

MEMS Capacitive Accelerometer



ASC 4421-MF / ASC 4425-MF

- ▶ Uniaxial
- ▶ MF (Medium Frequency; DC to 2.5 kHz)
- ▶ 4 Wire System
- ▶ Amplified Output
- ▶ Aluminium Housing / Stainless Steel Housing
- ▶ Made in Germany



Features

- ▶ Range: $\pm 2g$ to $\pm 200g$
- ▶ DC Response
- ▶ Gas Damped
- ▶ Excellent Bias and Scale Factor Stability
- ▶ Low Power Consumption
- ▶ Differential Mode

Options

- ▶ Customised Cable Length
- ▶ Customised Connector
- ▶ TEDS Module

Applications

- ▶ Structural Monitoring and Testing
- ▶ Endurance Testing
- ▶ Brake Test
- ▶ Vibration Monitoring
- ▶ Civil Engineering
- ▶ Modal Analysis
- ▶ Vehicle Testing
- ▶ Automotive Ride Quality & Comfort
- ▶ Railway Engineering
- ▶ Flutter Test
- ▶ Seismic Monitoring
- ▶ Tilt Measurements

Capacitive MEMS Technology

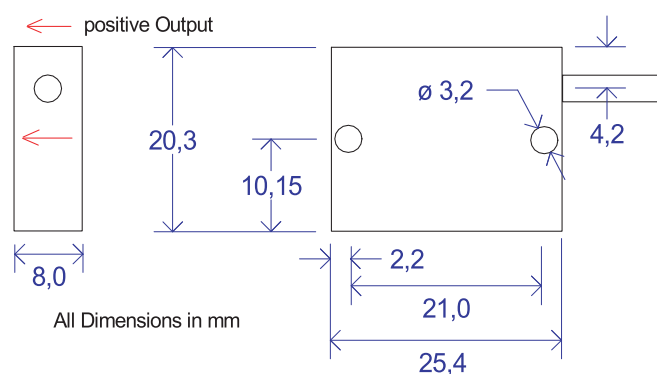
ASC's Medium Frequency (MF series) capacitive accelerometers are based on the capacitive sensing technology and produce an analog voltage proportional to the input acceleration. The accelerometers can measure both static (gravity) and dynamic accelerations. ASC's MF series can be used for very low to medium frequency vibration measurements from 0Hz to 2.5kHz. The MF series features a MEMS sensor element where the seismic mass is connected between two conductive capacitor plates. When subjected to an input acceleration, the seismic mass oscillates between the two capacitor plates and there is a change in the capacitance. This change in capacitance is converted via an ASIC (Application Specific Integrated Circuit) into a low impedance analog voltage output signal.

Description

ASC's MF series capacitive accelerometers, 4421-MF and 4425-MF, are analog voltage output sensors. The sensors can be powered by a DC power supply (+7V to +40V) where the output voltage is independent of the supply. The sensors operate in a differential configuration with $\pm 2.7V$ full-scale output. For the full-scale acceleration range, the output swings between 0.3V and 3V. The differential configuration results in an improved S/N ratio and a better performance.

ASC Type 4421-MF and 4425-MF operate in a wide temperature range from $-40^{\circ}C$ to $+125^{\circ}C$. The sensors exhibit exceptional temperature stability, very low non-linearity ($<0.5\%$) and can withstand repetitive shocks as high as $6000g$'s.

ASC Type 4421-MF features a lightweight Aluminium housing and Type 4425-MF features a rugged, corrosion proof stainless steel housing. The sensors are supplied with 6m integral cable as a standard.



Typical Specifications

DYNAMIC

		Range (\pm g)						
		2	5	10	30	50	100	200
Sensitivity	mV/g	1350	540	270	90	54	27	13.5
Frequency response: \pm 5%	Hz	700	700	1400	1600	1800	1800	1800
Amplitude non-linearity	% FSO	<0.5						
Transverse sensitivity	%	<3						
Shock limit	g _{pk}	6000 (0.1ms, half-sine)						
Recovery time	ms	1						

ELECTRICAL

Excitation voltage	V DC	7 to 40						
Supply current	mA	10						
Zero acceleration output	\pm mV	50						
Output Impedance	Ω	300						
Isolation		Case Isolated						
Spectral noise	μ g/ \sqrt Hz	10	20	35	100	170	340	680
Residual / Broadband noise (\pm 5% frequency range)	μ V	360	290	360	360	390	390	390

ENVIRONMENTAL

Temperature coefficient of sensitivity (Thermal sensitivity shift)	%/ $^{\circ}$ C	0.01						
Temperature coefficient of bias (Thermal zero shift)	mg/ $^{\circ}$ C	0.2	0.5	1	3	5	10	20
Operating temperature range	$^{\circ}$ C	-40 to +125						
Storage temperature range	$^{\circ}$ C	-55 to +125						
Humidity/Sealing		Epoxy sealed						

PHYSICAL

Sensing element		MEMS Capacitive						
Case material		Aluminium/Stainless Steel						
Connector (at cable end)		Optional						
Mounting		Adhesive/screw holes						
Weight (without cable)	gram	ASC 4421-MF: 10 ASC 4425-MF: 22						
Cable		12 gram/meter PUR; AWG 30; Diameter: 3mm						

FACTORY CALIBRATION (SUPPLIED WITH THE SENSOR)

Range	2g and 5g	10g	30g	50g to 200g
Sensitivity	at 16Hz and 0.5g	at 80Hz and 5g	at 80Hz and 15g	at 80Hz and 20g
Frequency Response min. 5%	1 to 200Hz	10 to 1400Hz	10 to 1600Hz	10 to 1800Hz

CALIBRATION DIN ISO 17025 (ORDER SEPARATELY)*

Range	2g and 5g	10g	30g	50g to 200g
Sensitivity	at 16Hz and 0.5g	at 80Hz and 5g	at 80Hz and 15g	at 80Hz and 200g
Frequency Response	0.5 to 200Hz	10 to 2000Hz	10 to 2300Hz	10 to 2500Hz

Cable Code/Pin Configuration

Red Supply +

Black Supply -

Green Signal +

White Signal -

ORDERING INFORMATION

ASC	4421-MF	002	6	A
	Model number	Range (Ex. 050 is 50g)	Cable length (meters)	Connector & Pinout
				A: no connector

* accredited by the German accreditation body (Deutsche Akkreditierungsstelle, DAkkS) to DIN EN ISO / IEC 17025