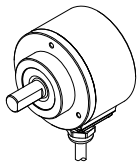
1. S58 Incremental Optical Encoder (Solid Shaft)

1.1 Introduction：

S58 is a solid shaft strong 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.

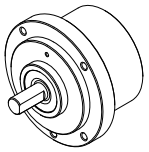
S58-A



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.

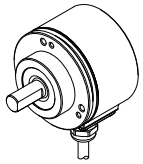
S58-B



1.3 Application：

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

S58-C



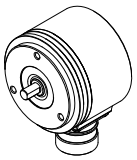
1.4 Connection：

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

1.5 Protection：

IP65 (Max)

S58-D



1.6 Weight：

About 420g

2. Model Selection Guide

Model composition(select parameters)

S58-	A	10	T	6	E	2048	H	D	-	000
Product model series	Mounting flange: ❶. 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+$\overline{A}$+B+$\overline{B}$ 6=A+$\overline{A}$+B+$\overline{B}$+Z+$\overline{Z}$	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) E=HTL (DC8-30V) R=Output TTL (RS422 compatible) (DC8-30V) A=HTL (DC8-30V) (Push-Pull compatible) (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； 2880； 3000； 3600； 4000； 4096； 4800； 5000； 5760； 6000； 8000； 8192； 10000； 11520； 12000； 16000； 16384； 20000； 23040； 24000； 32000； 32768； 40000； 46080； 48000； 65536	Supply voltage: Blank=DC5V H=DC8-30V	Special requirement: Blank=❷ D=IP65		Management No.

Mounting flange：

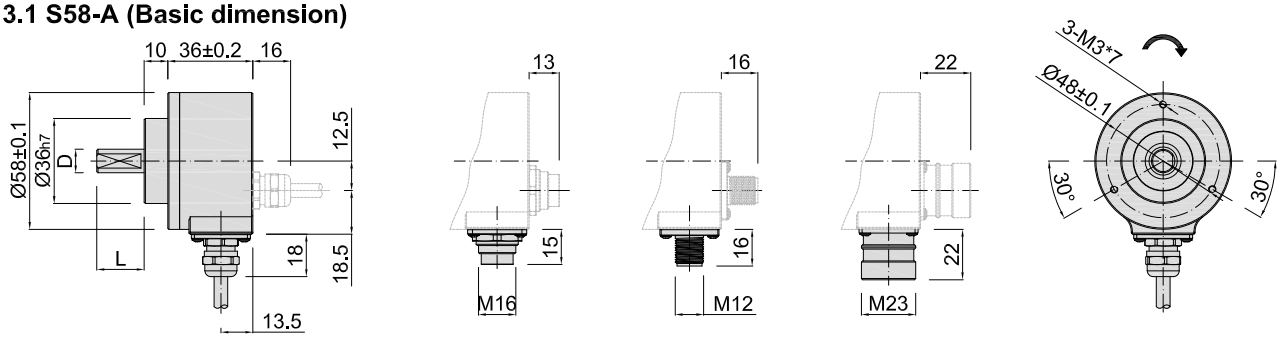
❶. A=Clamping flange， collar Ø36mm， 3-M3 PCDØ48mm；
B=Clamping flange， collar Ø56mm， 4-M4 PCDØ66mm；
C=Synchro flange， collar Ø36mm， 3-M3 & 3-M4 PCDØ48mm；
D=Synchro flange， collar Ø50mm， 3-M4 PCD42mm.

Special requirement：

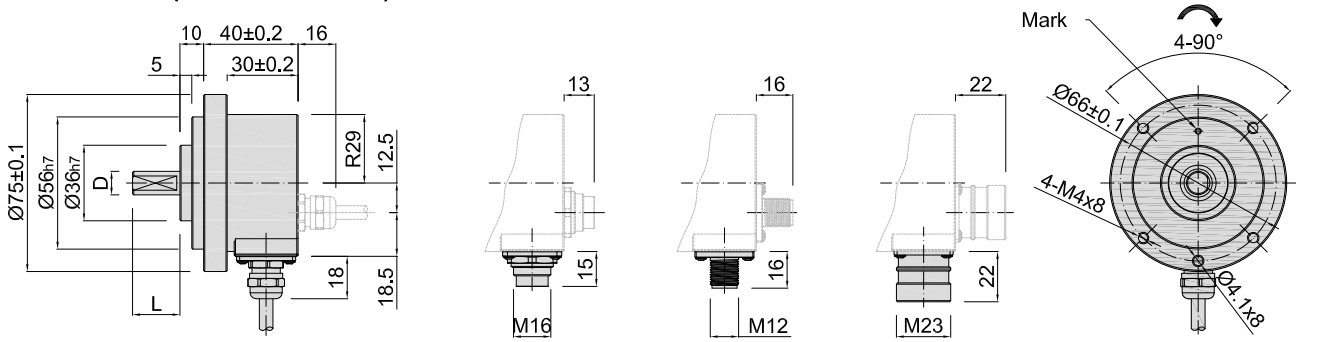
❷. IP=50； cable length 1m， if need to change the length C+number， max 100m(indicated by C100).

3. Basic Dimension

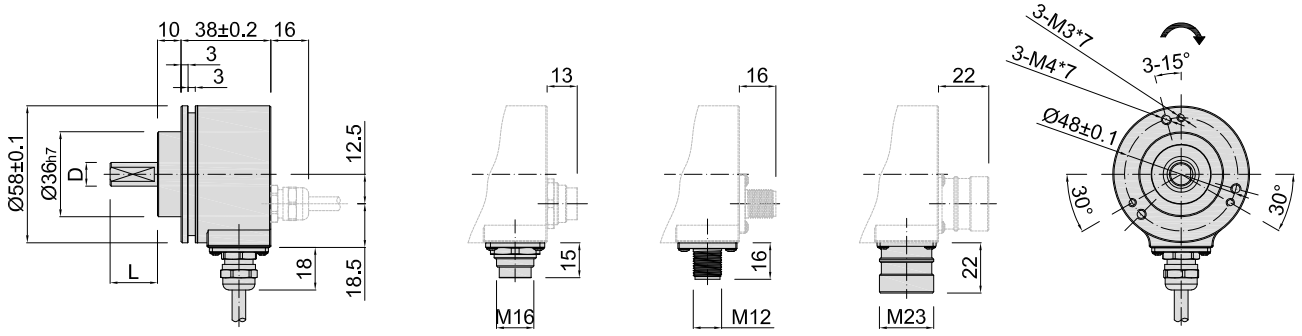
3.1 S58-A (Basic dimension)



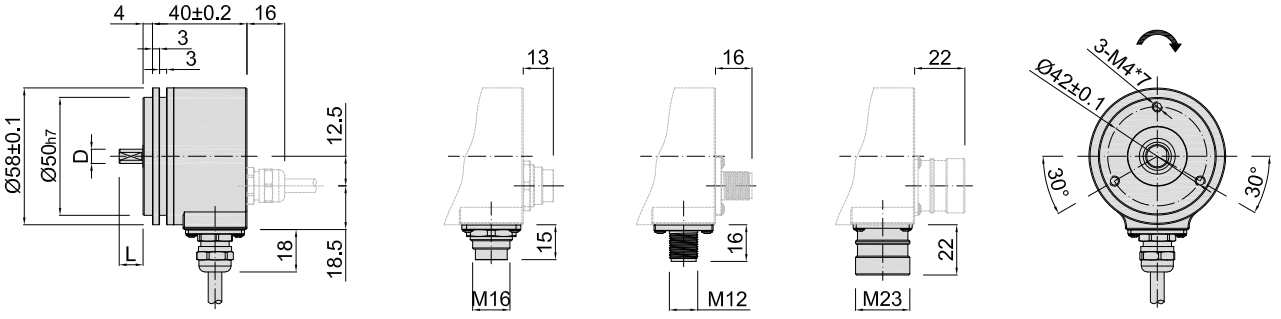
3.2 S58-B (Basic dimension)



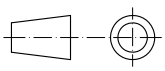
3.3 S58-C (Basic dimension)



3.4 S58-D (Basic dimension)



Unit：mm

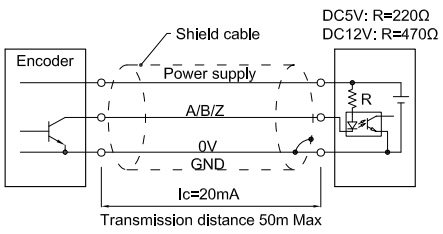
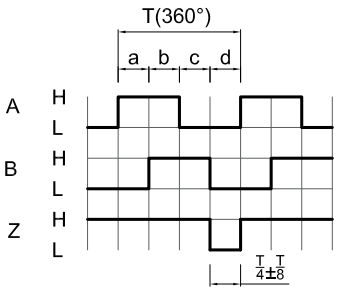
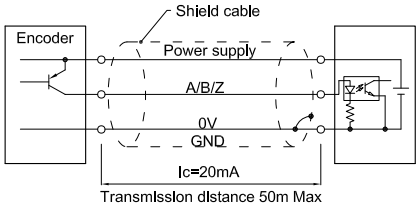
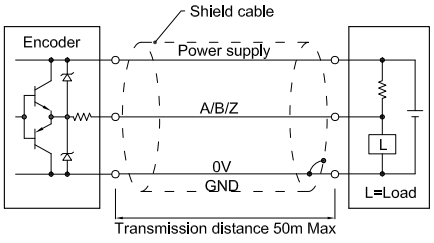
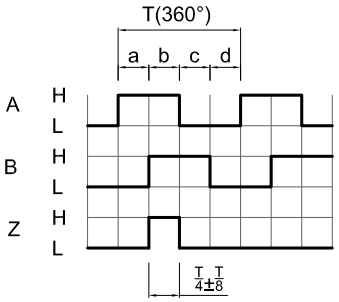
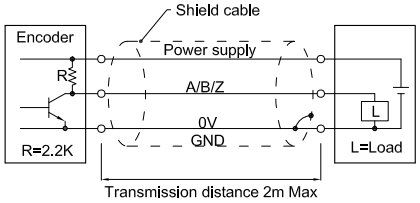
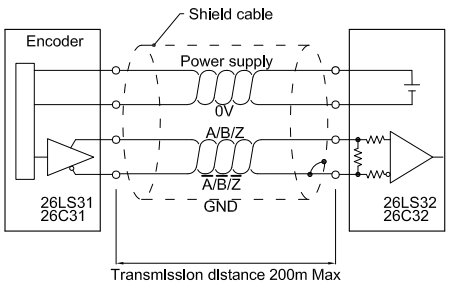
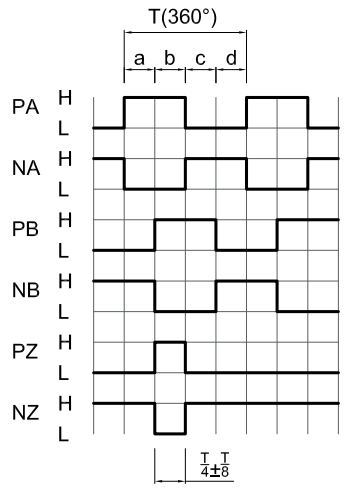


= Direction of shaft rotation for signal output

D(Shaft)	$Ø6_{h7}(^{0}_{-0.015})$	$Ø8_{h7}(^{0}_{-0.015})$	$Ø10_{h7}(^{0}_{-0.018})$
L	10	20	20

4. Output Method

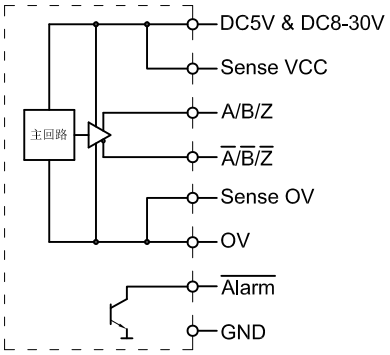
4.1 Incremental signal

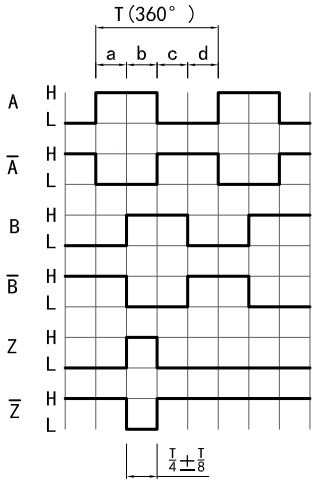
Electrical interface	Output circuit	Output wave form
OC NPN open collector circuit		 a.b.c.d=T/4±8 Phase A is ahead of B by T/4±8, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction Z signal is low level active
OC PNP open collector circuit		
Push-pull		 a.b.c.d=T/4±8 Phase A is ahead of B by T/4±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±8 Phase A is ahead of B by T/4±8, viewing from shaft end, direction is clockwise rotation. (See dimensional drawings) CW direction

4.2 Incremental signal (continued)

Electrical interface	Output circuit

Push-Pull (DC8-30V) (with Alarm/Sense)





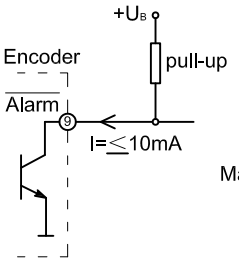
a. b. c. d=$\frac{T}{4}\pm\frac{T}{8}$

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)

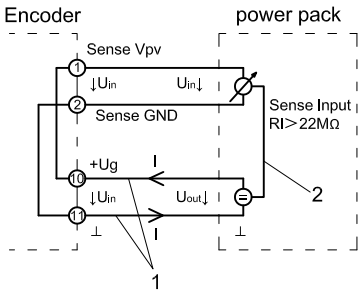
CW direction →

TTL(DC5V) (with Alarm/Sense)

Output-Alarm



Output	NPN-Open collctor
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)
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



The sense wires enable measuring of the actual encoder supply voltage(compensates for voltage drops due to supply current and cable resistance).

Due to the voltage drop in the cables and the voltage supply, the encoder input voltage Uin is less than the power pack output voltage U_{out}.
The present input voltage Uin is now output to the Sense Vcc and Sense GND cables and returns as data to the power pack.
The input resisance R on the power pack should amount to at least 22MΩ,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 Uout automatically.

1. Voltage drop due to long cable lengths
2. Automatic readjustment of the output voltage (only for power packs with sense input)

5. Electrical Parameter

Parameter / Output type / Item			OC	Voltage	Push-pull	TTL	TTL (Less wiring type)	Output 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)						
Delay motion time ❷			—				510±220ms	—	
GND			Not connect to encoder						

❶ Short-circuit to another channel or GND(PNP is effective for Up) , permitted for max.30s.
❷ Phase A.B.Z are back of phase U.V.W when power on.

6. Mechanical Parameter

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 3×10^{-6} kg·m²
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/s²
Operating speed	$6000min^{-1}$ ❶
Bearing lifetime	$3.6x10^{9}$ ❷
Housing material	Aluminum alloy
Weight	Approx.420g

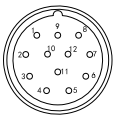
❶. Allow for self-heating of approx.3.0K per 1000rpm regarding the permissible operating temperature.
❷. On maximum operating speed and temperature.

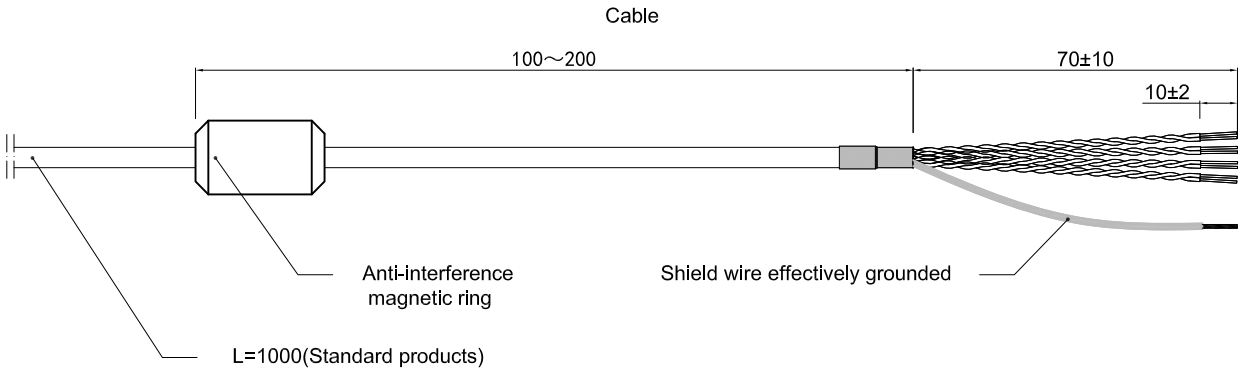
7. Environmental Parameters

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

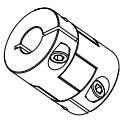
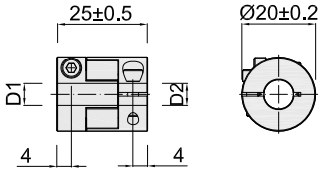
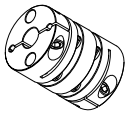
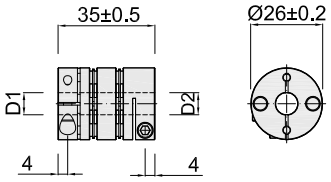
							
Socket pin definition (M12 8-pin male socket)	Socket pin definition (M16 8-pin male socket)	Socket pin definition (M16 14-pin male socket)	Socket pin definition (M23 12-pin male socket)	Wire colors (cable connection)	Signal	Explanation	Twisted wire
1	1	A	1	Red	Up	Power positive	
2	2	C	2	Black	Un	Power negative	
3	3	L	3	White	A	Signal wire	
4	4	U	4	White/BK	$\overline{A}$	Signal wire	
5	5	J	5	Green	B	Signal wire	
6	6	T	6	Green/BK	$\overline{B}$	Signal wire	
7	7	G	7	Yellow	Z	Signal wire	
8	8	S	8	Yellow/BK	$\overline{Z}$	Signal wire	
-	-	E	9	Blue	$\overline{Alarm}$	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						



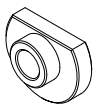
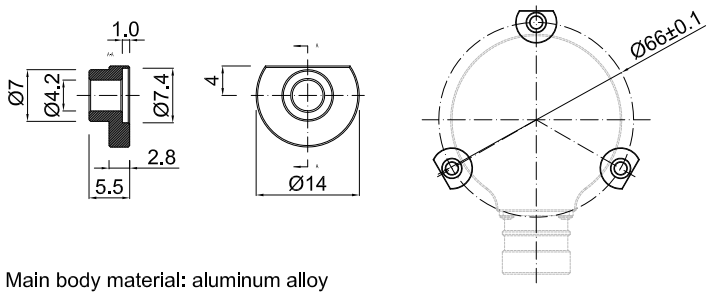
Unit: mm

9. Recommended Accessories

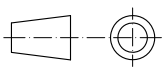
9.1 Coupler

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

9.2 Mounting cardboard

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

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.