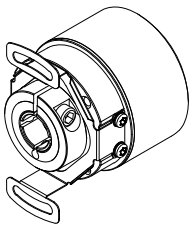
1. KH39 Ultra-high Resolution Incremental Optical Encoder (Blind shaft)

1.1 Introduction:

This product is an incremental high-resolution encoder, miniaturized blind hole shaft, sturdy, fixed with clamping ring and a flexible spring plate, protection grade IP65, east to install, widely used in industrial automation fields with limited space.

KH39-S

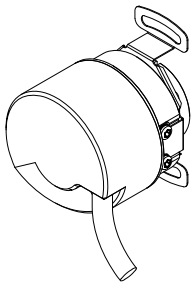


1.2 Feature:

- Encoder diameter Ø39mm,Thickness 41mm, Hollow shaft up to Ø10mm;
- Adopt ring locking structure, flexible spring plate installation(Ø46mm);
- Adopt non-contact photoelectric principle;
- With short circuit protection;
- Various electrical interfaces available;
- Resolution per turn up to 20Bits.

1.3 Application:

Servo motor, robot, CNC and other automation control fields.



1.4 Connection:

- Cable connection (standard length 1000mm)

1.5 Protection:

IP50 & IP65

1.6 Weight:

About 130g

2. Model Selection Guide

2.1 Model composition(select parameters)

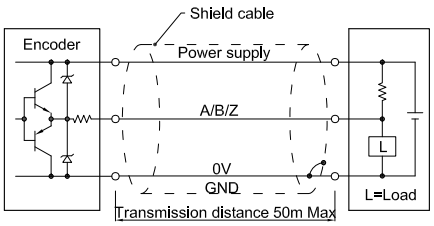
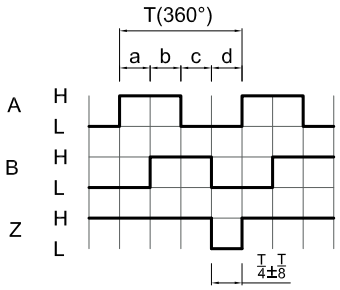
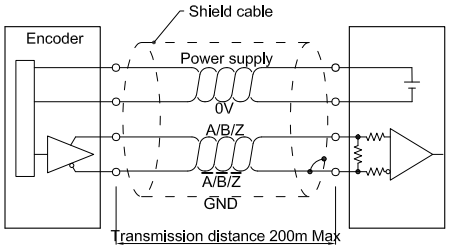
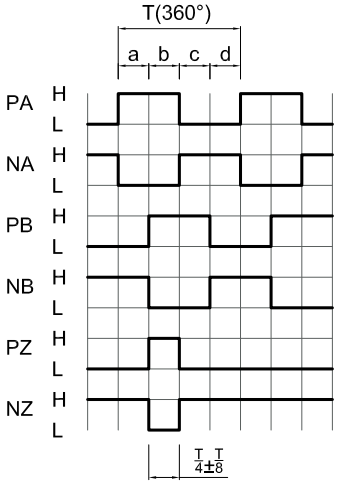
KH39-	S	6	C	10000	B10		D	-	000
Product model series	Connection interface: S=Cable connection	Output phase: 1=A 2=A+B 3=A+B+Z 4=A+$\overline{A}$+B+$\overline{B}$ 6=A+B+Z +$\overline{A}$+$\overline{B}$+$\overline{Z}$	Electrical interface: F=Push-pull C=TTL (DC5V,26LS31) L=TTL (DC5V,26C31) E=HTL (DC8-30V)	Resolution PPR: 10000. . . 20Bits (Optional)	Diameter of shaft: (blind hole) B6=Ø6mm B8=Ø8mm B10=Ø10mm		Special requirement: Blank=❶ D=IP65		Management No.

Supply voltage:
Blank=DC5V
H=DC8-30V

Special requirement：

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

3. Output Method

Electrical interface	Output circuit	Output wave form
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 low level active
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			Push-pull	TTL	HTL
Supply voltage			DC+5V±5%；DC8-30V±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	≤±20mA	≤±50mA
		Output	≤10mA		
	Output voltage	"H"	≥[（Supply voltage）-2.5V]	≥2.5V	≥Vcc-3 VDC
		"L"	≤0.4V(30mA)	≤0.5V	≤ 1V VDC
	Load voltage		—		
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%		
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 cable or GND permitted for max 30s.

5. Mechanical Specifications

Diameter of shaft	Ø6mm; Ø8mm; Ø10mm (optional)
Starting torque	Less than 9.8×10^{-3}N·m
Inertia moment	Less than 6.5×10^{-6} kg·m²
Shaft load	Radial 30N; Axial 20N
Slew speed	≤6000 rpm
Bearing Life	$1.5X10^{9}$ revs at rated load(100000hrs at 2500RPM)
Shell	Aluminium alloy
Weight	about 130g

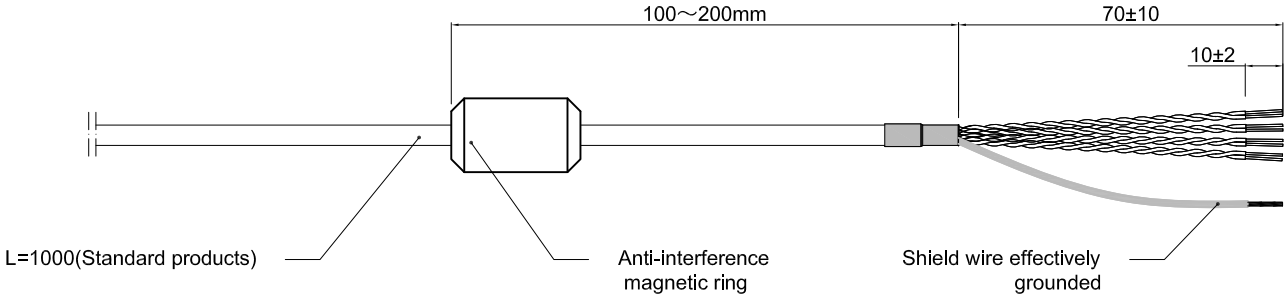
6. Environmental Parameters

Environmental temperature	Operating:—40～+95°C(repeatable winding cable: -10°C); Storage:—40～+95°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)	980m/s² 11ms three times for X,Y,Z direction individually
Protection	IP50 & IP65

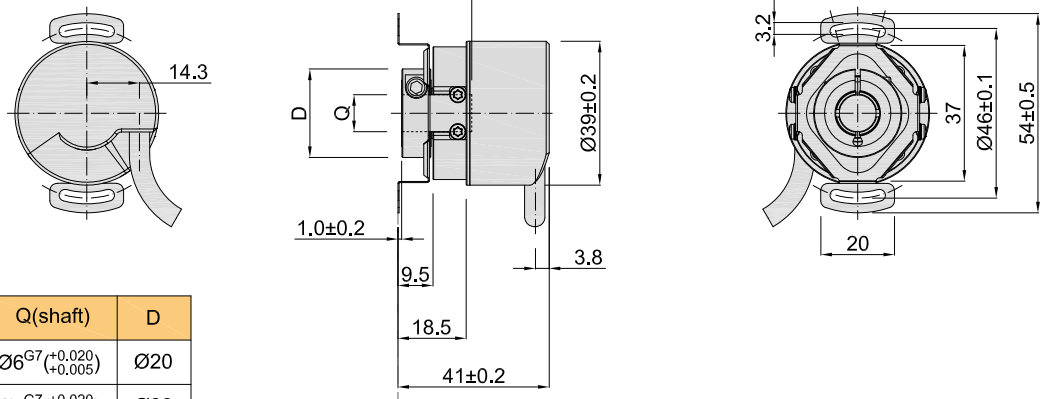
7. Wiring Table

Wire colors (cable connection)	Signal	Explanation	Twisted wire for differential
Red	Up	Power positive	
Black	Un	Power negative	
White	A	Signal wire	
White/BK	$\overline{A}$	Signal wire	
Green	B	Signal wire	
Green/BK	$\overline{B}$	Signal wire	
Yellow	Z	Signal wire	
Yellow/BK	$\overline{Z}$	Signal wire	
GND	Not connected to the encoder		

Radial cable wire diagram

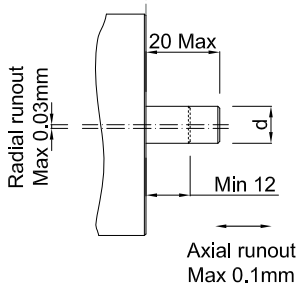


8. Basic Dimensions



Q(shaft)	D
$Ø6^{G7}(^{+0.020}_{+0.005})$	Ø20
$Ø8^{G7}(^{+0.020}_{+0.005})$	Ø22
$Ø10^{G7}(^{+0.020}_{+0.005})$	Ø24

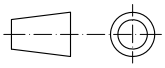
9. Specification for Mounting Shaft



d
$Ø6_{g6}(^{-0.005}_{-0.014})$
$Ø8_{g6}(^{-0.005}_{-0.014})$
$Ø10_{g6}(^{-0.005}_{-0.014})$

Mounting screws
Inner hexagon bolt +flat washer Specification: M3*6 Material: stainless steel Quantity: 2

Unit: mm



= Shaft rotation direction of the incremental signal output

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. 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.

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