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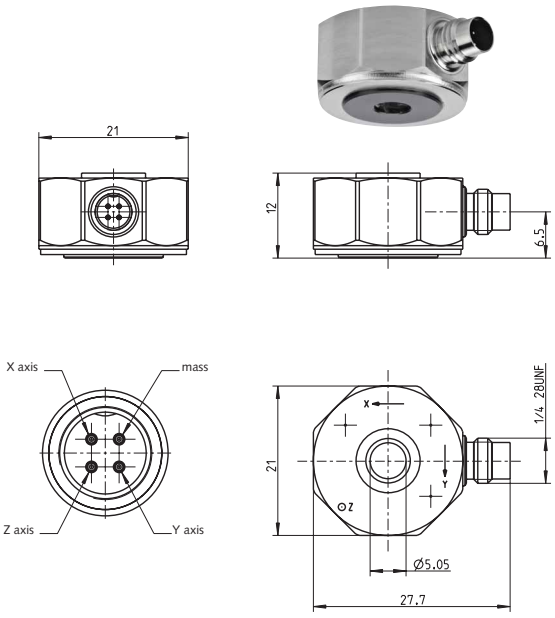
PiezoStar® Accelerometer

Type 8781A50...

IEPE Triaxial Accelerometer with Center-hole Mounting Capability Intended for NVH Investigations

Type 8781A50... triaxial accelerometer measures vibrations in three orthogonal axis. It is available in measurement range of ±50 g with a sensitivity of 100 mV/g.

- PiezoStar measuring element
- TEDS option
- Hermetic Titanium construction
- Very low temperature sensitivity
- Low base strain sensitivity
- Voltage output
- Low 13 gram mass
- Conforming to CE



Description

Type 8781A50... is an IEPE triaxial accelerometer designed for applications with large temperature changings. It uses Kistler's PiezoStar shear element design which provides wide operating frequency range and extremely low sensitivity to temperature changes. The IEPE sensor combines PiezoStar crystals and high gain integral hybrid microelectronics to achieve very low sensitivity variation over the operating temperature range, compared to other sensing element designs. The Kistler shear element technology also ensures high immunity to base strain errors. The accelerometer uses a welded titanium construction for low mass and an industry standard 4 pin connector for reliable measurements and long-term stability especially at higher operating temperatures.

Application

The accelerometer is designed for NVH investigations, mainly in the power train for vehicle testing and for measurements at joints between aggregates and the car body as well as on the engine, where increased fluctuations of temperature are experienced. The accelerometer is also dedicated for structural analysis in different applications and vibration testing of subsystems in aerospace applications when best fit for high temperature transient, a good frequency response and low phase shift is necessary. Thanks to the ground isolation and the optional shielded Kistler cables, the sensor is immune to parasitic coupling.

Mounting

Reliable and accurate measurements require that the mounting surface be clean and flat. The sensor can be attached to the structure with wax, adhesive or supplied mounting screw. The center-hole mounting permits flexibility for 360° orientation of the cable which allows a wide selection of locations for mounting. The instruction manual for Type 8781A50... (Doc No. 002-270) provides detailed information regarding mounting surface preparation.

Accessing TEDS Data

The "T" suffix incorporates the "Smart Sensor" design with TEDS according the standard IEEE 1451.4-2004. Viewing an accelerometer's data sheet requires an Interface/Coupler such as Kistler's Type 5134B… or 5000M04 with TEDS Editor software. Type 5000M04 is a PC based TEDS editor software (serial port). The Interface provides negative current excitation (reverse polarity) altering the operating mode of the PiezoSmart® sensor allowing the program editor software to read or add information contained in the memory chip.

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Technical Data

Specifications

Range	g	±50
	ms^{-2}	±490
Threshold, nom.	g_{rms}	<0,001
Sensitivity	mV/g	100 ±10
Resonant frequency mounted, nom.	kHz	>11
Frequency range ±5 %	Hz	0,5 ... 2 000
±10 %	Hz	0,3 ... 3 000
±12 %	Hz	0,3 ... 4 000

Phase Response

0,6 ... 3 Hz	°	±18
3 ... 2000 Hz	°	±5
Time constant, nom.	s	2
Linearity error	%FSO	±1
Transverse sensitivity, nom. (max. 5)	%	≤3

Environmental

Base strain sensitivity at 250 με	g/με	<0,005
Random vibration, max.	g_{rms}	2 000
Shock limit (1 ms pulse)	g_{pk}	5 000
Temperature coefficient of sensitivity	%/°C	–0,008
Magnetic sensitivity, nom. (max. 2,5)	g/T	≤0,5
Operating temperature range Type 8781A50T...[1]	°C	–54 ... 120

Output

Bias, nom.	VDC	11
Impedance	Ω	<100
Voltage full scale	V	±5
Current	mA	2

Power Supply

Voltage	VDC	20 ... 30
Constant current	mA	2 ... 18

Construction

Measuring element	Type	PiezoStar
Case/Base	material	Titan
Degree of protection case/ connector[2] (EN60529)		IP68
Connector	Type	4 pin pos.
Connector position		side
Ground isolation of case	Ω	$\geq 10^8$
Weight	grams	13
Mounting through center-hole	Type	Socket cap screw M5x16 or 10-32
Mounting torque	N·m	1,1 ... 2,2

1 g = 9,80665 m/s^2, 1 inch = 25,4 mm, 1 gram = 0,03527 oz,
1 lbf-in = 0,113 N·m

[1] For TEDS sensors: TEDS Data retention and data communications may be degraded for temperatures exceeding –40 ... 110 °C. Analog operation over the operating temperature is unaffected to 125 °C.

[2] with connected cable Type 1756B7Q1, test pressure 16 bar, 30 min

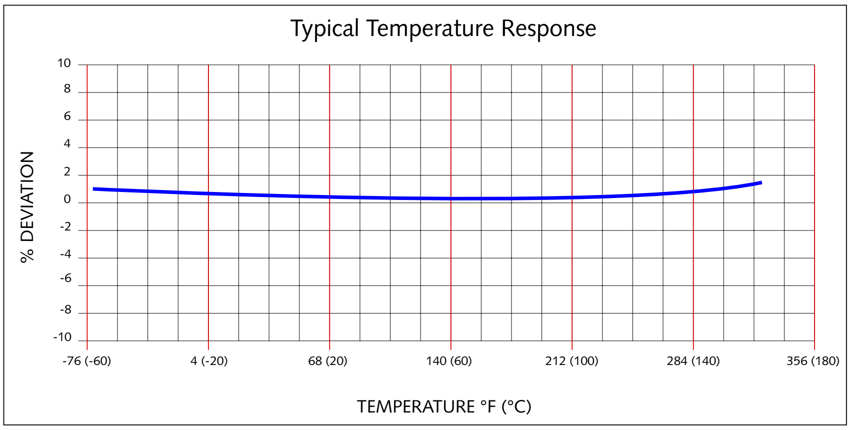

Fig. 1: Typical temperature response

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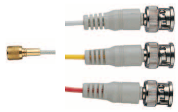
Measuring	Connecting	Amplifying	Output	Analyzing
				
Type 8781A50… sensor with voltage output	Type 1756B… 4 pin neg. on 3x BNC pos.	Type 51… coupler	Type 1511 BNC pos. – BNC pos.	not supplied

Fig. 2: Measuring chain

Included Accessories	Type/Art. No.
• Mounting screw M5x16	6.120.109
• Mounting screw 10-32	6.120.275
• Lubricating grease	1063

Optional Accessories	Type/Art. No.
• Connecting cable, 4 pin neg. on 3x BNC pos.	1756B…, 1756B7Q01
• Adhesive ground isolated, hex, mounting base with 10-32 thd. hole	8436
• Magnet mounting base with 10-32 thd. hole	8452A

Ordering Key

Type 8781A50 ☐

TEDS Templates

TEDS Templates	
Default, IEEE 1451.4 V0.9 template 0 (UTID 1)	**T**
TEDS, IEEE 1451.4 V0.9 template 24 (UTID 116225)	**T01**
LMS template 117, free format point ID	**T02**
LMS template 118, automotive format (field 14 geometry = 0)	**T03**
LMS template 118, aerospace format (field 14 geometry = 1)	**T04**
P1451.4 V1.0 template 25 – transfer function disabled	**T05**
P1451.4 V1.0 template 25 – transfer function enabled	**T06**

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