

Piezoelectric Charge Accelerometer Types 4393 and 4393-V

Uses

- High-level, high-frequency measurements
- Vibration testing and analysis
- Shock measurements
- Measurements on delicate structures, in confined spaces or in high-temperature environments

Features

- Small size
- Low weight
- Very high resonance frequency

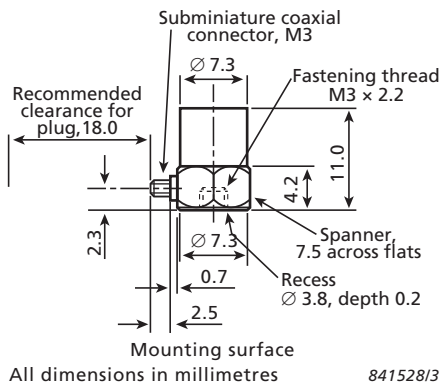


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Description

Type 4393 is a miniature DeltaShear™ Unigain* accelerometer with a low weight and high resonance frequency. It has an M3 side connector and an M3 threaded hole for mounting. Type 4393-V† has the same specifications and long-term stability as Type 4393, but it has a relaxed sensitivity tolerance.

Fig. 1 Dimensions of Type 4393



Characteristics

This piezoelectric accelerometer may be treated as a charge source. Its sensitivity is expressed in terms of charge per unit acceleration (pC/ms^{-2} , pC/g).

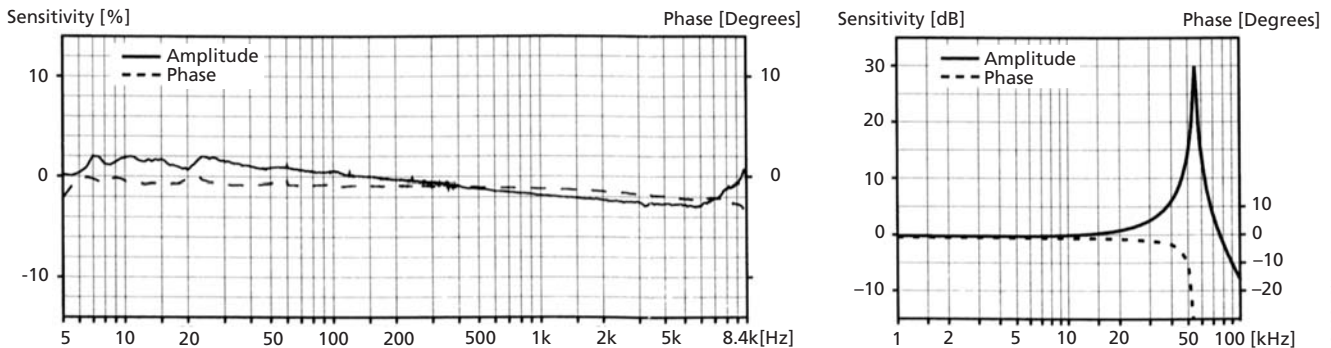
The DeltaShear design consists of three piezoelectric elements and three seismic masses arranged in a triangular configuration around a triangular centre post. They are held in place by a clamping ring that isolates the configuration from the base. The ring also prestresses the piezoelectric elements to give a high degree of linearity. This design provides a high sensitivity-to-mass ratio, a relatively high resonance frequency and high isolation from base strains and temperature transients.

The piezoelectric element used in Type 4393 is PZ 23, and the housing material is titanium.

Calibration

The sensitivity is calibrated to a convenient value such as 1, 3.16 or $31.6 \text{ pC}/\text{ms}^{-2}$ for Unigain accelerometers. The sensitivity given in the calibration chart has been measured at 159.2 Hz with 95% confidence level, using the coverage factor $k = 2$.

Fig. 2 Individual frequency (left) and typical high-frequency (right) response curves for Type 4393



* Unigain: The individual measured sensitivity is within $\pm 2\%$ of the specified sensitivity

† V-type: The individual measured sensitivity is within $\pm 15\%$ of the specified sensitivity

Specifications – Charge Accelerometer Types 4393 and 4393-V

All values are typical at 25 °C (77 °F) unless measurement uncertainty is stated

Type Number		4393	4393-V
General			
Weight	g	2.4	
	oz	0.085	
Charge Sensitivity (at 159.2 Hz)	pC/ms ⁻²	0.316 ±2%	0.316 ±15%
	pC/g	3.10 ±2%	3.10 ±15%
Frequency Range (±10% limit)	Hz	0.1 to 16500	
Mounted Resonance Frequency	kHz	55	
Max. Transverse Sensitivity (at 30 Hz, 100 ms ⁻²)	%	<4	
Transverse Resonance Frequency	kHz	18	
Max. Operational Continuous Sinusoidal Acceleration (peak)	kms ⁻²	50	
	g	5000	
Electrical			
Residual Noise Level (measured with NEXUS Type 2692-001 in the specified frequency range)	mms ⁻²	5.2	
	mg	0.52	
Capacitance (excluding cable)	pF	590	
Min. Leakage Resistance (at 20 °C)	GΩ	20	
Environmental			
Operating Temperature Range	°C	-74 to +250	
	°F	-101 to +482	
Temperature Coefficient of Sensitivity	%/°C	0.05*	
Temperature Transient Sensitivity (3 Hz Low. Lim. Freq. (-3 dB, 6 dB/octave))	ms ⁻² /°C	5	
	g/°F	0.28	
Base Strain Sensitivity (at 250 µε in the base plane)	ms ⁻² /µε	0.005	
	g/µε	0.0005	
Magnetic Sensitivity (50 Hz, 0.038 T)	ms ⁻² /T	30	
	g/kG	0.3	
Max. Non-destructive Shock (± peak)	kms ⁻²	250	
	g	25000	
Mechanical			
Housing Material		Titanium ASTM Grade 2	
Piezoelectric Sensing Element		PZ 23	
Construction		DeltaShear	
Sealing		Welded	
Electrical Connector		M3	
Mounting		M3 × 2.2 mm threaded hole	
Mounting Torque	Max.	Nm (lbf·in)	1.0 (8.8)
	Min.		0.3 (2.7)

* In the temperature range -25 to +125 °C (-13 to +257 °F)

COMPLIANCE WITH STANDARDS



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Ordering Information

Type 4393

includes the following accessories:

- Carrying box
- Calibration chart
- AO-0283-D-012: Super low-noise coaxial cable, M3 to 10–32 UNF, length 1.2 m
- YQ-2003: Set screw, stainless steel, hex socket with cup point, M3 × 5 mm

Type 4393-V

includes the following accessories:

- Carrying box
- Calibration chart
- YQ-2003: Set screw, stainless steel, hex socket with cup point, M3 × 5 mm

Optional Accessories	
AO-0283-x-yyy*	Super low-noise coaxial cable, M3 to 10–32 UNF, 250 °C (482 °F)
AO-0339-x-yyy*	Flexible low-noise coaxial cable, M3 to 10–32 UNF, 250 °C (482 °F)
AO-1381-x-yyy*	Flexible double-screened, low-noise cable, M3 to 10–32 UNF, 250 °C (482 °F)
DB-0757	Cementing stud, M3, dia. 8.0 mm
JJ-0032	Adapter, 10–32 UNF connectors
JP-0162	Plug adapter, 10–32 UNF to TNC
QA-0041	Tap for M3 thread
QA-0042	Hexagonal key for M3 studs
QS-0007	Tube of cyanoacrylate adhesive
UA-0629	Accelerometer accessory set
UA-1075	Mounting magnet and two insulating discs, M3, dia. 10 mm, length 1.6 mm (set of five)
UA-1216	Insulated stud, double end, M3 × 5.4 mm
YJ-0216	Beeswax for mounting
YQ-2003	Set screw, stainless steel, hex socket, cup point, M3 × 5 mm
YQ-2007	Set screw, stainless steel, hex socket, cup point, M3 × 8 mm
Type 4294	Vibration Exciter
Calibration Services	
ACC-M-CAI	Accredited initial calibration
ACC-M-CAF	Accredited calibration
ACC-M-CFF	Factory standard calibration
ACC-M-CTF	Traceable calibration

* x = D (decimetres) or M (metres)
 yyy = length in decimetres or metres
 Please specify cable length when ordering

