

## Ceramic/quartz impedance head for modal analysis

Type 8770A...

The Types 8770A... simultaneously measure dynamic force and acceleration at a point on a test structure for determining mechanical impedance.

- Low impedance, voltage mode
- Sensitivity unaffected by mounting torque
- Force and acceleration phase matched within two degrees
- Withstands maximum rated shock with 1 ms min. duration
- Conforming to CE



### Description

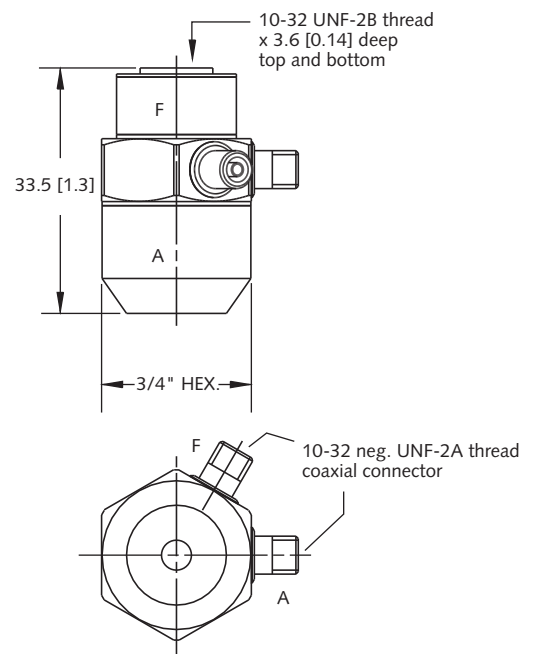
A unique sensing element construction optimizes the capabilities of this sensor. The result is a device which yields simultaneous dynamic acceleration and force measurements from exactly the same location on a test structure. Internal crystal isolation and tuned channel phase matching allows for the acquisition of Driving Point (DP) data with optimal spatial and temporal coincidence. During modal test studies, the importance of DP data is paramount since any error effects the scaled mode shapes directly. The required impedance transfer function can now be easily and accurately derived from the measurements made by this unique impedance head sensor.

The Type 8770A..., by construction, has negligible strain sensitivity which allows measurements on extremely flexible structures. Both acceleration and force sensitivities are unaffected by mounting torque or mass loading. The built-in high sensitivity, low noise and high stiffness features minimize force input requirements while still achieving accurate results. In many situations this is ideal since imposed stresses can be minimized and test fatigue can be ignored.

Each of the impedance head's two sensor elements are internally connected to a Piezotron microelectronic circuit that converts the charge signal from the piezoelectric elements into a useable high level voltage signal at a low impedance output.

### Application

Most common use of the impedance head is to obtain driving point data during modal test studies.



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## Technical Data

	Unit	Type 8770A5	Type 8770A50
<b>ACCELERATION</b>			
Acceleration range	g	±5	±50
Frequency response, ±5%	Hz	1 ... 4 000	1 ... 4 000
Sensitivity, ±10%	mV/g	1 000	100
Threshold, nom.	grms	0.0004	0.001
Resonant frequency, mounted, nom.	kHz	16	16
Transverse sensitivity, max. 5%	%	1.5	1.5
Base strain sensitivity @ 250 µε	g/µε	0.0005	0.0005
Temperature coefficient of sensitivity	%/°C [%/°F]	0.14 [0.08]	0.14 [0.08]

## FORCE

Measuring range	N [lbf]	±22 [±5]	±222 [±50]
Maximum force	N [lbf]	1112 [250]	1112 [250]
Sensitivity, ±10%	mV/N [mV/lbf]	227 [1000]	23 [100]
Resonant frequency, nom.	kHz	36	36
Threshold, nom.	N [lbf]	0.0006 [0.00013]	0.006 [0.0013]
Temperature coefficient of Sensitivity	%/°C [%/°F]	0.05 [0.03]	0.05 [0.03]

## ELECTRICAL-COMMON

### Output

Bias, nom.	VDC	11	11
Impedance, acceleration	Ω	≤500	≤100
Impedance, force	Ω	≤100	≤100
Current	mA	2	2
Voltage FS, nom.	V	±5	±5
Time constant, at room temperature	s	≥0.5	≥0.5

### Supply

Current	mA	2 ... 18	2 ... 18
Voltage	VDC	20 ... 30	20 ... 30

## ENVIRONMENTAL-COMMON

Acceleration Limit	g	±500	±500
Shock (1 ms pulse width), max.	g	2 500	2 500
Operating temperature range	°C [°F]	-55 ... 80 [-65 ... 175]	-55 ... 120 [-65 ... 250]
Amplitude linearity	%	±1	±1
Phase matching (Force and Acceleration, 5 ... 4 000 Hz)	°	2	2
Rigidity	kN/µm [lbf/µin]	0.9 [5]	0.9 [5]

## PHYSICAL-COMMON

Weight	grams	34	34
Housing/Base	material	titanium	titanium
Degree of protection housing/connector (EN 60529)		IP68	IP68
Mounting torque	N·m [in·lbf]	2 [18]	2 [18]
Sensing element (Acceleration/Force)	Type	quartz/ceramic	quartz/ceramic

1 g = 9.80665 m/s<sup>2</sup>, 1 Inch = 25.4 mm, 1 gram = 0.03527 oz, 1 lbf-in = 0.1129 N·m

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### Mounting

Reliable and accurate measurements require that the mounting surface be clean and flat. The impedance head can be attached to the electromagnetic shaker head or the test structure by 10-32 threaded mounting holes, top and bottom. Typically, a stinger is used to connect the vibration shaker to the impedance head or the impedance head to the test structure.

### Included Accessories

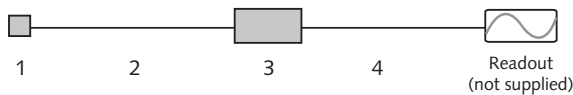
- |                                   | <b>Type</b> |
|-----------------------------------|-------------|
| • 2 mounting studs 10-32 to 10-32 | 8402        |
| • 2 mounting studs 10-32 to M6    | 8411        |

### Ordering Key

Range		Type 8770A <input type="checkbox"/>
±5 g	5	↑
±50 g	50	

### Measuring Chain

- |  | <b>Type</b> |
|--|-------------|
| 1 Low impedance sensor                 | 87...       |
| 2 Sensor cable, 10-32 pos. to BNC pos. | 1761B...    |
| 3 Power supply/signal conditioner      | 51...       |
| 4 Output cable, BNC pos. to BNC pos.   | 1511        |



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