

1. S50 Incremental Optical Encoder (Solid shaft)

1.1 Introduction:

S50 is a robust universal solid shaft design, compact, durable and safe, commonly used in industrial automation.

1.2 Feature:

- Encoder external diameter $\varnothing 50\text{mm}$, thickness 30mm, diameter of shaft $\varnothing 8\text{mm}$ (D type);
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 48000PPR.

1.3 Application:

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

1.4 Connection:

- Radial cable (standard length 1M)
- Axial cable (standard length 1M)
- Axial socket (binder, 682 series)

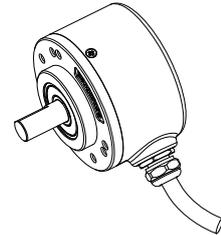
1.5 Protection:

IP50 & IP65

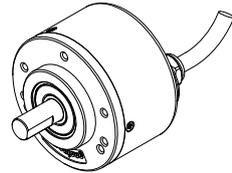
1.6 Weight:

about 190g

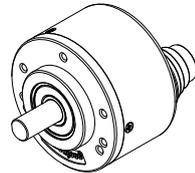
S50-T



S50-Q

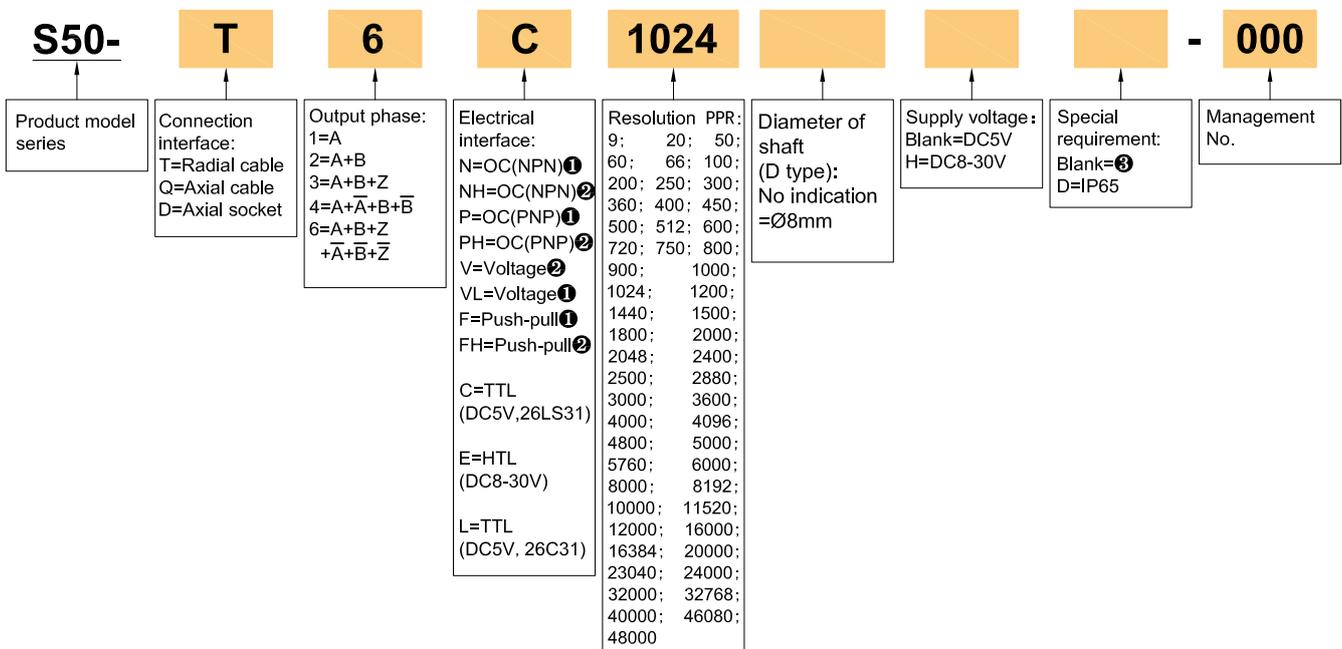


S50-D



2. Model Selection Guide

2.1 Model composition(select parameters)



2.2 Note

- Z signal is low level active.
- Z signal is high level active.
- None indicated for IP50 and cable length of 1M, if need to change the length C+number, the longest is 100M (expressed by C100). For the specific length of use, pls refer to page 2 of the provision of output circuit.

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 $\frac{T}{4}$, 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>OC PNP open collector circuit</p>		<p>Z signal is high level active</p>
<p>Push-pull</p>		<p>Z signal is high level active</p>
<p>Voltage</p>		<p>Z signal is high level active</p>
<p>TTL (DC5V)</p> <p>HTL (DC8-30V)</p>		<p>Phase A is ahead of B by $\frac{T}{4}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings)</p> <p>CW direction →</p>

4. Electrical Parameters

Parameter		Output type	OC	Voltage	Push-pull	TTL	HTL
Item							
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			300KHz	500KHz
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)			≤100ns	Less than 1us(Cable length: 2m)
Insulation strength			AC500V 60s				
Insulation resistance			10MΩ				
Mark to space ratio			45% to 55%				
Reverse polarity protection			✓				
Short-circuit protection			—			✓①	
Phase shift between A & B			90°±10° (frequency in low speed)				
			90°±20° (frequency in high speed)				
GND			Not connect to encoder				

① Short-circuit to another channel or GND permitted for max 30s.

5. Mechanical Specifications

Diameter of shaft	Ø8mm (D type, stainless steel material)
Starting torque	Less than $5 \times 10^{-3} \text{N} \cdot \text{m}$
Inertia moment	Less than $3 \times 10^{-6} \text{kg} \cdot \text{m}^2$
Shaft load	Radial 40N; Axial 20N
Slew speed	$\leq 6000 \text{ rpm (IP50)}$; $\leq 4000 \text{ rpm (IP65)}$
Bearing Life	1.5×10^9 revs at rated load(100000hrs at 2500RPM)
Shell	Aluminium alloy
Weight	about 190g

6. Environmental Parameters

Environmental temperature	Operating: $-20 \sim +90^\circ\text{C}$ (repeatable winding cable: -10°C); Storage: $-25 \sim +95^\circ\text{C}$
Environmental humidity	Operating and storage: 35~85%RH(noncondensing)
Vibration(Endurance)	Amplitude 0.75mm, 5~55Hz, 2h for X,Y,Z direction individually
Shock(Endurance)	490m/s^2 11ms three times for X,Y,Z direction individually
Protection	IP50 & IP65

7. Wiring table

7.1 OC/Voltage/Push-pull (Wiring table for socket and cable connection)

	Supply voltage		Incremental signal		
Socket pin number	1	2	3	4	5
Wire color	Red	Black	White	Green	Yellow
Function	Up	0V	A	B	Z

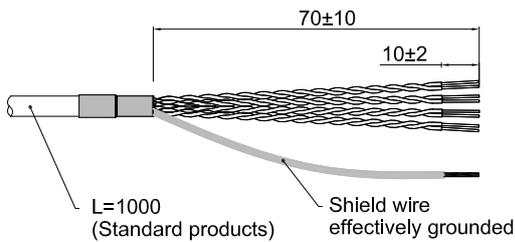
7.2 TTL/HTL (Wiring table for socket and cable connection)

	Supply voltage		Incremental signal					
Socket pin number	1	2	3	6	4	7	5	8
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								

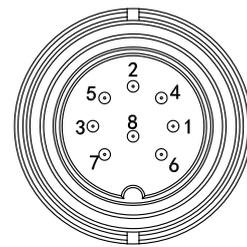
Up=Supply voltage.

Shield wire is not connected to the internal circuit of encoder.

Cable connection



Axial socket connection



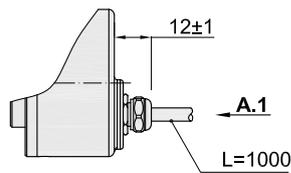
M16-8DIN pin male socket pin assignment diagram

8. Basic Dimensions

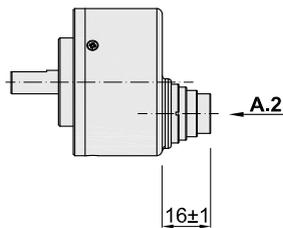
8.1 S50-T



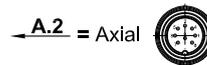
8.2 S50-Q



8.3 S50-D

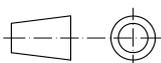


Socket model: (682 series, M16-8DIN flange socket)



- Pin 1=DC
- 2=0V
- 3=A
- 4=B
- 5=Z
- 6=A̅
- 7=B̅
- 8=Z̅

Unit: mm



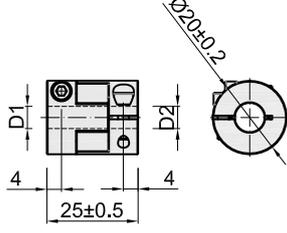
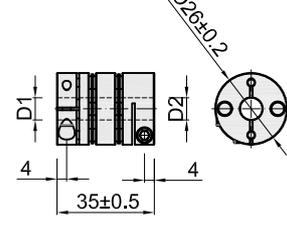
- ↻ = Shaft rotation direction of incremental signal output
- R.1 = Radial cable (standard length 1M)
- A.1 = Axial cable (standard length 1M)
- A.2 = Axial socket (M16-8DIN)

About vibration

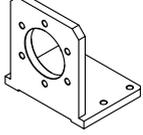
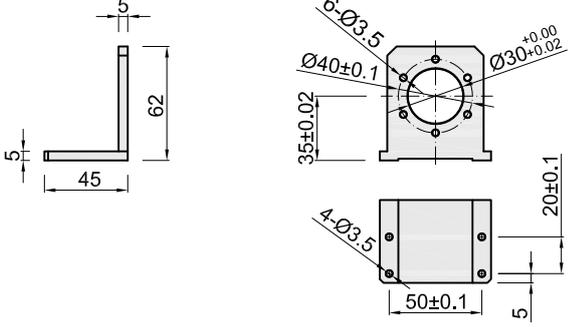
Vibration act on encoder always cause wrong pulse, so we should pay attention to working place. More pulse per revolution, narrower groovy spacing of grating, more effect to encoder by vibration, when rev is low or stop, vibration act on shaft or main body would cause grating vibrating, so encoder might make wrong pulse.

9. Accessories(Recommended purchase)

9.1 Coupling

Crossover M Series (general accuracy, higher accuracy optional W series) 6M8 No: 08700038 8M8 No: 08700039 8M10 No: 08700040			Model	D1	D2
			6M8	$\text{Ø}6^{+0.01}_{+0.03}$	$\text{Ø}8^{+0.01}_{+0.03}$
			8M8	$\text{Ø}8^{+0.01}_{+0.03}$	
			8M10		$\text{Ø}10^{+0.01}_{+0.03}$
Material: aluminium alloy					
Diaphragm Type W Series (high accuracy) 6W8 No: 08700042 8W8 No: 08700043 8W10 No: 08700044			Model	D1	D2
			6W8	$\text{Ø}6^{+0.01}_{+0.03}$	$\text{Ø}8^{+0.01}_{+0.03}$
			8W8	$\text{Ø}8^{+0.01}_{+0.03}$	
			8W10		$\text{Ø}10^{+0.01}_{+0.03}$
Material: aluminium alloy					

9.2 Mounting bracket

S50-50L30 No: 03500165		
Material: aluminium alloy		