TBR and TBRF Series Motorized Rotation Stages, 360°, Worm Gear Drive

Model TBR / TBRF Series · waveqvanta.com/products/tbr-and-tbrf-series-motorized-rotation-stages

Worm-gear motorized rotation stages for precise, rigid and repeatable 360° positioning in industrial automation.



TBR series rotation stages are built for industrial automation tasks that require precision, rigidity and repeatability. A tin bronze worm gear meshes with a high-frequency-quenched steel worm, and a gap-adjustment mechanism keeps motion smooth with low backlash. The standard TBR models use high gear ratios (110:1 or 180:1) for fine resolution, while the TBRF versions use a 60:1 ratio for faster rotation.

Key features

- Tin bronze worm gear and high-frequency-quenched steel worm for wear resistance and rigidity
- Gap-adjustment mechanism for smooth running and reduced backlash
- Crossed-roller ring bearing (angular contact ball bearing on TBR60L); usable horizontally, vertically or inverted
- Repeatability ≤ ±0.005° on TBR60L, TBR100 and TBR200
- TBRF versions with 60:1 gear ratio rotate at up to 60°/s
- Two-phase stepping motors as standard; servo motors optional
- Built-in origin sensor; DB9 connector with 0.2 m high-flex cable

Specifications

Rotation Range	360°
Table Diameter	Φ59–Φ196 mm (by model)
Drive	Worm gear and worm
Gear Ratio	110:1 (TBR60N); 180:1 (TBR60L, TBR100, TBR200); 60:1 (TBRF60L, TBRF75L)
Worm Gear / Worm	Wear-resistant tin bronze gear; high-frequency-quenched steel worm
Bearing	Crossed-roller ring; angular contact ball bearing on TBR60L
Body	Black anodized aluminum alloy
Static Parallelism	≤ 0.1 mm (TBR60N, TBR100, TBR200); ≤ 0.08 mm (TBR60L, TBRF60L, TBRF75L)
Axial Runout	≤ 40 μm
Backlash (μm, as Listed)	TBR60N ≤26; TBR60L ≤8; TBR100 ≤6; TBR200 ≤12; TBRF75L ≤25
Motor	Two-phase stepping motor, 1.8° (28, 42 or 57 frame); servo motor optional
Motor Current	1.0–2.4 A/phase (by model)
Motor Insulation	Class B; over 100 MΩ; 500 V AC for 1 minute without abnormality
Operating Temperature (Motor)	0 to +50 °C; TBR60L, TBR100: −10 to +50 °C; TBR200: −20 to +50 °C
Motor Temperature Limit	80 °C max
Stepping Driver	Optional
Connector	DB9 (pin)
Connection Cable	High-flex cable, 0.2 m
Limit Sensors	None
Origin Sensor	1 × built-in

Sensor Supply	DC 5–24 V ±10%
Max Load (Horizontal)	5–40 kg (by model)
Max Load (Vertical)	2–10 kg (by model)
Max Load (Inverted)	4–10 kg (by model)

Model overview

Model	Table Dia. (mm)	Gear Ratio	Full / Half Step (°)	Max Speed (°/s)	Repeatability (°)	Reverse Clearance (°)	Radial Runout (μm)	Load H / V / Inv. (kg)	Weight (kg)
TBR60N	Φ60	110:1	≈0.016 / 0.008	32.7	≤±0.01	≤0.05	≤25	5 / 2 / 5	0.8
TBR60L	Φ59	180:1	0.01 / 0.005	20	≤±0.005	≤0.01	≤25	5 / 2 / 5	0.7
TBR100	Φ102	180:1	0.01 / 0.005	20	≤±0.005	≤0.005	≤30	20 / 5 / 5	2
TBR200	Φ196	180:1	0.01 / 0.005	20	≤±0.005	≤0.005	≤45	40 / 10 / 10	7
TBRF60L	Φ60	60:1	0.03 / 0.015	60	≤±0.015	≤0.02	≤25	10 / 4 / 4	1.1
TBRF75L	Φ75	60:1	0.03 / 0.015	60	≤±0.015	≤0.02	≤25	15 / 5 / 5	1.4

Typical applications

- Industrial automation
- Angular positioning of optics and samples
- Rotary indexing in test and inspection equipment
- Angle-resolved and polarization measurements