



# User Manual

## AC-73 Force Balance Accelerometer



## Document Revision

Version	Date	Modification	Prepared	Checked	Released
1	05.12.2012	First issue	MAE	SER	TAB
2	19.12.2012	Pin out	TAB	MAE	TAB
3	20.12.2012	Minor corrections	MAE	TAB	MAE
4	23.09.2013	Minor corrections	JLT	MAE	MAE
5	24.03.2017	Full scale selection for internal version. Details on test pulse input. New Product Picture	JON	PAT	JON
6	08.05.2019	Spelling and Grammar Corrections	VAG	JOG	VAG
7	24.02.2022	Housing drawing update	KEC	ALB	KEC
8	04.08.2022	Updated Chapter 2, connector types	ALM	ALB	KEC
9	03.03.2022	Updated electrical connector information & photos	KEC	ALB	VAG
10	13.05.2024	Added Internal connector pinout picture	ALB	KEC	VAG

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## Warnings and Safety



*The sensor housing provides no protection against explosive atmosphere. It must not be directly operated in area where explosive gases are present.*

## 1. Basic specifications

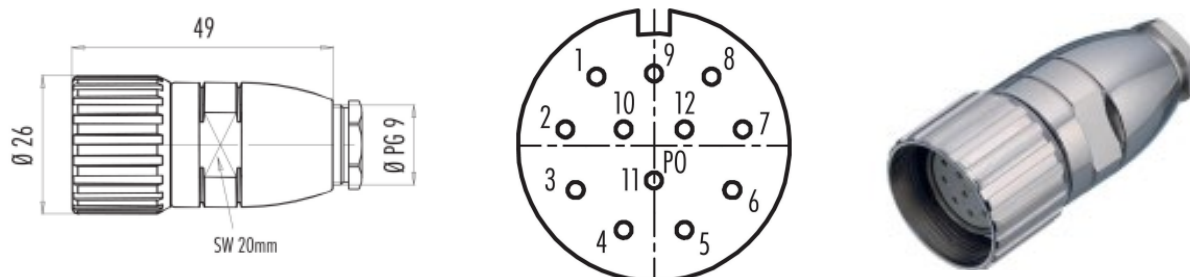
Sensor Series	AC-7x
Input range	Acceleration, $\pm 0.5$ , $\pm 1.0$ , $\pm 2.0$ , $\pm 3.0$ or $\pm 4.0$ g
Output range	$0 \pm 10$ Volt differential output (20 Vpp)
Frequency range	DC to 200 Hz
Protections	All connector pins are over voltage protected by Transzorb diodes
Power supply	9.5 – 18 VDC
Current drain	Average 90 mA @ 15 VDC
Test input range	3-36 VDC

## 2. Electrical Connector

All the AC-7x accelerometers are supplied as standard with a 2 m connection cable. Based on the intended use, the 12-pin metallic-style connectors will be supplied in one of the following options: Binder Serie 623 or Binder Serie 423.

### 2.1. Binder Serie 623

GeoSIG	P/N #J_CIR.012.002.F
Binder Serie 623	99 4606 00 12



**Figure 1, Binder Serie 623 Connector**

The cable gland nut is determined according to external diameter of the cable and must be ordered separately. It must also provide the cable shield connection to the connector case.

2.2. Binder Serie 423 12

GeoSIG	P/N #J_CIR.012.010.M
Binder Serie 423	P/N 99 5629 00 12

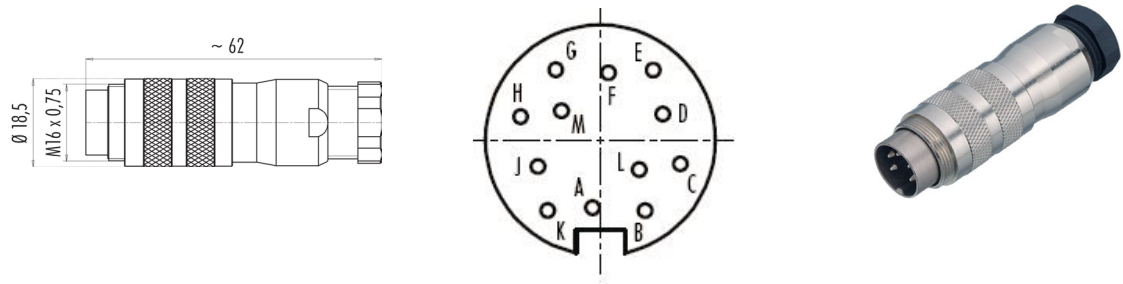


Figure 2, Binder Serie 423 connector

The cable gland nut is determined according to external diameter of the cable and must be ordered separately. It must also provide the cable shield connection to the connector case.

2.3. Internal Connector Pinout

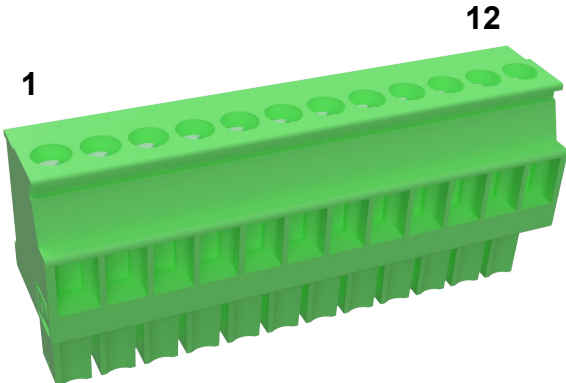
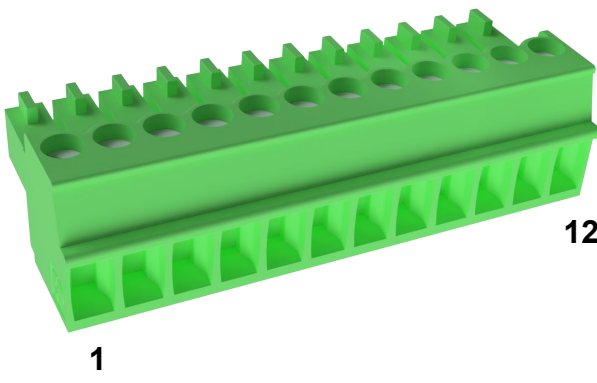
GeoSIG	P/N: #J_WIR.012.003.F	GeoSIG	P/N: #J_WIR.012.002.F
Phoenix Contact	P/N: 1862959	Phoenix Contact	P/N: 1840463
			

Figure 3, Internal sensor connector

## 2.4. Connector Pin Description (Voltage Output)

The connector pin assignment and the standard cable colour code can be observed in the table below:

Connector			SIGNAL	Comment	Colour	
Serie 623	Serie 423	Int. Conn				
Pin	Pin	Pin				
1	A	1	OUTPUT X (+)	0 V $\pm$ 10 V voltage output, 47 $\Omega$ output impedance	White	
2	B	2	OUTPUT X (-)	0 V $\pm$ 10 V voltage output inverted, 47 $\Omega$ output impedance	Brown	
3	C	3	OUTPUT Y (+)	0 V $\pm$ 10 V voltage output, 47 $\Omega$ output impedance	Green	
4	D	4	OUTPUT Y (-)	0 V $\pm$ 10 V voltage output inverted, 47 $\Omega$ output impedance	Yellow	
5	E	5	OUTPUT Z (+)	0 V $\pm$ 10 V voltage output, 47 $\Omega$ output impedance	Grey	
6	F	6	OUTPUT Z (-)	0 V $\pm$ 10 V voltage output inverted, 47 $\Omega$ output impedance	Pink	
7	G	7	TEST INPUT	Test input, output will result in a sensor step response	Blue	
8	H	8	GND	Connected to Recorder's GND	Red	
9	J	9	+12 VDC power	Power input, +9.5 to +18 VDC range, 90 mA @ +15 VDC	Black	
10	K	10	0 VDC power	Power return	Violet	
11	L	11	N/C	Reserved	Grey/Pink	
12	M	12	N/C	Reserved	Red/Blue	

Table 1. AC-7x Connector Pin Assignment and Cable Colour Code

## 2.5. Connector Pin Description (Current Output)

The connector pin assignment and the standard cable colour code can be observed in the table below:

Connector			SIGNAL	Comment	Colour	
Serie 623	Serie 423	Int. Conn				
Pin	Pin	Pin				
1	A	1	OUTPUT X	4 – 20mA current output, X axis	White	
2	B	2	OUTPUT X (Return <sup>1</sup> )	Current loop returns X axis (Normally not used)	Brown	
3	C	3	OUTPUT Y	4 – 20mA current output, Y axis	Green	
4	D	4	OUTPUT Y (Return <sup>1</sup> )	Current loop returns Y axis (Normally not used)	Yellow	
5	E	5	OUTPUT Z	4 – 20mA current output, Z axis	Grey	
6	F	6	OUTPUT Z (Return <sup>1</sup> )	Current loop returns Z axis (Normally not used)	Pink	
7	G	7	TEST INPUT	Test input, output will result in a sensor step response	Blue	
8	H	8	GND (Current Return)	Current common return (recorder GND reference)	Red	
9	J	9	+12 VDC power	Power input, +9.5 to +18 VDC range, 90 mA @ +15 VDC	Black	
10	K	10	0 VDC power	Power return	Violet	
11	L	11	N/C	Reserved	Grey/Pink	
12	M	12	N/C	Reserved	Red/Blue	

Table 2. AC-7x Connector Pin Assignment and Cable Colour Code

<sup>1</sup> Normally the current return pin in #8. Alternative configuration can be provided on request

### 3. Opening the housing

To access the sensor, simply unscrew the four hex screws positioned at each corner of the housing. Once the screws are loosened, carefully lift the sensor lid. When closing the sensor, ensure to handle it with care, avoiding any pressure on the o-ring or wires.



#### **STATIC ELECTRICITY**

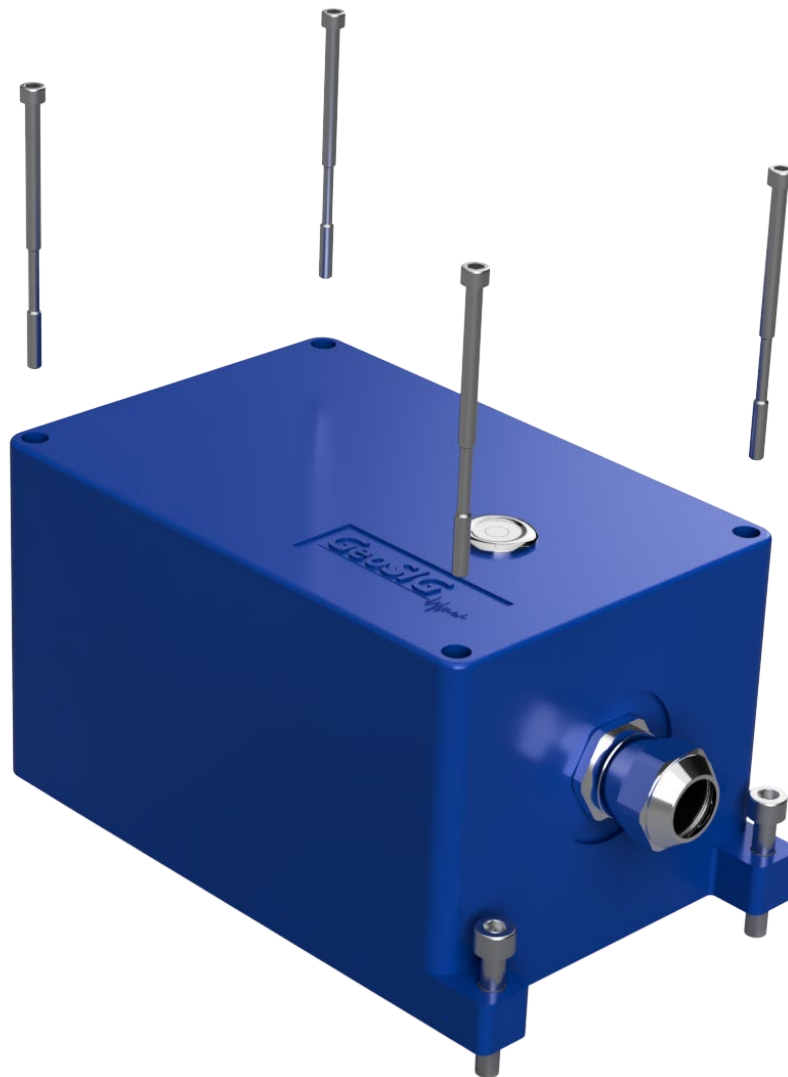
*The instrument contains CMOS devices and when serviced, care must be taken to prevent damage due to static electricity. This is very important to ensure long-term reliability of the unit. Such risk exists when both the instrument cover and the front panel are removed.*



***Under normal circumstances, there is no need to remove the lid of the sensor.  
In any case, only trained person should open the sensor's lid. Moreover, untrained access may lead to serious damage to the instrument, as well as may void the warranty.***

*Before opening the sensor:*

- 1. Turn the unit off*
- 2. Wait for 10 minutes*
- 3. Disconnect all cables connected to the unit*



## 4. Electric Configuration

The full scale is field selectable without gain re-calibration by means of jumpers with fixed 0.1% precise amplifiers.

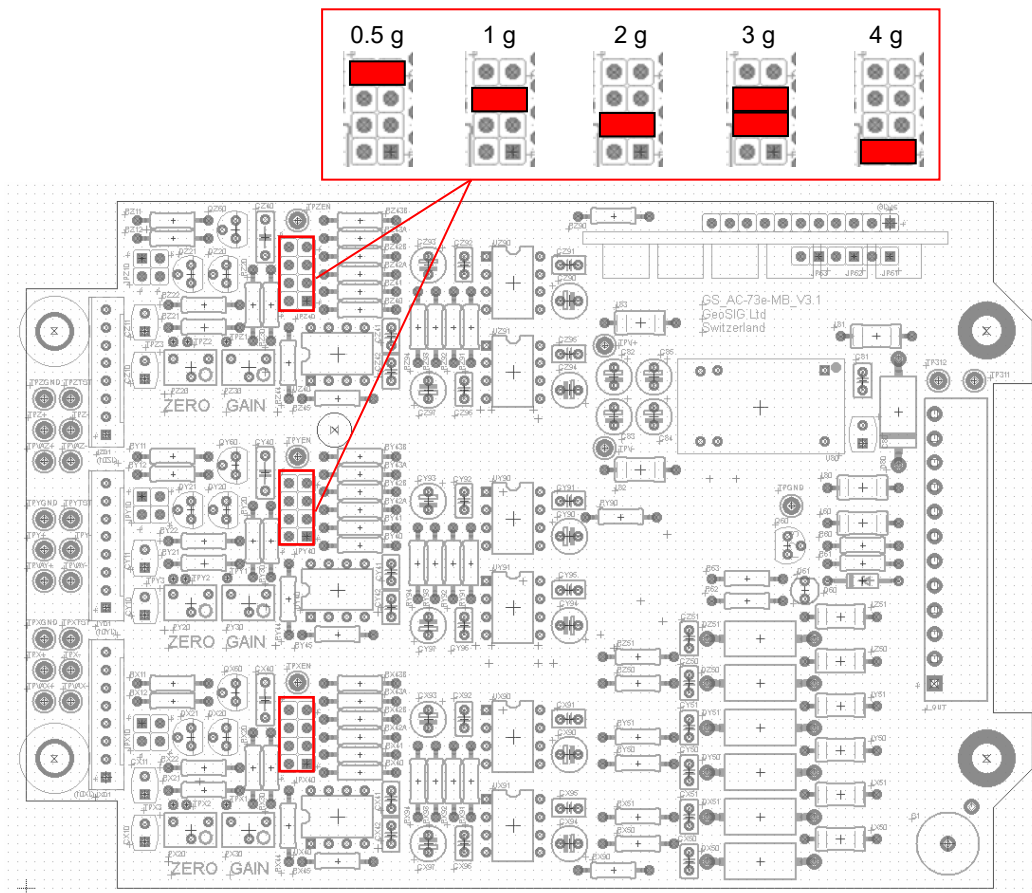


Figure 4. Full scale selection for external AC-7x.

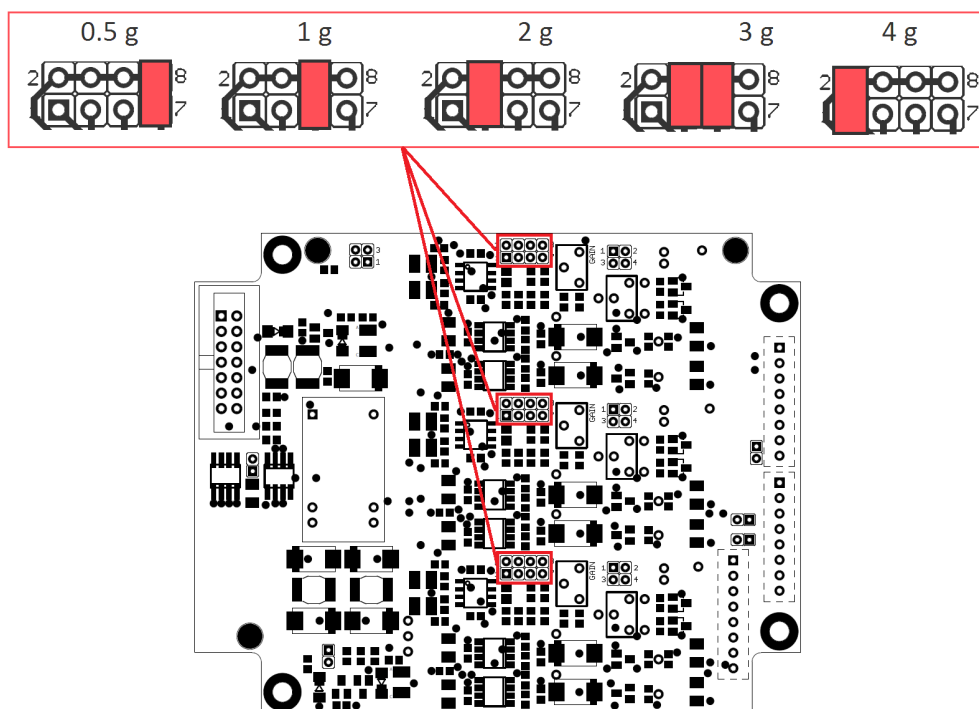


Figure 5. Full scale selection for internal AC-7x.



## 5. Mounting

Small size and single bolt attachment allow the AC-7x to be easily installed, saving installation time. The integrated bubble level simplifies the levelling done by the three-point levelling screws.

The accelerometers must be firmly mounted to a surface and levelled, as the application requires. Check to ensure that the accelerometer is aligned to produce the desired output signals.

Depending on the measurement setup, the sensor axes should be aligned to the monitored structure (any main direction of the structure) or to the coordinate plane (North/South, East/West).

Acceleration in the arrow direction indicated on the case will produce a positive output signal.

In case the sensor will be aligned to the coordinate plane, make sure the surface has a scribed north/south orientation line accurately surveyed from reliable markers. The X-axis of the sensor must be pointed to East or to any other main direction of the structure to monitor. The axes can then be interpreted as following:

- +X = East
- +Y = North
- +Z = Vertical (Up)

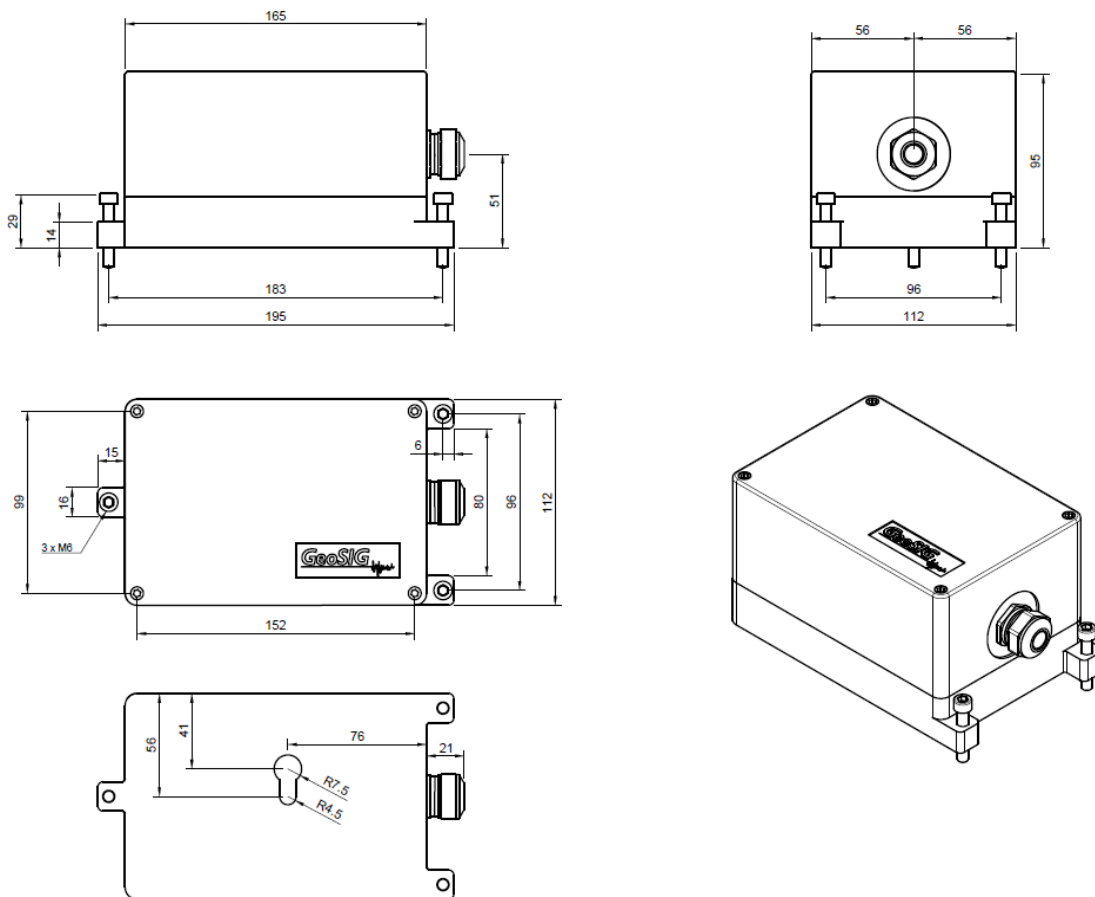


Figure 6, Sensor housing dimensions

The accelerometer has a single-bolt fixation. One M8 expanding nut rock anchor must be used for the sensor fixation.

The screw is applied on the mounting surface using the anchor, and the screw head is left outcropping for 1-2 cm. The sensor then is slotted via the opening under the sensor housing.

Levelling can be done with the help of the bubble level on the housing and the three-point levelling mechanism.



***Do not overtighten the three-point levelling mechanism. This may damage the sensor.***