

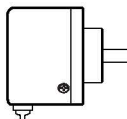
- Thin design with an outside diameter of Ø38 mm / depth of 37 mm
- Easy installation at narrow space
- Small diameter lineup with resolution up to 5000 P/R
- Low price contributes to cost reduction of the system
- IP54 protective structure
- Wide range of power source : 5~24VDC, 5VDC $\pm 5\%$
- Various output types



Order code Shaft version

Series	Incremental	Outer Dia	Shaft Dia 6mm	Pulse Per Revolution (PPR)	Output	Power Supply
B	I	38	S <small>Standard shaft dia 6mm</small>	30, 50, 60, 100, 200, 250, 360, 400, 500, 600, 720, 1000, 1024, 1800, 2000, 2048, 2500, 3600, 4096, 5000 <small>(other PPR are available on request)</small>	P Push Pull N Open Collector NPN L Line Driver	U 5~24VDC 5 5 VDC

A simple way of sensing rotary movements



High rotational speed

Temperature
-20° + 85°Shock/vibration
resistantMagnetic field
proofShort-circuit
proof

Optical sensor

Electrical Characteristics

Output Circuit	Push Pull	NPN Open Collector	Line Driver
Supply Voltage	5-30 VDC		5 V $\pm 5\%$
Power Consumption (no load)	$\leq 125\text{mA}$	$\leq 80\text{mA}$	$\leq 100\text{mA}$
Permissible Load / Channel	$\pm 80\text{mA}$	$\pm 50\text{mA}$	$\pm 80\text{mA}$
Pulse Frequency	Max. 250 kHz		
Signal Level High	Min. VCC 1.5V	Min. $U_b \times 70\%^*$	Min. 3.4V
Signal Level Low	Max. 0.8V	Max. 0.4V*	Max. 0.4V
Rising edge Time	Max. 1 μs	Max. 1 μs^{**}	<200ns
Falling edge Time	Max. 1 μs	Max. 1 μs^{**}	<200ns
Short Circuit Proof outputs	Yes		
Reverse Polarity Protection of the Power Supply	Yes		No
Over Current Protection	Yes		
	* NPN Open collector depends on pull-up resistor **NPN Open collector depends on pull-up resistor and cable length		

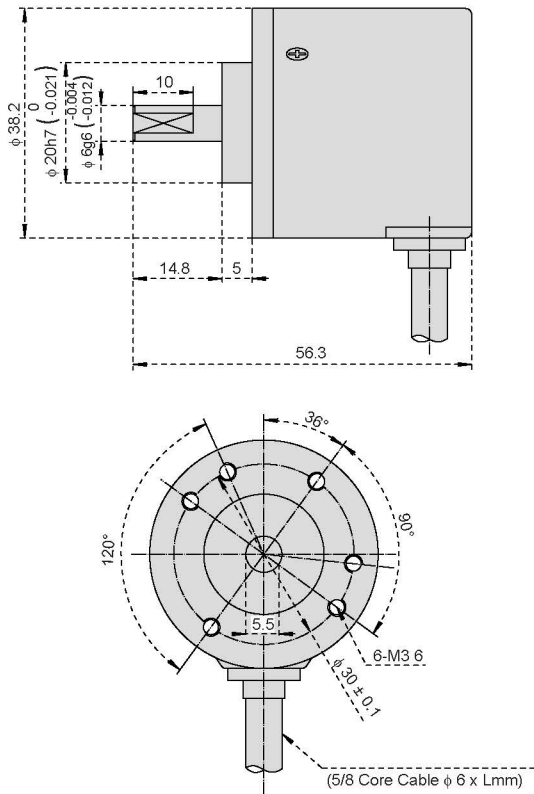
Mechanical & Characteristics

Max. Speed	6000RPM
Max. Speed Continuous	Max. Response Frequency / Resolution
Rotor moment of Inertia	approx. $1.8 \times 10^{-6} \text{ kgm}^2$
Shock Resistance	50G/11ms
Vibration Resistance	10G , 10-200Hz
Starting Torque	<0.05 Nm
Shaft Material	SS
Body Material	Aluminum alloy 2A12
Outer Case Material	Iron
Disk Material	Glass
Cable	2 Mtr. Black shield cable, side entry
Degree of Protection	IP 54
Weight	150g
Position Deflection of Allowable Shaft	Radial : Less than 0.05mm, Axial : Less than 0.2mm
Allowable Shaft Load	Radial : 2.5kg Max. Axial : 1.3kg Max.
Operating Temperature Range	-30°C ~ +85°C (No freezing) at 30% ~ 85% RH

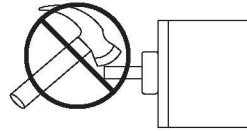
Connection Table

Wire Colour	Black	Red	Green	White	Yellow	Brown	Grey	Orange	Shield
Push Pull / NPN Open Collector	0 V	+V	A	B	Z				Ground
Line Driver	0 V	+V	A	B	Z	\bar{A}	\bar{B}	\bar{Z}	Ground

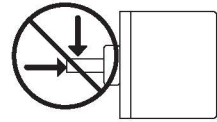
■ Dimension Drawing



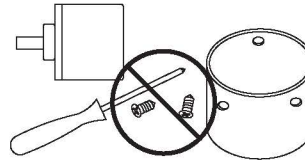
Caution: Avoid damage to your **BTH™**-Encoder. The following actions may cause damage, and void product warranty.



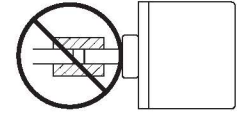
Do not shock or strike



Do not subject shaft to excessive axial or radial shaft stresses.



Do not disassemble

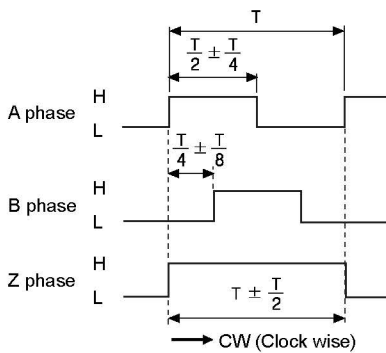


Do not use a rigid coupling.

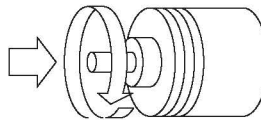
Incremental Encoder is the direct use of the principle of photoelectric conversion output. Incremental output phases are A phase, B phase which have phase difference at 90° and Z phase one pulse per revolution for benchmarks point positioning. The advantage is that the principle of simple structure, the average life span of the machine can be in the tens of thousands of hours, anti-interference ability, high reliability, suitable for long distance transmission. Shaft Encoders are useful because it can be mounted easily with the flexible coupling to the shaft.

■ **Output waveform**

- Push Pull output / NPN open collector output

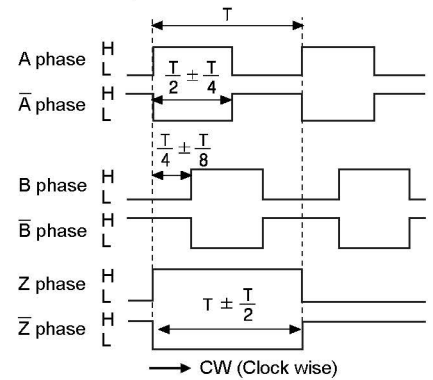


✱ Inverse type of Z phase is optional.



CW → Rotating Toward Clockwise
Viewed from an Arrow

- Line driver output



✱ CW : In a view of shaft

Industries

- Automotive Assembly
- Chemical, Petrochemical
- Drive Technology
- Electronic Production
- Food, Beverage, Semi-luxury Goods
- Graphical Machinery
- Handling and Robotics
- Injection Molding, Die Casting
- Machine Tools
- Medical Industry
- Pharmaceutical, Bio Technology
- Semiconductor Industry
- Textile Machinery
- Transportation
- Water, Energy, Mining
- Warehouse and Logistics
- Wood Machinery

Applications

- Drive and conveyor technology
- Lift construction
- Processing machines
- Handling Control
- Robotics
- Metal sheet processing
- Profile milling machines
- Machinery for plastics and semiconductor industry
- Wood processing machines
- Spindle positioning at profile milling machines
- Graphical machinery (printing machines)
- Environment plant engineering and textile machinery
- Conveying systems in day-mining
- Ship construction
- Gear test stands
- Packaging machines
- Blister and carton box packaging
- Labelling machines
- Foil-winding machines
- High racks
- Chipboard production plants
- Warehouse and logistics
- Metal sheet processing machines