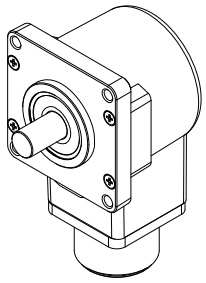
1. S52F Incremental Optical Encoder (Solid shaft)

1.1 Introduction:

S52F is a flange-mounted solid shaft encoder with the highest protection grade IP65. It has a compact and sturdy structure and is widely used in industrial automation fields such as elevator, textile, CNC and packaging.

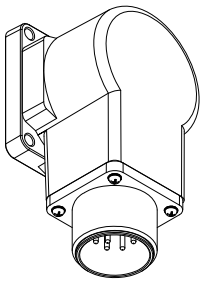


1.2 Feature:

- Flange 52*52mm,thickness 44mm, diameter of shaft Ø10mm;
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 48000PPR.

1.3 Application:

Servo motor, textile, CNC, packaging and other industrial assembly line fields.



1.4 Connection:

- Radial socket

1.5 Protection:

IP50 & IP65

1.6 Weight:

about 300g

2. Model Selection Guide

2.1 Model composition(select parameters)

S52F-	C	6	C	1024	B10			-	000
Product model series	Connection method: C=Radial socket	Output phase: 1=A 2=A+B 3=A+B+Z 4=A+$\overline{A}$+B+$\overline{B}$ 6=A+B+Z +$\overline{A}$+$\overline{B}$+$\overline{Z}$	Electrical interface: N=OC(NPN)❶ NH=OC(NPN)❷ P=OC(PNP)❶ PH=OC(PNP)❷ V=Voltage❷ VL=Voltage❶ F=Push-pull❶ FH=Push-pull❷ C=TTL (26LS31) E=HTL L=TTL (26C31)	Resolution PPR: 50; 100; 360; 400; 450; 500; 512; 600; 720; 750; 800; 900; 1000; 1024; 1500; 1800; 2000; 2048; 2400; 2500; 2880; 3000; 3600; 4000; 4096; 4800; 5000; 5760; 6000; 8000; 8192; 10000; 11520; 12000; 16000; 16384; 20000; 23040; 24000; 32000; 32768; 40000; 46080; 48000;	Diameter of shaft : B10=Ø10m	Supply voltage: Blank=DC5V H=DC8-30V	Special requirement: Blank=❸ D=IP65		Management No.

2. 2 Note

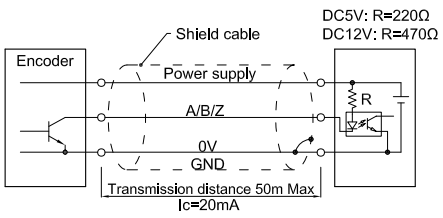
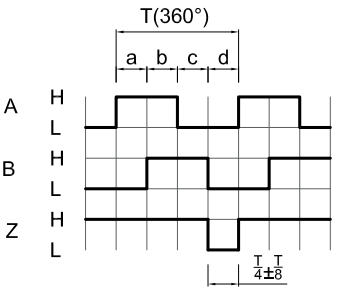
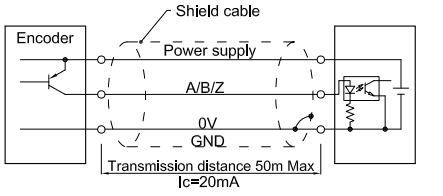
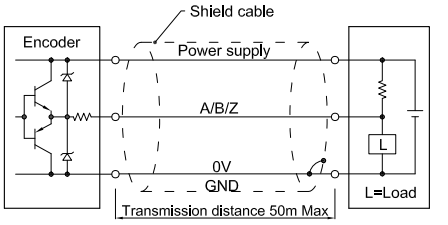
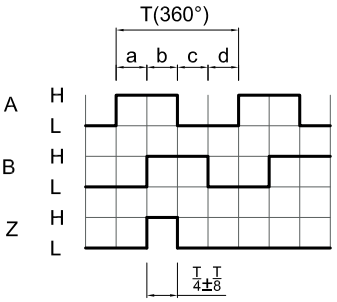
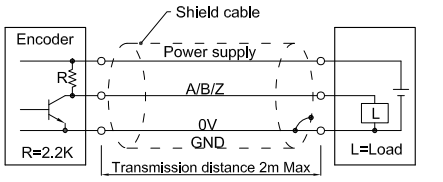
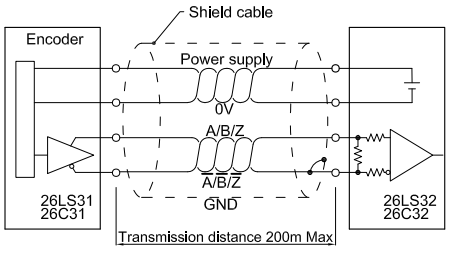
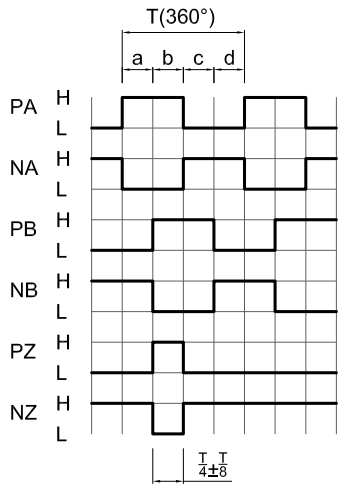
❶. Z signal is low level active.

❷. Z signal is high level active.

❸. None indicated for IP50 .

3. Output Mode

3.1 Incremental signal

Electrical interface	Output circuit	Output wave form
OC NPN open collector circuit		 a.b.c.d=$\frac{T}{4}\pm\frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4}\pm\frac{T}{8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction Z signal is low level active
OC PNP open collector circuit		
Push-pull		 a.b.c.d=$\frac{T}{4}\pm\frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4}\pm\frac{T}{8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction Z signal is high level active
Voltage		
TTL (DC5V) HTL (DC8-30V)		 a.b.c.d=$\frac{T}{4}\pm\frac{T}{8}$ Phase A is ahead of B by $\frac{T}{4}\pm\frac{T}{8}$, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction

4. Electrical Parameters

Parameter / Output type / Item			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 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)			≤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			—		✔❶		
Phase shift between A & B			90°±10° (frequency in low speed)				
			90°±20° (frequency in high speed)				
GND			Not connect to encoder				

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

5. Mechanical Specifications

Diameter of shaft	Ø10mm (stainless steel)
Starting torque	Less than 5×10^{-3}N·m
Inertia moment	Less than 3×10^{-6} kg·m²
Shaft load	Radial 50N; Axial 30N
Slew speed	≤6000 rpm； IP65≤5000 rpm
Bearing Life	$1.5X10^{9}$ revs at rated load(100000hrs at 2500RPM)
Shell	Aluminium alloy
Weight	about 300g

6. Environmental Parameters

Environmental temperature	Operating:－20～+85°C(repeatable winding cable: -10°C); Storage:－20～+90°C
Environmental humidity	Operating and storage：35～85％RH(noncondensing)
Vibration(Endurance)	Amplitude 1.52mm,5~55Hz,2h for X,Y,Z direction individually
Shock(Endurance)	490m/s² 11ms three times for X,Y,Z direction individually
Protection	IP50 & IP65

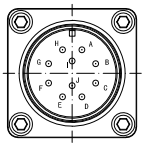
7. Wiring Table

7.1 Function & definition

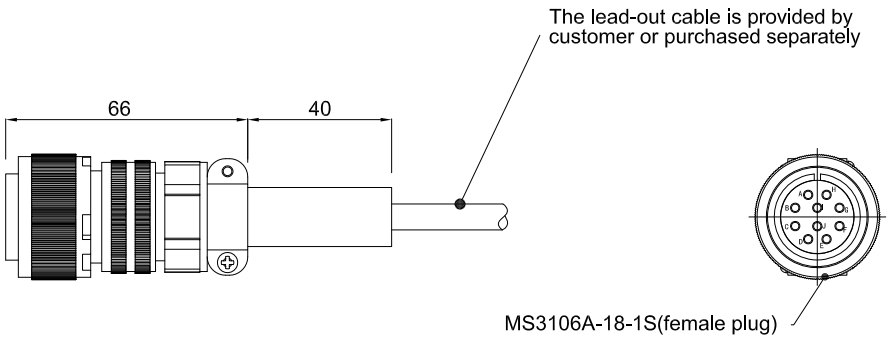
	Supply voltage		Incremental signal							
Socket pin definition (MS3102A-18-1P)	D	F	A	H	B	I	C	J	E	G
Function	Up	0V	A+	A-	B+	B-	Z+	Z-	-	-

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

MS3102A-18-1P
(10P-male socket)

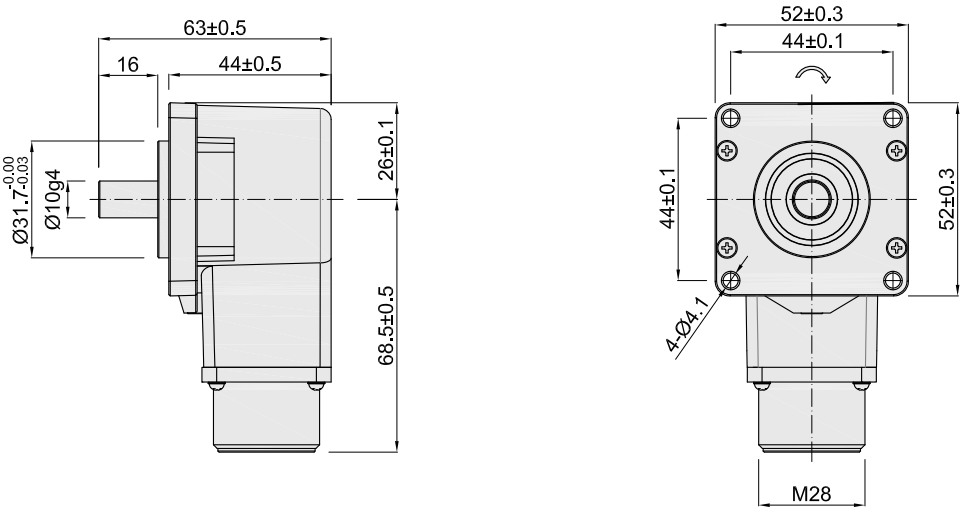


7.2 Plug size & model (MS3106A-18-1S)



8. Basic Dimensions

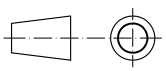
8.1 Dimensions



8.2 Mounting shaft requirements

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

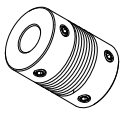
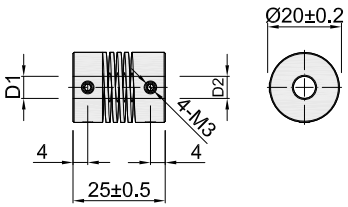
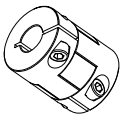
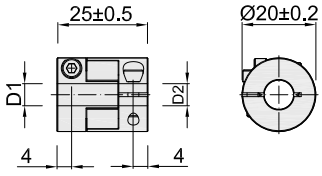
Unit：mm



= Direction of shaft rotation for incremental signal output

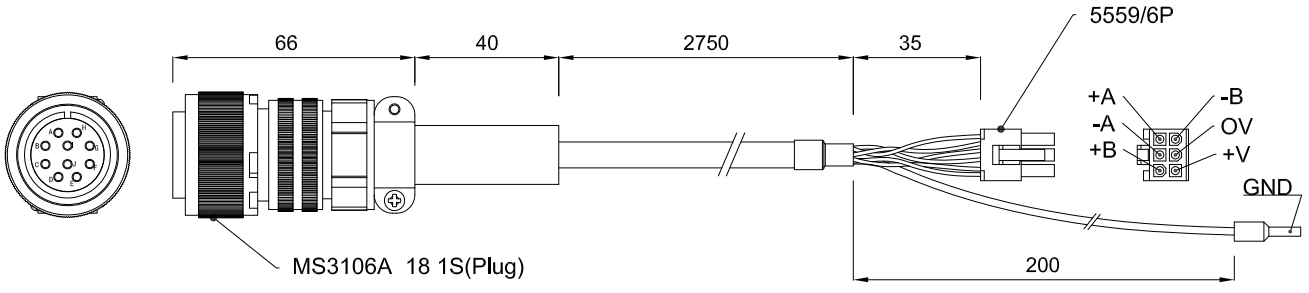
9. Recommended Accessories

9.1 Coupler

Coupler	Dimensions	D1	D2	Model	Order No.
Spring type: H series 	 Main body material: aluminum alloy	Ø8^{G8}	Ø10^{G8}	8H10	08700007
		Ø10^{G8}	Ø10^{G8}	10H10	08700046
Cross type: M series 	 Main body material: aluminum alloy	Ø8^{G8}	Ø10^{G8}	8M10	08700040
		Ø10^{G8}	Ø10^{G8}	10M10	08700047

9.2 Special connecting cable for differential output A+$\overline{A}$+B+$\overline{B}$,It can be customized according to customer needs.

52SC No: 01500085



Unit: mm

10. Caution

10. 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.

10. 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.

fang@shhxgd.com Tel: 86-21-54613487