

PRODUCT DATA

Calibration Exciter Types 4294 and 4294-002

Uses

- Precise field calibration of vibration transducers
- Rapid calibration and checking
- Quick, easy field calibration of vibration measurement and recording systems

Features

- Small, lightweight, and battery-driven
- Leather case for impact protection
- Designed for everyday use in harsh environments
- Acceleration, velocity and displacement calibration
- High-precision, crystal-controlled servo operating at 159.15 Hz (1000 rad s^{-1})
- Drop- and environment-tested according to IEC 60068
- Splash-proof according to IP 54 (IEC 60529)



Description

Type 4294 permits accurate adjustment of measuring instrumentation at a standard acceleration level of 10 ms^{-2} (0 – 70 g load). The reference signal may additionally be used for velocity and displacement calibration, at 10 mms^{-1} and $10 \mu\text{m}$, respectively.

Type 4294-002 permits accurate adjustment of measuring instrumentation at a standard acceleration level of 3.16 ms^{-2} (0 – 200 g load). The reference signal may additionally be used for velocity and displacement calibration, at 3.16 mms^{-1} and $3.16 \mu\text{m}$, respectively.

The calibrator embodies an electromagnetic exciter driven by a crystal oscillator at a frequency of 159.15 Hz (1000 rad s^{-1}). Servo feedback via a small accelerometer on the underside of the vibration table is used to maintain a constant and accurate vibration level independent of the mass of the transducer under test (70 g for Type 4294 and 200 g for Type 4294-002).

To prevent overload, power for the calibrator is automatically disconnected if a transducer mass above a certain level is mounted on the table (70 g for Type 4294 and 200 g for Type 4294-002).

Use of the calibrator is very straightforward. The transducer is conveniently attached to the calibrator table using a 10–32 UNF Steel Stud (YQ-2962). Alternatively, the 10 g Mounting Disc (DB-2996) supplied, provides a convenient means of attaching transducers manufactured with 3 mm threads or those fitted with Mounting Magnet UA-0642. The mounting disc also permits the attachment of transducers with either beeswax or cyanoacrylate adhesive.

The calibrator is actuated by pressing the small button on the side of its housing. Following system adjustment, the calibrator is switched off by pressing the button a second time. To prolong the useful life of its built-in battery, Type 4294 automatically switches off after approximately 100 seconds.

Specifications – Calibration Exciter Types 4294 and 4294-002

	4294	4294-002
Dynamic Characteristics		
Frequency (Hz)	159.15 ± 0.02%	
Acceleration (ms^{-2} (RMS))	10 ± 3%	3.16 ± 3%
Velocity (mms^{-1} (RMS))	10 ± 3%	3.16 ± 3%
Displacement (μm)	10 ± 3%	3.16 ± 3%
Transverse Amplitude	< 5% of main axis amplitude	
Distortion	4294: < 2% for 10 to 70 g 4294-002: < 2% for 10 to 200 g load 4294 & 4294-002: typical < 7% for 0 to 10 g. Use DB-2996 (10 g) with very light accelerometers to achieve 2% distortion	
Power Requirements		
Built-in Battery	One 9 V Alkaline Battery QB-0016 (IEC type 6LR61)	
Battery Life	Approx. 200 calibrations, each lasting 100 s with automatic switching off at the end of each calibration	
Warm-up Time (Seconds)	< 5	
Signal Duration (Seconds)	103 ± 1 s with automatic stop	
Long-term Stability	Better than 1% per year for acceleration, velocity and displacement; better than 10 ppm per year for frequency	
Physical Characteristics		
Length	from bottom to top of hex screw: 135 mm (5.3 in) – see Fig. 1	
Diameter	with case: 46 mm (1.8 in), without case: 43.5 mm (1.7 in)	
Weight	500 g (17.6 oz) including battery and leather case	
Transducer Mounting		
Maximum Load (g)	70	200
Mounting Torque (Nm)	max. 0.5	
Mounting Thread	10–32 UNF	

COMPLIANCE WITH STANDARDS



EMC Directive and Low Voltage Directive; EMC requirements of Australia and New Zealand

Safety: EN/IEC 61010–1; UL 61010B–1

EMC Emission: EN/IEC 61000–6–3; EN/IEC 61000–6–4; CISPR 22: Radio disturbance characteristics of information technology equipment. Class B Limits; FCC Rules, Part 15: Complies with the limits for a Class B digital device

EMC Immunity: EN/IEC 61000–6–1; EN/IEC 61000–6–2; EN/IEC 61326 (**Note:** Only guaranteed using accessories listed in this product data)

Temperature: IEC 60068–2–1 & IEC 60068–2–2:
• Operating Temperature: +10 to +40°C (50 to 104°F) for 10 ms^{-2} reference within ± 3% and 3.16 ms^{-2} reference within ± 3%

–10 to +55°C (14 to 131°F) for 10 ms^{-2} reference within ± 5% and 3.16 ms^{-2} reference within ± 5%
• Storage Temperature: –25 to +70°C (–13 to 158°F)
• IEC 60068–2–14, Change of temperature: –10 to +55°C (2 cycles, 1°C/min)

Humidity: IEC 60068–2–78: Damp Heat: 90% RH (non-condensing at 30°C (86°F))

Mechanical: Non-operating:

- IEC 60068–2–6: Vibration: 0.3 m/s^2 , 20 m/s^2 , 10–500 Hz
- IEC 60068–2–27: Shock: 1000 m/s^2
- IEC 60068–2–29: Bump: 1000 bumps at 400 m/s^2

Enclosure: IEC 60529: Protection provided by enclosures: IP 54

Fig. 1 Dimensions of Type 4294/4294-002 without leather case



Ordering Information

Type 4294 Calibration Exciter (70 g load)
Type 4294-002 Calibration Exciter (200 g load)

Types 4294 and 4294-002 include the following accessories:

- Leather Case
- QB-0016: 9 V Battery
- YQ-2962: 10–32 UNF Steel Stud
- DB-2996: Mounting Disc Adaptor
- Calibration Chart

OPTIONAL ACCESSORIES

4294-CAI	Accredited Initial Calibration
4294-CAF	Accredited Calibration
4294-EW1	Extended Warranty, one year extension
4294-002-CAI	Accredited Initial Calibration
4294-002-CAF	Accredited Calibration
4294-002-EW1	Extended Warranty, one year extension

RE-CALIBRATION

Periodic re-calibration of Type 4294 is recommended in order to maintain the high accuracy of the vibration unit, and in order to have proof of traceability. Depending on the application, a re-calibration every 1–3 years is recommended.

Brüel & Kjær reserves the right to change specifications and accessories without notice. © Brüel & Kjær. All rights reserved.

HEADQUARTERS: Brüel & Kjær Sound & Vibration Measurement A/S · DK-2850 Nærum · Denmark
Telephone: +45 7741 2000 · Fax: +45 4580 1405 · www.bksv.com · info@bksv.com

Local representatives and service organisations worldwide

Brüel & Kjær

