

# 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.

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**4290**

**Brüel & Kjær** 

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## Uses and Features

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*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

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## Calibration Exciter Type 4290

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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  $1 \text{ ms}^{-2}$  (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).

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## Example of Use

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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

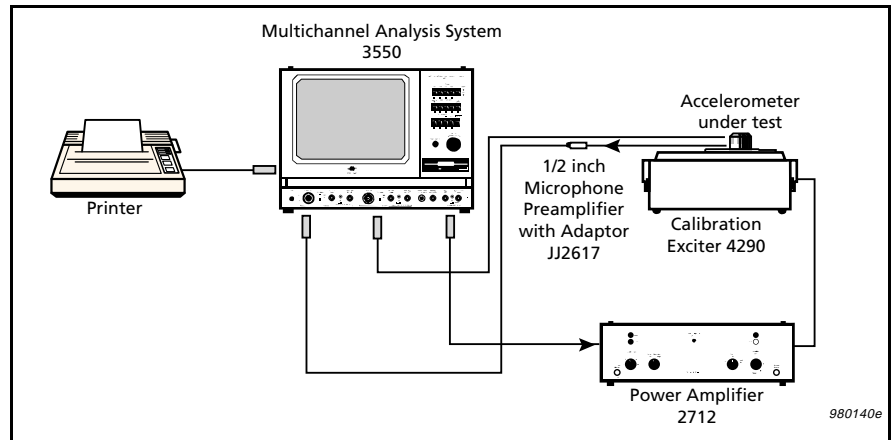
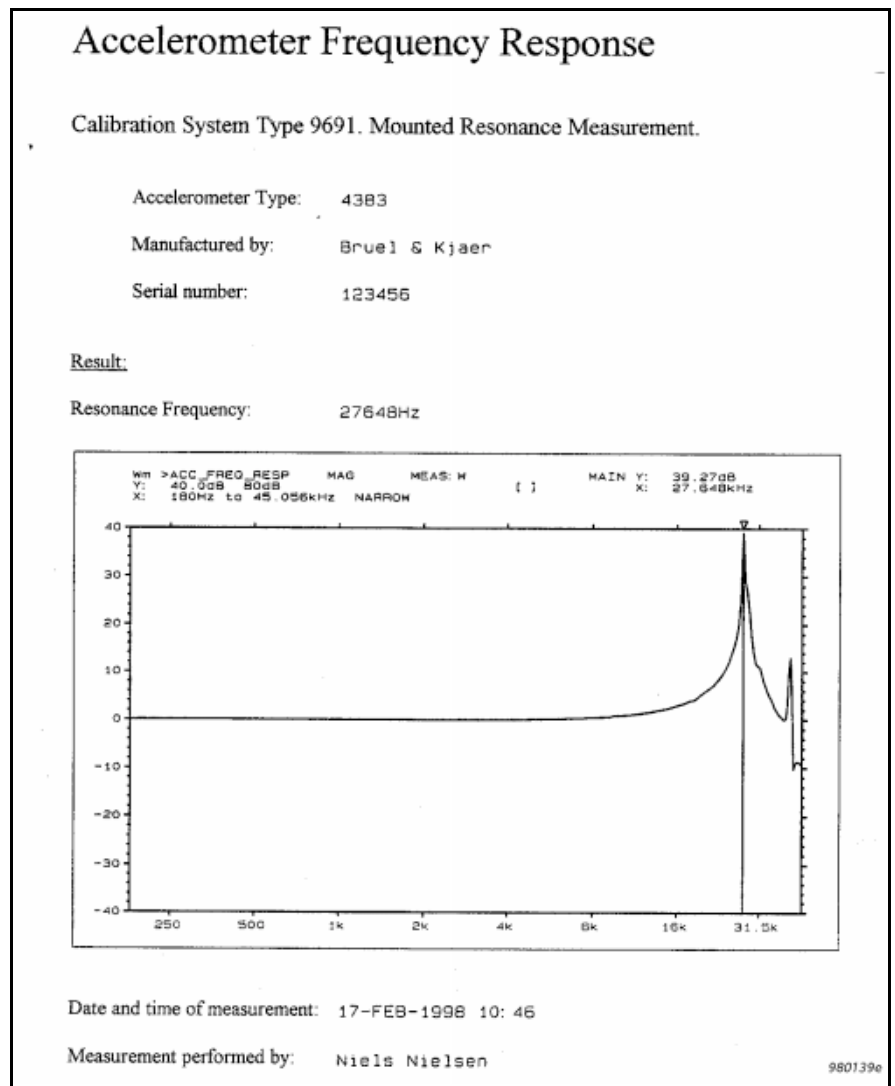


Fig. 2 Frequency response of an accelerometer with the set-up shown in Fig. 1



# Specifications 4290

<p><b>FREQUENCY RANGE:</b> 200 Hz to 50 kHz</p> <p><b>FREQUENCY RESPONSE:</b> (with regulation) 200 Hz to 20 kHz <math>\pm 1</math>dB 200 Hz to 30 kHz <math>\pm \frac{1}{3}</math> dB (typical)</p> <p><b>FIRST PRINCIPAL RESONANCE OF VIBRATING UNIT:</b> 50 TO 60 kHz</p> <p><b>PRINCIPAL RESONANCE OF CONTROL ACCELEROMETER:</b> 60 to 70 kHz</p> <p><b>RESONANCE OF SUSPENSION:</b> 30 to 100Hz</p>	<p><b>CONTROL PICK-UP:</b> (individually calibrated) <b>Sensitivity:</b> 0.5 to 0.7 mV/ms<sup>-2</sup> (5 to 7 mV/g) <b>Capacitance:</b> 500 to 700 pF including cable</p> <p><b>DRIVE COIL:</b> <b>Nominal impedance:</b> –50 <math>\Omega</math> at 500Hz <b>Max. input:</b> 240 mA RMS</p> <p><b>ATTAINABLE FORCE LEVEL:</b> ~3N (0.675 lbf) Peak</p> <p><b>MASS OF MOVING ELEMENT:</b> 160 to 180 g (5.6 to 6.35 oz)</p>
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## Compliance with Standards

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

## Ordering Information

<p>Type 4290 Vibration Exciter for Transducer Calibration</p> <p><b>Includes the following accessories:</b>            JP 0145: 10–32 to BNC plug adaptor            DB 0583: 10–32 to 1/8W thread adaptor            DB 1425: 10–32 to M3 thread adaptor</p>	<p>QA 0013: Hexagonal key            YG 0150: 10–32 flanged stud            YQ 2962: 5 <math>\times</math> 10–32 studs            Instruction Manual</p>
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Brüel & Kjær reserves the right to change specifications and accessories without notice