

DIGITAL INDUSTRIES SOFTWARE

Simcenter Qsources integral shaker

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Product Information Sheet

Summary

The Simcenter Qsources hardware integral shaker is an excitation solution for measuring structural and vibro-acoustic frequency response functions (FRF) in narrow spaces. Several trends create challenges in the field of FRF acquisition. Products become more complex, which increases product packaging density and the number of interface connections between integrated systems. On top of that, product development requires true transfer functions for higher frequencies.

BENEFITS

- Designed to be used for complete
- vehicle frequency response function measurements
- Delivers frequency range of 20 to 2,000 Hz
- Enables excitation for any mounting angle and in difficult-to-reach locations
- Includes self-suspending and self-aligning feature

FEATURES

- In-line driving point accelerometer
- Patented internal 3D suspension system
- Built-in mechanical and electronic protection



The Simcenter Qsources integral shaker has been designed to excite a broad range of structures and allows for accurate FRF in narrow spaces. The force level is enough to excite full vehicles. Typical test objects are full vehicles, vehicle bodies, powertrains and drivelines, suspension systems, aircraft and railway bodies and systems, and machinery up to 10 meters (m) in length or 15,000 kilograms (kg) in weight. The Simcenter Qsources integral shaker enables a direct mounting on the test object without external support or the need for alignment. Thanks to the patented internal suspension, the inert mass is dynamically decoupled from the test object and the force is always aligned along the internal stinger axis. This significantly improves the efficiency of testing by eliminating the support and alignment work associated with conventional shaker testing. Additionally, you only need one operator to execute data acquisition.

Application

The integral shaker can be used in two configurations: in combination with the driving point (DP) accelerometer or with M5 direct mounting studs.

When combining the shaker with the DP accelerometer, the accelerometer is integrated in a special bell house with an elastomer decoupling. As it enables force transmission through the bell house, the accelerometer only measures the surface acceleration at the center, resulting in highly accurate driving point measurements.



When the excitation locations are instrumented with external accelerometers, each location can be prepared with special M5 mounting studs. The shaker can then be used in a roving excitation setup to acquire FRFs from driveline and suspension interface locations.

Conducting transfer path analysis (TPA) on vehicles requires a dedicated set of transfer functions from energy sources to target locations such as ear pressure or seat-rail vibration. By contrast, hammer excitation is inaccurate and often impossible to perform due to space constraints. The optional In Plane excitation Adaptor [Q-TRX] allows to capture accurate FRFs in even more space constrained locations. The frequency range allows the user to capture transfer functions over the complete frequency range from 20 hertz (Hz) to 2,000 Hz.

In addition, the self-supporting and self-alignment feature of the integral shaker in combination with the integrated driving point accelerometer makes it a perfect exciter for modal analysis on components such as engines and complete powertrains.

To facilitate the long-term reliable use of the shaker, Siemens PLM Software offers a sensitivity measurement for the internal transducers, including a detailed performance check.

The integral shaker can be used with Simcenter Testlab Spectral Testing software or Simcenter Testlab MIMO

FRF Testing together with the Simcenter Qsources measurement amplifier. The integrated transducers are IEPE type sensors and are compatible with Simcenter SCADAS hardware input modules.

Application

- Structural transfer functions
- Direct vibro-acoustic FRF
- Driving point FRF
- Transfer path analysis
- Structural modal analysis
- Body benchmarking
- Target setting

Physical specifications with accelerometer

- Dimensions: Ø40x87 millimeters (mm)
- Total mass: 0.38 kg
- Mass loading of the test structure: 26 grams

Physical specifications with M5 mounting stud

- Dimensions: Ø40x76 mm
- Total mass: 0.37 kg
- Mass loading of the test structure: 19 grams
- Footprint: Ø20 mm
- Sensor connector type: female 10 to 32

- Power cable connector: male banana
- Sensor cable length: 50 centimeters (cm)
- Power cable length: 4 meters
- Stinger thread connection: M5

Performance

- Frequency range for random testing: 20 to 2,000 Hz
- Frequency range for sine testing: 40 to 2,000 Hz
- Force level: 7 Newton root mean square (Nrms)
- Internal sensors type: IEPE
- The rms averaged force level is 6 Newtons (N) over the frequency range of 20 to 2,000 Hz

Supplied accessories

- User manual
- Mounting studs
- Signal and power cables
- Driving point accelerometer
- Cleaning tool
- Positioning and removal tool
- Electronic protection device
- Flight case
- Sensitivity sheet reference sensors

- Product requirements
- Simcenter Qsources measurement amplifier [Q-AMP230V/Q-AMP115V]
- Simcenter Testlab™ software for FRF acquisition or similar

Options

- Sensitivity measurement [Q-SR-SENS]
- In-plane excitation adaptor [Q-TRX]
- Excitation hardware application training

Simcenter Qsources structural and acoustic exciters

- Low-mid frequency volume source [Q-LMF]
- Mid-high frequency volume source [Q-MHF]
- High frequency shaker [Q-HSH]
- Miniature shaker [Q-MSH]
- Thumper shaker [Q-TMP]
- Low-frequency monopole source [Q-MED]