

# SE-09

## Calibration Vibration Exciter (for high frequencies)



### Applications

- ✓ Accelerometer calibration
- ✓ Testing of micro-mechanic sensors (MEMS)
- ✓ Resonance frequency determination of sensors up to 50 kHz
- ✓ Characterization of transducers

### Selected Data

- ✓ Frequency range 5 Hz ... 50 kHz
- ✓ Max. force up to 100 N (22.49 lbf)
- ✓ Max. acceleration 400 m/s<sup>2</sup> (40 g<sub>n</sub>)
- ✓ Max. payload 350 g

### Features

- ✓ Ceramics shaker table (scratch resistive surface; first resonance > 52 kHz)
- ✓ Air bearing for low cross motion
- ✓ Internal reference accelerometer covering the whole frequency range
- ✓ Designed for calibration of accelerometers according to ISO 16063-11 and ISO 16063-21
- ✓ Tap hole for device mounting cut directly into ceramics



## Specification

The SE-09 is an electro dynamic vibration exciter that was especially designed for operation over a wide frequency range from 5 Hz to 50 kHz. The ceramics armature of this shaker has its first longitudinal resonance frequency above 52 kHz. The polished ceramics surface is very scratch resistive and thus offers perfect mounting conditions for devices under test (DUT) for vibration excitation in the high frequency range. Additionally the surface allows a good reflectivity for the work with a laser vibrometer as reference sensor. The standard reference transducer, which is mounted inside each SE-09 vibration exciter, is an IEPE accelerometer that covers the whole frequency range of this exciter.

Each SE-09 is delivered with a DAkkS accredited calibration certificate for this reference transducer. For operation down to 5 Hz the exciter is equipped with an air bearing that allows a vibration excitation with low mechanical noise and transverse motion.

Typical use cases for the SE-09 are the calibration of accelerometers according to ISO 16063-11 or ISO 16063-21 as well as high-frequency vibration tests of MEMS transducers or other small devices. Especially immunity tests of MEMS sensors against high frequency vibration disturbances during sensor development or for quality assurance became an important application.

### Technical Data

Force Rating <sup>1)</sup>	100 N	22.49 lbf
Frequency range	5 Hz... 50 kHz	
Resonance frequency	> 52 kHz	
Stroke <sup>2)</sup> , max.	7.5 mm	0.3 inch
Velocity, max.	0.5 m/s	19.7 inch/s
Acceleration <sup>1)</sup> , max.	400 m/s <sup>2</sup>	40 g <sub>n</sub>
Operation	vertical	
Transverse motion	typical < 10 %	
Payload, max.	350 g	0.77 lbs
Required Compressed Air Supply	1.0 ... 1.5 bar, air quality according to ISO 8573.1	
Total Weight	10 kg	22.05 lbs

#### Internal Reference Standard BN-09 <sup>3)</sup>

Sensitivity ( $\pm 10\%$ )	1 mV / m/s <sup>2</sup> (10 mV / g <sub>n</sub> )
Frequency range	3 Hz ... 50 kHz
Amplitude linearity	< 0.25 %
Resonance frequency	ca. 70 kHz
Constant current supply	2 mA ... 20 mA

1) Interval mode of operation

2) Peak-Peak

3) All specifications are at room temperature unless otherwise specified.



## Accessories

- ✓ PA14-500 power amplifier (500 VA), recommended for operation with SE-09
- ✓ power amplifier connecting cable [length 3 m (9.8 ft), 8-pin SPEAKON® connector on amplifier side]
- ✓ sensor cable for internal reference transducer [length 3 m (9.8 ft), double shielded, Microdot (10-32") to BNC + banana plug (ground)]

The supplied cables need to be used.

## Performance

The Performance Chart shows the maximum possible acceleration (peak) as a function of frequency for different payloads. In addition, a recommended acceleration for the calibration of accelerometers is shown for the smallest measurement uncertainties.

SE-09 performance chart

