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 enables accurate adjustment of measuring instrumentation at a standard acceleration level of 10 ms^{-2} (0 to 70 gram load). The reference signal can also be used for velocity and displacement calibration at 10 mms^{-1} and 10 µm, respectively.

Type 4294-002 enables accurate adjustment of measuring instrumentation at a standard acceleration level of 3.16 ms^{-2} (0 to 200 gram load). The reference signal can also be used for velocity and displacement calibration at 3.16 mms^{-1} and 3.16 µm, respectively.

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

To prevent overload, power to the calibrator is automatically disconnected if a transducer mass above 70 gram for Type 4294 or 200 gram for Type 4294-002 is mounted on the exciter's vibration table.

Use of the calibrator is straightforward. You can attach a transducer to the vibration table using:

- 10 – 32 UNF Steel Stud YQ-2962
- 10 g Mounting Disc DB-2996 (supplied) for transducers:
  - with 3 mm thread
  - fitted with Mounting Magnet UA-0642
  - mounted with beeswax

To switch the calibrator on, press the small button on the side of its housing. After system adjustment, turn the calibrator off by pressing the button again.

To maximise battery life, Type 4294 automatically switches off after approximately 100 s. Using Battery QB-0016, approximately 200 calibrations, each of approximately 100 s, are possible. After this, the operating period rapidly decreases, indicating that the battery needs to be replaced. However, the exciter can be used until its battery is fully depleted without influencing the accuracy of the reference level generated.

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 gram load 4294-002: < 2% for 10 to 200 gram load 4294 and 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	Approximately 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 calibrator table: 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 (gram)	70	200
Mounting Torque (Nm)	Max. 0.5	
Mounting Thread	10–32 UNF	

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

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

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/IEC61000–6–1; 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 mm, 20 ms^{-2}, 10 to 500 Hz
- IEC 60068–2–27: Shock: 1000 ms^{-2}
- IEC 60068–2–29: Bump: 1000 bumps at 400 ms^{-2}

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

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

RECALIBRATION

Periodic recalibration 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 one to three years is recommended.

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