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PRODUCT DATA

Calibration Exciter — Type 4290



Calibration Exciter Type 4290 is an electrodynamic vibration exciter designed to vibrate accelerometers or small components at variable frequency in the range 200 Hz to 50 kHz. This range, with reliable acceleration control up to 30 kHz, makes the Calibration Exciter a useful reference device in high frequency vibration work.

4290

Brüel & Kjær

Uses and Features

USES

- ❍ Frequency response recording of accelerometers and other vibration transducers

FEATURES

- ❍ Precision control of vibration level with built-in regulating accelerometer
- ❍ Frequency range 200 Hz to 50 kHz
- ❍ Small, rigid construction

Calibration Exciter Type 4290

The Exciter consists of two separate parts, a cylindrical permanent magnet and a small compact moving element with built-in control accelerometer. When the moving element is placed onto the core of the permanent magnet, the drive coil is situated in the radial magnetic field produced by the magnet. Suitable suspension is obtained by simply inserting a disc of foam nylon between the moving element and the magnet core. (This type of floating suspension has no transverse resonance in the frequency range of the calibration exciter.)

The suspension resonance occurs at 30 to 100 Hz. Small dimensions, extreme compactness and rigid construction, give the moving element an outstandingly high first resonant frequency: above 50 kHz. The built-in control accelerometer, which has a mounted resonant frequency around 60 to 70 kHz, follows exactly the movement of the table, and the output signal is used to control and monitor the acceleration at the table surface.

The exciter will be driven by a sine/noise generator through a power amplifier. The maximum force output which is around 3 N (0.675 lbf) peak is obtained with a power of 2.5 W.

The acceleration level obtained with a typical 30 g accelerometer is of the order 1 ms^{-2} (0.1 g) which is sufficient for calibration of piezoelectric accelerometers.

The calibration exciter can be used in environmental test chambers in a range from 0 to 80°C (32 to 176°F).

Example of Use

The main purpose of the calibration exciter is the automatic plotting of the high frequency response of accelerometers in combination with a Brüel & Kjær Type 3550 Analyzer (with WT 8091 software) and a printer. A measuring set-up is shown in Fig. 1. The drive signal is provided by the generator module in the analyzer which covers the frequency range 200 Hz to 50 kHz, and the Power Amplifier Type 2712 (or 2706).

The built-in control accelerometer monitors the vibration level and provides a control signal to the analyzer (channel A) via the Microphone Preamplifier with Adaptor JJ 2617. The output signal level from the noise

generator module is regulated by the channel A input signal which keeps the acceleration level approximately to the chosen level. With the accelerometer under test connected to channel B, the analyzer is able to calculate the frequency response.

Fig. 1 Measuring arrangement for the frequency response calibration of accelerometers

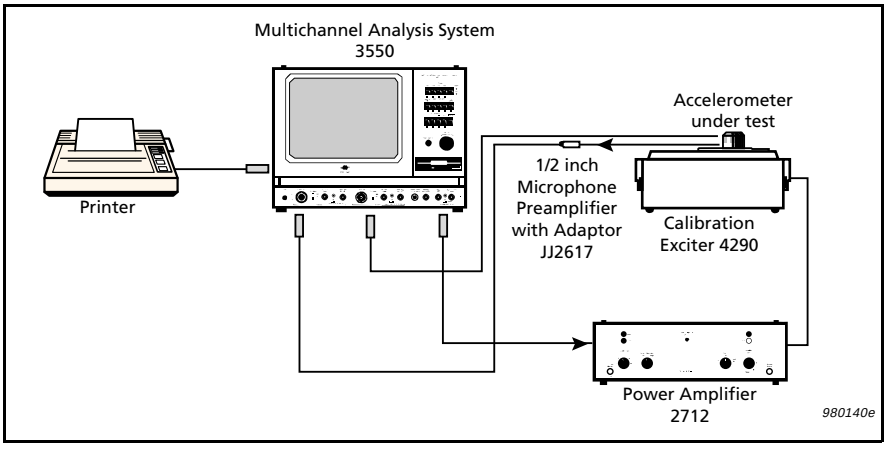
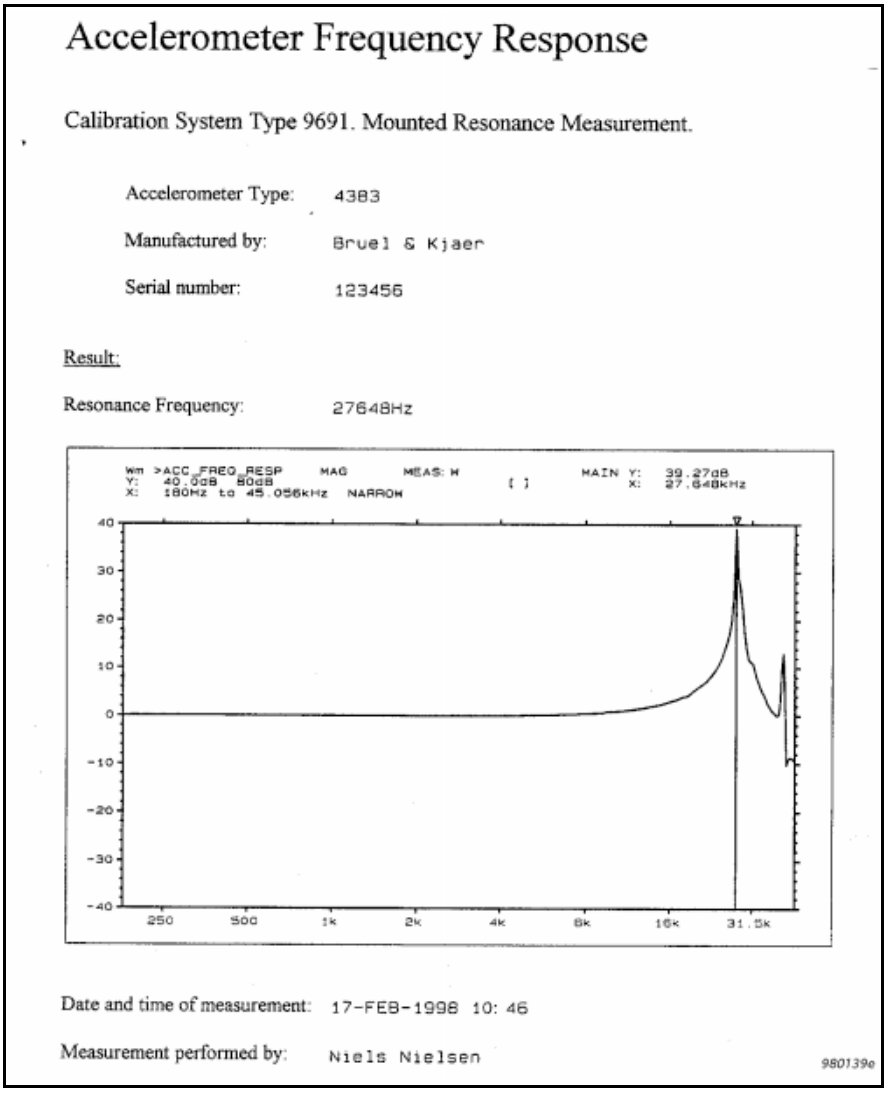


Fig. 2 Frequency response of an accelerometer with the set-up shown in Fig. 1



Specifications 4290

FREQUENCY RANGE:
200 Hz to 50 kHz

FREQUENCY RESPONSE:
(with regulation)
200 Hz to 20 kHz ±1dB
200 Hz to 30 kHz $^{+1}_{-3}$ dB (typical)

FIRST PRINCIPAL RESONANCE OF VIBRATING UNIT:
50 TO 60 kHz

PRINCIPAL RESONANCE OF CONTROL ACCELEROMETER:
60 to 70 kHz

RESONANCE OF SUSPENSION:
30 to 100 Hz

CONTROL PICK-UP:
(individually calibrated)
Sensitivity: 0.5 to 0.7 mV/ms^{-2} (5 to 7 mV/g)
Capacitance: 500 to 700 pF including cable

DRIVE COIL:
Nominal impedance: – 50 Ω at 500 Hz
Max. input: 240 mA RMS

ATTAINABLE FORCE LEVEL:
~3N (0.675 lbf) Peak

MASS OF MOVING ELEMENT:
160 to 180 g (5.6 to 6.35 oz)

Compliance with Standards

CE	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive
Safety	EN 61010–1 and IEC 1010–1: Safety requirements for electrical equipment for measurement, control and laboratory use
EMC Emission	EN 50081–1: Generic emission standard. Residential, commercial and light industry
EMC Immunity	EN 50082–2: Generic immunity standard. Industrial environment

Ordering Information

Type 4290 Vibration Exciter for Transducer Calibration

Includes the following accessories:

JP 0145:	10–32 to BNC plug adaptor
DB 0583:	10–32 to 1/8 W thread adaptor
DB 1425:	10–32 to M3 thread adaptor
QA 0013:	Hexagonal key
YG 0150:	10–32 flanged stud
YQ 2962:	5 × 10–32 studs
	Instruction Manual

Brüel & Kjær reserves the right to change specifications and accessories without notice

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