TBG Series Motorized Goniometers, ±6° to ±10° Range, Worm Gear Drive

Model TBG Series · waveqvanta.com/products/tbg-series-motorized-goniometers

Compact worm-gear goniometers for precise tilt adjustment in space-limited instruments and automation equipment.



TBG series motorized goniometers are compact tilt stages for applications with limited space and high operating rates. A finely ground steel worm drives a wear-resistant tin bronze worm gear, and a two-phase 42 stepping motor provides fine resolution and positioning. TBG45-60 and TBG80-60 run on arc V-shaped ball guides, while TBGX100-80 and TBGX140-80 use arc crossed-roller guides; rotation center heights range from 45 mm to 140 mm.

Key features

- Ground steel worm and wear-resistant tin bronze worm gear for long-term durability
- Arc V-shaped ball guides (TBG45-60, TBG80-60) or arc crossed-roller guides (TBGX100-80, TBGX140-80)
- Four rotation center heights: 45, 80, 100 and 140 mm
- Repeatability ≤ ±0.005° and reverse clearance ≤ 0.01° on all models
- Swing accuracy at the rotation center ≤ 0.01 mm
- Two-phase 42 stepping motor, 1.8°, 1.7 A; stepping driver optional
- Built-in limit (2) and origin (1) sensors; DB9 connector with 0.2 m high-flex cable

Specifications

Rotation Center Height	45 / 80 / 100 / 140 mm (by model)
Stage Size	60 × 60 mm (TBG45-60, TBG80-60); 80 × 80 mm (TBGX100-80, TBGX140-80)
Angle Range	±6° to ±10° (by model)
Drive	Worm gear and worm, 159:1 to 399:1
Worm Gear / Worm	Wear-resistant tin bronze gear; high-frequency-quenched steel worm
Guide	Arc V-shaped ball guide (TBG); arc crossed-roller guide (TBGX)
Body	Black anodized aluminum alloy
Thickness	35 mm (TBG45-60, TBG80-60); 40 mm (TBGX100-80, TBGX140-80)
Weight	0.9 kg (TBG45-60, TBG80-60); 1.2 kg (TBGX100-80, TBGX140-80)
Repeatability	≤ ±0.005°
Reverse Clearance	≤ 0.01°
Swing Accuracy at Rotation Center	≤ 0.01 mm
Motor	Two-phase 42 stepping motor, 1.8° step angle
Motor Current / Torque	1.7 A / 0.456 N·m
Stepping Driver	Optional
Connector	DB9 (pin)
Connection Cable	High-flex cable, 0.2 m
Limit Sensors	2 × built-in
Origin Sensor	1 × built-in
Sensor Supply	DC 5–24 V ±10%

Sensor Output	NPN open collector, DC 5–24 V, ≤ 8 mA; residual ≤ 0.3 V at 2 mA; ON when blocked
Max Load (Horizontal)	4 kg (TBG45-60, TBGX100-80); 5 kg (TBG80-60, TBGX140-80)

Model overview

Model	Center Height (mm)	Stage (mm)	Angle Range	Gear Ratio	Step Res. (°)	8-Microstep Res. (°)	Max Speed (°/s)	Backlash (μm)	Max Load Horiz. (kg)
TBG45-60	45	60 × 60	±10°	159:1	≈0.011	≈0.001	≈22	≤7	4
TBG80-60	80	60 × 60	±8°	247:1	≈0.007	≈0.0009	≈14	≤10	5
TBGX100-80	100	80 × 80	±8°	299:1	≈0.006	≈0.0007	≈12	≤12	4
TBGX140-80	140	80 × 80	±6°	399:1	≈0.0045	≈0.0005	≈9	≤15	5

Typical applications

- Integration in automation equipment and instruments
- Production lines with limited motion space and high repetition rates
- Tilt alignment of optics, samples and detectors
- Angle-dependent optical measurements