

PRODUCT DATA

HBK 4250 Wideband Volume Velocity Sources

Volume velocity sources (VVS) are used as 'acoustical shakers' to measure acoustic transfer functions (ATF)* typically in connection with noise source contribution analysis. Uniquely, HBK volume velocity sources use a special dual-microphone probe to measure accurate volume velocity directly in real time.

HBK 4250 wideband volume velocity sources cover the full acoustic frequency range with two powerful drivers to maximize signal-to-noise in real-world conditions, and three probes providing calibrated volume velocity in the low-, mid- and high-frequency ranges.

Uses and Features

Uses

- Measurement of acoustic volume velocity
- Measurement of acoustic transfer functions (P/Q) and reciprocal noise transfer functions (P/F)
- Airborne and structure-borne source path contribution analysis

Features

- Wideband omnidirectional acoustic radiation for assessment of both airborne and structure-borne generated phenomena
- Accurate in situ measurement of output volume velocity using a pair of low-noise, 1/4-inch microphones
- Dual-microphone design minimizes near-field effects of the test object for optimum measurement accuracy
- High-power output for measurement on vehicles with high transmission loss or when background noise conditions are sub-optimal
- Measurement of transfer functions at vehicle source systems (engine bay, tyres etc.) with the use of a low-emission, 3-metre hose
- Quick-release coupling system for switching probes or hose-probe assemblies on the driver
- Microphones with CCLD and TEDS for quick setup
- Built-in overload protection circuit
- Can be used with BK Connect® software for real-time volume velocity measurements:
 - With VVS Measurements Type 8442, you have dedicated software for pass-by source path contribution (SPC) measurements
 - With Data Processing Type 8403, you can filter and measure spectra (FFT, CPB) or acquire FRFs



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Configurations

HBK 4250 comes in three different configurations each consisting of a powerful sound source and a two-microphone sensing probe with optional hose for flexible positioning of the probe depending on the desired frequency range:

HBK 4250-A

Low-frequency VVS (16 to 2000 Hz) that includes a 3-metre hose with a 76-millimetre hose/probe diameter.



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HBK 4250-B

Mid-frequency VVS (32 Hz to 8000 Hz) that includes a 3-metre hose with a 38-millimetre hose/probe diameter.



HBK 4250-C

High-frequency VVS (100 to 16000 Hz) that includes a 3-metre hose with a 20-millimetre hose diameter and a 10-millimetre probe diameter.



About the Volume Velocity Sources

Reliable, high-output sound sources

The low- and mid-frequency VVSs use the same low/mid-frequency driver (sound source) designed for optimum, high-power output across the operating range 16 Hz to 8 kHz.

The high-frequency VVS has its own high-frequency driver with an operating range of 100 Hz to 16 kHz. Each source includes overload protection for reliable, continuous operation at high output levels.

Precise, in situ measurement of volume velocity
Each VVS probe incorporates HBK's special two-microphone design to enable precise, calibrated, in situ measurement of volume velocity in various acoustical environments, for example enclosed conditions close to tyres or engine components, or open conditions some distance from a reflecting surface. The microphones are CCLD^{*}-powered and TEDS-enabled, so the VVS is ready to use 'out of the box' without special calibration[†].

Versatility


For maximum sound power in low transmissibility conditions or when making vibro-acoustic measurements with the source inside a cabin, the volume velocity probe can be connected directly to the driver unit. The low-mid-frequency driver is designed to position the output orifice at typical occupant ear height on a vehicle seat.

For maximum flexibility, for example when used in relation to Source Path Contribution (SPC) analysis where assumed sources might be in confined spaces, such as close to tyres or engine components, each VVS has a 3-metre flexible extension hose allowing the probe to be positioned close to known operating sources. A quick release coupling ring facilitates easy swapping of probes or hose-probe assemblies.



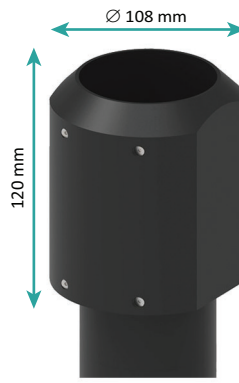
* CCLD: Constant current line drive, also known as DeltaTron[®] (ICP[®] and IEPE compatible)

† Conventional single-microphone designs must undergo a special calibration process in free-field conditions. The measured signal is then converted from sound pressure to volume velocity using a frequency domain calibration curve derived from the free-field measurement. It is then assumed that this free-field calibration applies for all subsequent measurements even though near-field effects cannot be quantified.

	<p>The CE marking is the manufacturer's declaration that the product meets the requirements of the applicable EU directives. For this product, it is the Radio Equipment Directive 2014/53/EU.</p> <p>RCM mark indicates compliance with applicable ACMA technical standards – that is, for telecommunications, radio communications, EMC and EME.</p> <p>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.</p> <p>WEEE mark indicates compliance with the EU WEEE Directive</p>
ELECTRICAL SAFETY	EN/IEC 61010-1, ANSI/UL 61010-1 and CSA C22.2 No.1010.1: Safety requirements for electrical equipment for measurement, control and laboratory use, part 1: General requirements
EMC EMISSION AND IMMUNITY	<p>EN/IEC 61326: Electrical equipment for measurement, control and laboratory use – EMC requirements.</p> <p>EN/IEC 61000-6-2: Generic standard – Immunity for industrial environments.</p> <p>EN/IEC 61000-6-3: Generic emission standard for residential, commercial and light industrial environments, class B</p> <p>CISPR 32: Radio disturbance characteristics of multimedia equipment. Class B Limits.</p> <p>47 CFR FCC Part 15 subpart B</p> <p>NOTE: The above is only guaranteed using accessories listed in this document</p>
TEMPERATURE	IEC 60068-2-1 & IEC 60068-2-2: Environmental Testing. Cold and Dry Heat Operating Temperature: – 10 to +50 °C (14 to 122 °F) Storage Temperature: – 25 to +70 °C (– 13 to 158 °F)
HUMIDITY	IEC 60068-2-78: Damp Heat: 93% RH (non-condensing at +40 °C (104 °F)). Recovery time 2 ~ 4 hours
MECHANICAL	<p>Non-operating:</p> <p>IEC 60068-2-6: Vibration: 0.15 mm, 20 m/s², 10 – 500 Hz</p> <p>IEC 60068-2-27: Bump:</p> <ul style="list-style-type: none"> • HF Transducer: 4000 bumps at 400 m/s², 6 directions • LF Transducer: 1000 bumps at 150 m/s², 6 directions <p>IEC 60068-2-27: Shock:</p> <ul style="list-style-type: none"> • HF Transducer: 1000 m/s², 6 directions • LF Transducer: 500 m/s², 6 directions <p>EN 60068-2-32: Free fall:</p> <ul style="list-style-type: none"> • Portable Equipment: 25 cm, 10 directions • In Intended Package: 75 cm, 10 directions


Specifications

HBK 4250-A Low-frequency Volume Velocity Source

SPECIFICATION	UNIT	VALUE
Operating frequency range* (Sufficient power and valid volume velocity estimation)	Hz	16 to 2000
Omni-frequency range (Omnidirectionality within ±5 dB threshold)	Hz	16 to 2000
Nominal impedance	Ω	8, coaxial driver
Power consumption (Amplifier protection circuit)	W	150, maximum continuous
Sound power level (with HBK 2755 Smart Power Amplifier)	dB	Broadband: 115, re 1 pW
		Spectral: Min. 90, f > 31.5 Hz re 1 pW in each 1/3-octave band
Connection		Four-pin Neutrik® speakON® socket, pins 1+ and 1–
Dimensions, W × H × D	cm (in)	35.0 × 35.0 × 40.5 (13.7 × 13.7 × 15.9)
Weight	kg (lb)	19 (41.9)
Included hose dimensions	m (ft)	Length: 3 (9.8)
	mm (in)	Diameter: 76 (3.0)
Included nozzle dimensions		 <p>220114</p>
Nozzle orifice dimensions	mm (in)	Radius: 38 (1.50) Length: 30 (1.18) Spacing Δ: 20 (0.79)
	mm ² (in ²)	Area: 4536 (7.03)
Nominal temperature range	°C (°F)	5 to 50 (41 to 122)
Relative humidity	%	85

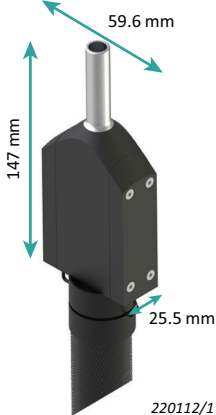
* Actual operating frequency is determined by the hose in use. The stated values are based on the included default hose

HBK 4250-B Mid-frequency Volume Velocity Source

SPECIFICATION	UNIT	VALUE
Operating frequency range* (Sufficient power and valid volume velocity estimation)	Hz	32 to 8000
Omni-frequency range (Omnidirectionality within ± 5 dB threshold)	Hz	32 to 3150
Nominal impedance	Ω	16, coaxial driver
Power consumption (Amplifier protection circuit)	W	130, maximum continuous
Sound power level (with HBK 2755 Smart Power Amplifier)	dB	Broadband: 116, re 1 pW
		Spectral: Min. 85, $f > 31.5$ Hz re 1 pW in each 1/3-octave band
Connection		Four-pin Neutrik® speakON® socket, pins 1+ and 1-
Dimensions, W × H × D	cm (in)	35.0 × 35.0 × 40.5 (13.7 × 13.7 × 15.9)
Weight	kg (lb)	19 (41.9)
Included hose dimensions	m (ft)	Length: 3 (9.8)
	mm (in)	Diameter: 38 (1.5)
Included nozzle dimensions		 <p style="text-align: center;">220113</p>
Nozzle orifice dimensions	mm (in)	Radius: 19 (0.75) Length: 30 (1.18) Spacing Δ: 20 (0.79)
	mm ² (in ²)	Area: 1134 (1.76)
Nominal temperature range	°C (°F)	5 to 50 (41 to 122)
Relative humidity	%	85

* Actual operating frequency is determined by the hose in use. The stated values are based on the included default hose

HBK 4250-C High-frequency Volume Velocity Source

SPECIFICATION	UNIT	VALUE
Operating frequency range* (Sufficient power and valid volume velocity estimation)	Hz	100 to 16000
Omni-frequency range (Omnidirectionality within ± 5 dB threshold)	Hz	100 to 10000
Nominal impedance	Ω	16
Power consumption (Amplifier protection circuit)	W	50, continuous
Sound power level (with HBK 2755 Smart Power Amplifier)	dB	Broadband: 108, re 1 pW
		Spectral: Min. 80, f > 0.8 kHz re 1 pW in each 1/3-octave band
Connection		Four-pin Neutrik® speakON® socket, pins 1+ and 1-
Dimensions (W × H × D)	cm (in)	23.2 × 20.1 × 23.1 (9.1 × 8.3 × 9.1)
Weight	kg (lb)	5 (11)
Included hose dimensions	m (ft)	Length: 3 (9.8)
	mm (in)	Diameter: 20 (0.79)
Included nozzle dimensions		
Nozzle orifice dimensions	mm (in)	Radius: 5 (0.20) Length: 75 (2.95) Spacing Δ : 10 (0.39)
	mm ² (in ²)	Area: 78.5 (0.12)
Nominal temperature range	°C (°F)	5 to 50 (41 to 122)
Relative humidity	%	85

* Actual operating frequency is determined by the hose in use. The stated values are based on the included default hose

Ordering Information

4250-A Low-frequency VVS

which includes the following:

- Type 4944-D: ¼-in. Low/Mid-frequency Volume Velocity Microphone Pair with TEDS
- Type 4250-A-003: LF VVS Hose & Probe with 1 × spare nozzle for direct connection to the driver (DR-0018)
- Type 4250-A-004: LMF VVS Driver
- AO-0824-D-100: Red coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AO-0825-D-100: Blue coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AQ-0649-D-100: Shaker drive cable, speakON 4-pin (M) to speakON 4-pin (M), 10 m (32.8 ft)

4250-B Mid-frequency VVS

which includes the following:

- Type 4944-D: ¼-in. Low/Mid-frequency Volume Velocity Microphone Pair with TEDS
- Type 4250-B-003: MF VVS Hose & Probe
- Type 4250-A-004: LMF VVS Driver
- AO-0824-D-100: Red coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AO-0825-D-100: Blue coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AQ-0649-D-100: Shaker drive cable, speakON 4-pin (M) to speakON 4-pin (M), 10 m (32.8 ft)

4250-C High-frequency VVS

which includes the following:

- Type 4944-C: ¼-in. High-frequency Volume Velocity Microphone Pair with TEDS
- Type 4250-C-003: HF VVS Hose & Probe
- Type 4250-C-004: HF VVS Driver
- AO-0824-D-100: Red coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AO-0825-D-100: Blue coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AQ-0649-D-100: Shaker drive cable, speakON 4-pin (M) to speakON 4-pin (M), 10 m (32.8 ft)

4250-D Low/Mid-frequency VVS

which includes the following:

- 2 × Type 4944-D: ¼-in. Low/Mid-frequency Volume Velocity Microphone Pair with TEDS
- Type 4250-A-003: LF VVS Hose & Probe with 1 × spare nozzle for direct connection to the driver (DR-0018)
- Type 4250-B-003: MF VVS Hose & Probe
- Type 4250-A-004: LMF VVS Driver
- AO-0824-D-100: Red coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AO-0825-D-100: Blue coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AQ-0649-D-100: Shaker drive cable, speakON 4-pin (M) to speakON 4-pin (M), 10 m (32.8 ft)

4250-E Wideband VVS System

which includes the following:

- Type 4944-C: ¼-in. High-frequency Volume Velocity Microphone Pair with TEDS
- 2 × Type 4944-D: ¼-in. Low/Mid-frequency Volume Velocity Microphone Pair with TEDS
- Type 4250-A-003: LF VVS Hose & Probe with 1 × spare nozzle for direct connection to the driver (DR-0018)
- Type 4250-A-004: LMF VVS Driver
- Type 4250-B-003: MF VVS Hose & Probe
- Type 4250-C-003: HF VVS Hose & Probe
- Type 4250-C-004: HF VVS Driver
- AO-0824-D-100: Red coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AO-0825-D-100: Blue coax cable, BNC (M) to BNC (M), 10 m (32.8 ft)
- AQ-0649-D-100: Shaker drive cable, speakON 4-pin (M) to speakON 4-pin (M), 10 m (32.8 ft)

Software and Accessories Available Separately

VVS SUB-SYSTEMS

Type 4250-A-003	LF VVS Hose & Probe
Type 4250-B-003	MF VVS Hose & Probe
Type 4250-C-003	HF VVS Hose & Probe
Type 4250-A-004	LMF VVS Driver
Type 4250-C-004	HF VVS Driver

AMPLIFIERS

2755-X	Smart Power Amplifier, with Wi-Fi
2755-A-X	Smart Power Amplifier, without Wi-Fi

MEASUREMENT SOFTWARE

Type 8403-X*	BK Connect Data Processing
Type 8442-X*	BK Connect VVS Measurements

CARRYING CASES

For HBK 4250-A, B and D:

KE-4250-A	Carrying Case for Low-frequency and Mid-frequency VVS. Can hold 1 LF/MF VVS
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For HBK 4250-C:

KE-4250-C	Carrying Case for High-frequency VVS
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For HBK 4250-E:

Both KE-4250-A and KE-4250-C carrying cases would be needed

CABLES

AO-0824-D-100	Red Coax Cable
AO-0825-D-100	Blue Coax Cable
AQ-0649-D-100	Shaker Drive Cable

Services

ACCREDITED CALIBRATION

MIC-CAF-SET	Microphone with Preamplifier Accredited Calibration
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Calibration is per microphone. So you need 2 × MIC-CAF-SET per microphone set.

	NUMBER OF MICROPHONE SETS	NUMBER OF MIC-CAF-SET TO ORDER
Type 4250-A	1	2
Type 4250-B	1	2
Type 4250-C	1	2
Type 4250-D	2	4
Type 4250-E	3	6

CALIBRATION CLOUD

Our cloud-based portal provides easy access to calibration data and services. For more details, go to www.bksv.com/calibrationdata

WARRANTIES

Factory Standard Warranty: HBK 4250 VVS have a two-year warranty that is valid from the delivery of the product

Extended Hardware Warranty: Extend your standard product warranty up to 10-years

HBK ASSURED

A multi-year contract of up to four years with, for example, regular calibrations, extended warranty throughout the contract period (for assets less than 10 years old), discount accessories and other services

ENGINEERING SERVICES

HBK's engineering services are designed to add value to your processes and enhance your product and engineering capabilities while transferring knowledge and technology.

For more information about all HBK service offerings, go to: www.hbkworld.com

* "X" indicates the licence model can either be N: Node-locked or F: Floating