

1. S38 Incremental Optical Encoder (Solid shaft)

1.1 Introduction:

S38 is a small economic universal design, compact, sturdy, high safety, and commonly used in industrial automations.

1.2 Feature:

- Encoder external diameter Ø38mm, thickness 28mm, diameter of shaft up to Ø6mm;
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 32768PPR.

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)

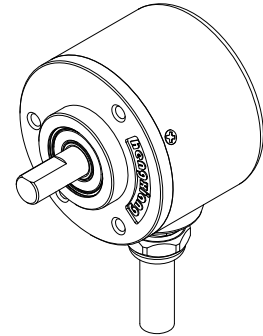
1.5 Protection:

IP50 & IP65

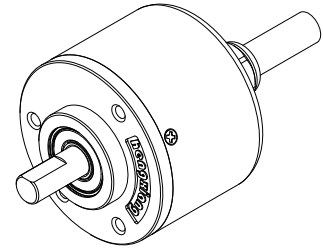
1.6 Weight:

about 120g

S38-T

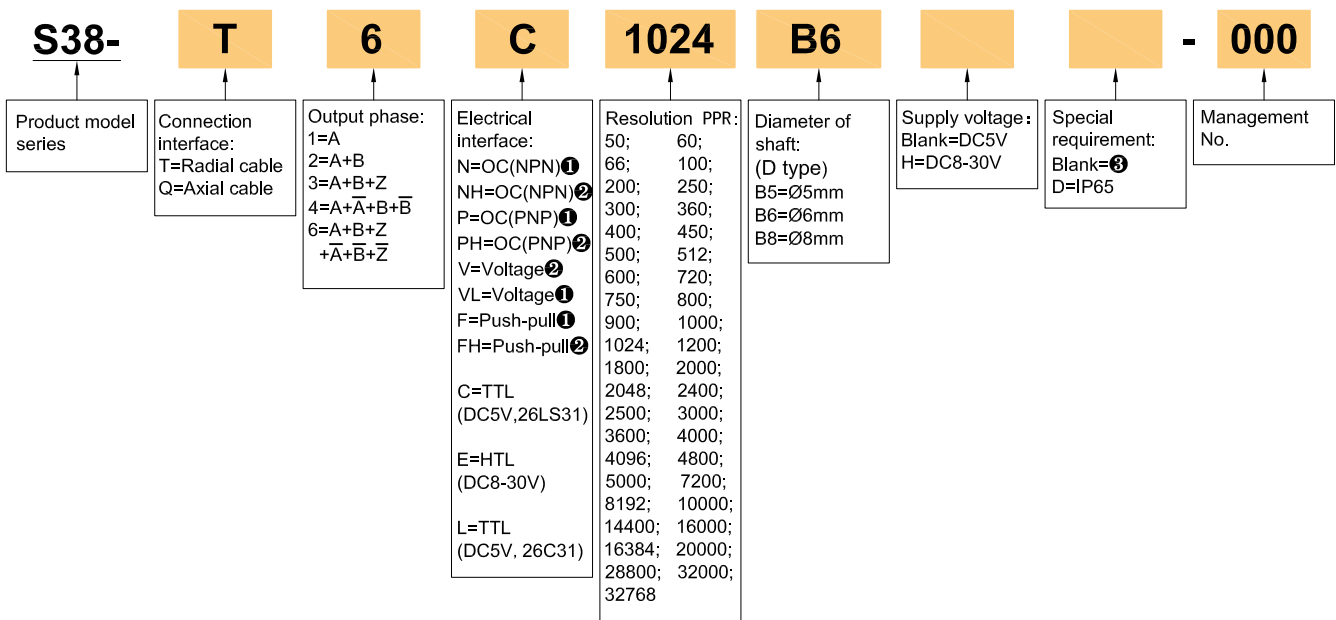


S38-Q



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 Characteristics

Parameter / Item	Output type	OC	Voltage	Push-pull	TTL	HTL	
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	≥Vcc-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	Ø5mm; Ø6mm; Ø8mm (D type, stainless steel material)
Starting torque	Less than $4.4 \times 10^{-3} \text{N}\cdot\text{m}$
Inertia moment	Less than $1.5 \times 10^{-6} \text{kg}\cdot\text{m}^2$
Shaft load	Radial 30N; Axial 20N
Slew speed	$\leq 6000 \text{ rpm (IP50)}$; $\leq 4000 \text{ rpm (IP65)}$
Bearing Life	1.5×10^9 revs at rated load(100000hrs at 2500RPM)
Shell	Aluminium alloy
Weight	about 120g

6. Environmental Specifications





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 cable connection)

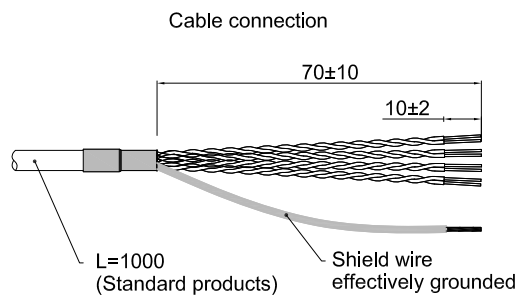
	Supply voltage		Incremental signal		
Wire color	Red	Black	White	Green	Yellow
Function	Up	0V	A	B	Z

7.2 TTL/HTL (Wiring table for cable connection)

	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								

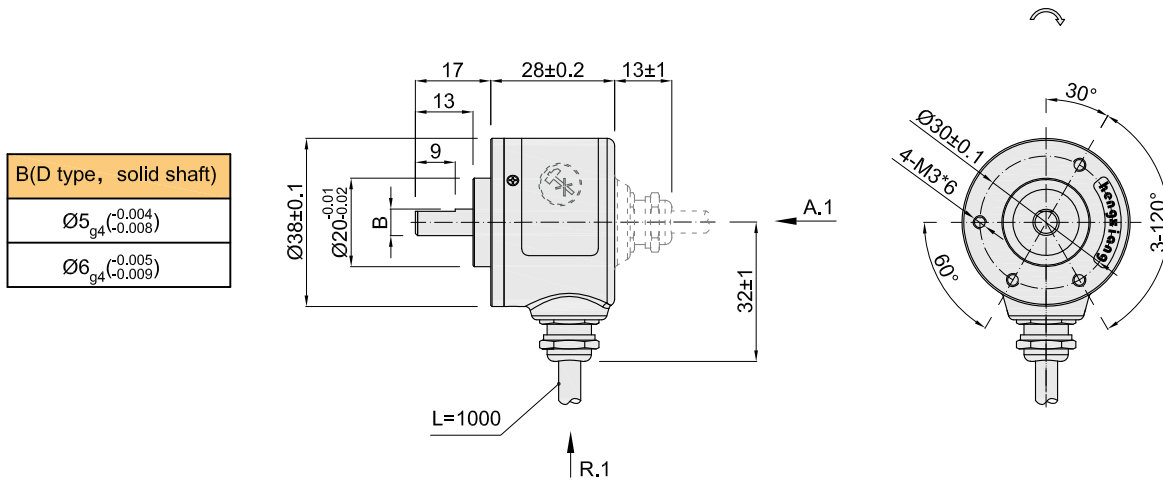
Up=Supply voltage.

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



8. Basic Dimensions

8.1 Dimensions

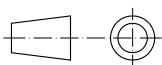


8.2 Assembling requirement



Notice : The radial runout of motor shaft should be less than 0.03mm, and the angle should be less than 1.0°.

Unit: mm

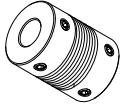
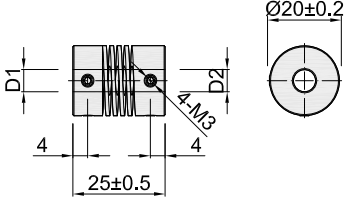

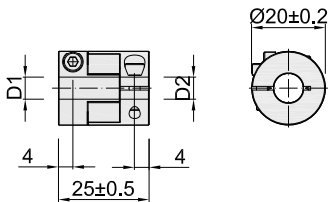


↻ = Shaft rotation direction of the signal output

R.1 = Radial cable (standard length 1M)

A.1 = Axial cable (standard length 1M, no through shaft option)

9. Accessories(Recommended purchase)

<p>Spring type H series coupling (general accuracy, or choose M series for higher accuracy) 6H6 No: 08700021 6H8 No: 08700022 8H8 No: 08700023</p>  	<table border="1"> <thead> <tr> <th>Model</th> <th>D1</th> <th>D2</th> </tr> </thead> <tbody> <tr> <td>6H6</td> <td rowspan="2">Ø6^{+0.03}_{+0.01}</td> <td>Ø6^{+0.03}_{+0.01}</td> </tr> <tr> <td>6H8</td> <td>Ø8^{+0.03}_{+0.01}</td> </tr> <tr> <td>8H8</td> <td>Ø8^{+0.03}_{+0.01}</td> <td>Ø8^{+0.03}_{+0.01}</td> </tr> <tr> <td colspan="3">material: aluminium alloy</td> </tr> </tbody> </table>	Model	D1	D2	6H6	Ø6 ^{+0.03} _{+0.01}	Ø6 ^{+0.03} _{+0.01}	6H8	Ø8 ^{+0.03} _{+0.01}	8H8	Ø8 ^{+0.03} _{+0.01}	Ø8 ^{+0.03} _{+0.01}	material: aluminium alloy		
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<p>Crossover type M series coupling 6M6 No: 08700037 6M8 No: 08700038 8M8 No: 08700039</p>  	<table border="1"> <thead> <tr> <th>Model</th> <th>D1</th> <th>D2</th> </tr> </thead> <tbody> <tr> <td>6M6</td> <td rowspan="2">Ø6^{+0.03}_{+0.01}</td> <td>Ø6^{+0.03}_{+0.01}</td> </tr> <tr> <td>6M8</td> <td>Ø8^{+0.03}_{+0.01}</td> </tr> <tr> <td>8M8</td> <td>Ø8^{+0.03}_{+0.01}</td> <td>Ø8^{+0.03}_{+0.01}</td> </tr> <tr> <td colspan="3">material: aluminium alloy</td> </tr> </tbody> </table>	Model	D1	D2	6M6	Ø6 ^{+0.03} _{+0.01}	Ø6 ^{+0.03} _{+0.01}	6M8	Ø8 ^{+0.03} _{+0.01}	8M8	Ø8 ^{+0.03} _{+0.01}	Ø8 ^{+0.03} _{+0.01}	material: aluminium alloy		
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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.