PRODUCT DATA

Accelerometer Types 8344, 8344-B-001 and 8344-B-002

Low-frequency, calibration-grade accelerometers

Low-frequency accelerometer Types 8344, 8344-B-001 and 8344-B-002 have similar construction but are suited for different measurement and calibration applications due to their differences in sensitivity and lower frequency range.

200024

Uses and Features

Uses

- Low-frequency, general-purpose measurements
- Measurements in vibration calibration laboratories
- Reference standard accelerometer for calibration systems according to ISO 16063–21
- Working standard accelerometer for calibration systems according to ISO 16063–21
- Transfer of primary calibration data from as low as 10 mHz to 3000 Hz
- Low-frequency inter-laboratory comparisons (ILC) using Type 8344-B-002

Features

- Low noise floor
- High sensitivity
- Extended lower frequency range (<10 mHz)
- CCLD with built-in preamplifier
- Transducer electronic datasheet (TEDS)
- 10–32 UNF side connector for output signal
- Hermetically sealed

Description

Types 8344, 8344-B-001 and 8344-B-002 are piezoelectric accelerometers designed and optimized for low-frequency and low-level measurements. They feature low-noise, built-in CCLD* preamplifiers with TEDS and are based on Brüel & Kjær's patented DeltaShear design.

The DeltaShear design consists of three piezoelectric elements and three seismic masses arranged in a triangular configuration around a triangular centre post. They are held in place by a clamping ring that isolates the configuration from the base. The ring also prestresses the piezoelectric elements to give a high degree of linearity. This design provides a high sensitivity-to-mass ratio, a relatively high resonance frequency and high isolation from base strains and temperature transients.

The piezoelectric element used is PZ 27, zirconate lead titanate, and the hermetically sealed housing is made of stainless steel, AISI316-L, and has an M5-threaded hole for mounting on the base.

Characteristics

The built-in CCLD preamplifier requires that the accelerometers are supplied with a constant current and treated as a voltage source. The sensitivity is expressed in terms of voltage per unit acceleration (mV/ms^{-2}).

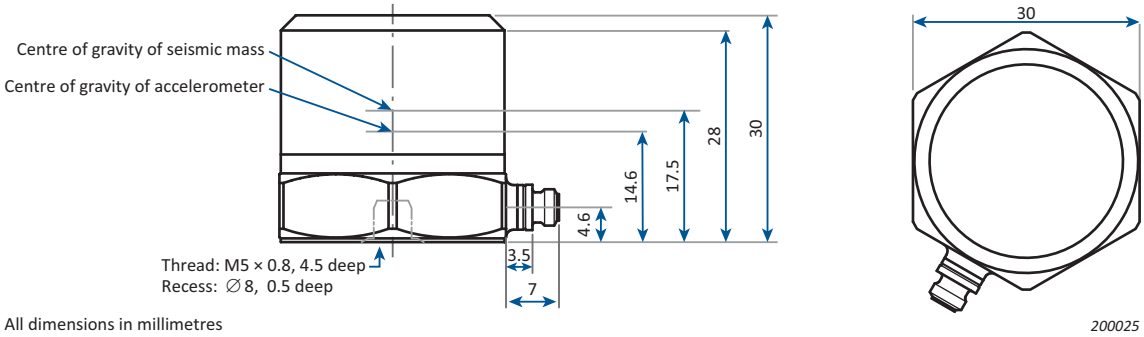
* Constant current line drive, also known as DeltaTron® (ICP and IEPE compatible)

Brüel & Kjær

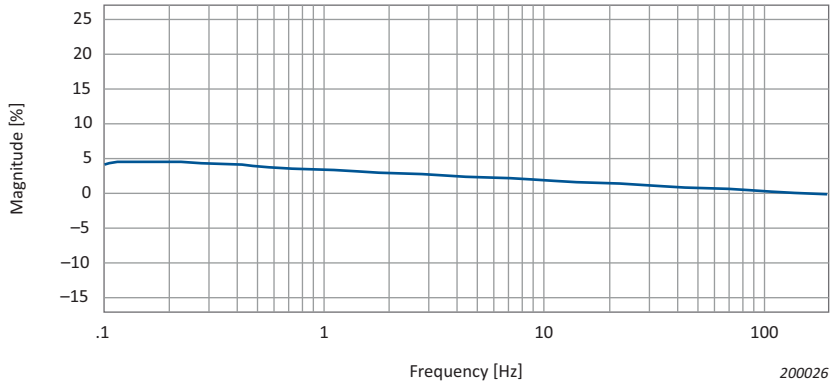
			8344	8344-B-001	8344-B-002
General					
Weight		gram (oz)	176 (6.2)		
Voltage Sensitivity (At 159.2 Hz and 4 mA supply current, ± 20%)		mV/ms^{-2}	250	50	500
		mV/*g*	2450	490	4900
Frequency Range	Amplitude (±10%)	Hz	0.2 to 3000	0.05 to 3000	0.008 to 3000
	Phase (±5°)		0.5 to 1000	0.5 to 1000	0.1 to 1000
Mounted Resonance Frequency		kHz	>10		
Max. Transverse Sensitivity (At 30 Hz, 100 ms^{-2})		%	<5		
Transverse Resonance Frequency		kHz	3.5		
Measuring Range (± peak)		kms^{-2}	0.026	0.137	0.014
		g	2.8	14	1.4
Output Non-linearity		%	<1		
TEDS			IEEE 1451.4, template version 1.0		
Electrical					
Bias Voltage	At 25 °C and 4 mA	V	13 ± 1		
	At full temp. and current range		13 ± 1		
Power Supply	Constant current	mA	2 to 20		
	Unloaded supply voltage	V	24 to 30		
Output Impedance		Ω	<30		
Start-up time (to final bias ±10%)		s	<30	120	<180
Residual Noise (Inherent rms broadband noise from 0.1 to 3000 Hz)		µV	≤40	≤20	≤12.5
		µ*g*	≤16	≤40	≤2.5
Noise Spectral	0.1 Hz	$mms^{-2}/\sqrt{Hz}$ ($\mu g/\sqrt{Hz}$)	0.42 (42)	1.0 (100)	0.0450 (4.5)
	1 Hz		0.046 (4.6)	0.15 (15)	0.0100 (1)
	10 Hz		0.0027 (0.27)	0.0045 (0.45)	0.0020 (0.2)
	100 Hz		0.00067 (0.067)	0.0010 (0.10)	0.0008 (0.08)
	1000 Hz		0.00025 (0.025)	0.0006 (0.06)	0.0003 (0.03)
Signal Ground			Grounded to case		
Measuring Axes			Perpendicular to mounting surface		
Environmental					
Operating Temperature Range		°C (°F)	–50 to +100 (–58 to +212)		
Temperature Coefficient of Sensitivity		%/°C	0.05		
Temperature Transient Sensitivity (3 Hz Lower Limiting Freq. (–3 dB, 6 dB/octave))		ms^{-2}/°C	0.001		
		g/°F	0.000055		
Magnetic Sensitivity (50 Hz, 0.038 T)		ms^{-2}/T	0.5	2.5	0.25
		g/kG	0.005	0.025	0.0025
Base Strain Sensitivity (At 250 µε in base plane)		ms^{-2}/µε	0.002		0.02
		g/µε	0.0002		0.002
Max. Non-destructive Shock (± peak)		kms^{-2}	3.5		
		g	350		
Max. Operating Sinusoidal Vibration		*g* RMS	2.0	10	1.0
Mechanical					
Case Material			Stainless steel AISI 316-L		
Sensing Element			PZ 27		
Construction			DeltaShear		
Sealing			Hermetic		
Electrical Connector			10–32 UNF		
Mounting			M5 × 4.5 mm threaded hole		
Mounting Torque		Nm (lbf-in)	Max. 3.5 (31), Min. 0.5 (4.4)		

All values are typical at 25 °C (77 °F) unless otherwise specified

DIMENSIONS OF TYPES 8344, 8344-B-001 AND 8344-B-002



TYPICAL FREQUENCY RESPONSE OF TYPE 8344-B-002



Compliance with Standards

CE RCM e WEEE	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: Safety requirements for electrical equipment for measurement, control and laboratory use ANSI/UL 61010–1: Safety requirements for electrical equipment for measurement, control and laboratory use
EMC Emission	EN/IEC 61000–6–3: Generic emission standard for residential, commercial and light industrial environments EN/IEC 61000–6–4: Generic emission standard for industrial environments CISPR 32: Radio disturbance characteristics of information technology equipment. Class B Limits FCC Rules, Part 15: Complies with the limits for a Class B digital device This ISM device complies with Canadian ICES–001 (standard for interference-causing equipment)
EMC Immunity	**Note**: Maximum surge voltage for Types 8344-B-001 and 8344-B-002 is ±500 V EN/IEC 61000–6–1: Generic standards – Immunity for residential, commercial and light industrial environments EN/IEC 61000–6–2: Generic standards – Immunity for industrial environments EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements **Note:** The above is only guaranteed using accessories listed in this product data sheet

Type 8344 CCLD Accelerometer
Type 8344-B-001 CCLD Accelerometer
Type 8344-B-002 CCLD Accelerometer
All types include the following:
- Calibration chart

Optional Accessories

CABLING

AO-0038-D-020	Cable, super low-noise, 10–32 UNF plug to 10–32 UNF plug, –75 to +250 °C (–103 to +482 °F), 2 m (6.7 ft)
AO-0038-D-001	Cable, super low-noise, 10–32 UNF plug to 10–32 UNF plug, –75 to +250 °C (–103 to +482 °F), 0.1 m (0.3 ft)
AO-0414-D-005	Cable for junction box, LEMO 7-pin plug to LEMO 7-pin socket, 0.5 m (1.7 ft)
AO-0531-D-001	Cable, single-screen coaxial cable, 10–32 UNF plug to BNC plug, –20 to +80 °C (–4 to +176 °F), 0.1 m (0.3 ft)
AO-0531-D-020	Cable, single-screen coaxial cable, 10–32 UNF plug to BNC plug, –20 to +80 °C (–4 to +176 °F), 2 m (6.7 ft)
JP-0145	Adaptor, BNC plug to 10–32 UNF socket, straight

MOUNTING

QA-0068	Tap for M5 thread
WA-0268	Syringe with high vacuum grease
YJ-0216	White beeswax
UA-2229	Low-frequency calibration fixture
DV-0459	Mounting clip

CONDITIONING

Type 2697-A	Differential amplifier
Type 2647-B	Conditioning amplifier, charge to CCLD, fixed gain 10 mV/pC
WB-3494	Junction box, 6-pin LEMO
WB-3479	Junction box, 7-pin LEMO

Calibration Services

PRIMARY CALIBRATION SERVICES

Primary calibration services are performed at the Danish Primary Laboratory of Acoustics at Brüel & Kjær (BKSV-DPLA)

ET-2041	Single-point calibration at 160 Hz or customer defined (≥16 Hz to ≤1 kHz)
ET-2042	Multi-point calibration, 10 Hz to 10 kHz, 1/3-octave values
ET-2043	Additional measurement points
ET-2044	Multi-point calibration, 10 Hz to 5 kHz, 1/1-octave values
ET-2045	Multi-point calibration, 1 to 20 Hz, 1/3-octave values
ET-2046	Multi-point calibration, 0.5 to 20 Hz, 1/3-octave values
ET-2047	Multi-point calibration, 0.1 to 20 Hz, <5 Hz: 1/1-octave values, ≥5 Hz: 1/3-octave values
ET-2048	Multi-point calibration, 0.1 to 200 Hz, 1/3-octave values
ET-2050	Instrument check

See Service Information BU 0200 for detailed information about BKSV-DPLA and a complete list of accelerometer calibration services.

SECONDARY CALIBRATION SERVICES

Secondary calibration services are performed at the Brüel & Kjær calibration laboratory

BK-0068-015-CAI	Initial accredited low-frequency calibration, 1 to 20 Hz, 1/3-octave values
BK-0068-015	Accredited low-frequency calibration, 1 to 20 Hz, 1/3-octave values
ACC-M-CFF	Factory standard calibration
ACC-M-CAF	Accredited calibration
ACC-M-CAI	Initial accredited calibration
ACC-M-CTF	Traceable calibration

BP 2262 – 13 2020-02

Brüel & Kjær