TBRU Series Closed-Loop Motorized Rotation Stages, 360°, Circular Encoder

Model TBRU Series · waveqvanta.com/products/tbru-series-closed-loop-motorized-rotation-stages

Closed-loop worm-gear rotation stages with a built-in circular encoder for demanding angular adjustment.



TBRU stages are closed-loop motorized rotation stages for applications with strict angle-adjustment requirements. A built-in circular grating encoder provides position feedback, while a tin bronze worm gear, a high-frequency-quenched steel worm and a precision crossed-roller ring carry the motion. An adjustment mechanism on the worm gear compensates mechanical play for long-term accuracy, and the stages can also be mounted vertically or inverted.

Key features

- Built-in circular grating encoder for closed-loop angle control
- 180:1 worm gear drive with tin bronze gear and high-frequency-quenched alloy steel worm
- Worm gear adjustment mechanism to compensate mechanical errors and hold accuracy over time
- Precision crossed-roller ring; mountable horizontally, vertically or inverted
- Repeatability ≤ ±0.003° and reverse clearance ≤ 0.003°
- Two-phase 57 stepping motor; built-in origin sensor, external limit sensors optional

Specifications

Rotation Range	360°
Table Diameter	Φ102 mm (TBRU100); Φ196 mm (TBRU200)
Drive	Worm gear and worm, 180:1
Worm Gear / Worm	Wear-resistant tin bronze gear; high-frequency-quenched steel worm
Bearing	Crossed-roller ring
Body	Black anodized aluminum alloy
Position Feedback	Built-in circular grating encoder
Closed-Loop Resolution	0.0000762712° per pulse
Open-Loop Resolution (8 Microsteps)	0.00125°
Max Speed	20°/s
Repeatability	≤ ±0.003°
Reverse Clearance	≤ 0.003°
Backlash (µm, as Listed)	≤ 12 µm
Static Parallelism	≤ 0.08 mm
Axial Runout	≤ 40 µm
Radial Runout	≤ 30 µm
Motor	Two-phase 57 stepping motor, 1.8° step angle
Motor Current / Torque	2.4 A / 1 N·m
Stepping Driver	Optional
Connector	DB9 (pin)

Connection Cable	High-flex cable, 0.2 m
Limit Sensors	None built in; external sensors optional
Origin Sensor	1 × built-in
Sensor Supply / Consumption	DC 5–24 V ±10%; ≤ 15 mA
Sensor Output	NPN open collector, DC 5–24 V, ≤ 50 mA; ON when sensor is blocked
Max Load	Horizontal 20 / 40 kg; vertical 5 / 10 kg; inverted 5 / 10 kg (TBRU100 / TBRU200)

Model overview

Model	Table Dia. (mm)	Max Load Horizontal (kg)	Max Load Vertical (kg)	Max Load Inverted (kg)
TBRU100	Φ102	20	5	5
TBRU200	Φ196	40	10	10

Typical applications

- Precision angular adjustment
- Optical alignment and angle-dependent measurements
- Rotary positioning in automated inspection
- Sample orientation in research setups