

**g** ASC 4425MF  
MEMS Capacitive Accelerometer



**SPECIFICATIONS**

- 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**

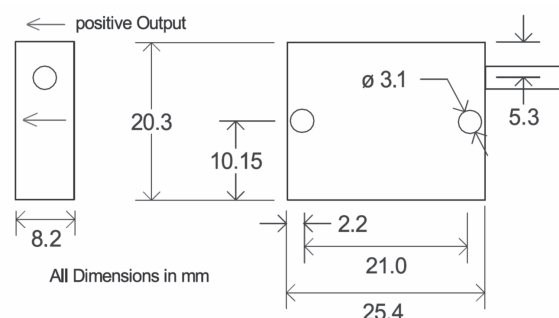
ASC's Medium Frequency (MF series) capacitive accelerometers are based on the capacitive sensing technology and produce an analog voltage proportional to the input acceleration. The accelerometers can measure both static (gravity) and dynamic accelerations. ASC's MF series can be used for very low to 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, 4421MF and 4425MF, are analog voltage output sensors. The sensors can be powered by a DC power supply (+5V 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 4421MF and 4425MF 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 4421MF features a lightweight Aluminium housing and Type 4425MF 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 <sub>pk</sub> | 6000 (0.1ms, half-sine) |     |      |      |      |      |      |
| Recovery time                | ms              | 1                       |     |      |      |      |      |      |

**ELECTRICAL**

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

**ENVIRONMENTAL**

|  |                  |             |     |   |   |   |    |    |
|--|------------------|-------------|-----|---|---|---|----|----|
| Temperature coefficient<br>of sensitivity<br>(Thermal sensitivity shift) | %/ $^{\circ}$ C  | 0.01        |     |   |   |   |    |    |
| Temperature coefficient<br>of bias<br>(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   |                  | IP67        |     |   |   |   |    |    |

**PHYSICAL**

|                          |      |  |  |  |  |  |  |  |
|--------------------------|------|--|--|--|--|--|--|--|
| Sensing element          |      | MEMS Capacitive  |  |  |  |  |  |  |
| Case material            |      | Aluminium/Stainless Steel  |  |  |  |  |  |  |
| Connector (at cable end) |      | Optional   |  |  |  |  |  |  |
| Mounting                 |      | Adhesive/screw holes   |  |  |  |  |  |  |
| Weight (without cable)   | gram | ASC 4421MF: 10<br>ASC 4425MF : 22  |  |  |  |  |  |  |
| Cable                    |      | 12 gram/meter PUR; Li6YD11Y-T150 5*0.06mm <sup>2</sup> (AWG 30); Diameter: 2.9 $\pm$ 0.2mm |  |  |  |  |  |  |



**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 100Hz       | 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 20g |
| Frequency Response | 0.5 to 150Hz     | 10 to 2000Hz   | 10 to 2300Hz    | 10 to 2500Hz    |

**CABLE CODE / PIN CONFIGURATION**

|  |                        |                        |
|--|------------------------|------------------------|
|  | <i>Red: Supply +</i>   | <i>Green: Signal +</i> |
|  | <i>Black: Supply -</i> | <i>White: Signal -</i> |

**ORDERING INFORMATION**

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

Example: ASC 4421MF-002-6A