



Precise, Affordable Rotary Motion

Accurate research findings require the use of precise, safe, and reliable testing equipment. Neuro Kinetic's high precision solution is a digital rate table system designed to provide high torque and high angular acceleration, in a cost effective, comprehensive package. Based on patent-pending technology, the new system provides researchers both increased confidence in measurements and flexibility in designing and setting up experiments.

Neuro Kinetics has combined all of the necessary elements for precise rotary motion in a single package, making it easier to get started quickly. Coupled with the low maintenance aspects of the system, individuals gain more time to conduct research. With the new Rate Table, researchers secure increased capabilities through affordable, high-performance equipment.

The Rate Table features innovations in the type and usage of slip rings. Neuro Kinetics has pioneered the use of fiber optic rings to provide noiseless collection of an unprecedented amount of digital data. In addition, the motor set is designed to allow for a variety of slip ring combinations ensuring transmission of both digital and analog data.

Key Features and Benefits

- **Digital Motor Set** – supports unmatched motion control: low torque ripple (.1%) and constant feedback loop provides precise position validation resulting in increased confidence in measurements; the motor is tuned electronically, thereby reducing the cost of operation.
- **Electrical and Fiber Optic Slip Rings** – support transmission of both traditional analog and 32 bit digital data. The new fiber optic rings provide expanded data collection capabilities, and the noiseless transmission allows collection of more delicate, physiological signals.
- **Affordable, Complete Rotary Motion Package** – comprehensive package includes motor set, digital drive, PLC with preprogrammed safety limits, slip rings, and encoder; making it easier to get started. Researchers gain a cost effective solution and more time to conduct experiments.
- **Compact Design** – delivers unprecedented high torque and acceleration (up to 6000 degrees/sec²) in a compact package. The small footprint reduces floor space for conducting experiments and allows greater design flexibility.
- **High Load Bearing Set** – provides smooth and quiet operations at high loads allowing researchers to test a greater range of subjects and design equipment for specialized experiments. Minimal inertial artefacts and external stimulus to subjects, leads to greater confidence in measurements.



The new rotary motor set is the base of NKI's clinical Neuro-Otologic Test Center. Its unmatched motion control features precise movement with minimal inertial artifacts, providing better testing data for patient diagnosis.



Available Motor Series*

| | 11" Diameter | | 14" Diameter | | | 24" Diameter | | |
|-------------------------------|--------------|------|--------------|------|------|--------------|------|------|
| | SMB1 | SMB2 | SMC1 | SMC2 | SMC3 | SMD1 | SMD2 | SMD3 |
| Continuous Torque (ft-lbs) | 35 | 85 | 160 | 260 | 420 | 590 | 880 | 1540 |
| Continuous Speed (deg/second) | 1620 | 1620 | 1080 | 1080 | 1080 | 600 | 600 | 600 |
| Continuous Power (kW) | 1.4 | 3.4 | 4.1 | 6.6 | 10.8 | 8.4 | 12.6 | 22 |
| Continuous Current (A) | 7 | 13 | 14.8 | 26 | 35 | 28.6 | 31.2 | 64 |
| Peak Torque (ft-lbs) | 75 | 185 | 340 | 510 | 850 | 1320 | 1990 | 3460 |
| Max. Speed (deg/second) | 3600 | 3600 | 2100 | 2100 | 2100 | 1200 | 900 | 1200 |

*Contact NKI for other available sizes, speeds, and custom options including tabletops and other custom plates.

Motor Performance

| | |
|---|---|
| Rotation freedom | degree unlimited |
| Velocity resolution, deg/second | .001 |
| Velocity % accuracy (over 360 deg) | .001 |
| Position accuracy, arc-second | 18 (2 arc-second accuracy also available) |
| Position resolution, degrees | .00025 |
| Torque ripple | 0.1% |
| Feedback | velocity and position |
| Encoder | single turn absolute, sin/cos 1 Vpp |
| Bearing type | angular contact duplexed ball bearing, ABEC 5F runouts (SMC and SMD Series; contact NKI for SMB Series bearing set) |
| Bearing friction | less than 12 in. lb. |
| Bearing capacity | static load rating: radial 35,000 lb., axial 32,500 lb. dynamic load rating: radial 20,000 lb., axial 21,200 moment load rating: Static 65,000 in. lb., dynamic 58,000 in. lb. |
| Shaft diameter | 7.5" with 6.5" BC mounting, .5" bolt holes |
| Cooling | closed loop liquid cooled (option) |
| Failsafe limits | velocity limits, position limits, acceleration limit, jerk limit, following error limit, encoder failure, short circuit protection, over current, under and over voltage protection, over temperature |

Control Electronics

System electronics are enclosed in a NEMA 12 gasketed, forced ventilation enclosure. The digital drive features velocity, force/torque and position control, encoder emulation, electronic dynamic brake, limits and protection. The frequency response of the drive velocity loop and current loop is up to 400 and 1000 Hz. The command motion profile (selectable velocity, torque or position) is input via analog input or profibus interface. Square profiles can be programmed within the drive via the discrete I/O or profibus.



Two configurable analog outputs are available for monitoring velocity, position, torque, force, etc. (8 bit resolution). Safety limits include velocity, torque, acceleration, position, follow error, encoder error detection, short circuit protection, over and under voltage, and temperature. The system also includes an E-stop.

