Capacitive Accelerometer - Triaxial

AIS 5525L

- Range ±2 to ±400 g
- Triaxial
- Extreme Robust Stainless Steel Housing
- Low Noise 7 to 400 µg/√Hz
- Frequency Range (±5 %) 0 to 2000 Hz
- Protection Class IP64
- Screw Mount
- Repairable
- Engineered for Precision - Built for Extremes

Description

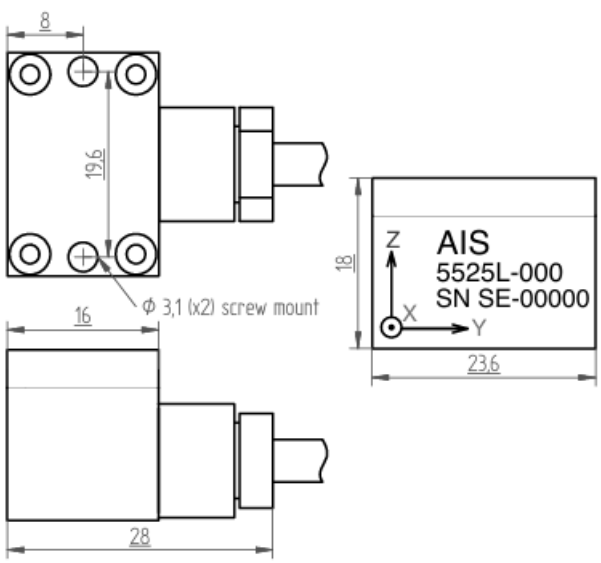
The AIS 5525L three-axis MEMS accelerometer, featuring variable capacitance (VC), is an extremely precise and reliable measurement device suitable for a wide range of demanding applications. It excels in low- to mid-frequency applications, particularly where reliable performance, extremely low noise, relative insensitivity to temperature changes, and high long-term stability are absolute requirements. It features three orthogonally arranged, low-noise sensors in a single, robust, epoxy-sealed housing made of stainless steel. Thanks to integrated voltage regulation and an internal voltage reference, no precision power supplies are required. The integrated electronics provide a choice of either a differential or single-ended analog voltage output.

Features

- Triaxial MEMS-Variable Capacity Technology (VC)
- Differential Output Signal ±4 V
- Flexible Power Supply +6 bis +36 VDC
- High Shock Resistance
- Operating Temperature -55 bis +125 °C
- Temperature Compensated from -55 °C to +125 °C
- Excellent Scale Factor Stability
- Excellent Linearity typ. 0.15 % of FSO
- Excellent Long-Term Stability

Dimensions

- 16 (28) x 23,6 x 18 mm
- Sensor Weight w/o Cables 39 g



Applications

- NVH testing
- Structural Durability Testing
- Vehicle Dynamics and Comfort Testing
- Machine monitoring
- Seismic Measurements
- Vibration Testing
- Structural Monitoring

Options

- 0,5-4,5 V Single Ended Output
- 4–20 mA Current Output
- 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

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Technical Data

(All Values are typical at +24°C, V_{DD} =V_R =5.0 VDC, T_C =25°C, Differential. Span = ±g range = 8000mV

Dynamic		5525L-002	5525L-005	5525L-010	5525L-025	5525L-050	5525L-100	5525L-200	5525L-400	Notes
Measurement Range	g	±2	±5	±10	±25	±50	±100	±200	±400	
Sensitivity (Scale Factor) Differential	mV/g	2000	800	400	160	80	40	20	10	Single ended is half value
Frequency Response	Hz	0- 250	0 - 400	0 - 700	0 - 1300	0 - 1600	0 - 1700	0 - 1900	0 - 2000	Typical ±5 %
Frequency Response	Hz	0 - 525	0 - 800	0 - 1100	0 - 1750	0 - 2100	0 - 3000	0 - 3600	0 - 4200	Typical ±3 dB
Non-Linearity	±% FSO	<0,15 (typ) and <0,5 (max.)								±90% FSO
Transverse Sensitivity	±%	<2 (typ) and <3 (max.)								Typical
Output Noise	µg/√Hz	7	12	18	25	50	100	200	400	Differential

Electrical			
Supply Voltage	Vdc	6 to 36	Chip 5 VDC
Operating Current	mA	<10 per axis	I_{DD}+I_{VR}
Bias (Offset) Error	mV	< ±80 / < ±80 / < ±50 / < ±50 / < ±50 / < ±50 / < ±50 / < ±50	Typical
Output Impedance	Ohm	90	Typical
Long Term Scale Factor Stability	±ppm	500 typical and 1000 max.	
Isolation		electronic circuit isolated from sensor housing, Sensor housing and cable shield are not connected	

Environmental										
Bias (Offset) Temperature Shift	±ppm of Span/°C	50 typical and +200 max.								
Sensitivity (Scale Factor) Temperature Shift	±ppm/°C	-200 min. and +200 max.								
Operating Temperature	°C	-55 to +125								
Storage Temperature	°C	-55 to +125								
Shock Limit	g	2000	2000	5000	5000	5000	5000	5000	5000	Max. peak (0,1 ms)
Humidity		Sealed								

Physical			
Material Housing	Stainless Steel		
Weight Sensor	g	39	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	64	
Mounting Type	Screw Mount, Glue Mount, Magnet Mount with Adapter		
Size l	mm	16 (28)	
Size w	mm	23,6	
Size h	mm	18	
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 (Included with the Sensor)

Measurement Range Sensor	g	±2	±5	±10	±25	±50	±100	±200	±400
Order No.		12495	12858	12895	12860	12861	12862	12863	12864
Frequency	Hz	10 - 250	10 - 400	10 - 700	10 - 1300	10 - 1600	10 - 1700	10 - 1900	10 - 2000
Amplitude	g	1	3	5	5	5	10	10	10
Reference Frequency	Hz	16	16	80	80	80	80	80	80
Measurement Points		3x16	3x22	3x22	3x22	3x22	3x22	3x22	3x22

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. For example, we also offer calibrations in the low-frequency range of 0.4 Hz – 160 Hz and up to 5 m/s².

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 5525L	002	6	A	0	12	Separate power supply for all axes
	005				8	joint power supply for all axes
	010				12X3	Cable Split - Separate power supply for all axes
	025					
	050					
	100					
	200					
	400					

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

AIS GmbH triaxial variable-capacitance (VC) MEMS accelerometers deliver optimal performance when connected to data acquisition systems in a differential configuration; at zero acceleration, the differential output voltage is nominally 0 volts DC, and at rated acceleration, the output is ±4 volts DC. The output scaling factor is independent of the supply voltage, which ranges from +6 to +36 VDC.

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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