BRÜEL & KJÆR® Modal and Measurement Exciters

Hand-held Exciter Type 5961

Hand-held Exciter Type 5961 combines the versatility of a shaker test for optimizing the excitation signal to the test at hand with the mobility of an impact hammer test for easily roving around the test structure.

While an impact hammer test is fast and easy to perform, the high crest factor has the potential to drive the structure into non-linear behaviour. Also, the highly deterministic nature of the impact signal means that a linear approximation of slightly non-linear structures is not possible when performing averaging.*

In a shaker test, various types of random excitation signals such as continuous, burst, and periodic can be used to significantly lower the crest factor and perform a good linear fit of slightly non-linear structures. In addition, using burst or periodic random excitation you can avoid leakage in the analysis. With shaker testing, you also have full control of excitation bandwidth and can limit it to the frequency range of interest including zoom measurements.

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Uses

- Excitation of small structures:
  - General vibration testing
  - Mechanical impedance and mobility measurements
  - Experimental modal analysis
- Tests where hand-held operation is ideal:
  - Field measurements
  - Troubleshooting
  - Fast investigations
- Permanent lab setups with a fixed exciter position using fixtures and stingers

Features

- The mobility of hammer testing combined with the broad range of excitation signals of shaker testing
- Compact and lightweight design
- Battery operation, no separate power amplifier or connection to mains power
- Hand-held operation, requires no elaborate fixturing
- Frequency range: 45 Hz to 15 kHz
- Force range: 2 N peak (0.310 N RMS)

Description

Hand-held Exciter Type 5961 is a lightweight, compact exciter that consists of an electromagnetic exciter driven by a built-in battery-operated power amplifier.

The excitation signal is fed to the exciter via the BNC connector at the bottom of the exciter. The exciter can operate within a (typical) frequency range of up to 15 kHz with a force rating of 0.310 N RMS, or approximately 2 N peak.

Type 5961 weighs about 500 grams (17 oz) and comes with a spiral cable which has a length from 1.1 to 4 metres (3.6 to 13.1 feet). The exciter is delivered in its case together with its cable and accessories.

* Crest factor = X_{Peak}/X_{RMS}, where X is the excitation signal

Using Type 5961

Hand-held Exciter Type 5961 can be used for various applications such as general vibration tests, mechanical impedance and mobility measurements, and experimental modal analysis where only low force levels are required.

Hand-held use

A force transducer (not included with Type 5961) is connected to the front of the exciter. The exciter comes with two different steel test probe tips, round and sharp, which enable mechanical contact with the test structure. The tips can be mounted on a short pin or a long pin.

Typical hand-held test scenarios range from a simple resonance test in which the structure is excited at a single point and direction, called a degree of freedom (DOF), to a complete modal test in which the structure is excited at multiple DOFs one by one. One or more fixed uni- or triaxial accelerometers are typically used as references.

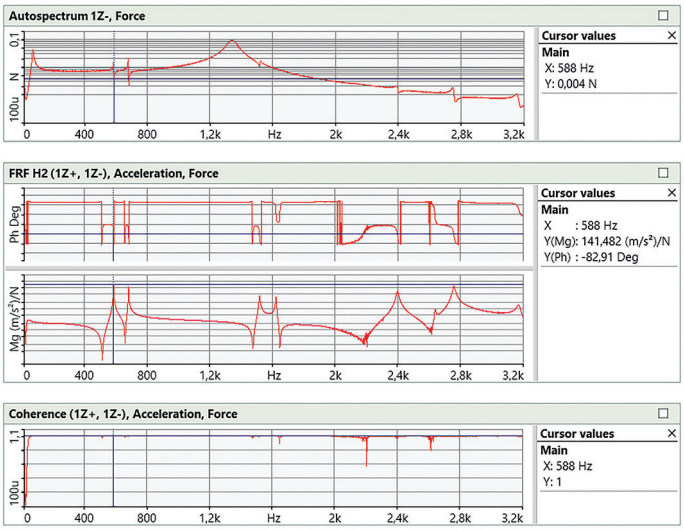
Permanent lab setups

One or more exciters with fixed positions can be used with fixed or roving uni- or triaxial accelerometers. For each exciter, a force transducer is mounted on the structure with a stinger between the force transducer and the exciter.

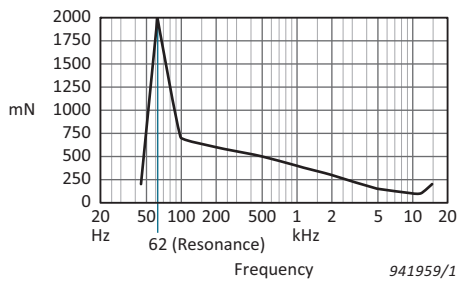
Measurements

Fig. 1 shows measurement results from a resonance test on a small lightly-damped structure using pseudo-random excitation performed using BK Connect® software and a LAN-XI data acquisition system. The H_2 FRF (frequency response function) estimator is used as it often is the best estimator for testing on smaller structures.

Fig. 1 ***Top****: Input force autospectrum.* ***Middle****: FRF H_2.* ***Bottom****: Coherence function.*



Specifications – Hand-held Exciter Type 5961

Frequency range	45 Hz to 15 kHz
Sensitivity	150 mN/V_{in} (typical and broadband) where V_{in} = 2.0 V RMS, Load mass = 2 kg
Force rating (RMS)	2 N (typical at resonance)
	100 mN (typical at 10 kHz)
	Fig. 2 *Force vs frequency (linear y-axis)* 
Input voltage	2.0 V RMS (Distortion: <3%)
	3.5 V RMS (Max. input)
Battery lifetime	Approximately 3 hours constant use
Dimensions	Length: 155 mm (6.1 in)
	Diameter: 52 mm (2.05 in)
	Weight: 500 grams (17 oz) including battery

Ordering Information

Type 5961 **Hand-held Exciter**

Includes the following accessories:

- WL-1100: Spiral cable, length 1.1 to 4 m (3.6 to 13.1 ft)
- QB-0016: 9 V alkaline battery, IEC Type 6LF22 or 6LR61
- WS-3677: Test pin, short
- YP-0080: Test pin, long
- DB-0544: Test probe tip, round
- DB-0545: Test probe tip, sharp
- YQ-2962: Screw, socket set screw, 10–32 UNF × 5/16″ (7.7 mm)

Optional Accessories

STINGERS

WZ-0066 Nylon Stinger Kit

- 10 × stingers, length 50 mm (0.16 ft)
- 10 × stingers, length 120 mm (0.39 ft)

FORCE TRANSDUCER

Type 8230 CCLD Force Transducer (+44/–44 N range)

ACCELEROMETERS

Type 4507-B Piezoelectric CCLD Accelerometer

Type 4524-B Triaxial Piezoelectric CCLD Accelerometer

Note: Other stingers, force transducers and accelerometers are available, please ask your sales representative.

Compliance with Standards

The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives

RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME

China RoHS mark indicates compliance with administrative measures on the control of pollution caused by electronic information products according to the Ministry of Information Industries of the People's Republic of China

WEEE mark indicates compliance with the EU WEEE Directive

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