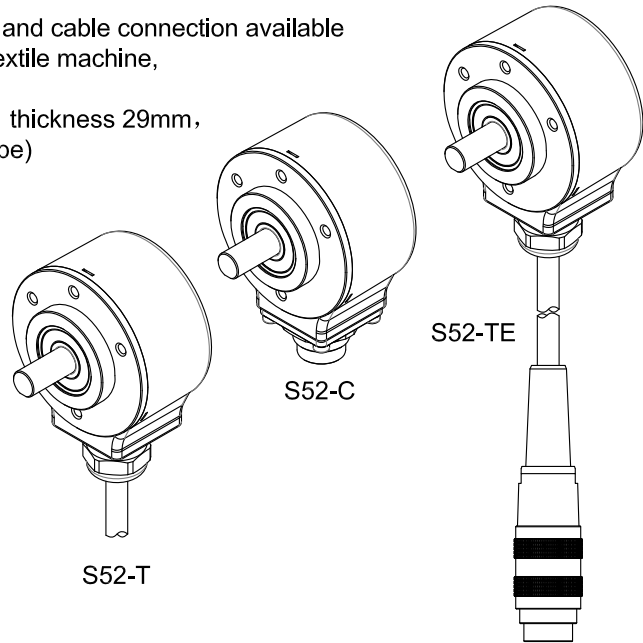


S52

Specifications 1/6

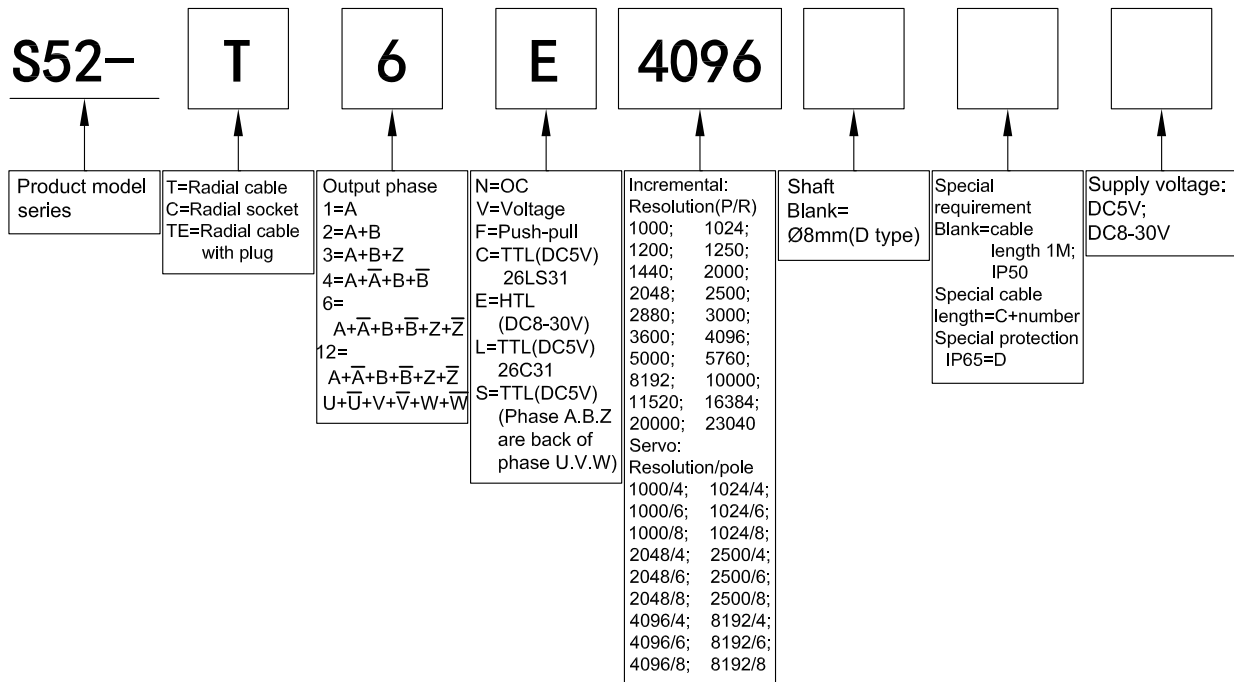
Incremental Type(Solid Shaft)

- Feature: sturdy and durable, various circuit mode and cable connection available
- Application: automation control like motor, CNC, textile machine, industrial assembly line, etc.
- External dimensions: external diameter $\varnothing 51\text{mm}$, thickness 29mm, diameter of shaft 8mm(D type)
- Resolution: Max to 23040ppr
- Supply voltage: DC5V; DC8-30V
- Protection: IP50; IP65
- Cable length: 1000mm
- Weight: about 300g



Model Guide

- Model form (filled required parameters in the box as following)



- Must choose supply voltage: DC5V; DC8-30V
- If need coupling and bracket, please purchase additionally (accessory at specifications 6/6)

Output Mode

Output type	Output circuit	Output wave form	Connection
OC		<p> $T(360^\circ)$ $a \quad b \quad c \quad d$ $a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4} \pm \frac{T}{8}$, rotate direction CW (View from shaft end, direction is clockwise rotation) $\frac{T}{4} \pm \frac{T}{8}$ 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> $T(360^\circ)$ $a \quad b \quad c \quad d$ $a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4} \pm \frac{T}{8}$, rotate direction CW (View from shaft end, direction is clockwise rotation) $\frac{T}{4} \pm \frac{T}{8}$ CW direction \rightarrow </p>	
Voltage		<p> $T(360^\circ)$ $a \quad b \quad c \quad d$ $a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4} \pm \frac{T}{8}$, rotate direction CW (View from shaft end, direction is clockwise rotation) $\frac{T}{4} \pm \frac{T}{8}$ CW direction \rightarrow </p>	
TTL		<p> $T(360^\circ)$ $a \quad b \quad c \quad d$ $a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4} \pm \frac{T}{8}$, rotate direction CW (View from shaft end, direction is clockwise rotation) $\frac{T}{4} \pm \frac{T}{8}$ CW direction \rightarrow </p>	0=shielding=GND 1=red=DC5V; DC8-30V 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}
HTL		<p> $T(360^\circ)$ $a \quad b \quad c \quad d$ $a.b.c.d = \frac{T}{4} \pm \frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4} \pm \frac{T}{8}$, rotate direction CW (View from shaft end, direction is clockwise rotation) $\frac{T}{4} \pm \frac{T}{8}$ CW direction \rightarrow </p>	

S52

Specifications 3/6

● Output Mode

Output type	Output circuit	Output wave form	Connection																																																																		
TTL		<p> $a, b, c, d = \frac{T}{4} \pm \frac{T}{8}$ $e = T \pm \frac{T}{2}$ f: center of phase Z to rise point of phase U, that is $\pm 0.3^\circ$ </p> <p>CCW direction → (Viewed from shaft end when installing)</p>	0=shielding=GND 1=A=red=DC5V 2=C=black=OV 3=E=white=A 4=G=green=B 5=J=yellow=Z 6=L=white/black= \bar{A} 7=M=green/black= \bar{B} 8=N=yellow/black= \bar{Z} 9=O=blue=U 10=P=grey=V 11=R=pink=W 12=S=blue/black= \bar{U} 13=T=grey/black= \bar{V} 14=U=pink/black= \bar{W}																																																																		
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°	<p> $a, b, c, d = \frac{T}{4} \pm \frac{T}{8}$ $e = T \pm \frac{T}{2}$ f: center of phase Z to rise point of phase U, that is $\pm 0.3^\circ$ </p> <p>CCW direction → (Viewed from shaft end when installing)</p>	<table border="1"> <thead> <tr> <th rowspan="2">No.</th> <th rowspan="2">Function</th> <th colspan="3">Mode</th> </tr> <tr> <th>Color</th> <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	Mode			Color	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		
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°																																																																			
No.	Function	Mode																																																																			
		Color	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																																																																			
<p>Timing Chart</p> <p> Supply voltage: 5 ± 0.25, 4.25 ± 0.3 Instantaneous power down Power off Power on Time(msec) </p> <p> Mode: 1, 2, 3 510±220, 22±11, 35MIN, 7±2, 510±220 </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 volume	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° (low speed,frequency ≤1000Hz)						
		90°±20° (high speed,frequency >1000Hz)						
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	Ø8mm(stainless)
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 50N; Axial 30N
Slew speed	≤3000 rpm; IP65≤2000 rpm
Bearing Life	1.5×10^9 revs at rated load(100000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	about 300g

■ Environmental Specifications

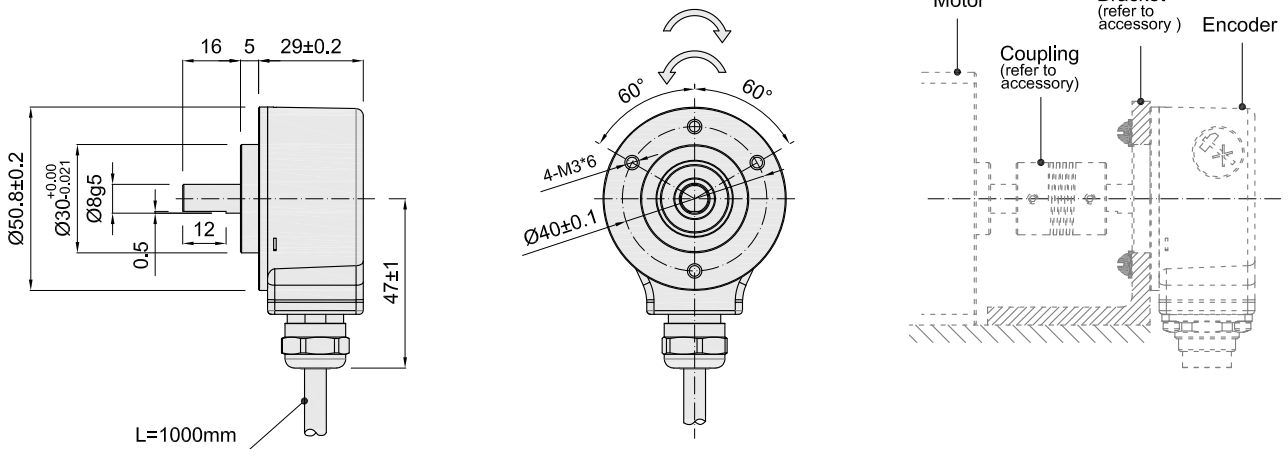
Environmental temperature	Operating: -20~+80°C(repeatable winding cable: -10°C); Storage: -25~+85°C
Environmental humidity	Operating and storage: 35~85%RH(noncondensing)
Vibration(endure)	Amplitude 0.75mm,5~55Hz,2h for X,Y,Z direction individually
Shock(endure)	490m/s ² 11ms three times for X,Y,Z direction individually
Protection	IP50; IP65

S52

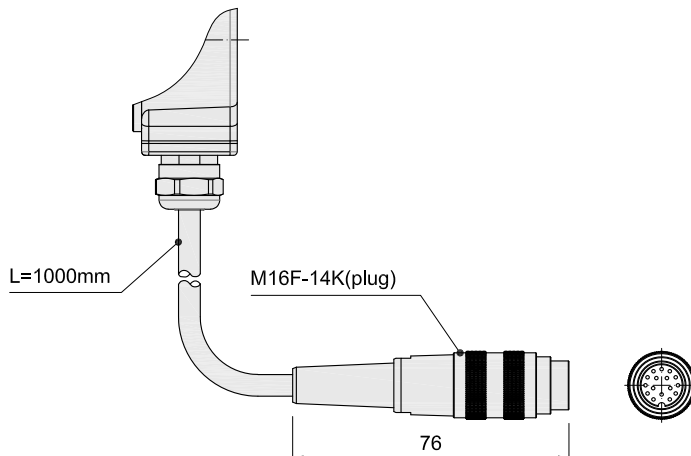
Specifications 5/6

Basic Dimensions

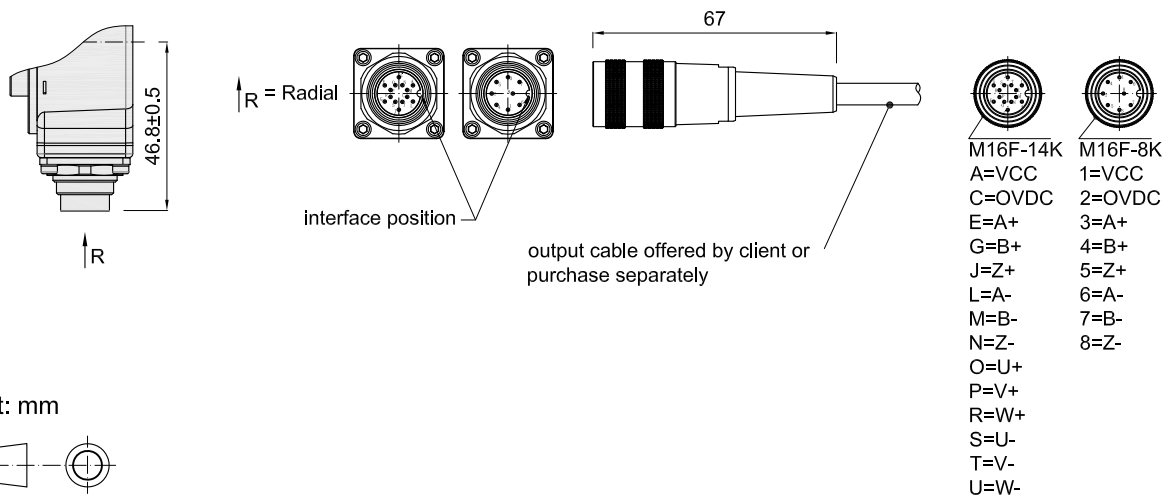
● S52-T



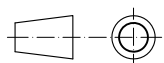
● S52-TE



● S52-C



Unit: mm



= Rotate direction of incremental signal output shaft

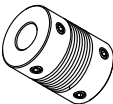
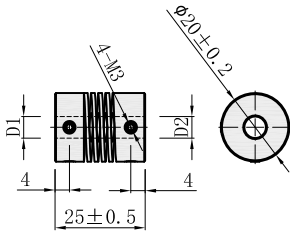
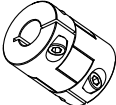
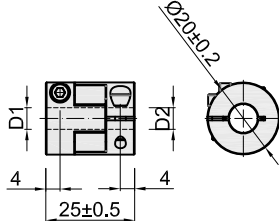
= Rotate direction of servo signal output shaft

S52

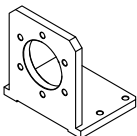
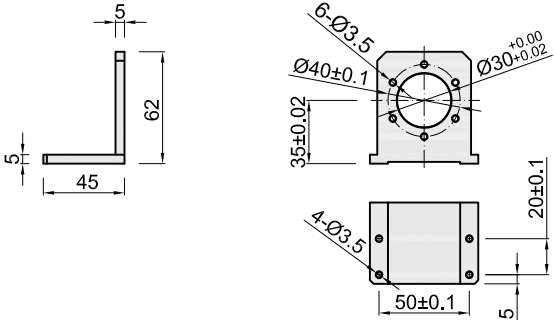
Specifications 6/6

■ Accessory(Need purchase additionally)

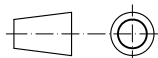
● Coupling

<p>H series spring coupling (general accuracy, or choose M series for higher accuracy)</p> <p>6H8 No:8700022 8H8 No:8700023 8H10 No:8700007</p>  	Model	D1	D2
	6H8	Ø6 ^{+0.01} / _{+0.03}	Ø8 ^{+0.01} / _{+0.03}
	8H8	Ø8 ^{+0.01} / _{+0.03}	
	8H10		Ø10 ^{+0.01} / _{+0.03}
material: aluminium alloy			
<p>M series oldham coupling (high accuracy)</p> <p>6M8 No:8700038 8M8 No:8700039 8M10 No:8700040</p>  	Model	D1	D2
	6M8	Ø6 ^{+0.01} / _{+0.03}	Ø8 ^{+0.01} / _{+0.03}
	8M8	Ø8 ^{+0.01} / _{+0.03}	
	8M10		Ø10 ^{+0.01} / _{+0.03}
material: aluminium alloy			

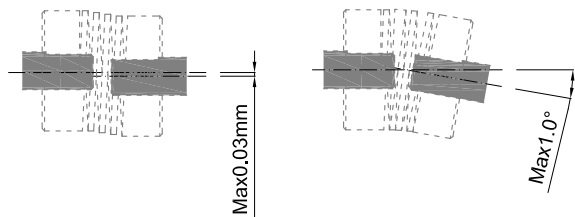
● Bracket

<p>50L30 No:3500165</p>  	material: aluminium alloy
--	------------------------------

Unit: mm



● Assembling requirement



Notice : coaxiality between shaft of encoder and power shaft must be less than 0.03mm, and gradient must be less than 1.0°.

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.