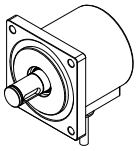
1. SC65F Incremental Optical Encoder (Solid Shaft)

1.1 Introduction：

SC65F is a solid shaft housing design, various of electrical interfaces and resolutions available, mounting by flange, highest protection grade IP65, compact product structure, high safety, suitable for high intensity mechanical movement fields.

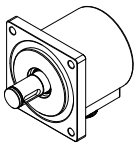
SC65F-T



1.2 Feature：

- Encoder external diameter Ø61mm； thickness 58mm；diameter of shaft Ø15mm(keyway 5mm)；
- Dimension of mounting flange 68mm*68mm; installation hole distance 56mm*56mm;
- Adopt non-contact photoelectric principle;
- Resolution up to 48000PPR;
- Reverse polarity protection;
- Short circuit protection

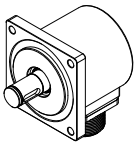
SC65F-C
SC65F-D



1.3 Application：

CNC machine tools, textile industry, packaging machinery and other industrial automation fields.

SC65F-E



1.4 Connection：

- Radial cable (Standard length 1M)
- Radial socket (M18/M28 male socket)

1.5 Protection：

IP65(Max)

1.6 Weight：

About 590g

2. Model Selection Guide

2.1 Model composition(select parameters)

SC65F- | **T** | **6** | **C** | **1024** | | | | | **-** | **000**

Product model series	Connection method: T=Radial cable Radial socket: C=M18-9P D=M18-7P E=M28-10P	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 (DC5V,26LS31) E=HTL (DC8-30V) L=TTL (DC5V, 26C31)	Resolution PPR: 9; 20; 50; 60; 66; 100; 200; 250; 300; 360; 400; 450; 500; 512; 600; 720; 750; 800; 900; 1000; 1024; 1200; 1440; 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: No indication =Ø15mm (keyway 5mm)	Supply voltage: Blank=DC5V H=DC8-30V	Special requirement: Blank=❸ D=IP65	Management No.

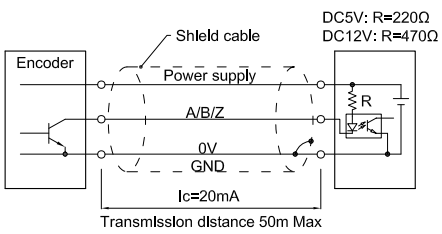
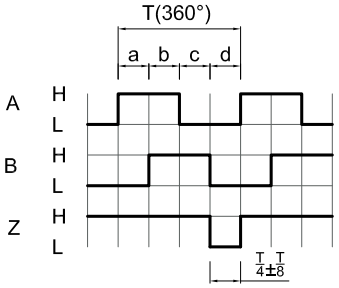
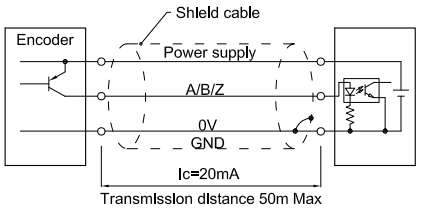
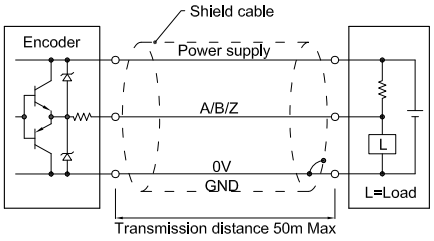
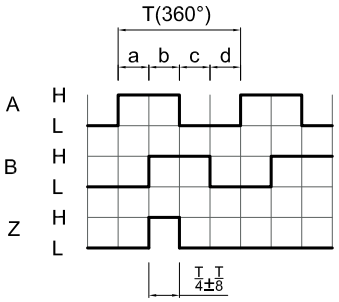
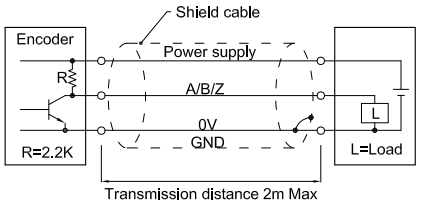
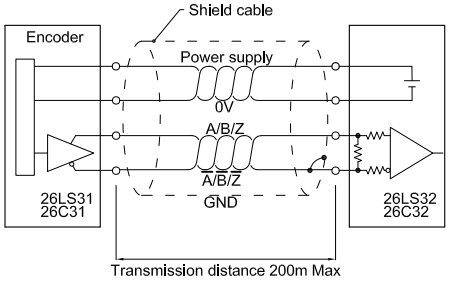
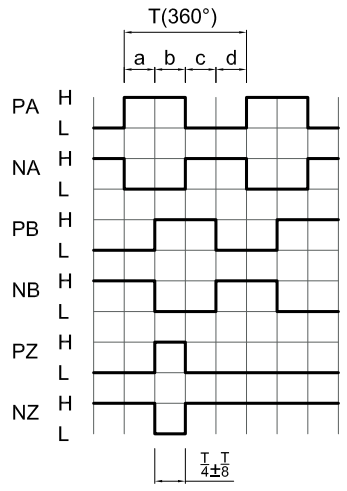
2. 2 Note

❶. Z signal is low level active.

❷. Z signal is high level active.

❸. None indicated for IP50 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
OC NPN open collector circuit		 a.b.c.d=T/4±T/8 Phase A is ahead of B by T/4±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=T/4±T/8 Phase A is ahead of B by T/4±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=T/4±T/8 Phase A is ahead of B by T/4±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)			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(PNP is effective for Up) , permitted for max.30s.

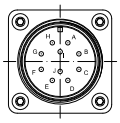
5. Mechanical Specifications

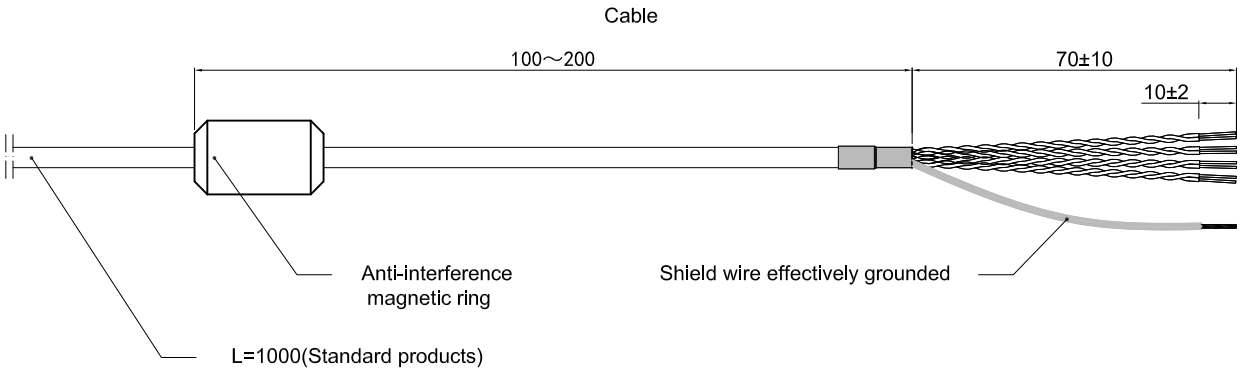
Diameter of shaft	Ø15mm (keyway 5mm)
Starting torque	Less than 10×10^{-3}N·m
Inertia moment	Less than 3×10^{-6} kg·m²
Shaft load	Radial 30N; Axial 20N
Slew speed	≤5000 rpm(IP50); ≤3000 rpm(IP65)
Bearing Life	$1.5X10^{9}$ revs at rated load(100000hrs at 2500RPM)
Shell	Aluminium alloy
Weight	About 590g

6. Environmental Parameters

Environmental temperature	Operating:－20～+90°C(repeatable winding cable: -10°C); Storage:－25～+95°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/s² 11ms three times for X,Y,Z direction individually
Protection	IP50 & IP65

7. Wiring Table

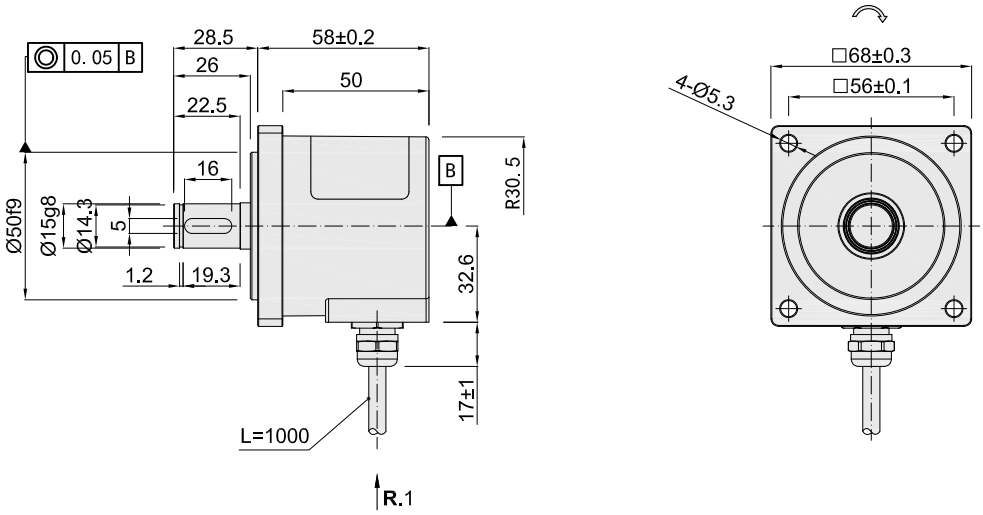
						
Socket pin definition (M18 9-pin male socket)	Socket pin definition (M18 7-pin male socket)	Socket pin definition (M28 10-pin male socket)	Wire colors (cable connection)	Signal	Explanation	Differential twisted pair
1	1	J	Red	Up	Power positive	
2	2	I	Black	Un	Power negative	
3	3	A	White	A	Signal wire	
6	-	B	White/BK	$\overline{A}$	Signal wire	
4	4	C	Green	B	Signal wire	
7	-	D	Green/BK	$\overline{B}$	Signal wire	
5	5	E	Yellow	Z	Signal wire	
8	-	F	Yellow/BK	$\overline{Z}$	Signal wire	
9	6	G	-	-		
-	7	H	-	-		
GND	Not connected to the encoder body					



Unit: mm

8. Basic Dimensions

8.1 SC65F-T



8.2 SC65F-C
SC65F-D

8.3 SC65F-E

Unit: mm

= Shaft rotation direction of incremental signal output
R.1 = Radial cable (standard length 1M)
R.2 = Radial socket (M18 7-pin & M18 9-pin male socket)
R.3 = Radial socket (M28 10-pin male socket)

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.