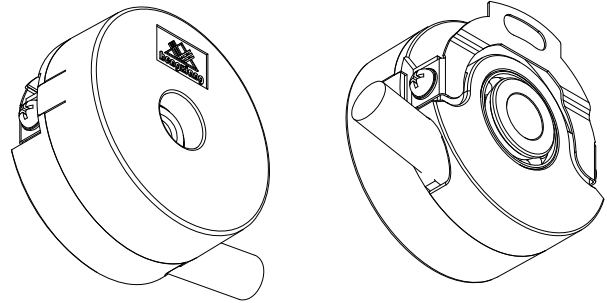


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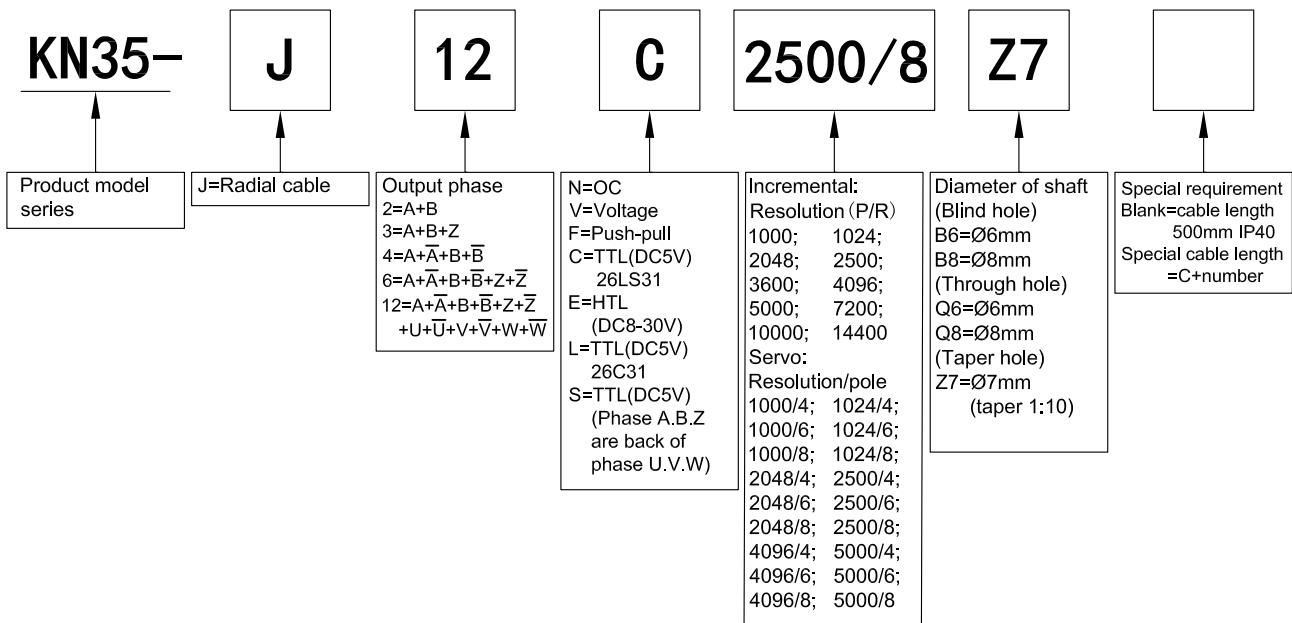
■ Incremental Type (Hollow shaft)

- 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 $\varnothing 35\text{mm}$, thickness 18mm, various shaft size
- Resolution: Up to 14400P/R
- Supply voltage: DC5V; DC8-30V
- Protection: IP40
- Cable length: 500mm
- Weight: About 80g



■ Model Guide

- Model form (filled required parameters in the box as following)
- Must choose supply voltage: DC5V; DC8-30V
- Must choose leaf spring 35T27、35T29、35T40、35G29、35G40 (Please refer to the specifications 7/7)



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Output Mode

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

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● Output Mode

Output type	Output circuit	Output wave form	Connection																																																																	
TTL			<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}</p>																																																																	
TTL (phase A.B.Z are back of phase U.V.W)	 <table border="1"> <thead> <tr> <th>pole</th> <th>g,h,j,k,m,n</th> <th>r</th> </tr> </thead> <tbody> <tr> <td>4</td> <td>$30 \pm 1^\circ$</td> <td>180°</td> </tr> <tr> <td>6</td> <td>$20 \pm 1^\circ$</td> <td>120°</td> </tr> <tr> <td>8</td> <td>$15 \pm 1^\circ$</td> <td>90°</td> </tr> </tbody> </table>	pole	g,h,j,k,m,n	r	4	$30 \pm 1^\circ$	180°	6	$20 \pm 1^\circ$	120°	8	$15 \pm 1^\circ$	90°		<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>\bar{U}</td> <td>\bar{A}</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>\bar{V}</td> <td>\bar{B}</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>\bar{W}</td> <td>\bar{Z}</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>Symbol signification</p> <ul style="list-style-type: none"> ★: indicate position of UVW channel ☆: position to start counting ABZ channel ▨: non-using zone HZ: high impedance 																																																																				

■ 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%	
Consumption current		100mA Max						120mA Max			
Allowable ripple		≤3%rms									
Top response frequency		100KHz						200KHz		300KHz	
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)		≤100ns	
Insulation strength		AC500V 60s									
Insulation resistance		10MΩ									
Mark to space ratio		45% to 55%									
Phase shift between A & B		90°±10° (frequency in low speed)									
		90°±20° (frequency in high speed)									
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	1.5×10^9 revs at rated load(100000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	about 80g

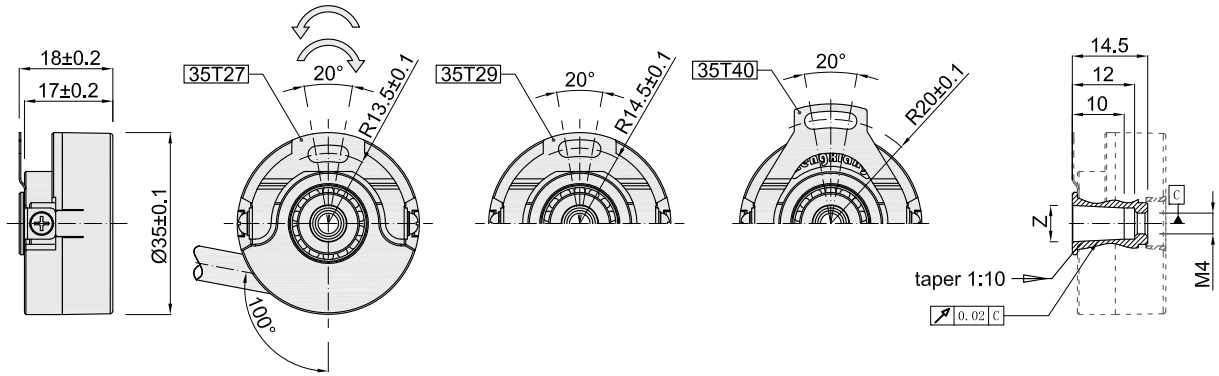
■ Environmental Specifications

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(Endurance)	Amplitude 0.75mm,5~55Hz,2h for X,Y,Z direction individually
Shock(endure)	490m/s ² 11ms three times for X,Y,Z direction individually
Protection	IP40

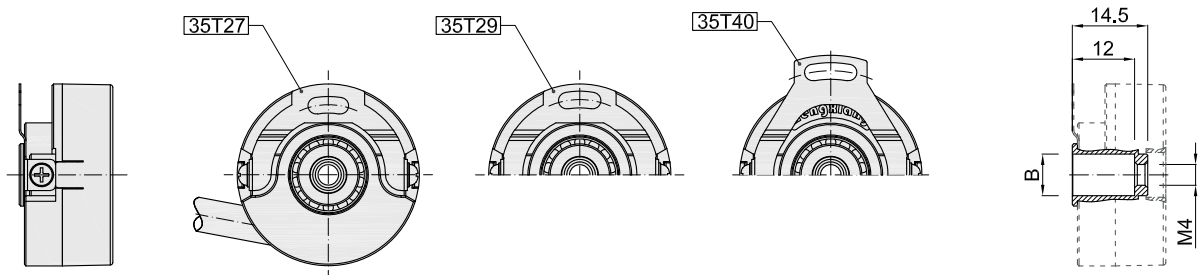
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■ Basic Dimensions

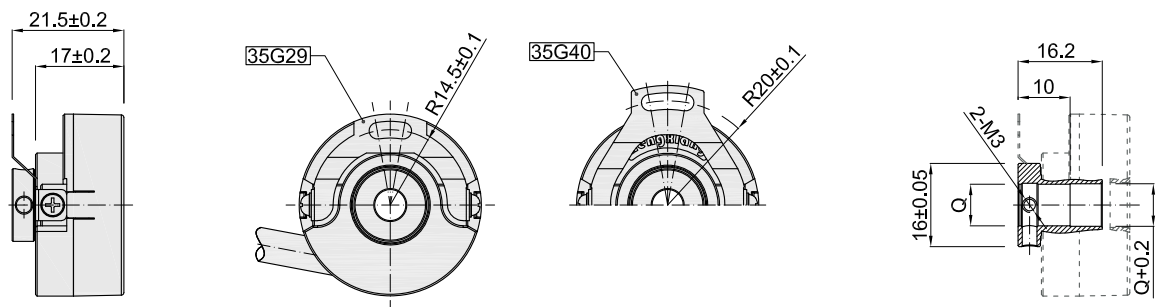
- Z (Taper hole)



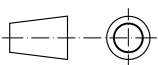
- B (Blind hole)



- Q (Through hole)



Unit: mm



35T27 35T29 35T40 35G29 35G40 = Leaf Spring (Please refer to the specifications 7/7)

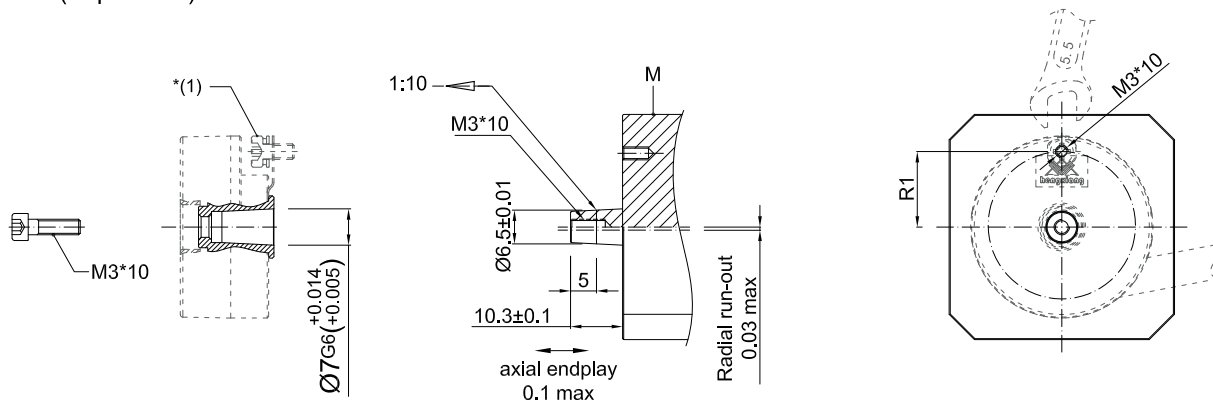
= The shaft rotary direction for encoder without UVW signal

= The shaft rotary direction for encoder with UVW signal

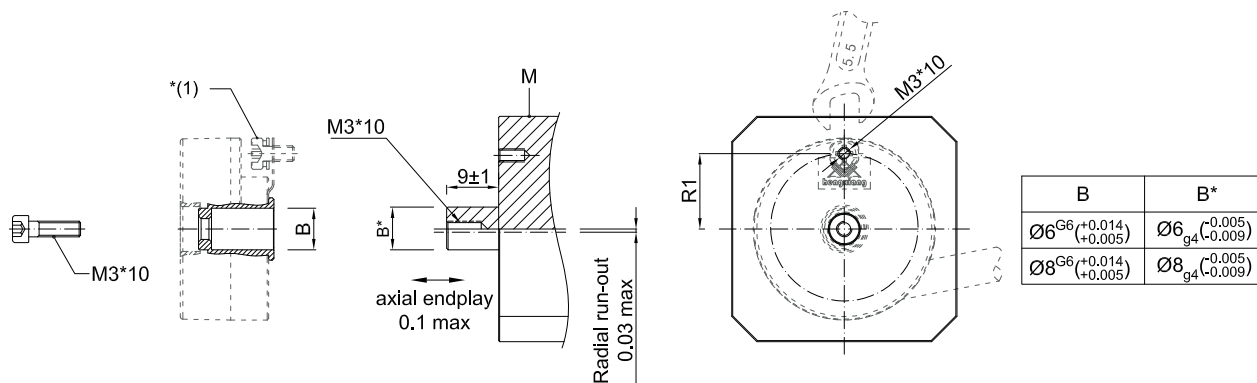
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■ Assembling requirement

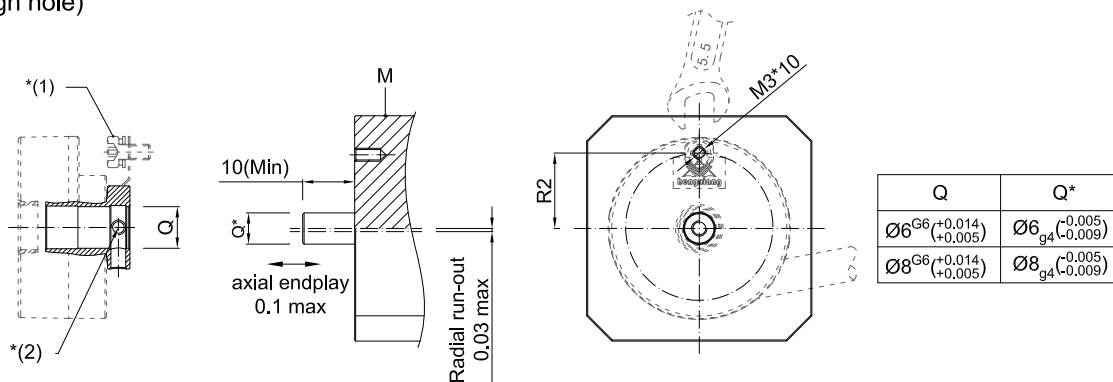
- Z (Taper hole)



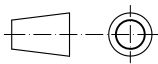
- B (Blind hole)



- Q (Through hole)



Unit: mm



M = Motor

Note:

*(1): Outer hexagon screw M3*10 with flat gasket and spring ring is recommended to use

*(2): Apply threadglue to the surface of the two M3 screws Tightening force is 0.6N.m

R1: R13.5±0.1 & R14.5±0.1 & R20±0.1(Choose the spring plate to determine the installation size)

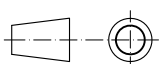
R2: R14.5±0.1 & R20±0.1(Choose the spring plate to determine the installation size)

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■ Accessory(leaf spring optional)

<p>[35T27] No:3700116</p>	
<p>[35T29] No:3700117</p>	<p>[35G29] No:3700119</p>
<p>[35T40] No:3700118</p>	<p>[35G40] No:3700120</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.