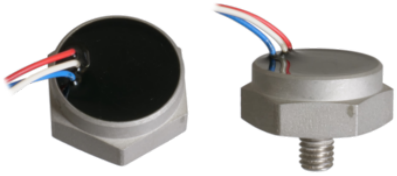


Accelerometers of high overload resistance with integrated electronics for dynamic measurement of vibration and acceleration in the frequency range 1Hz to several kHz

Features

- **very high overload resistance**
- **light weight**
- **linear frequency response with little or no resonant peak at upper cut-off frequency**
- **low non-linearity**
- **small lower cut-off frequency**
- **high signal-to-noise ratio**
- **hermetically sealed**
- **low transverse sensitivity**
- **high long-term stability**
- **integrated sensor electronics**
- **low output impedance**
- **optional galvanic isolation of sensor circuit from measuring location**
- **multiple housing options**
- **long connection lines possible**

Description

The dynamic accelerometers BDK3, BDK10, and BDK100 are capacitive spring-mass accelerometers with integrated sensor electronics. Resonant peaks are minimized by dynamic gas damping in the primary transformer.

The sensor electronics require only minimal power and are in conjunction with the capacitive primary transformer characterized by low error and high long-term stability.

Application

The accelerometers BDK3, BDK10, and BDK100 are used for applications requiring high overload resistance, high long-term stability, small lower cut-off frequency, light weight and low power consumption. Typical applications include:

- measurements on vehicles, machinery, buildings and plants for process control and error diagnosis
- seismic measurements
- vibration measurements
- safety engineering
- dynamic measurement of position and velocity

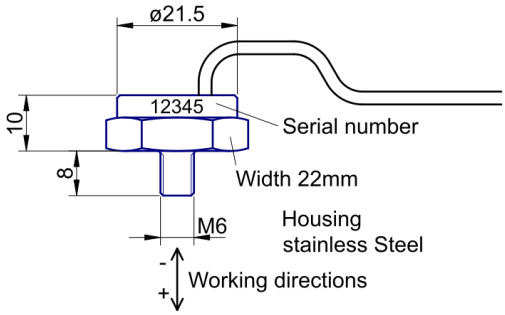
Specifications

Type	BDK3	BDK10	BDK100
Measuring range	±3g (ca.±30m/s^2)	±10g (ca.±100m/s^2)	±100g (ca.±1000m/s^2)
Resolution	<10^{-3}g	<$5 \cdot 10^{-3}$g	<$5 \cdot 10^{-2}$g
Frequency range	1....300Hz	1....800Hz	1....1500Hz
Sensitivity at U_b = 5 Volt	approx. 150mV/g	approx. 60mV/g	approx. 15mV/g

Shared specifications	
Temperature drift of sensitivity	approx. <+0.06%/K
Zero offset	2.5±0.1 Volt - generally: 0.5Ub±4%
Output impedance	approx. 100 Ohm
Linearity deviation	<1%
Transverse sensitivity	<1%
Mechanical overload resistance in direction of measurement	approx.10 000g (appr.100 000m/s^2) !
Nominal supply voltage (regulated externally)	U_{bN} = 5 Volt
Permissible supply voltage range	U_{bz} = 2V ... 16V
Current drawn at U_b = 5V	approx. 2mA
Degree of protection	IP65
Operating temperature	-40°C ... +85°C (125°C optional)
Storage temperature	-45°C ... +90°C (125°C optional)
Weight (stainless steel housing with screw thread and approx. 18cm wires)	approx. 19.5g
Weight in small housing without cable	approx. 7g
Electrical connection	standard: • 3 highly flexible, color-coded wires ø ~1mm, length approx. 18 cm optional: • for sensors in stainless steel housing: 0.5m strong, flexible, shielded cable, 2 wires + shield, ø2,1mm or • 3 flexible, color-coded wires with Teflon insulation for extended temperature range • special lengths on request

• On request: special design for very low power consumption of approx. 30µA

Dimensions (in mm) and Connections

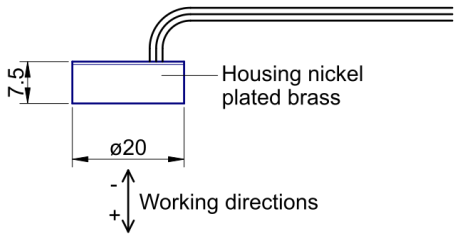


Cable connections:
red: Ub:+5V (stable)
white output signal
shield: GND, (-Ub)
Housing isolated from electronics

Cable or 3 wire connection

3 wire connections:
red: Ub:+5V (stable)
white: output signal
blue: GND, (-Ub)
Housing isolated from electronics

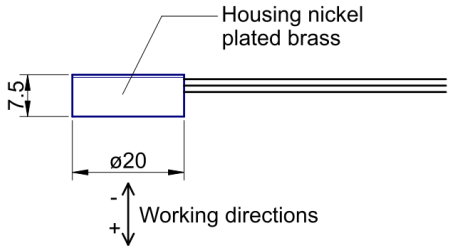
Housing type 1



3 wire connections:

3 wire connections:
red: Ub:+5V (stable)
white: output signal
blue: GND, (-Ub), housing

Housing type 2

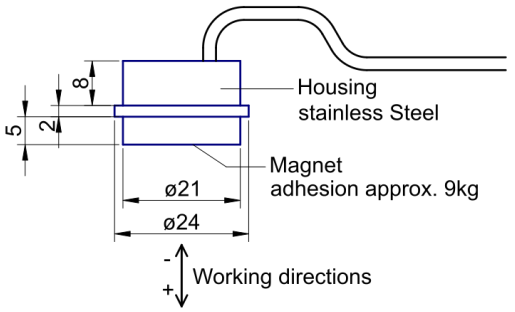


Cable connections:
red: Ub:+5V (stable)
white: output signal
shield: GND, (-Ub), housing

Cable or 3 wire connection

3 wire connections:
red: Ub:+5V (stable)
white: output signal
blue: GND, (-Ub), housing

Housing type 3



Cable connections:
red: Ub:+5V (stable)
white: output signal
shield: GND, (-Ub)
Housing isolated from electronics

Cable or 3 wire connection

3 wire connections:
red: Ub:+5V (stable)
white: output signal
blue: GND, (-Ub)
Housing isolated from electronics

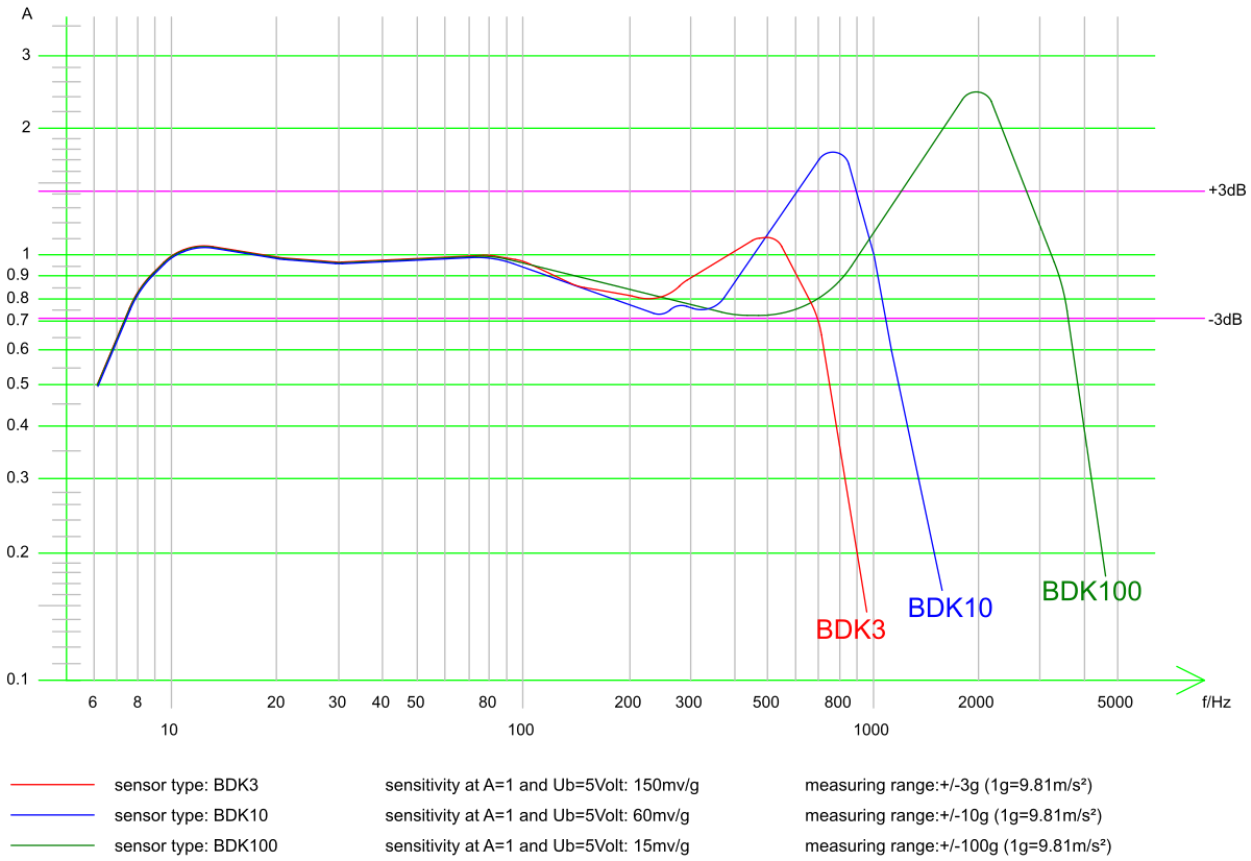
Housing type MAG

Attention! The supply voltage polarity must not be reversed.

Accessory MAGZ1 — lever to detach the magnetic housing

Frequency response

Typical amplitude-frequency characteristics of the SEIKA sensors BDK3, BDK10, BDK100



sensor type: BDK3	sensitivity at A=1 and Ub=5Volt: 150mv/g	measuring range:+/-3g (1g=9.81m/s²)
sensor type: BDK10	sensitivity at A=1 and Ub=5Volt: 60mv/g	measuring range:+/-10g (1g=9.81m/s²)
sensor type: BDK100	sensitivity at A=1 and Ub=5Volt: 15mv/g	measuring range:+/-100g (1g=9.81m/s²)