



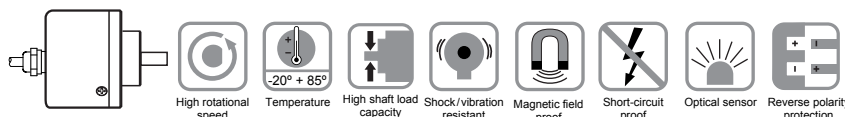
- Thin design with an external diameter of Ø52 mm / depth of 47.5 mm
- Easy installation, excellent for middle duty load
- Small diameter lineup with resolution up to 5000 P/R
- Low price contributes to cost reduction of system
- IP54 protective structure
- Wide range of power sources : 5~24VDC, 5VDC ±5%
- Various output types



### Order Code Shaft Version

| Series   | Incremental | Outer Dia | Shaft Dia 8mm                         | Pulse Per Revolution (PPR)  | Output  | Power Supply                      |
|----------|-------------|-----------|---------------------------------------|---|---|-----------------------------------|
| <b>B</b> | <b>I</b>    | <b>52</b> | <b>S</b><br>Standard shaft<br>dia 8mm | <b>30, 50, 60, 100, 200, 250, 360,<br/>400, 500, 600, 720, 1000, 1024,<br/>1800, 2000, 2048, 2500, 3600,<br/>4096, 5000</b><br>(other PPR are available on request) | <b>P</b> Push Pull<br><b>N</b> Open Collector NPN<br><b>L</b> Line Driver | <b>U</b> 5~24VDC<br><b>5</b> 5VDC |

A simple way of sensing rotary movements



### Electrical Characteristics

| Output Circuit                                  | Push Pull   | NPN Open Collector | Line Driver |
|---|---|--------------------|-------------|
| Supply Voltage                                  | 5-30 VDC  |                    | 5 V ±5%     |
| Power Consumption (no load)                     | ≤125mA  | ≤80mA              | ≤100mA      |
| Permissible Load / Channel                      | ±80mA   | ±50mA              | ±80mA       |
| Pulse Frequency                                 | Max. 250 kHz  |                    |             |
| Signal Level High                               | Min. VCC 1.5V   | Min. Ub*70%*       | Min. 3.4V   |
| Signal Level Low                                | Max. 0.8V   | Max. 0.4V*         | Max. 0.4V   |
| Rising Edge Time                                | Max. 1μs  | Max. 1μs**         | <200ns      |
| Falling Edge Time                               | Max. 1μs  | Max. 1μs**         | <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<br>**NPN Open collector depends on pull-up resistor and cable length |                    |             |

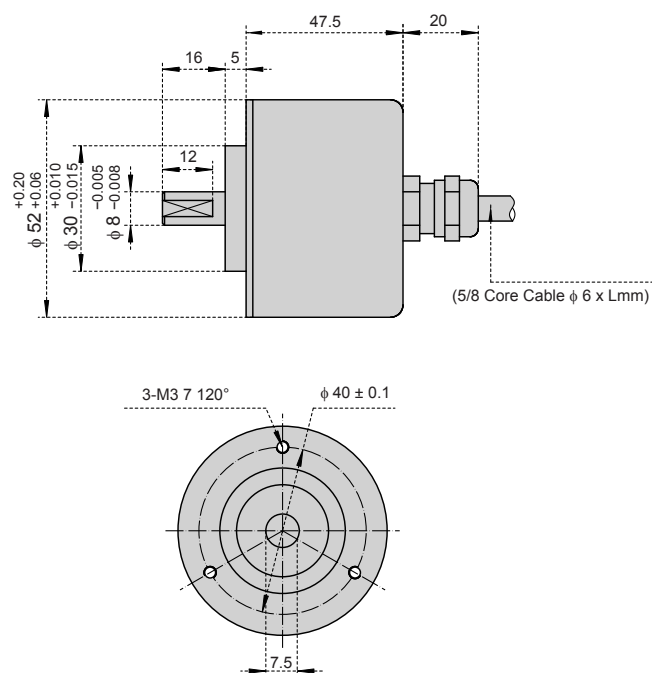
### Mechanical Characteristics

|  |  |
|--|--|
| Max. Speed                             | 6000RPM  |
| Max. Speed Continuous                  | Max. Response Frequency / Resolution               |
| Rotor Moment of Inertia                | approx. $1.8 \times 10^{-6}$ kgm <sup>2</sup>      |
| Shock Resistance                       | 75G/11ms   |
| Vibration Resistance                   | 10G, 10-200Hz                                      |
| Starting Torque                        | Max. 80gf .cm (6,860 μN . m)                       |
| 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                                 | 300g   |
| 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        |

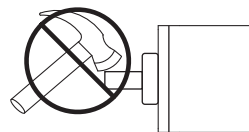
### Connection Table

| 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 |

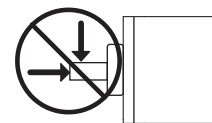
## Dimension Drawing



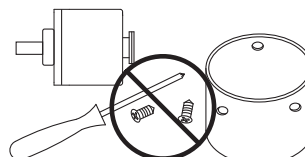
**Caution:** Avoid damage to your **BTH** Encoder. The following actions may cause damage, and void product warranty.



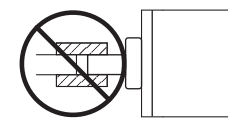
Do not shock or strike



Do not subject shaft to excessive axial or radial shaft stresses



Do not disassemble

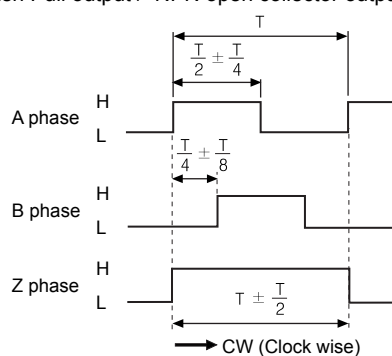


Do not use a rigid coupling

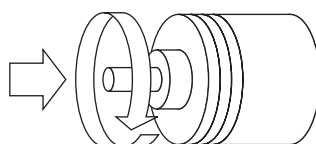
Incremental Encoder is the direct use of the principle of photoelectric conversion output. Incremental output phases are A phase, B phase which have phase difference at 90° and Z phase one pulse per revolution for benchmarking point positioning. The advantage is that the principle of simple structure, 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 they can be mounted easily with flexible coupling to the shaft.

## Output Waveform

### ● Push Pull output / NPN open collector output

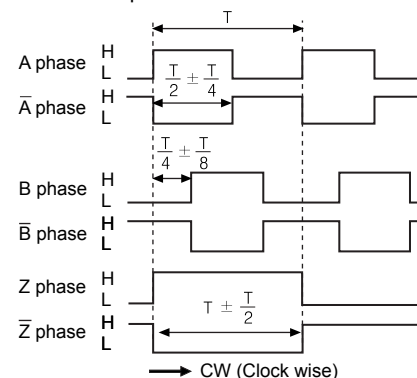


※ Inverse type of Z phase is optional.



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