

AIS 89C2F

- Range ± 50 to ± 6000 g
- Triaxial
- Meets SAE J211 Specification
- Frequency Range (± 5 %) DC to 5000 Hz
- Aluminum Housing
- Protection Class IP67
- Screw Mount M2,5 with Multiple Options
- Repairable
- Engineered for Precision - Built for Extremes

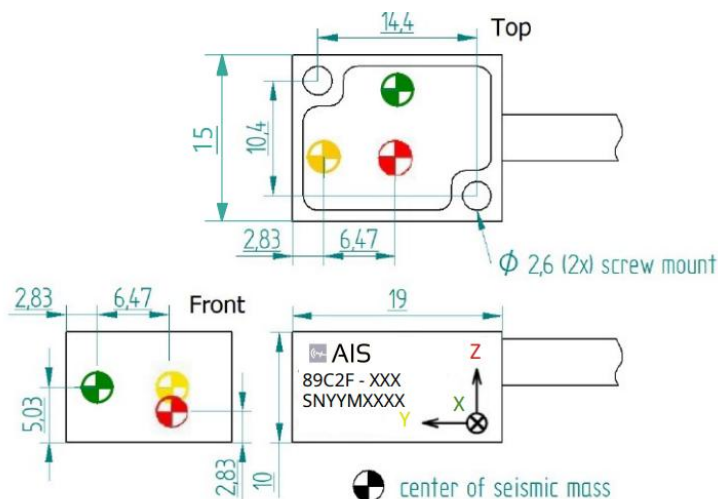


Description

The AIS 89C2F triaxial accelerometer was developed for use under extreme temperature, vibration, and shock conditions. It features gas-damped piezoresistive (PR) MEMS sensing elements that ensure outstanding long-term stability and, with mechanical overload stops, provide shock protection for loads $> 10,000$ g. AIS sensors have proven themselves for more than 20 years in extreme applications such as vehicle crash tests. The sensor elements have a very small inertial mass, which deflects under the influence of acceleration, resulting in a change in resistance (strain gauge principle). The resistors are connected in a Wheatstone bridge, and the output signal varies proportionally to the acceleration. With measurement ranges from ± 50 to $\pm 6,000$ g and a high frequency response, this sensor meets the SAE J211 specification.

Dimensions

- 19 x 15 x 10 mm
- Sensor Weight w/o Cables 6,4 g



Features

- Piezoresistive MEMS Technology
- DC Response
- Gas Damping
- 2-10 VDC Excitation
- Low Power Consumption
- Mechanical Overload Stops

Applications

- Automotive Crash Testing
- Automotive Misuse Testing
- Vibration & Shock Monitoring
- Shock and Impact Testing
- Drop Testing
- Road Vehicle Testing
- Harsh Environments

Options

- Shunt-Resistors
- Dallas-ID (TEDS) with 20 kbit EEPROM
- Direkt Wiring or Connector
- Customized cable length and Labeling
- Customized connector types and pin layouts

Services

- Calibration
- Repair Work
- Signal Conditioning

AIS 89C2F

Technical Data (All Values are typical at +24°C, 80Hz and 5Vdc Supply)

Dynamic		89C2F-050	89C2F-100	89C2F-200	89C2F-500	89C2F-2k	89C2F-6k	Notes
Measurement Range	g	±50	±100	±200	±500	±2000	±6000	
Sensitivity	mV/V/g	0.12 - 0.30	0.06 - 0.12	0.06 - 0.12	0.03 - 0.06	0.012 - 0.03	0,005 - 0,03	Ratio metric
Frequency Response	Hz	0-1.000	0-1.200	0-1.400	0-2.000	0-4.500	0-5.000	±5 %
Natural Frequency	Hz	4000	6000	8000	15000	24000	26000	
Non-Linearity typ.	%	±1	±1	±1	±1	±1	±2	FSO
Transverse Sensitivity	%	<3	<3	<3	<3	<3	<3	typ. <1
Damping Ratio		0,4 - 0,9	0,4 - 0,9	0,2 - 0,6	0,2 - 0,6	0,05 - 0,3	0,05 - 0,3	
Shock Limit	g	5.000	5.000	5.000	10.000	10.000	10.000	

Electrical

Zero Acceleration Output typ.	mV	25						Differential
Supply Voltage	Vdc	2 to 10						
Input and Output Resistance	Ohm	3.000-5.000						
Insulation Resistance	MOhm	>100						@50V
Residual Noise Maximum	µV RMS	10						Max.
Ground Isolation isolated from Mounting Surface								

Environmental

Thermal Zero Shift	%FSO/°C	-0,09						Typical
Thermal Sensitivity Shift typ.	%/°C	-0,15						Typical
Operating Temperature Uncompensated	°C	-55 to +125						
Compensated Temperature		Uncompensated						
Storage Temperature	°C	-55 to +125						
Humidity		Sealed						

Physical

Material Housing	Aluminum							
Weight Sensor	g	6,4						w/o Cable
Weight Cable 15 Wire	g/m	30		15-wire, polyurethane, 85 shore A, 15 x 0,061 mm², Shield plated (0.10 mm) tinned copper				
Weight Cable 6 Wire	g/m	12,5		6-wire, polyurethane, 87 shore A, 6 x 0,064 mm², Shield plated (0.08 mm) tinned copper				
Protection Class	IP	67						
Mounting Type	Screw Mount, Glue Mount, Magnet Mount with Adapter							
Size l	mm	19						
Size w	mm	15						
Size h	mm	10						
Diameter Cable 15 Wire	mm	4,4 ±0,1						
Diameter Cable 6 Wire	mm	3,0 ±0,1						
Diameter Cable Split	mm	15,0 ±0,3						

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Calibration

Factory Calibration Sinus (Included with the Sensor)

Measurement Range Sensor	g	±50	±100	±200	±500	±2000	±6000
Order No.		12876	12875	12874	12873	10070	12872
Frequency	Hz	0-1.000	0-1.200	0-1.400	0-2.000	0-4.500	0-5.000
Amplitude	g	20	20	20	20	20	20
Reference Frequency	Hz	80	80	80	80	80	80

Factory Calibration Shock

Order No.: 12512 | Amplitude: 40 – 200 g | Measurement Points: 10
Order No.: 12283 | Amplitude: 200 – 2000 g | Measurement Points: 10
Order No.: 12878 | Amplitude: 200 – 6000 g | Measurement Points: 10

Notes:

We recommend annual recalibration to ensure the sensor remains suitable for measurement use.
After overload, repair, or changes to the wiring, we strongly recommend recalibrating the sensor.
Calibrations according to customer specifications can be performed at any time, subject to consultation and technical feasibility.

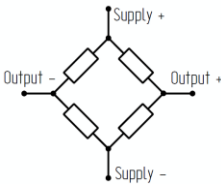
Connection Assignment

The standard integrated cable has 15 wires, is 6 meters long, and has open ends (12-wire).
Optionally, the cable can be supplied with a cable splitter and 3 x 6-wire leads (with cable splitter).
Other cable lengths and configurations are available.

Cable Code 12X3

12 Wire with Cable Split - Separate power supply for all axes

	X-Axis	Y-Axis	Z-Axis
Supply +	Red	Red	Red
Supply - (GND)	Black	Black	Black
Output +	Green	Green	Green
Output -	White	White	White



Cable Code 8

8 Wire - joint power supply for all axes

	X-Axis	Y-Axis	Z-Axis
Supply +	Red	Red	Red
Supply - (GND)	Black	Black	Black
Output +	Green/Orange	Green/Blue	Green
Output -	White/Orange	White/Blue	White

Cable Code 12

12 Wire - Separate power supply for all axes

	X-Axis	Y-Axis	Z-Axis
Supply +	Red/Orange	Red/Blue	Red
Supply - (GND)	Black/Orange	Black/Blue	Black
Output +	Green/Orange	Green/Blue	Green
Output -	White/Orange	White/Blue	White

Order Information

The cabling can generally be customized entirely to the customer's specifications and is assigned a corresponding code in the accompanying documentation.

Type	Measurement Range [±g]	Cable Length [m]	Connector Type	Pin-Layout	Configuration
AIS 89C2F	050	6	A	0	12 Separate power supply for all axes
	100				8 joint power supply for all axes
	200				12X3 Cable Split - Separate power supply for all axes
	500				
	2K				
	6K				

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Installation

The individual axis directions are marked on the housing, with positive acceleration defined as acceleration in the direction of the axis arrow.

The sensor must be mounted on a stable, level surface, and all screws must be tightened; alternatively, the sensor can be glued or secured with a suitable magnet, taking care to avoid any deformation of the sensor housing, as this can negatively affect the measurement result.

The sensor is equipped with a robust housing to provide the best possible protection for the sensor elements and electronics; improper handling and excessive strain can lead to damage that may not be immediately apparent and could cause electrical failures or reliability issues.

Always handle the sensor, cable, and connector with care; even though the sensor is specifically designed for harsh applications, impacts and shocks to the housing, such as from being dropped or struck with a hammer, can damage or destroy the sensor.

Tensile stress on the cable should generally be avoided and prevented by using appropriate strain reliefs.

Use the sensor only under the specified environmental conditions, and transport and store the sensor in protective packaging suitable for sensors (padded and ESD-protected).

Operation

The sensors are compatible with standard data acquisition systems; however, the user is responsible for selecting the appropriate measuring instrument and must ensure that the sensor is used within the specified electrical parameters.

The sensor connections are susceptible to damage from electrostatic discharge (ESD).

Improper wiring of the sensor connections will cause damage, and no modifications may be made to the sensor itself.

Ensure that the sensor and the connection cable are properly shielded and avoid ground loops.

Do not modify the wiring or pin assignments while the system is energized.

Before use, verify the plausibility of the measurement signal, e.g., by performing a ± 1 g test.

Safety Instructions for Installation and Operation

This data sheet is an integral part of the product. Read it carefully before using the product and keep it accessible for future reference throughout its entire service life.

Handling of the product, electrical connections, installation, and all other work on the product must be performed exclusively by authorized qualified personnel.

Take appropriate safety precautions to eliminate any risk of personal injury or damage to equipment resulting from a sensor malfunction.

Engineered for Precision - Built for Extremes

AIS GmbH manufactures industrial-grade sensors that maintain their accuracy even under extreme forces, shocks, and vibrations. Our products are trusted in critical applications where durability and measurement accuracy are of paramount importance. Through exceptionally high manufacturing quality, strict testing standards, and application-oriented development based on many years of experience,

AIS GmbH ensures long-term reliability even in the harshest operating environments. Our sensor solutions have proven themselves for many years in the fields of development and testing in the automotive industry, rail transportation, aviation, and defense technology.

All products are designed for durability and serviceability, and we offer complete solutions, including consulting, accessories, calibration, and application-specific custom solutions.

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