

1. S9.6F Incremental Optical Encoder (Solid Shaft)

1.1 Introduction:

S9.6F is an ultra-miniature photoelectric encoder with solid shaft flange mounting and incremental pulse signal. It is suitable for micro-sized equipment and industrial automation fields with limited space.

1.2 Feature:

- Encoder external diameter $\varnothing 9.6\text{mm}$, thickness 17mm, diameter of shaft $\varnothing 3.0\text{mm}$;
- Flange installation;
- Adopt non-contact photoelectric principle;
- Electrical interface TTL differential signal;
- Resolution per turn up to 5120PPR.

1.3 Application:

Micro equipments, small instruments and other automation control fields.

1.4 Connection:

- Axial cable (standard length 0.5M)
- Radial cable (standard length 0.5M)

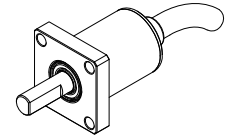
1.5 Protection:

IP50

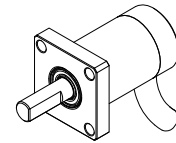
1.6 Weight:

About 15g

S9.6F-L

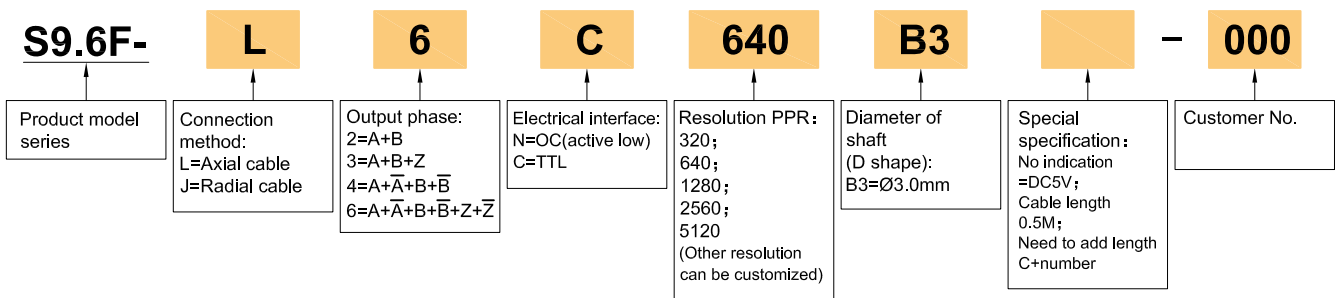


S9.6F-J



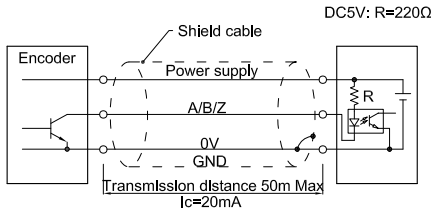
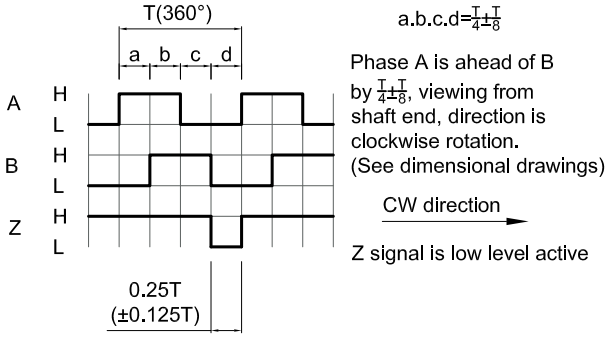
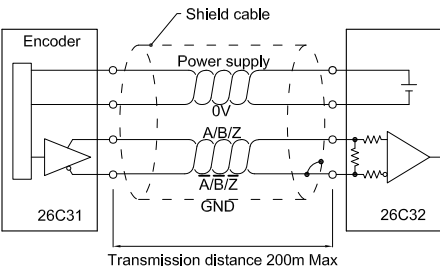
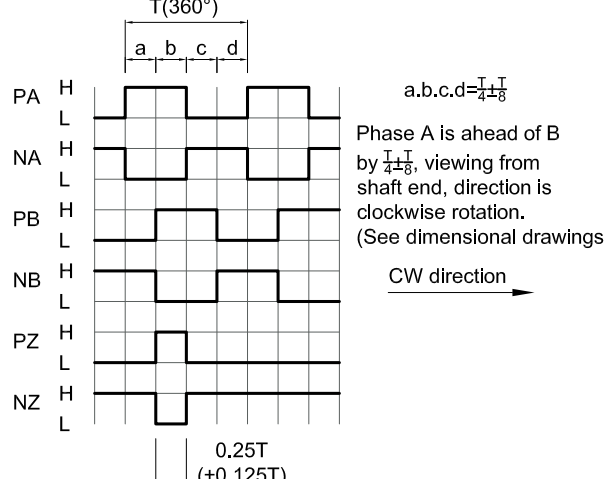
2. Model Selection Guide

Model composition(select parameters)



S9.6F INCREMENTAL

3. Output Mode

Electrical interface	Output circuit	Output wave form
<p>OC NPN open collector circuit</p>		 <p>Phase A is ahead of B by $\frac{I \pm I}{4 \pm 8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p> <p>Z signal is low level active</p>
<p>TTL (DC5V)</p>		 <p>Phase A is ahead of B by $\frac{I \pm I}{4 \pm 8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p>

4. Electrical Parameters

Parameter		Output type		OC		TTL	
Item							
Supply voltage		DC+5V±5%					
Consumption current		100mA Max					
Allowable ripple		≤3%rms					
Top response frequency		100KHz			200KHz		
Output capacity	Output current	Input	≤30mA		≤±20mA		
		Output	—				
	Output voltage	"H"	—		≥2.5V		
		"L"	≤0.4V		≤0.5V		
Load voltage		≤DC30V			—		
Rise & Fall time		Less than 2us(cable length: 2m)			≤100ns Less than 1us(Cable length: 2m)		
Mark to space ratio		45% to 55%					
Phase shift between A & B		90°±10° (frequency in low speed)					
		90°±20° (frequency in high speed)					
GND		Not connect to encoder					

5. Mechanical Specifications

Diameter of shaft	Ø3mm(D shape)
Starting torque	Less than 5×10^{-4} N·m
Inertia moment	Less than 0.3×10^{-6} kg·m ²
Shaft load	Radial 2N; Axial 2N
Slew speed	≤5000 rpm
Shell	Aluminium alloy
Weight	about 15g

6. Environmental Parameters





Environmental temperature	Operating: -20~+80°C; Storage: -25~+85°C
Environmental humidity	Operating and storage: 35~85%RH(noncondensing)
Vibration(Endurance)	Amplitude 0.75mm,5~50Hz,2h for X,Y,Z direction individually
Shock(Endurance)	49m/s ² 11ms three times for X,Y,Z direction individually
Protection	IP50

7. Wiring Table

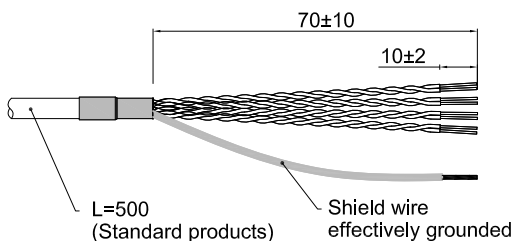
7.1 OC (Wiring table)

	Supply voltage		Incremental signal		
Wire color	Red	Black	White	Green	Yellow
Function	Up	0V	A	B	Z

7.2 TTL (Wiring table)

	Supply voltage		Incremental signal					
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								

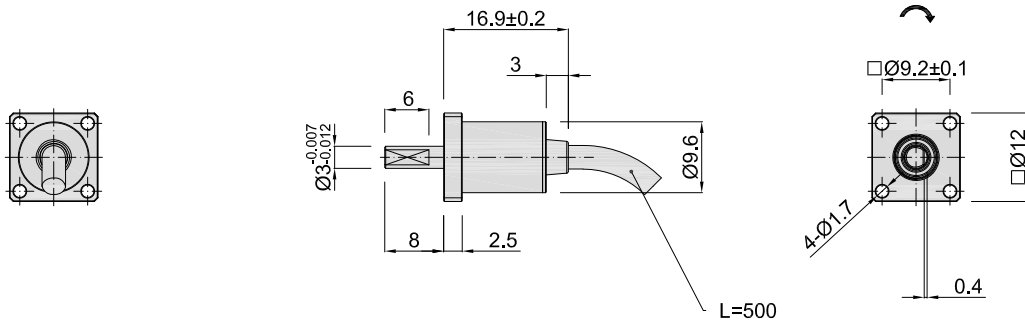
Up=Supply voltage.
Shield wire is not connected to the internal circuit of encoder.



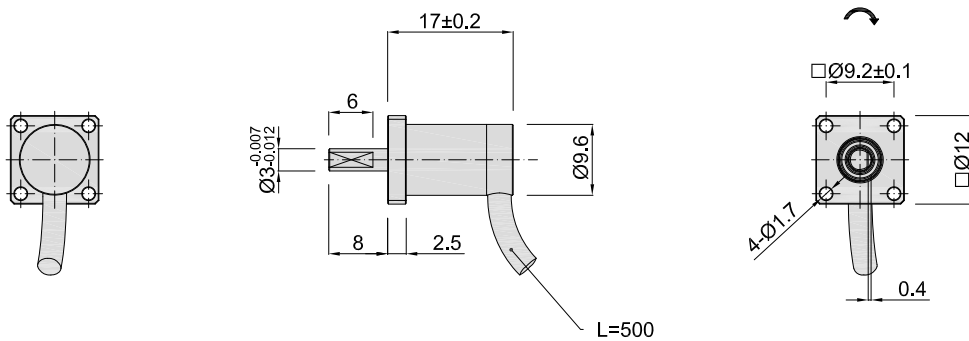
Unit: mm

8. Basic Dimensions

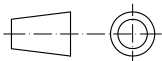
8.1 S9.6F-L



8.2 S9.6F-J



Unit: mm



= Shaft rotation direction of the incremental signal output

9. Caution

9.1 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.

9.2 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.

