DRE-01

Dynamic Rotation Exciter

Applications

- ✓ Calibration of gyro transducers (angular rate/acceleration)
- ✓ MEMS development & qualification
- ✓ Accelerated stress testing
- ✓ Device testing and characterization

Selected Data

- ✓ ±15° rotation angle max.
- ✓ up to 5 300 °/s velocity (peak)
- ✓ up to 2 500 000 °/s² acceleration (peak)
- ✓ 1 Hz…5 kHz frequency range
- ✓ < 3% THD (frequencies > 6 Hz)

Features

- ✓ Compact design for desktop operation
- ✓ Customizable table for DUT mounting
- ✓ Works with any signal generator or vibration controller
- ✓ Internal reference sensors available
- ✓ Very low distortion of movement (electronic zero position controller option)
- ✓ Integrated overload protection and cooling for improved performance

Specification

The DRE-01 Dynamic Rotation Exciter has been developed as a versatile and precise rotation exciter for periodic excitation over a wide frequency range. It can be used for the calibration of transducers as well as for the characterization of devices requiring a periodic or random rotation input. A typical example for the latter is the determination of properties of MEMS sensors and sensor components in the development phase. Designed as an electro-dynamic exciter, the DRE-01 can be easily combined with many standard laboratory devices like signal generators or vibration controllers. The devices under test (DUT) can be attached by glue, wax, screws or clamp adapters and also customized DUT adaptors can be provided on request. The design of the exciter is optimized for an operation with low lateral motion as well as harmonic distortion.

Technical Data

Torque, max. (sine peak) [1)]	0.95 Nm
Frequency range [2)]	1 Hz…5 kHz
Angle, max. (peak - peak) [3)]	30 °
Angular velocity, max. (sine peak) [1)]	5 300 °/s
Angular acceleration, max. (sine peak) [1)]	2 500 000 °/s²
Mass moment of inertia of bare table	22 kg·mm²
Mass moment of inertia of payload, max.	400 kg·mm²
Max. payload	0.5 kg
Max. centrifugal force due to unbalance	1.5 N
Transverse acceleration	1 Hz…600 Hz: < 0.2 m/s²/(°/s) 600 Hz…5 kHz: < 2.0 m/s²/(°/s)
Total harmonic distortion (angular velocity)	1 Hz…6 Hz: < 10% 6 Hz…5 kHz: < 3%
Stray magnetic field	0.1 mT on mounting table
Dimensions (H x W x L)	195 mm × 140 mm × 140 mm
Mounting table size	Ø 50 mm (customization on request)
Weight	3.6 kg
Connector to power amplifier	5-pin Yamaichi®
Temperature range for operation	5 °C…40 °C
Temperature range for storage and transportation	-25 °C…+55 °C

Options and Accessories

- ✓ Internal Reference Standard BN-43 [4)]
  - Sensitivity (± 5 %): 0.25 mV/(°/s)
  - Frequency Range: 0 Hz…2 kHz
  - Angular verlocity: 8 000 °/s peak
- ✓ Internal Reference Standard BN-42
  - Sensitivity (± 5 %): 1.33 mV/(°/s)
  - Frequency Range: 0 Hz…2 kHz
  - Angular verlocity: 1 500 °/s peak
- ✓ Power Amplifier PA 500 DM
- ✓ 082-0005_01 Power supply for BN 42/43
- ✓ APS 0109 zero position controller

All specification are at room temperature unless otherwise specified.

1) Intervals of 5 minutes; other operating modes are displayed in the diagrams

2) Without mounting table. With mounting table the frequency range is 1 Hz…4.5 kHz. With internal reference standard, the frequency range is 1 Hz…2 kHz

3) Recommended operation range peak-peak; mechanical stops at 40 ° peak-peak

4) Other options: BN-41 (max. angular velocity: 300 °/s).

Performance

The possible performance charts for angular velocity measurements with different payloads are exemplified in the following graph. The performance charts are based on operation of the DRE-01 with its recommended power amplifier PA 500 DM and the optional internal reference standard. All displayed measurements with the PA 500 DM are operated with the internal cooling system.

Examples for the mass moment of inertia for DUT with a square base area of 30 mm x 30 mm

- weight 67 g -> 10 kg·mm²
- weight 133 g -> 20 kg·mm²
- weight 333 g -> 50 kg·mm²

Assumption: the body's center of gravity is located on the rotary axis.