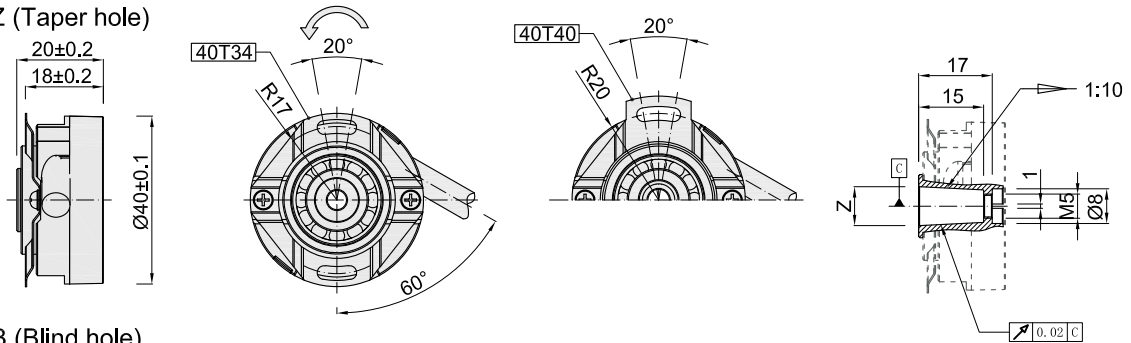
## ■ Environmental Specifications

Environmental temperature	Operating: -20~+100°C(repeatable winding cable: -10°C); Storage: -25~+100°C
Environmental humidity	Operating and storage: 35~85%RH(noncondensing)
Vibration(endure)	Amplitude 0.75mm,5~55Hz,2h for X,Y,Z direction individually
Shock(endure)	490m/s <sup>2</sup> 11ms three times for X,Y,Z direction individually
Protection	IP40

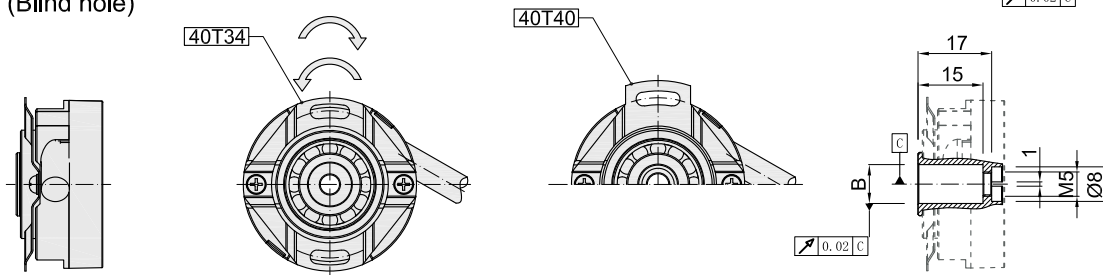
# KN40 Specifications 5/7

## Basic Dimensions

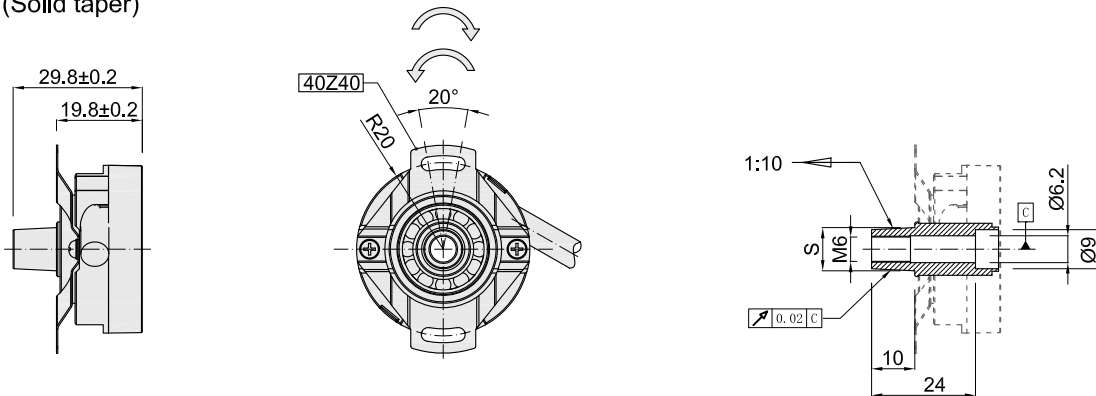
### Z (Taper hole)



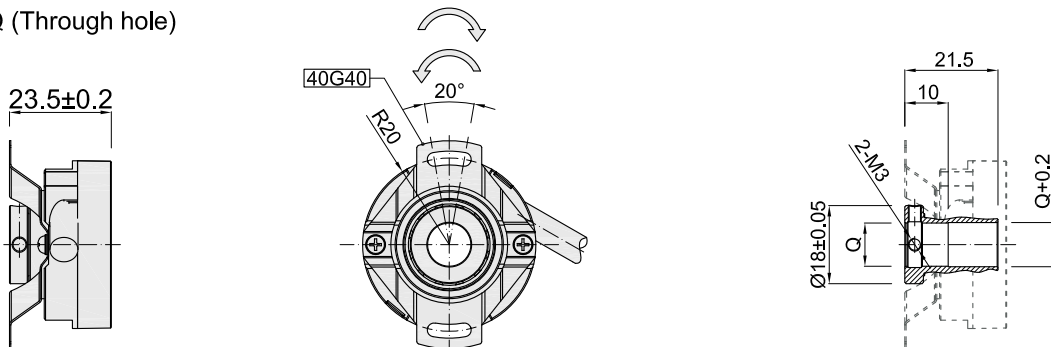
### B (Blind hole)



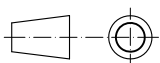
### S (Solid taper)



### Q (Through hole)



Unit: mm



= Rotate direction of incremental signal output shaft

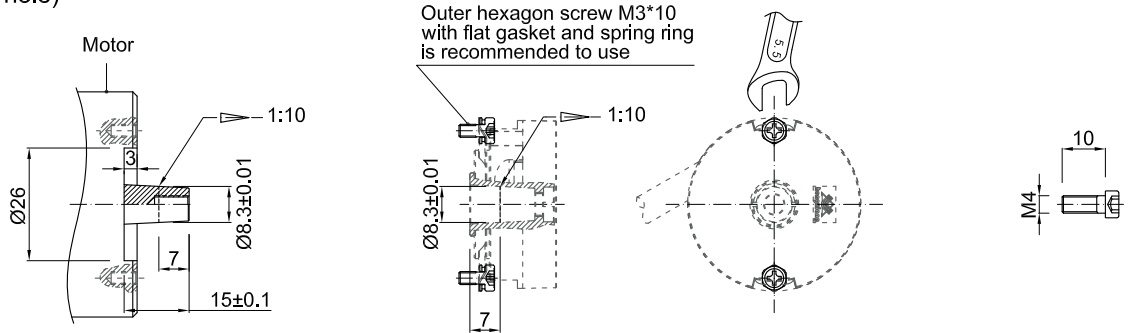
= Rotate direction of servo signal output shaft

Z	B	S	Q
Ø9 <sup>H7</sup>	Ø6 <sup>H7</sup>	Ø10 <sub>g6</sub> Solid taper 1:10	Ø6 <sup>H7</sup>
Taper hole 1:10	Ø8 <sup>H7</sup>		Ø8 <sup>H7</sup>
	Ø9.54 <sup>H7</sup>		Ø10 <sup>H7</sup>
	Ø10 <sup>H7</sup>		—

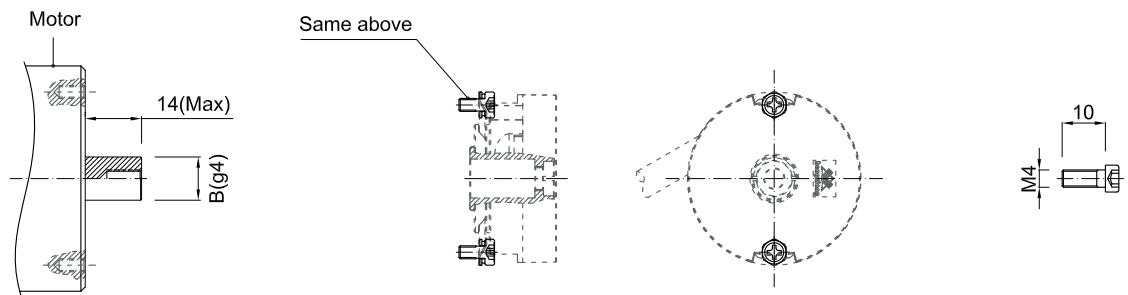
# KN40 Specifications 6/7

■ Assembling requirement

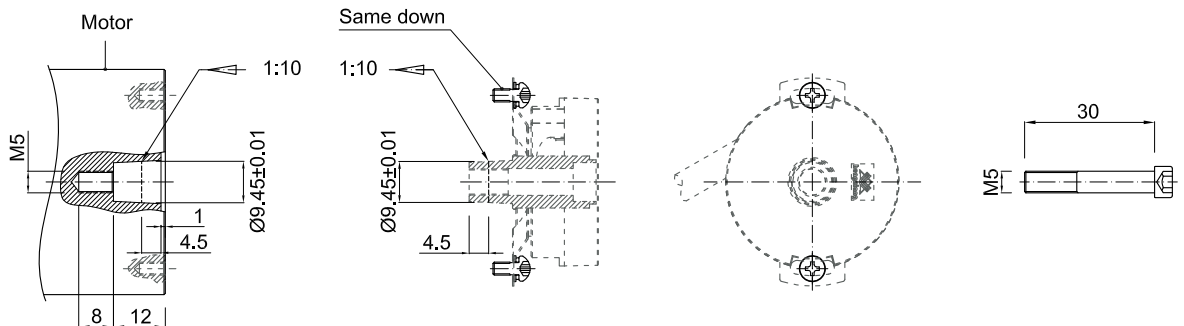
- Z (Taper hole)



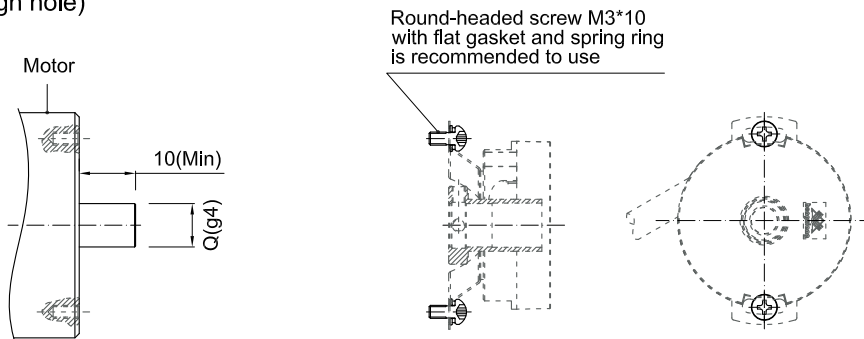
- B (Blind hole)



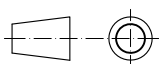
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- Q (Through hole)




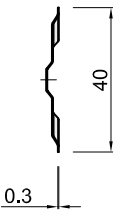
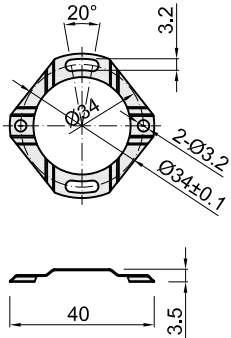
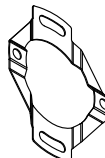
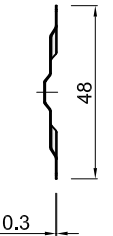
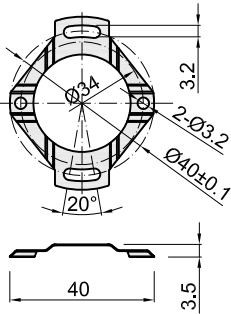
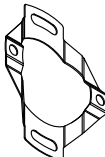
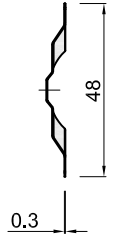
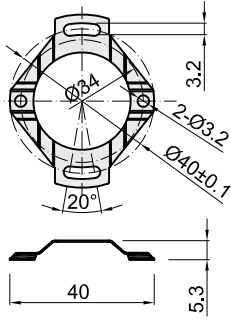
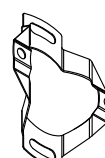
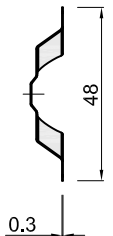
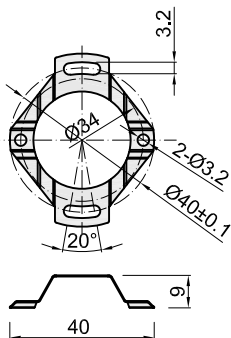
Unit: mm



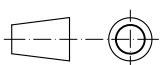
Motor shaft coaxiality 0.03 max; axial endplay 0.1 max.

# KN40 Specifications 7/7

■ Accessory(leaf spring optional)

<p>40T34 No:3700112</p> 		
<p>40T40 No:3700111</p> 		
<p>40Z40 No:3700121</p> 		
<p>40G40 No:3700113</p> 		

Unit: mm



**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.