

## 1. S58 Incremental Optical Encoder (Solid shaft)

### 1.1 Introduction:

S58 is a solid shaft housing design, various of electrical interfaces and resolutions available, four mounting flanges and collar sizes, protection grade IP65, compact product structure, high safety, suitable for high-intensity mechanical movement fields.

### 1.2 Feature:

- Encoder external diameter Ø58mm、thickness 36-40mm、diameter of shaft of Ø6mm、Ø8mm、Ø10mm available;
- Four sizes of mounting flanges available;
- Adopt non-contact photoelectric principle;
- Resolution up to 65536PPR;
- Alarm/sense available;
- Reverse polarity protection ;
- Short circuit protection.

### 1.3 Application:

Motor, elevator, textile, packaging, CNC and other automation control fields.

### 1.4 Connection:

- Cable connection (Standard length 1000mm)
- Socket connection (M12/M16/M23 male socket)

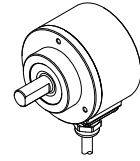
### 1.5 Protection:

IP65 (Max)

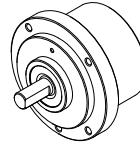
### 1.6 Weight:

About 420g

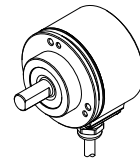
S58-A



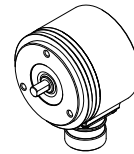
S58-B



S58-C



S58-D



## 2. Model Selection Guide

Model composition(select parameters)

<b>S58-</b>	<b>A</b>	<b>10</b>	<b>T</b>	<b>6</b>	<b>E</b>	<b>2048</b>	<b>H</b>	<b>D</b>	<b>-</b>	<b>000</b>
Product model series	Mounting flange: ①. A/B/C/D	Diameter of shaft: (Solid hole) 6=Ø6mm 8=Ø8mm 10=Ø10mm	Connection method: T=Radial cable Q=Axial cable  Radial socket: E=M12-8P C=M16-8P K=M16-14P G=M23-12P  Axial socket: F=M12-8P D=M16-8P M=M16-14P H=M23-12P	Output phase: 2=A+B 3=A+B+Z 4=A+A+B+B 6=A+A+B+B+Z+Z	Output type N=OC(NPN) NH=OC(NPN) P=OC(PNP) PH=OC(PNP) V=Voltage VL=Voltage F=Push-pull FH=Push-pull C=TTL (26LS31)  L=TTL (26C31)  R=TTL (RS422)  E=HTL (DC8-30V)  A=Push-Pull (Alarm/Sense)  B=TTL(DC5V) (Alarm/Sense)	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; 3000; 3600; 4000; 4096; 4800; 5000; 8000; 8192; 10000; 16000; 16384; 20000; 32000; 32768; 40000; 65536	Supply voltage: Blank=DC5V H=DC8-30V	Special requirement: Blank=② D=IP65		Management No.

Mounting flange:

- ①. A=Clamping flange, collar Ø36mm, 3-M3 PCDØ48mm;
- B=Clamping flange, collar Ø56mm, 4-M4 PCDØ66mm;
- C=Synchro flange, collar Ø36mm, 3-M3 & 3-M4 PCDØ48mm;
- D=Synchro flange, collar Ø50mm, 3-M4 PCD42mm.

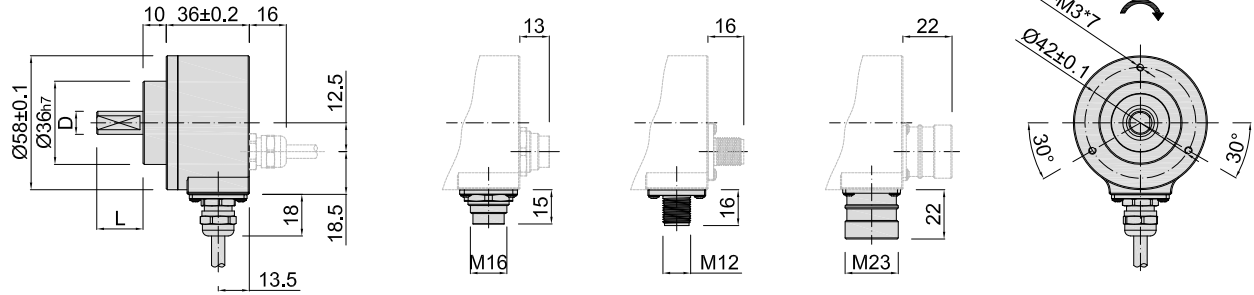
Special requirement:

- ②. IP=50; cable length 1m, if need to change the length C+number, max 100m(indicated by C100).

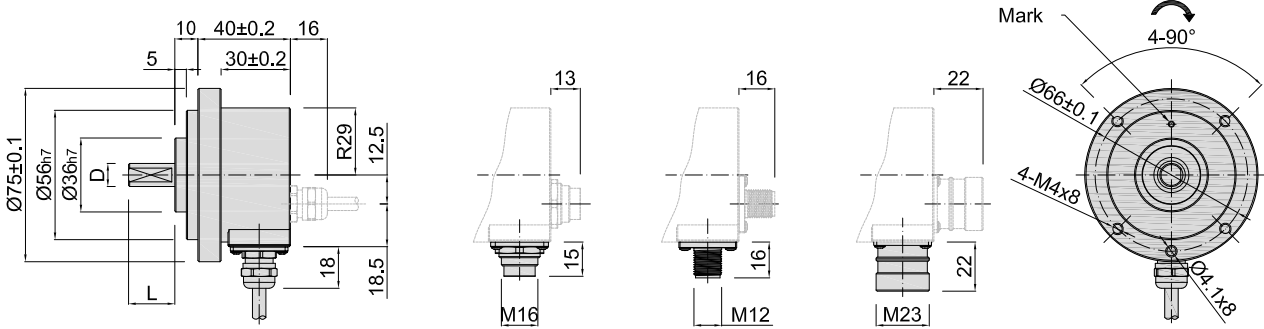
**S58** INCREMENTAL

3. Basic Dimensions

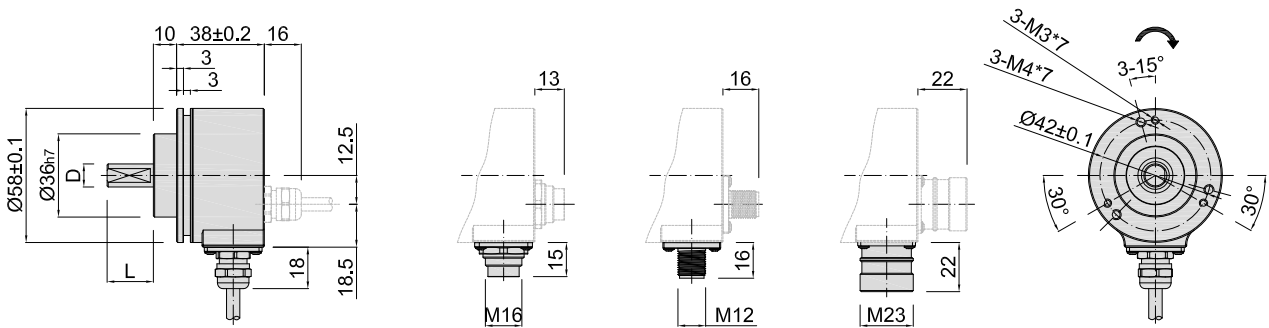
3.1 S58-A (Basic dimensions)



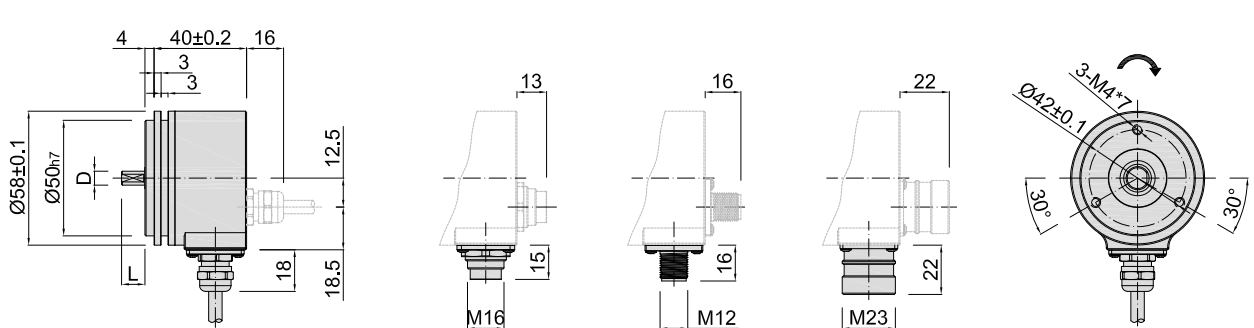
3.2 S58-B (Basic dimensions)



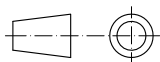
3.3 S58-C (Basic dimensions)



3.4 S58-D (Basic dimensions)



Unit: mm



= Direction of shaft rotation for signal output

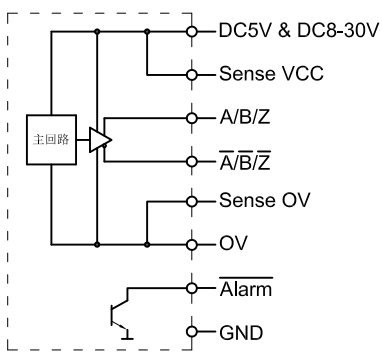
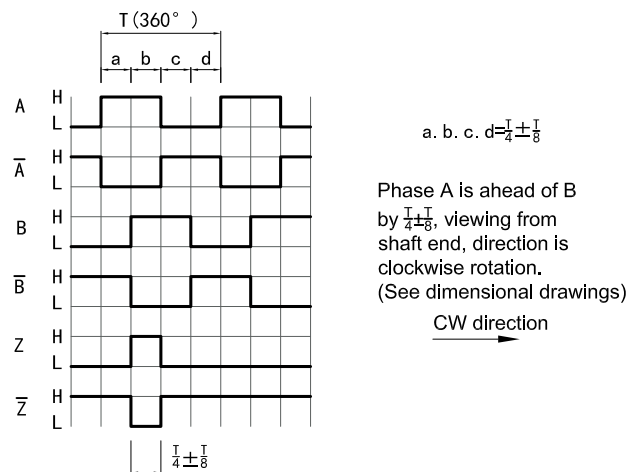
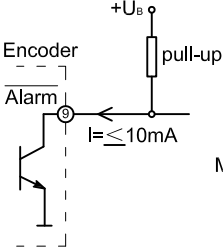
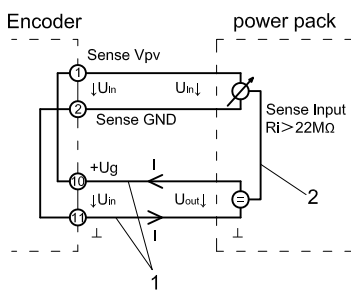
D(Shaft)	Ø6 <sub>h7</sub> ( <sup>0</sup> <sub>-0.015</sub> )	Ø8 <sub>h7</sub> ( <sup>0</sup> <sub>-0.015</sub> )	Ø10 <sub>h7</sub> ( <sup>0</sup> <sub>-0.018</sub> )
L	Ø10	Ø20	Ø20

4. Output Mode

4.1 Incremental signal

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

4.2 Incremental signal (continued)

Electrical interface	Output circuit
<p>Push-Pull (DC8-30V) (with Alarm/Sense)</p> <p>TTL(DC5V) (with Alarm/Sense)</p>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">  </div> <div style="width: 45%;">  </div> </div> <div style="margin-top: 20px;"> <p>Output-Alarm</p>  <p>Output NPN-Open collector              Output load max 5mA/24V at UB=DC10-24V              Output level Output active(failure condition): L≤DC0.7V              Output inactive: high impedance(if necessary: get H-level by an external pull-up resistor)</p> <p>Malfunction indication time ≥20ms              Function -Overtemperature +85°C              -Overload (e.g.current at 500mA due to short circuit)              -Voltage range ±10%(for DC5V only)              -Voltage drop on the supply lines</p> </div> <div style="margin-top: 20px;">  <p>The sense wires enable measuring of the actual encoder supply voltage(compensates for voltage drops due to supply current and cable resistance).</p> <p>Due to the voltage drop in the cables and the voltage supply, the encoder input voltage <math>U_{in}</math> is less than the power pack output voltage <math>U_{out}</math>.              The present input voltage <math>U_{in}</math> is now output to the Sense Vcc and Sense GND cables and returns as data to the power pack.              The input resistance <math>R</math> on the power pack should amount to at least <math>22M\Omega</math>,so that no voltage drop occurs on these cables.              In case of power packs with sense input,it is now possible to readjust the output voltage <math>U_{out}</math> automatically.</p> </div> <div style="margin-top: 20px;"> <p>1. Voltage drop due to long cable lengths              2. Automatic readjustment of the output voltage (only for power packs with sense input)</p> </div>

## 5. Electrical Characteristics

Parameter		Output type	OC	Voltage	Push-pull	TTL	TTL (Less wiring type)	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			500KHz		800KHz
Output capacity	Output current	Input	≤30mA	Load resistance 2.2K	≤30mA	≤±20mA		≤±50mA
		Output	—		≤10mA			
	Output voltage	"H"	—	—	≥ $\lfloor \frac{\text{Supply voltage}}{2.5} \rfloor$	≥2.5V		≥V <sub>CC</sub> -3 V <sub>DC</sub>
		"L"	≤0.4V	≤0.7V(less than 20mA)	≤0.4V(30mA)	≤0.5V		≤ 1V V <sub>DC</sub>
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			✓①			—		
Phase shift between A & B			90°±10° ( frequency in low speed)					
			90°±20° ( frequency in high speed)					
Delay motion time ②			—				510±220ms	—
GND			Not connect to encoder					

① Short-circuit to another channel or GND(PNP is effective for Up) , permitted for max.30s.

② Phase A,B,Z are back of phase U.V,W when power on.

## 6. Mechanical Parameters

Diameter of shaft	Ø6mm; Ø8mm; Ø10mm available
Shaft material	Stainless steel
Starting torque	at +20°C IP50 < 0.05 Nm; IP65 < 0.1 Nm
Inertia moment	Less than $3 \times 10^{-6}$ kg·m <sup>2</sup>
Shaft load	Radial 60N; Axial 40N
Permissible movement static	±0.3mm (radial) ; ±0.5mm (axial)
Permissible movement dynamic	±0.05mm (radial) ; ±0.1mm (axial)
Max.angular acceleration	≤500,000 rad/s <sup>2</sup>
Operating speed	6000min <sup>-1</sup> ❶
Bearing lifetime	3.6x10 <sup>9</sup> ❷
Housing material	Aluminum alloy
Weight	Approx.420g

- ❶. Allow for self-heating of approx.3.0K per 1000rpm regarding the permissible operating temperature.  
 ❷. On maximum operating speed and temperature.

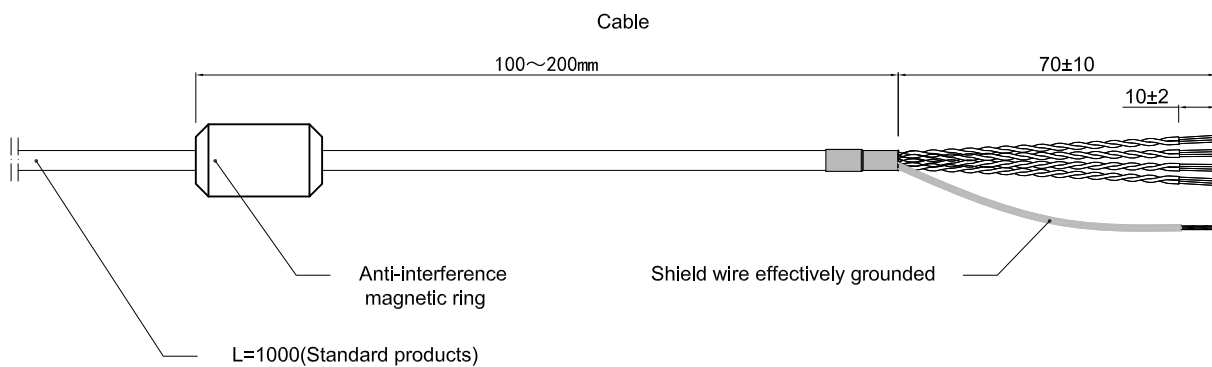
## 7. Environmental Parameters

Shell protection grade	IP65 (Max)
Permissible relative humidity	90%, Condensation not permitted
Operating temperature range	-40°C...+95°C
Storage temperature range	-40°C...+95°C
Resistance to shocks	100g, 6ms(EN60068-2-27) ❶
Frequency range of resistance to vibrations	30g, 10Hz...1,000Hz(EN60068-2-6) ❷

- ❶. Checked during operation using vector length monitoring.  
 ❷. Checked during operation using vector length monitoring, including matching plug.

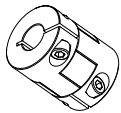
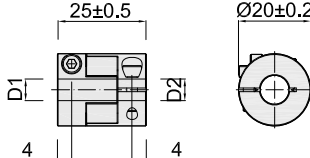

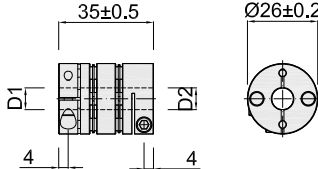
8. Wiring table

Socket pin definition (M12 8-pin)	Socket pin definition (M16 8-pin)	Socket pin definition (M16 14-pin)	Socket pin definition (M23 12-pin)	Wire colors (cable connection)	Signal	Explanation	Twisted wire
1	1	A	1	Red	Up	Power positive	
2	2	C	2	Black	Un	Power negative	
3	3	L	3	White	A	Signal wire	
4	4	U	4	White/BK	$\bar{A}$	Signal wire	
5	5	J	5	Green	B	Signal wire	
6	6	T	6	Green/BK	$\bar{B}$	Signal wire	
7	7	G	7	Yellow	Z	Signal wire	
8	8	S	8	Yellow/BK	$\bar{Z}$	Signal wire	
-	-	E	9	Blue	$\bar{Alarm}$	Signal wire	
-	-	R	10	Pink	Sense VCC	Signal wire	
-	-	P	11	Gray	Sense OV	Signal wire	
-	-	M	12	-	N.C.	Unallocated	
-	-	N	-	-	N.C.	Unallocated	
-	-	O	-	-	N.C.	Unallocated	
GND	No encoder body connected						

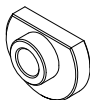
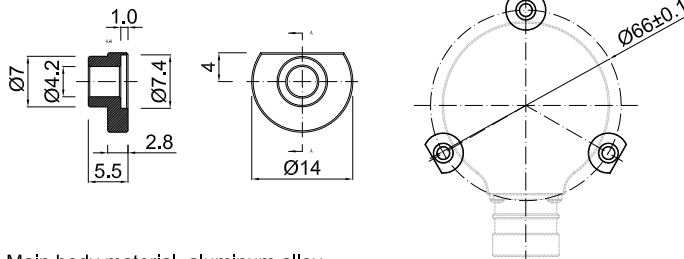


9. Recommended Accessories

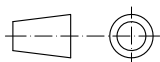
9.1 Coupler

Coupler	Dimensions	D1	D2	Model	Order No.
Cross type: M series 	 <p>Main body material: aluminum alloy</p>	Ø6 <sup>G8</sup>	Ø8 <sup>G8</sup>	6M8	08700038
		Ø8 <sup>G8</sup>	Ø8 <sup>G8</sup>	8M8	08700039
		Ø8 <sup>G8</sup>	Ø10 <sup>G8</sup>	8M10	08700040
Diaphragm type: W series 	 <p>Main body material: aluminum alloy</p>	Ø6 <sup>G8</sup>	Ø8 <sup>G8</sup>	6W8	08700042
		Ø8 <sup>G8</sup>	Ø8 <sup>G8</sup>	8W8	08700043
		Ø8 <sup>G8</sup>	Ø10 <sup>G8</sup>	8W10	08700044

9.2 Mounting cardboard

Mounting cardboard	Dimensions	Model	Order No.
 3 pcs as a set	 <p>Main body material: aluminum alloy</p>	58C66	03700733

Unit: mm





## 10. Caution

### 10.1 Caution for operation

- The working temperature shall not exceed the storage temperature.
- The working humidity shall not exceed the storage humidity.
- Do not use where the temperature changes dramatically and have fog.
- Do not close to corrosive and flammable gas.
- Keep away from dust, salt and metal powder.
- Keep away from places where you will use water, oil, or medicine.
- Undue vibration and shock will impact the encoder.

### 10.2 Caution for Installation

- Electrical components should not be subjected to excessive pressure, etc., and electrostatic assessment of the installation environment should be conducted.
- Do not close the cable of the motor power to the encoder.
- The FG wire of the motor and mechanical device should be grounded.
- The shielding wire must be effectively grounded since the shielding is not connected to the encoder.

### 10.3 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.