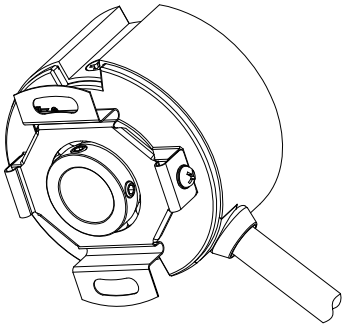
K48

Specifications 1/5

Incremental Type (Hollow shaft， through hole)

- Feature: small, logical compact configuration,optional various output mode and diameter of shaft
- Application: servo motor、textile industry、packing machinery、small instrument , etc , for automation control
- External dimensions: external diameter Ø48mm, thickness 34mm，diameter of shaft Ø6mm; Ø8mm; Ø10mm; Ø12mm
- Resolution: up to 8192P/R
- Supply voltage: DC5V; DC8-30V
- Protection: IP40
- Cable length: 500mm
- Weight: about 140g

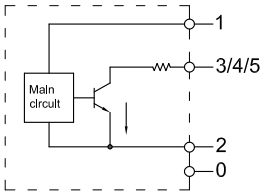
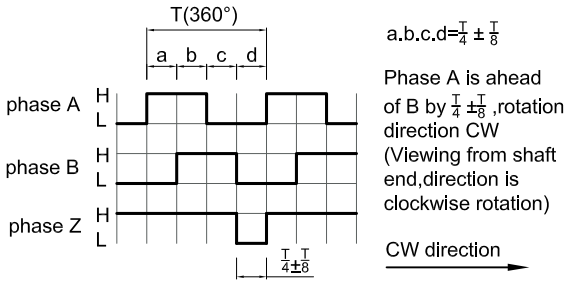
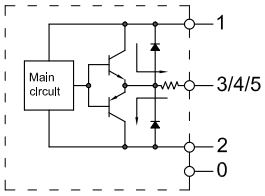
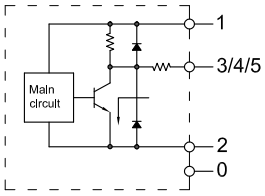
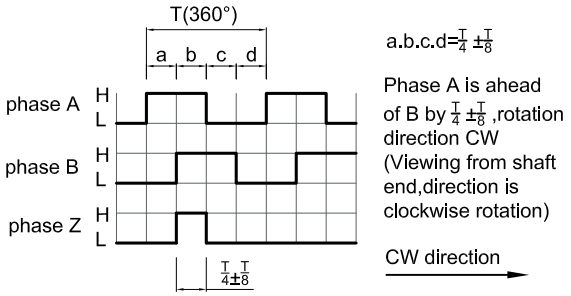
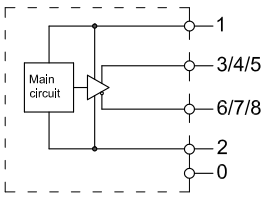
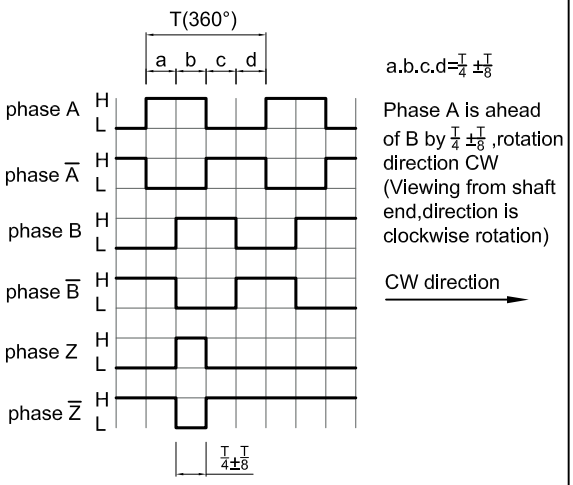


Model Guide

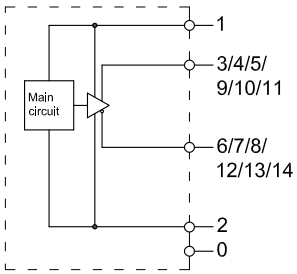
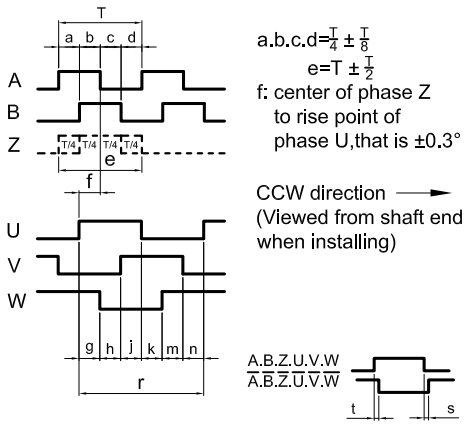
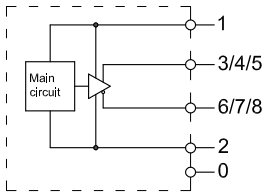
- Model form (filled required parameters in the box as following)
- Must choose supply voltage: DC5V; DC8-30V

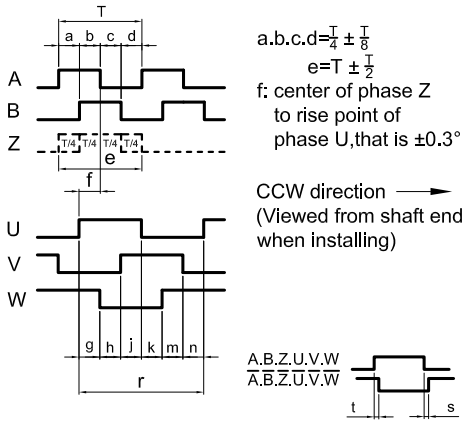
K48−	J	6	C	2500	Q8	
Product model series	J=Radial cable	Output phase 1=A 2=A+B 3=A+B+Z 4=A+$\overline{A}$+B+$\overline{B}$ 6=A+$\overline{A}$+B+$\overline{B}$+Z+$\overline{Z}$ 12=A+$\overline{A}$+B+$\overline{B}$+Z+$\overline{Z}$ +U+$\overline{U}$+V+$\overline{V}$+W+$\overline{W}$	N=OC V=Voltage F=Push-pull C=TTL(DC5V) 26LS31 E=HTL (DC8-30V) L=TTL(DC5V) 26C31 S=TTL(DC5V) (Phase A.B.Z are back of phase U.V.W)	Incremental: Resolution（P/R） 50; 60; 100; 200; 256; 300; 360; 500; 512; 600; 720; 1000; 1024; 1200; 2000; 2048; 2500; 3600; 4096; 5000; 8192; 10000 Servo: Resolution/pole 1000/4; 1024/4; 1000/6; 1024/6; 1000/8; 1024/8; 2048/4; 2500/4; 2048/6; 2500/6; 2048/8; 2500/8; 4096/4; 8192/4; 4096/6; 8192/6; 4096/8; 8192/8; 10000/6; 10000/8	Diameter of shaft Q6=Ø6mm Q8=Ø8mm Q10=Ø10mm Q12=Ø12mm	Special requirement Blank=cable length 500mm; IP40 Special cable length =C+number

■ Output Mode

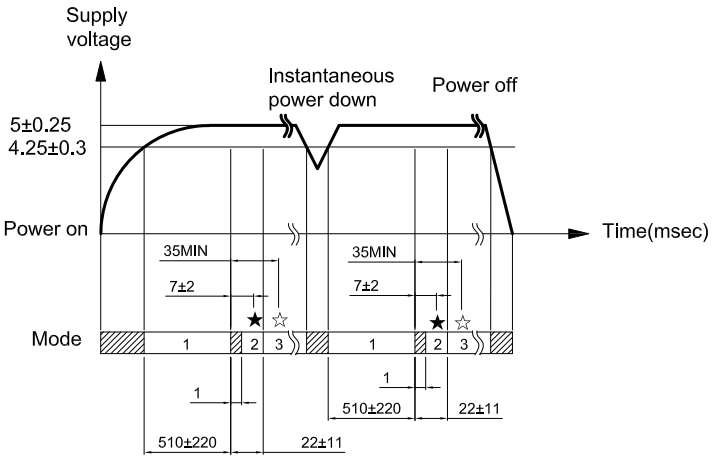
Output type	Output circuit	Output wave form	Connection
OC			0=GND 1=red=DC5V; DC8-30V 2=black=OV 3=white=A 4=green=B 5=yellow=Z
Push-Pull			
Voltage			
TTL HTL			0=shielding=GND 1=red=DC5V; DC8-30V 2=black=OV 3=white=A 4=green=B 5=yellow=Z 6=white/black=$\overline{A}$ 7=green/black=$\overline{B}$ 8=yellow/black=$\overline{Z}$

Output Mode

<table>
<tr><th>Output type</th><th>Output circuit</th><th>Output wave form</th><th>Connection</th></tr>
<tr><td>TTL</td><td> 
</td><td> 
</td><td>0=shielding=GND
1=red=DC5V
2=black=OV
3=white=A
4=green=B
5=yellow=Z
6=white/black=$\overline{A}$
7=green/black=$\overline{B}$
8=yellow/black=$\overline{Z}$
9=blue=U
10=grey=V
11=pink=W
12=blue/black=$\overline{U}$
13=grey/black=$\overline{V}$
14=pink/black=$\overline{W}$</td></tr>
<tr><td>TTL
(phase A.B.Z are back of phase U.V.W)</td><td> 

<table>
<tr><th>pole</th><th>g.h.j.k.m.n</th><th>r</th></tr>
<tr><td>4</td><td>30±1°</td><td>180°</td></tr>
<tr><td>6</td><td>20±1°</td><td>120°</td></tr>
<tr><td>8</td><td>15±1°</td><td>90°</td></tr>
</table></td><td> 
</td><td>
<table>
<tr><th rowspan="2">No.</th><th>Function</th><th colspan="3">Mode</th></tr>
<tr><th>Color</th><th>1</th><th>2</th><th>3</th></tr>
<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>$\overline{U}$</td><td>$\overline{A}$</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>$\overline{V}$</td><td>$\overline{B}$</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>$\overline{W}$</td><td>$\overline{Z}$</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>
</table>
</td></tr>
</table>

Timing Chart



Symbol signification

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

■ Electrical Characteristics

Parameter / Output type / Item			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 capascity	Output current	Input	≤30mA	Load resistance 2.2K	≤30mA	≤±20mA			≤±50mA
		Output	—		≤10mA				
	Output voltage	"H"	—	—	≥[(Supply voltage) -2.5V]	≥2.5V			≥Vcc-3 VDC
		"L"	≤0.4V	≤0.7V(less than 20mA)	≤0.4V(30mA)	≤0.5V			≤ 1V VDC
	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。

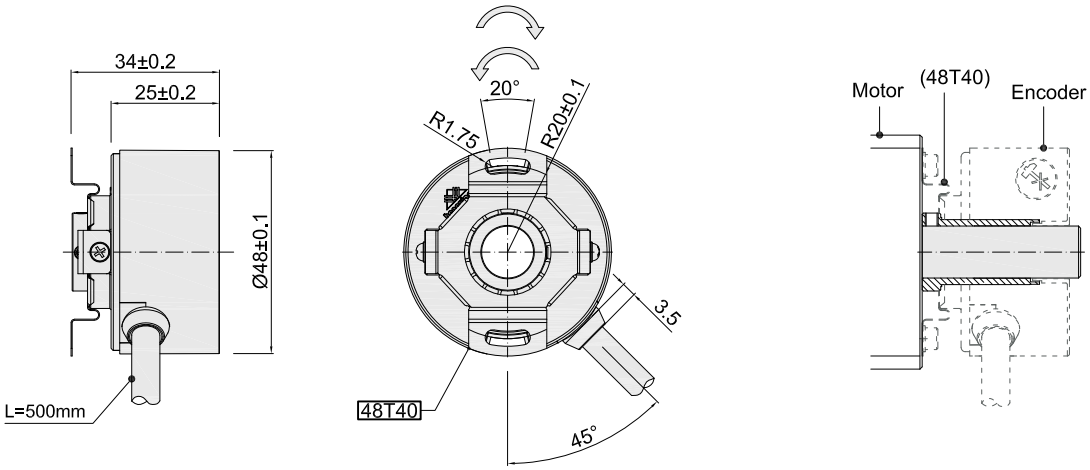
■ Mechanical Characteristics

Shaft	Ø6mm; Ø8mm; Ø10mm; Ø12mm (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	≤5000 rpm
Bearing Life	$1.5X10^{9}$ revs at rated load(100000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	about 140g

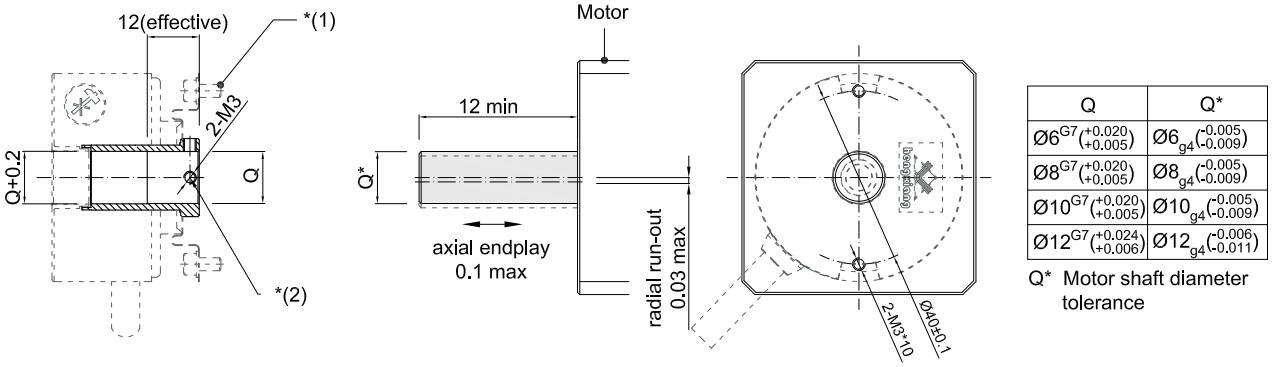
■ Environmental Specifications

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,5~55Hz,2h for X,Y,Z direction individually
Shock(endure)	490m/s² 11ms three times for X,Y,Z direction individually
Protection	IP40

Basic Dimensions



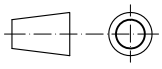
Assembling requirement



Q	Q*
$Ø6^{G7}_{(+0.005)}$	$Ø6_{g4}$
$Ø8^{G7}_{(+0.005)}$	$Ø8_{g4}$
$Ø10^{G7}_{(+0.005)}$	$Ø10_{g4}$
$Ø12^{G7}_{(+0.006)}$	$Ø12_{g4}$

Q* Motor shaft diameter tolerance

Unit: mm



40T40 = Leaf Spring

= The shaft rotary dirrction for encoder without UVW signal

= The shaft rotary dirrction for encoder with UVW signal

Note:
*(1): Inner 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 forceis0.6N.m

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.