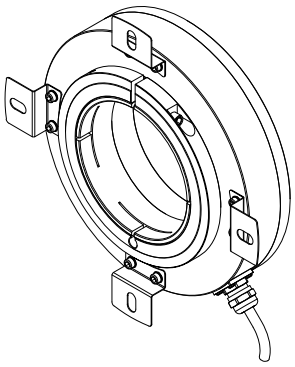
1. K158 Incremental Optical Encoder (Large diameter through shaft)

1.1 Introduction:

K158 is a large diameter through shaft encoder which can output incremental signals, various electrical interfaces and resolutions available, compact structure, sturdy and durable, widely used in industrial automation fields such as motors, elevators and CNC.

K158-T



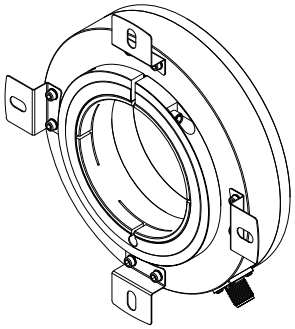
1.2 Feature:

- Encoder external diameter Ø158mm、thickness 43mm、diameter of shaft up to Ø82mm;
- Adopt shaft ring locking structure, fixed with flexible spring plate;
- Adopt non-contact photoelectric principle;
- Reverse polarity protection;
- Short circuit protection;
- Multiple electrical interfaces available;
- Resolution per turn up to 160000PPR.

1.3 Application:

Elevator, motor, packaging machinery, CNC and other automation control fields.

K158-C



1.4 Connection:

- Radial cable (standard length 1M)
- Radial socket (M12 8pin male socket)

1.5 Protection:

IP50

1.6 Weight:

About 1800g

2. Model Selection Guide

2.1 Model composition(select parameters)

K158-	T	6	C	4096	BQ82			-	000
Product model series	Connection interface: T=Radial cable C=Radial socket (M12 8pin male 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 (DC5V,26LS31) E=HTL (DC8-30V) L=TTL (DC5V, 26C31)	Resolution PPR: 1024； 1600； 2048； 3200； 3600； 4096； 5000； 6400； 7200； 8192； 10000； 14400； 16384； 20000； 40000； 80000； 160000	Diameter of shaft: (through hole) clamping ring at prior: BQ70=Ø70mm BQ73=Ø73mm BQ75=Ø75mm BQ78=Ø78mm BQ80=Ø80mm BQ82=Ø82mm		Supply voltage: Blank=DC5V H=DC8-30V	Special requirement: Blank=❸	Management No.

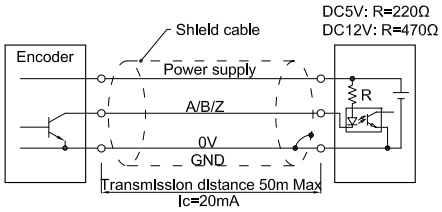
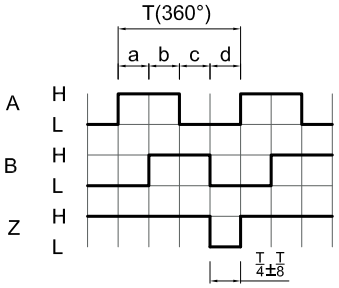
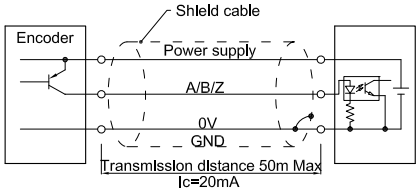
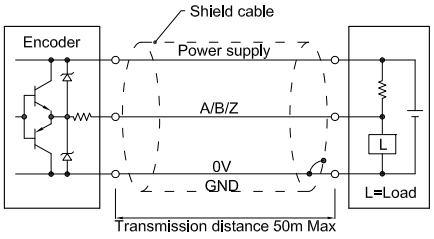
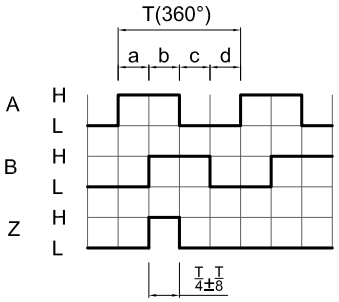
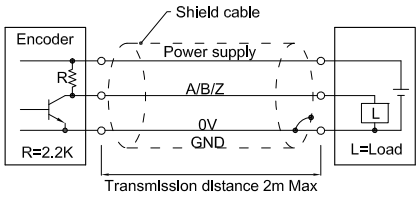
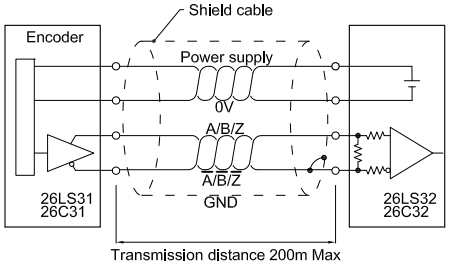
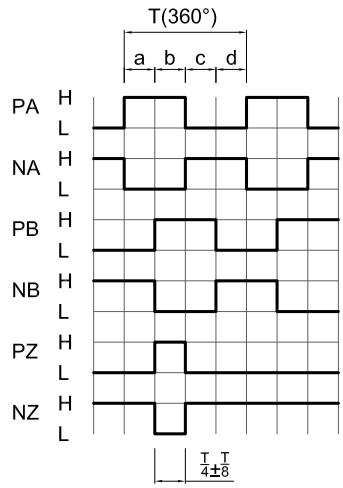
2. 2 Note

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 Method

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			DC5V±5%；DC8V-30V±5%			DC5V±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 permitted for max.30s.

5. Mechanical Specifications

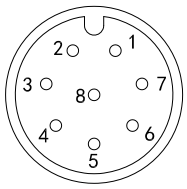
Diameter of shaft	Ø70mm；Ø73mm；Ø75mm；Ø78mm；Ø80mm；Ø82mm；material stainless steel
Starting torque	Less than 400×10^{-3}N·m
Inertia moment	Less than 350×10^{-6} kg·m²
Shaft load	Radial 90N; Axial 60N
Slew speed	≤3000 rpm
Bearing Life	$1.5X10^{9}$ revs at rated load(100000hrs at 2500RPM)
Shell	Die cast aluminum
Weight	about 1800g

6. Environmental Parameters

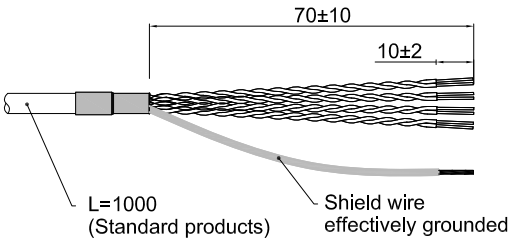
Environmental temperature	Operating:—20～+85°C(repeatable winding cable: -10°C); Storage:—25～+90°C
Environmental humidity	Operating and storage：35～85%RH(noncondensing)
Vibration(Endurance)	Amplitude 0.75mm,5~55Hz,2h for X,Y,Z direction individually
Shock(Endurance)	1960m/s² 11ms three times for X,Y,Z direction individually
Protection	IP50

7. Wiring Table

M12 8pin male socket
pin distribution diagram



Cable connection



7.1 OC/Voltage/Push-pull (Wiring table for socket connection and cable connection)

	Supply voltage		Incremental signal					
Socket pin definition	1	2	3	4	5	6	7	8
Wire color	Red	Black	White	/	Green	/	Yellow	/
Function	Up	Un	A	/	B	/	Z	/

7.2 TTL/HTL (Wiring table for socket connection and cable connection)

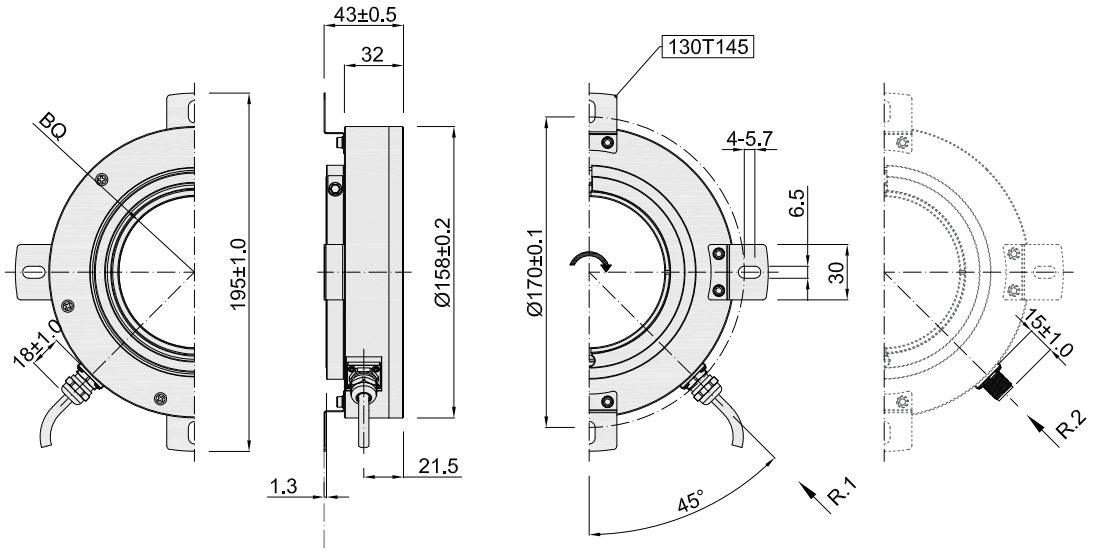
	Supply voltage		Incremental signal					
Socket pin definition	1	2	3	4	5	6	7	8
Wire color	Red	Black	White	White/BK	Green	Green/BK	Yellow	Yellow/BK
Function	Up	Un	A+	A-	B+	B-	Z+	Z-
Twisted-paired cable								

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

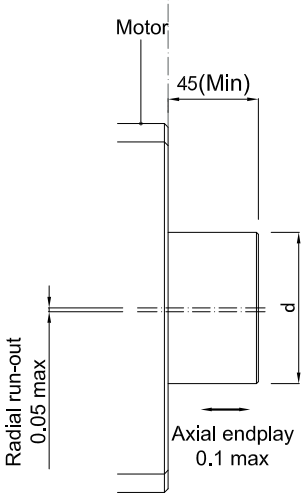
8. Basic Dimensions

8.1 Dimensions

BQ(Shaft)
$Ø70^{G7}_{(+0.010)}^{(+0.040)}$
$Ø73^{G7}_{(+0.010)}^{(+0.040)}$
$Ø75^{G7}_{(+0.010)}^{(+0.040)}$
$Ø78^{G7}_{(+0.010)}^{(+0.040)}$
$Ø80^{G7}_{(+0.010)}^{(+0.040)}$
$Ø82^{G7}_{(+0.012)}^{(+0.047)}$



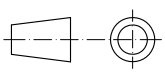
8.2 Mounting shaft requirements



d
$Ø70_{g7}^{(-0.010)}_{(-0.040)}$
$Ø73_{g7}^{(-0.010)}_{(-0.040)}$
$Ø75_{g7}^{(-0.010)}_{(-0.040)}$
$Ø78_{g7}^{(-0.010)}_{(-0.040)}$
$Ø80_{g7}^{(-0.010)}_{(-0.040)}$
$Ø82_{g7}^{(-0.012)}_{(-0.047)}$

Mounting screws
Inner hexagon bolt +flat washer Specification: M6*8 Material: stainless steel Quantity: 4

Unit: mm



= Shaft rotation direction of the incremental signal output

130T145 = Install spring plate model (standard)

R.1 = Radial cable(standard length 1M)

R.2 = Radial socket(M12x1 8pin male socket)

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. Recommended Accessories

Plug and cable	Brief description	No.	Order No.
	C2C=Connection type head A: M12, 8-pin female straight connector; Connection type head B: M12, 8-pin male straight connector; Cable length: 2M 8-core with shield,halogen-free PUR	K77C2C	44400001
	C5C=Connection type head A: M12, 8-pin female straight connector; Connection type head B: M12, 8-pin male straight connector; Cable length: 5M 8-core with shield,halogen-free PUR	K77C5C	44400002
	C1=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 1M 8-core with shield,halogen-free PUR	K77C1	44400003
	C2=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 2M 8-core with shield,halogen-free PUR	K77C2	44400004
	C5=Connection type head A: M12, 8-pin female straight connector; Connection type head B: Bare wire end; Cable length: 5M 8-core with shield,halogen-free PUR	K77C5	44400005