

# Simcenter Qsources low-mid frequency source

## Product Information

Simcenter/Q-LMF/2/20200114

### Benefits

- Support volume acceleration sound source for low- and mid-frequency FRF measurements
- Provide human torso diffraction effect
- Deliver fast reciprocal FRF acquisition
- Support high sound pressure level
- Provide frequency range of 10 to 1,000 Hz

### Features

- Integrated sound source strength sensor
- Shaped source for seat position
- Built-in protection for electronics

### Summary

The Simcenter Qsources hardware low-mid frequency source is used for producing high noise levels, more than sufficient for the excitation of complete vehicles. The integrated volume acceleration sensor gives real-time feedback of the emitted source strength and can be used as a reference for frequency response functions (FRFs) measurements without any postprocessing.

Since 1996 almost all automotive manufacturers and many suppliers use these sources for improving the acoustic performance of their products on the system level. The low-mid frequency source is designed to be used in the 10 to 1,000 hertz (Hz) frequency band an important frequency band in vehicle development. This source is typically used for transfer path analysis (TPA) of structure-borne or airborne noise and cabin vibro-acoustic modal analysis.

Because most applications are for seat positions, the device is optimized for quick positioning on a seat with the acoustic center at ear location.

This is in compliance with International Organization for Standardization (ISO) 5128.



For linear systems, the reciprocity principle is applicable. As a vehicle can be seen as a linear system in typical cases, the input and output of the system can be switched. This allows you to introduce acoustic energy at ear location and measure acceleration at many operational force input points, such as body interface locations for the suspension, exhaust and engine. This will result in a shorter FRF acquisition time as it is not necessary to excite the system at every force input location with a shaker.



The unique properties of this low-mid frequency source include, human body diffraction simulation, time stable sensor sensitivity and high noise levels. These features make this device extremely accurate and efficient for the analysis of transport vehicles like cars, vans, trucks, busses, trains and aircraft.

To facilitate the long-term reliable use of the source, Siemens Digital Industries offers a sensitivity measurement service for the internal transducers, including a detailed performance check.

### Application

- Body noise transfer function measurements (BNTF)
- TPA
- Airborne source quantification (ASQ)
- Vibro-acoustic modal analysis (EMA)
- Acoustic waveform replication

### Physical specifications

- Dimensions (torso): 245 X 380 X 790 millimeters (mm)
- Dimensions (minimum): 245 X 380 X 485 millimeters (mm)
- Sensor connector type: Bayonet Neill–Concelman (BNC)
- Power cable connector: male banana
- Power cable length: 4 meters
- Mass: 9 kilograms (kg)

### Performance

- Frequency response sensor ( $\pm 2$  decibel): 10 to 1,000 Hz
- Sensor output: volume acceleration
- Sensor type: ICP®
- Source input impedance: 7 Ohm nominal

### Supplied accessories

- User manual
- Adaptor set for ear height positioning
- Flight case
- Sensitivity sheet sensor [mV/m<sup>3</sup>/s<sup>2</sup>]

### Product requirements

- Simcenter Qsources measurement amplifier [Q-AMP230V/Q-AMP115V]
- Simcenter Testlab™ software MIMO FRF testing, spectral acquisition or similar



### Options

- Sensitivity measurement [Q-SR-SENS]

### Simcenter Qsources structural and acoustic exciters

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

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