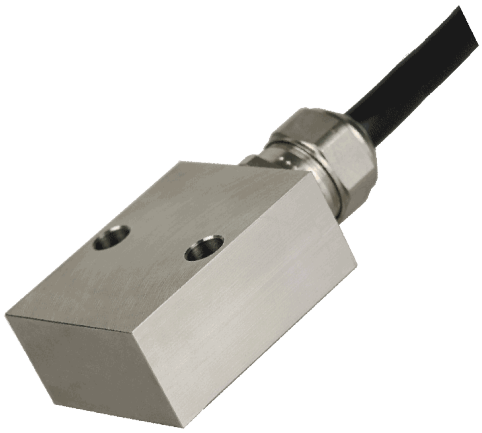
Acceleration sensor type BAM53, flange housing, stainless steel

Measuring principle	Capacitive MEMS sensor
Supply voltage	9...32 VDC
Frequency range	1...20000 Hz (-3 dB)
Measuring range	+/- 50 g oder +/- 100 g
Output signal	Channel 1, measuring range 0...5 V...10 V = - g...0...+ g Channel 2, measuring range 0...5 V...10 V = + g...0...- g Channel symmetric, measurement range +/- 10 V = +/- g
Protection class	IEC 60529, IP66/IP68
Material	Stainless steel



Beschleunigungssensor BAM53

Application range

Acceleration sensors of the BAM#53 series are used to measure the vibration or for evaluating driving comfort and running dynamics of rail vehicles, especially for condition monitoring and predictive maintenance.

Specific features

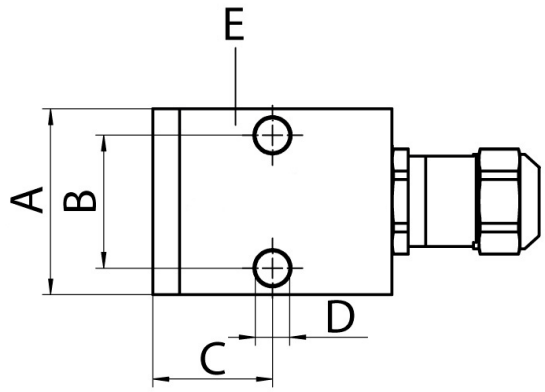
- MEMS sensor, type approved according to railway standard DIN EN 50155
- High accuracy due to very low noise
- Wide frequency range
- Ideal for predictive maintenance
- Robust and compact design, customer-specific connections possible

Measuring principle

A MEMS acceleration sensor consists of stacked plates (minimum 3), which are interconnected by spiral springs. The outer plates are fixed and the inner plates are flexible. The flexibility of these plates is determined by the spiral springs. By this structure, capacitors in series connection with variable capacity emerge. Vibration or acceleration forces lead to a change of the plate distances. As a result, there is an output signal from the sensor that is proportional to the acceleration forces. A phase-sensitive demodulation determines the size and polarity of the output signal.

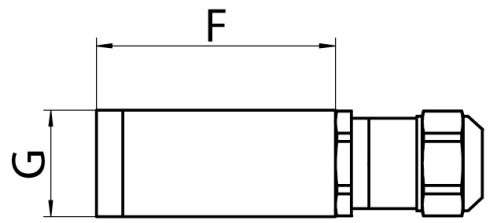
Dimensions, connections and drawings

Dimensions



Explanation to the left illustration:

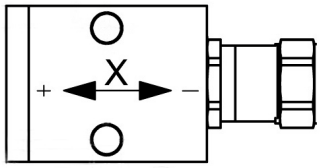
A) 35 mm
B) 25 mm
C) 22.5 mm
D) □6.5
E) Stainless steel flange

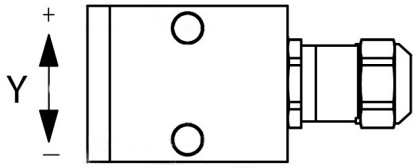


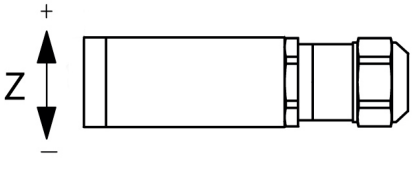
Explanation to the left illustration:

F) 45 mm
G) 19.5 mm

The accelleration sensor BAM53 is available in uniaxial or biaxial design (triaxial on request). Type and number of measuring axes depends on customer's requirements.







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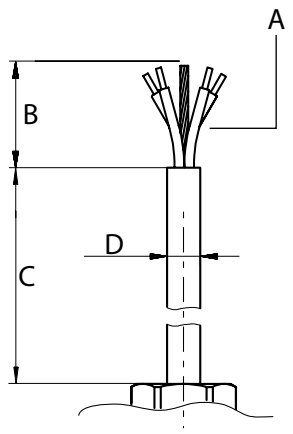
Connection cable and pin assignment

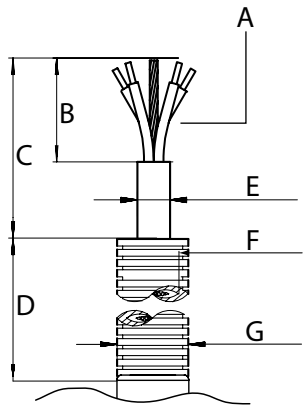
Connection cable type -X with 4 wires (for uniaxial sensors)



Explanation to the left illustration

A) Wires 4 x 0.33 mm², halogen-free
B) Length 80 ±10 mm
C) Length K1 ± 5% (K1 see customer drawing)
D) Ø 7 ±0.5 mm

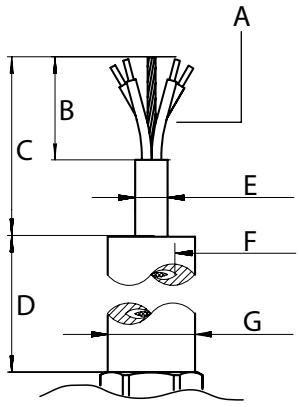
Connection cable type -XP with 4 wires (for uniaxial sensors)



Explanation to the left illustration

A) Wires 4 x 0.33 mm², halogen-free
B) Length 80 ±10 mm
C) Length 200 ±20 mm
D) Length K1 ± 5% (K1 see customer drawing)
E) Ø 7 ±0.5 mm
F) Ø 9.6 ±0.5 mm
G) Ø 13 ±0.5 mm

Connection cable type -XG with 4 wires (for uniaxial sensors)



Explanation to the left illustration

A) Wires 4 x 0.33 mm², halogen-free
B) Length 80 ±10 mm
C) Length 200 ±20 mm
D) Length K1 ± 5% (K1 see customer drawing)
E) Ø 7 ±0.5 mm
F) Ø 9.5 ±0.5 mm
G) Ø 16.5 ±0.5 mm

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Connection assignment type BAMX[..], BAMY[..], BAMZ[..]

Colour	Explanation
Brown	U_S +
Green	U_S - (0V)
White	Signal +
Yellow	Signal -
Shield	Ground

Note on connection cables and pin assignment of the biaxial sensor variant

For further information on connection variants of the biaxial acceleration sensor, please contact our sales department (sales@noris-group.com).

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Technical data

Electrical connection	
Supply voltage	9...32 VDC
Nominal voltage	15 VDC
Current consumption	1…5 mA / Axis @ 24V
Reverse voltage protection	Yes
Over voltage protection	Yes
Connection	Connection cable type X (see customer drawing)
Recommended cable length	< 10 m
Recommended cable type	0.33 mm²
Output signal	Channel 1, measuring range 0...5 V...10 V = - g...0...+ g Channel 2, measuring range 0...5 V...10 V = + g...0...- g Channel symmetric, measurement range +/- 10 V = +/- g
Output stage	Analogue amplifier
Reverse voltage protection	Yes
Internal resistance Ri	100 Ω
Galvanic isolation	No

Signal acquisition	
Measuring principle	Capacitive MEMS sensor
Sensitivity	100 mV/g @ +/- 50 g or 50 mV/g @ +/- 100 g
Measuring range	+/- 50 g oder +/- 100 g
Frequency range	1...20000 Hz (-3 dB)

Environmental influences	
Operating temperature	-40...+105 °C
Storage temperature	Recommended: -25 ... +70 °C; max.: -40 ... +105 °C (max. limit values within 30 days per year @ relative humidity 5...95%)
Protection class - housing	Housing: IEC 60529, IP66/IP68 Connections: Type X: IP66/IP68
Vibration resistance	IEC 61373, 144 m/s² @ 10...500 Hz (Random)
Shock resistance	IEC 60068-2-27, 1000 m/s² @ 6 ms
Climatic test	IEC 60068-2-1, Ad @ -25 °C (-40 °C) IEC 60068-2-2, Be @ 90 °C (105 °C) IEC 60068-2-30, Db-V2 @ 55 °C , 2 cycles
EMI - ESD	IEC 61000-4-2, Lev. 3
EMI - Burst	IEC 61000-4-4, Lev. 3
EMI - Surge	IEC 61000-4-5, Lev. 2 + X
EMI - HF immunity	IEC 61000-4-3, Lev. 3 + X IEC 61000-4-6, Lev. 3
Emitted interference	CISPR 16-1, CISPR 16-2 @ industry

Mechanical properties	
Material - sensor body	Stainless steel
Material - connector/cable	See customer drawing
Mounting	Screw connection
Length / Width / Height	45 mm (without cable fitting) / 35 mm / 19.5 mm
Installation position	Depending on configuration X, Y, Z
Weight	Depending on conncection and cable length

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Type code

Type code structure										
BA	**M**	**X**	**53-**	**1**	**U51**	**S**	**X**	**05**	**-S0**	**Example: BAMX53-1U51SX05-S0**
	Measuring principle									
		Measuring axis								
			Construction type and material							
				Measuring range						
					Output signal					
						Connection outlet				
							Electrical Connection			
								Sheath length		
									Shield	

Type code BAM53										
Measuring principle	**M**	Mems (Micro-Electro-Mechanical System)								
Measuring axis		**X**	Uniaxial X							
		Y	Uniaxial Y							
		Z	Uniaxial Z							
		U	Biaxial X+Y							
		V	Biaxial X+Z							
		W	Biaxial Y+Z							
		D	Triaxial X+Y+Z							
Construction type and material			**53-**	Stainless steel flange						
Measuring range				**1**	+/- 50g					
				2	+/- 100g					
Output signal					**U51**	2 outputs for each measuring channel: Positive output signal 0…10V: -g…+g, Negative output signal 0…10V: +g…-g Symmetrical output signal -10…+10V: -g…+g				
Connection outlet							Without code: straight cable outlet			
						S	Lateral cable outlet			
						R	90° angled cable outlet			
Electrical connection							**X**	Cable end standard (without protective tubing)		
							XGS	Cable end, protective tubing, steel reinforced		
							XGT	Cable end, protective tubing, textile reinforced		
							XP	Cable end, protective tubing, polyamide		
Sheath length								**05-**	Sheath length 2.0 m, halogen-free	
								07-	Sheath length 5.0 m, halogen-free	
								08-	Sheath length 7.5 m, halogen-free	
								09-	Sheath length 10.0 m, halogen-free	
Shield										Without code: Shield attached to the sensor housing
									S0	Shield not attached to the sensor housing
BA	**M**	**X**	**53-**	**1**	**U51**	**S**	**X**	**05-**	**S0**	**Example: BAMX53-1U51SX05-S0**

Special types

If our standard types do not correspond with your expectations, we are pleased to develop a special solution together with you.

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