

FOSA™ Series Fiber Optic Accelerometers



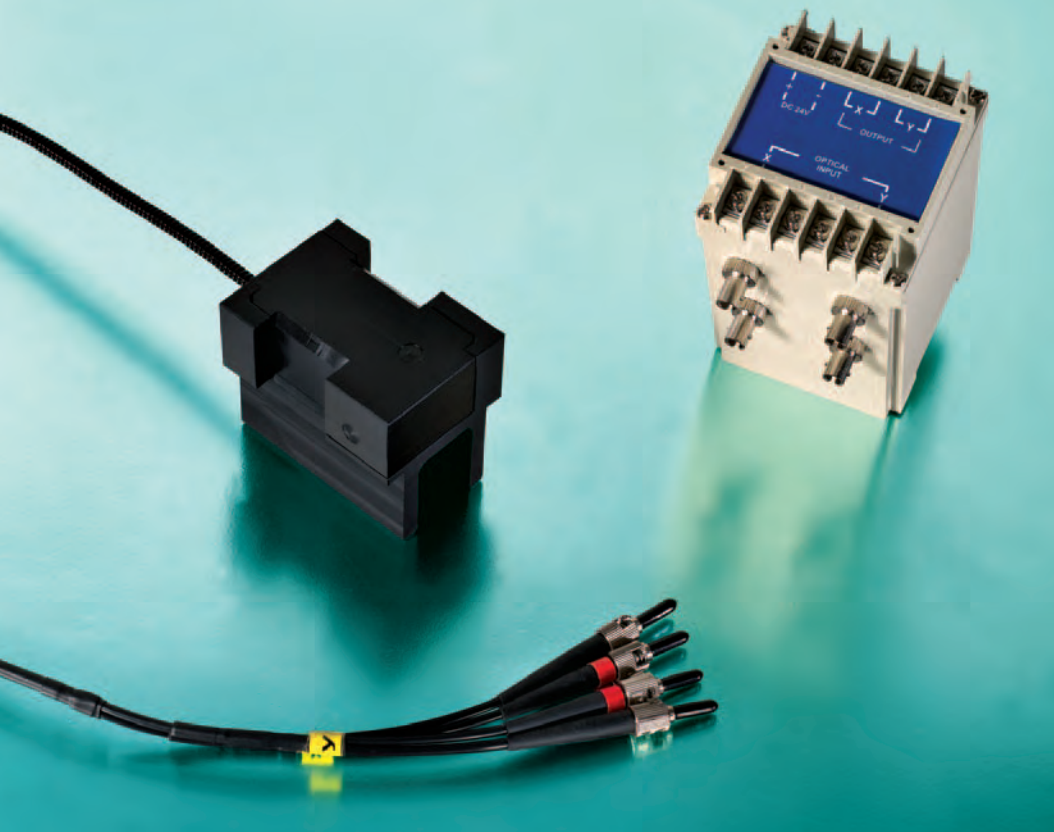
**The Leading Wave
in Passive Fiber Optic
Accelerometers**

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SOUND SOLUTIONS FROM LIGHT TECHNOLOGY



Dual axis FOSA 2665 with standard fiber optic cable and electro optical unit EOU 400.

FOSA System Components

Each FOSA is delivered as a complete, plug-and-play system comprised of our advanced optical accelerometer attached to 10 meters of fiber optic cable, electro-optical unit (EOU), line out cable, DC power supply and carrying case.

Optoacoustics' FOSA system is purely analog with standard line output. It does not require any additional pre-amplifiers or amplifiers. Each sensor is calibrated individually to its nominal performance specifications at the factory, and is guaranteed to perform flawlessly throughout its lifetime.

Highest Resolution for the Toughest Applications

Our FOSA™ fiber optic accelerometers bring high precision monitoring and early fault detection capabilities to any equipment, regardless of the environment. FOSA offers **500 times higher resolution** than competing accelerometers, with the lowest noise density available in its class.

- ▶ Completely passive, spark-free and EMI/RFI immune, Optoacoustics' FOSA is ideal for the harshest conditions: high temperature, high voltage, high RF, high volatility or high corrosion.
- ▶ The FOSA Series is ideal for monitoring frequencies from 1 to 1000 Hz, and produces standard analog output for any type of monitoring equipment.
- ▶ FOSA optical fiber connections can be extended over great distances with negligible signal loss, and offer outstanding long-term reliability and environmental stability.
- ▶ FOSA provides complete end-to-end monitoring hardware flexibility, with a wide variety of mounting, feedthrough and installation options.



The rack-mountable EOU 2100 multi-channel electro-optical unit supports simultaneous monitoring by up to six single axis FOSA units.

FOSA Applications

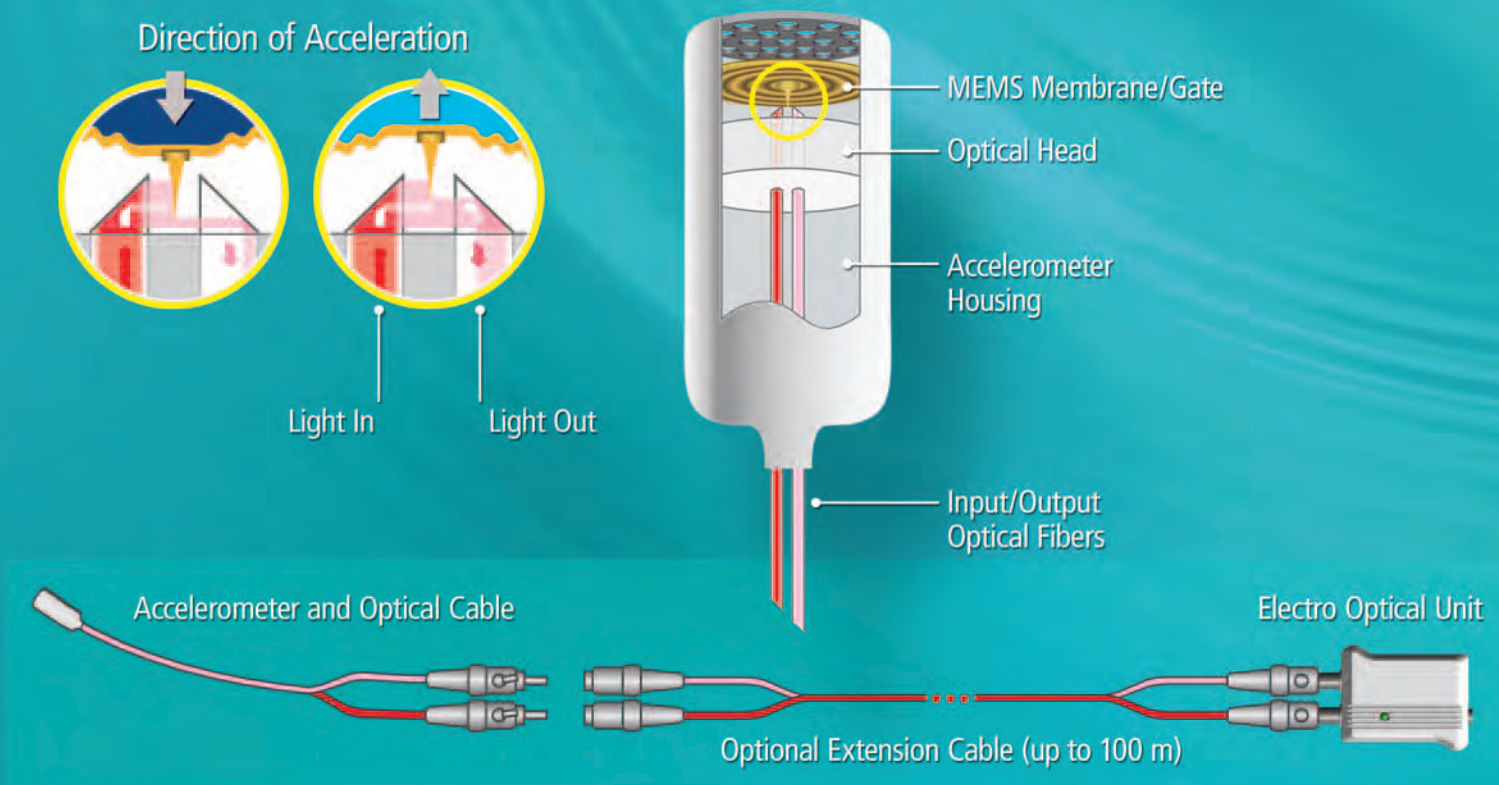
Optoacoustics manufactures a wide variety of fiber optic accelerometers, suitable for a broad range of settings and applications:

- ▶ Power generation facilities
- ▶ Industrial equipment monitoring
- ▶ Structural vibration monitoring
- ▶ Pantograph and railway equipment
- ▶ Seismic vibration monitoring
- ▶ Hazardous area monitoring
- ▶ High voltage facility monitoring
- ▶ Oil and gas exploration
- ▶ MRI patient and machine monitoring
- ▶ High RFI or EMI areas
- ▶ Highly explosive areas
- ▶ EMC test labs

FOSA™ Series Accelerometers – AVAILABLE IN SINGLE, DUAL AND TRI-AXIAL MODELS

Model	1550	1650	1660	1670	1760	2660	2665	3660	Notes
Description	Basic fiber optic accelerometer for small structures.	Fiber optic accelerometer for medium structures.*	Fiber optic accelerometer for extended temperatures.*	Fiber optic accelerometer for large structures, extended temperatures.*	Slim fiber optic accelerometer for narrow structures.*	Fiber optic accelerometer for orthogonal monitoring.*	Fiber optic accelerometer for power generator monitoring.	Fiber optic accelerometer for tri-axial seismic monitoring.	* These models are available in three distinct types with varying frequency response ranges and acceleration sensitivities. Extension cables of up to 100m in length are available. A wide selection of cable types and optional accessories are available.
Laboratory	•	•			•	•		•	
Seismic								•	
Heavy Industry		•	•	•	•	•	•		
Monitoring Axis	Single	Single	Single	Single	Single	Dual	Dual	Tri-axial	
Max. Frequency Response	300 [Hz]	100, 330, 1000 [Hz]	100, 330, 1000 [Hz]	100, 330, 1000 [Hz]	100, 330, 1000 [Hz]	100, 330, 1000 [Hz]	330 [Hz]	80 [Hz]	
Max. Acceleration	15 [g]	3, 20, 80 [g]	3, 20, 80 [g]	3, 20, 80 [g]	3, 20, 80 [g]	3, 20, 80 [g]	20 [g]	1 [g]	
Noise Density	<50 micro-g/√Hz	<3 ,<30, <300 micro-g/√Hz	<3 ,<30, <300 micro-g/√Hz	<3 ,<30, <300 micro-g/√Hz	<3 ,<30, <300 micro-g/√Hz	<3 ,<30, <300 micro-g/√Hz	<100 micro-g/√Hz	<1 micro-g/√Hz	
Nominal Sensitivity	100 mV/g	100 mV/g	100 mV/g	100 mV/g	100 mV/g	100 mV/g	100 mV/g	4000 mV/g	
Operating Temperature	-20/+60 [°C] -4/+140 [°F]	-20/+60 [°C] -4/+140 [°F]	-20/+100 [°C] -4/+212 [°F]	-20/+100 [°C] -4/+212 [°F]	-20/+60 [°C] -4/+140 [°F]	-20/+100 [°C] -4/+212 [°F]	-20/+100 [°C] -4/+212 [°F]	-20/+100 [°C] -4/+212 [°F]	
Weight	0.7 g	1.5 g	1.5 g	3 g	5 g	20 g	140 g	20 g	
Footprint Ø/H, L/W/H	6/16 [mm]	20/16 [mm]	20/16 [mm]	10/30 [mm]	40/5 [mm]	45/16/21 [mm]	70/50/60 [mm]	45/25/22 [mm]	
									

FOSA™ Series Fiber Optic Accelerometers



Optoacoustics' core platform blends the natural physical intelligence of optics and acoustics.

It's built around a tiny MEMS membrane and two optical fibers. Alternative acceleration forces impinge on the membrane and cause it to vibrate, changing the intensity of light that is reflected from incoming to outgoing fibers. This patented mechanism detects even the slightest changes in membrane displacement, with resolutions at a fraction of an Angstrom. Such precision translates to high resolution with low self-noise, and results in outstanding accelerometer performance.



SOUND SOLUTIONS FROM LIGHT TECHNOLOGY

Optoacoustics is a leading manufacturer of high performance, optical fiber-based sound and vibration sensors. Each of our products combines the natural intelligence of optics and acoustics to meet technical performance demands which cannot be addressed by conventional sensing solutions. Optoacoustics' pioneering technology is protected by over 20 international patents.

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BR-FOSA-2 1011



FOSA™ 1660

Fiber Optic Accelerometer for Extended Temperature Applications

Miniature fiber optic accelerometer for remote monitoring of vibration at high temperatures. Ideal where the footprint for placement is limited or where the accelerometer is a sub-component in another device or system.

FEATURES

- ▶ Small, lightweight design
- ▶ Absolute EMI/RFI immunity
- ▶ Completely passive sensor with no electrical parts
- ▶ Exceptionally low noise density
- ▶ Model options suited to a variety of applications
- ▶ Standard analog output
- ▶ High reliability and environmental stability
- ▶ Optical fiber connection over extended lengths without signal loss
- ▶ Plug-and-play system
- ▶ Cost-effective, long-term solution

TECHNICAL SPECIFICATIONS

Model Options	Type 1	Type 2	Type 3
Frequency Response ($\pm 5\%$)	0.5-100 Hz	1-330 Hz	1-1000 Hz
Maximum Acceleration	3 g	20 g	20 g
Noise Density (micro-g/ $\sqrt{\text{Hz}}$)	<3	<30	<300
Nominal Sensitivity	100 mV/g		
Power Supply	8-15 V, 50 mA		
Output Impedance	<100 Ohm		
Phase Shift	0 deg		
Amplitude Non-linearity	<5 %		
Transverse Sensitivity	<3 %		
Base Strain Sensitivity	0.0001 g/micro-m/m		
Temperature Range	-20 to +100 °C (-4 to +212 °F)		
MTBF	>100,000 hours		
Sensor Head			
Material	Polycarbonate		
Weight	1.5 g		
Dimensions D/H	20/16 mm		
EOU Box Dimensions L/W/H	52/45/12.5 mm		
Optical Cable Length	10 m		

APPLICATIONS

- ▶ Patient and machine monitoring in MRI scanning environments
- ▶ Highly explosive areas
- ▶ Industrial equipment monitoring
- ▶ High voltage electrical areas
- ▶ High RF areas
- ▶ EMC test labs
- ▶ Severe electromagnetic fields



FOSA™ 1660 System Kit

Complete, versatile,
cost-effective solution

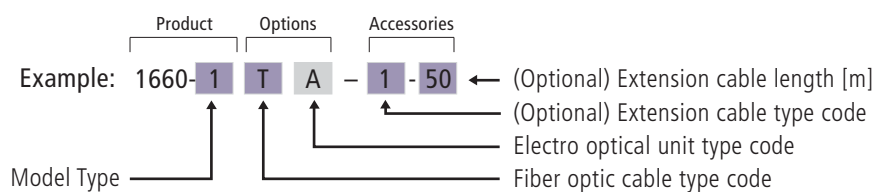
Optoacoustics' FOSA 1660 system is comprised of our advanced fiber optic accelerometer, electro-optical unit, output signal cable with BNC connector, DC power supply and a ruggedized carrying case.



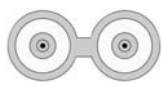
Optoacoustics EOU 100 electro-optical unit showing fiber optic, output signal, and power supply connections

PRODUCT ORDERING GUIDE

Use the matrix below to select options and accessories for your order.



Options	Fiber Optic Cable Type		Electro-Optical Unit Type
Item	Clear Teflon Ø 1 mm	Black or Clear Teflon Ø 3 mm	EOU 100 Single Channel
Code	S	T	A
			

Accessories	Extension Cable Type (Specify length from 10-100 m)			
Item	Outdoor, Milspec Ø 5 mm	PVC Ø 5 mm	Indoor, Rugged Ø 3.0 mm	Indoor, Zip Cord Ø 3.0 x 2 mm
Code	1	2	3	4
				



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DS-1660-3 1011



FOSA™ 1670

Fiber Optic Accelerometer for Extended Temperature Applications

Miniature fiber optic accelerometer for remote monitoring of vibration at high temperatures. Ideal where the accelerometer is a sub-component in another device or system. Similar to FOSA 1660, but more robust and with a larger footprint.

FEATURES

- ▶ Lightweight design
- ▶ Absolute EMI/RFI immunity
- ▶ Completely passive sensor with no electrical parts
- ▶ Exceptionally low noise density
- ▶ Model options suited to a variety of applications
- ▶ Standard analog output
- ▶ High reliability and environmental stability
- ▶ Optical fiber connection over extended lengths without signal loss
- ▶ Plug-and-play system
- ▶ Cost-effective, long-term solution

TECHNICAL SPECIFICATIONS

Model Options	Type 1	Type 2	Type 3
Frequency Response ($\pm 5\%$)	0.5-100 Hz	1-330 Hz	1-1000 Hz
Maximum Acceleration	3 g	20 g	80 g*
Noise Density (micro-g/ $\sqrt{\text{Hz}}$)	<3	<30	<300
Nominal Sensitivity	100 mV/g		
Power Supply	8-15 V, 50 mA or 24 V, 50 mA		
Output Impedance	<100 Ohm		
Phase Shift	0 deg		
Amplitude Non-linearity	<5 %		
Transverse Sensitivity	<3 %		
Base Strain Sensitivity	0.0001 g/micro-m/m		
Temperature Range	-20 to +100 °C (-4 to +212 °F)		
MTBF	>100,000 hours		
Sensor Head			
Material	Polycarbonate		
Weight	3 g		
Dimensions D/H	10/30 mm		
Optical Cable Length	10 m		

* When paired with EOU 500

APPLICATIONS

- ▶ Power generation facilities
- ▶ Patient and machine monitoring in MRI scanning environments
- ▶ High voltage electrical areas
- ▶ Highly explosive areas
- ▶ High RF areas
- ▶ Severe electromagnetic fields
- ▶ Industrial equipment monitoring
- ▶ Aerospace measurements



FOSA™ 1670 System Kit

Complete, versatile,
cost-effective solution

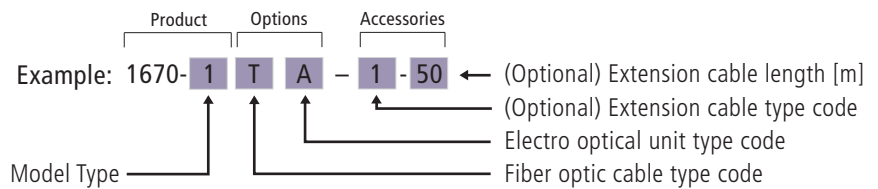
Optoacoustics' FOSA 1670 system is comprised of our advanced fiber optic accelerometer, electro-optical unit, output signal cable with BNC connector, DC power supply and a ruggedized carrying case.



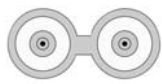
Optoacoustics EOU 100 electro-optical unit showing fiber optic, output signal, and power supply connections

PRODUCT ORDERING GUIDE

Use the matrix below to select options and accessories for your order.



Options	Fiber Optic Cable Type		Electro-Optical Unit Type	
Item	Black Polyamide Ø 5.1 mm	Clear Teflon Ø 4 mm	EOU 100 Single Channel	EOU 500 Single Channel
Code	R	T	A	F
				

Accessories	Extension Cable Type (Specify length from 10-100 m)			
Item	Outdoor, Milspec Ø 5 mm	PVC Ø 5 mm	Indoor, Rugged Ø 3.0 mm	Indoor, Zip Cord Ø 3.0 x 2 mm
Code	1	2	3	4
				



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DS-1670-3 1011



FOSA™ 2660

Fiber Optic Accelerometer for Orthogonal Monitoring Applications

Dual axis fiber optic accelerometer for remote monitoring of vibration in two orthogonal directions. Ideal for equipment where the accelerometer is a sub-component in another device or system.

FEATURES

- ▶ Completely passive sensor with no electrical parts
- ▶ Absolute EMI/RFI immunity
- ▶ Exceptionally low noise density
- ▶ Model options suited to a variety of applications
- ▶ Standard analog output
- ▶ Small, lightweight design
- ▶ High reliability and environmental stability
- ▶ Optical fiber connection over extended lengths without signal loss
- ▶ Plug-and-play system
- ▶ Cost-effective, long-term solution

TECHNICAL SPECIFICATIONS

Model Options	Type 1	Type 2	Type 3
Frequency Response (±5%)	0.5-100 Hz	1-330 Hz	1-1000 Hz
Maximum Acceleration	3 g	20 g	80 g*
Noise Density (micro-g/√Hz)	<3	<30	<300
Nominal Sensitivity	100 mV/g		
Power Supply	8-15 V, 100 mA		
Output Impedance	<100 Ohm		
Phase Shift	0 deg		
Amplitude Non-linearity	<5 %		
Transverse Sensitivity	<3 %		
Base Strain Sensitivity	0.0001 g/micro-m/m		
Temperature Range	-20 to +100 °C (-4 to +212 °F)		
MTBF	>100,000 hours		
Sensor Head			
Material	Polycarbonate		
Weight	20 g		
Dimensions L/W/H	45/16/21 mm		
Optical Cable Length	10 m		

* When paired with EOU 400 Industrial

APPLICATIONS

- ▶ End-winding vibration monitoring
- ▶ Power generation facilities
- ▶ High voltage electrical areas
- ▶ Oil and gas installations
- ▶ Highly explosive areas
- ▶ High RF areas
- ▶ Severe electromagnetic fields
- ▶ Petrochemical/nuclear facilities
- ▶ EMC test labs



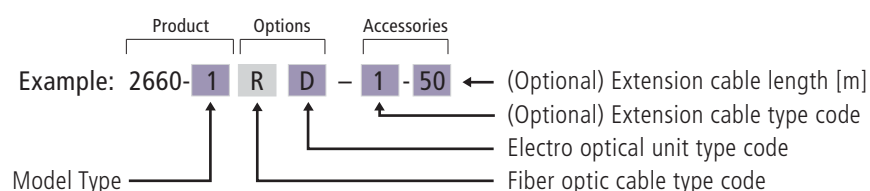
FOSA™ 2660 System Kit

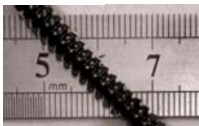
Complete, versatile, cost-effective solution

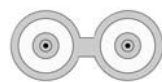
Optoacoustics' FOSA 2660 system is comprised of our dual axis fiber optic accelerometer, electro-optical unit, output signal cable with BNC connector, DC power supply and a ruggedized carrying case.

PRODUCT ORDERING GUIDE

Use the matrix below to select accessories for your order.



Options	Fiber Optic Cable Type	Electro-Optical Unit Type	
Item	Black Polyamide Ø 5.1 mm	EOU 450 Lab Dual Axis	EOU 400 Industrial Dual Axis
Code	R	D	E
			

Accessories	Extension Cable Type (Specify length from 10-100 m)			
Item	Outdoor, Milspec Ø 5 mm	PVC Ø 5 mm	Indoor, Rugged Ø 3.0 mm	Indoor, Zip Cord Ø 3.0 x 2 mm
Code	1	2	3	4
				



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DS-2660-3 1011



SOUND SOLUTIONS FROM LIGHT TECHNOLOGY



FOSA™ 3660 Seismic

Fiber Optical Accelerometer for Tri-Axial Monitoring Applications

Tri-axis fiber optical accelerometer for remote monitoring of vibration in three orthogonal directions. Ideal for laboratories or where the accelerometer is a sub-component in another device or system.

FEATURES

- ▶ Completely passive sensor with no electrical parts
- ▶ Absolute EMI/RFI immunity
- ▶ Exceptionally low noise density
- ▶ Model options suited to a variety of applications
- ▶ Standard analog output
- ▶ Small, lightweight design
- ▶ High reliability and environmental stability
- ▶ Optical fiber connection over extended lengths without signal loss
- ▶ Plug-and-play system
- ▶ Cost-effective, long-term solution

TECHNICAL SPECIFICATIONS

Frequency Response ($\pm 5\%$)	0.5-80 Hz
Maximum Acceleration	1 g
Noise Density (micro-g/ $\sqrt{\text{Hz}}$)	<1
Nominal Sensitivity	4000 mV/g
Power Supply	12 V, 300 mA
Output Impedance	<100 Ohm
Phase Shift	0 deg
Amplitude Non-linearity	<5 %
Transverse Sensitivity	<3 %
Base Strain Sensitivity	0.0001 g/micro-m/m
Temperature Range	-20 to +60 °C (-4 to +140 °F)
MTBF	>100,000 hours
Sensor Head	
Material	Polycarbonate
Weight	20 g
Dimensions L/W/H	45/25/22 mm
Optical Cable Length	10 m

APPLICATIONS

- ▶ Seismic vibration monitoring
- ▶ Power generation facilities
- ▶ High voltage electrical areas
- ▶ Oil and gas installations
- ▶ Highly explosive areas
- ▶ High RF areas
- ▶ Severe electromagnetic fields
- ▶ Petrochemical/nuclear facilities
- ▶ Aerospace measurements



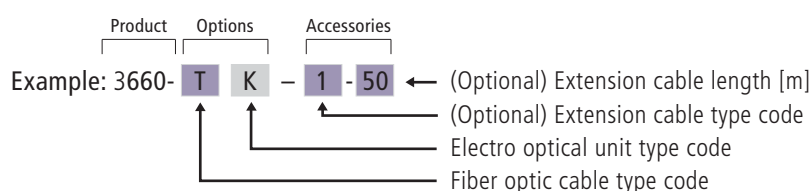
FOSA™ 3660 Seismic System Kit

Complete, versatile, cost-effective solution

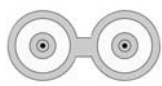
Optoacoustics' FOSA 3660 system is comprised of our tri-axial fiber optical accelerometer, electro-optical unit, output signal cables with BNC connectors, DC power supply and a ruggedized carrying case.

PRODUCT ORDERING GUIDE

Use the matrix below to select accessories for your order.



Options	Fiber Optic Cable Type		Electro-Optical Unit Type
Item	Black or Clear Teflon Ø 3 mm	Black Polyamide Ø 5.1 mm	EOU 600 Tri-Axis
Code	T	R	K
			

Accessories	Extension Cable Type (Specify length from 10-100 m)			
Item	Outdoor, Milspec Ø 4.5 mm	Outdoor, Armored Ø 6.5 mm	Indoor, Rugged Ø 3.0 mm	Indoor, Zip Cord Ø 3.0 x 2 mm
Code	1	2	3	4
				



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DS-3660S-1 0911

EOU 400



Dual Axis EOU 400 can monitor up to two sensors simultaneously. It features two analog outputs; two pairs of ST-style fiber optic connectors; screw terminals for power input, test points and analog outputs; a green/red LED optical line condition indicator. Mountable with external DC power supply.

EOU 500



Single Axis EOU 500 with liquid crystal display for real-time readout of data, supports monitoring up to two sensors simultaneously. It features one analog output; one pair of ST-style fiber optic connectors; screw terminals for power input, test points and analog outputs; a green/red LED optical line condition indicator. Mountable with external DC power supply.

EOU 2100



Six Channel EOU 2100, 19-inch 3U rack-mountable, supports monitoring up to 12 sensors simultaneously. For each channel the unit features one analog (BNC) output connector, one pair of ST-style fiber optic connectors, a +20 dB gain toggle switch, a green/red LED optical line condition indicator, and test point and trimmer to enable channel-level sensor tuning for optimal operation. Internal AC/DC power supply.

Industrial EOU Models - FOSA FAMILY

Single and Dual Axis; Bench and Standard Rack Mountable Models

Our mountable industrial electro-optical unit (EOU) series provides regular analog signals for high performance monitoring and analyzing equipment. Optoacoustics manufactures a model to suit every application.

Each of our EOU units is designed to drive its designated FOSA fiber optic accelerometers at consistent, peak performance.

INDUSTRIAL EOU SERIES TECHNICAL SPECIFICATIONS

EOU Model	400	500	2100
Signal Output [V p-p]	9/16	9	9/16
Supply Voltage [V]	12/24	12	100/220
Current Drain (max) [mA]	200	200	100
Power Supply Connector	Screw	Screw	Mains Plug
Line Out Connector	Screw	Screw	BNC
Optical Connector Type	ST	ST	ST
Adjustable Gain Range [dB]	None	None	+20 dB
Display Type	None	LCD	None
Channel-Level Test Points	Yes	Yes	Yes
Channel-Level Trimmers	Yes	Yes	Yes
Operating Temperature	-20 to +60 °C (-4 to +140 °F)		
EOU Box			
Material	Polycarbonate	Metal	
Weight [g]	150	200	4500
Dimensions [mm]	W 112	W 100	W 19 in
	D 65	D 110	D 9.5 in
	H 70	H 70	H 3U

EOU 100



Single Axis EOU 100 is extremely compact. It features a pair of ST fiber optic connectors; a 3.5 mm socket for analog output; green LED voltage indicator. Unit uses external DC power only.

EOU 600



Triaxial EOU 600 supports monitoring up to three sensors simultaneously. It features three analog outputs; three pairs of ST-style fiber optic connectors; three green/red LED optical line condition indicators. Uses external DC power supply.

EOU 2000



Six Channel EOU 2000 supports monitoring up to 12 sensors simultaneously. For each channel the unit features one analog (BNC) output connector, one pair of ST-style fiber optic connectors, and a green/red LED optical line condition indicator. Internal AC/DC power supply.

Laboratory EOU Models - FOSA FAMILY

Single, Dual and Tri-Axis; Compact, Bench and Rack Mountable Models

Our mountable industrial electro-optical unit (EOU) series provides regular analog signals for high performance monitoring and analyzing equipment. Optoacoustics manufactures a model to suit every application.

Each of our EOU units is designed to drive its designated FOSA fiber optic accelerometers at consistent, peak performance.

LABORATORY EOU SERIES TECHNICAL SPECIFICATIONS

EOU Model	100	600	2000
Signal Output [V p-p]	5	9	9
Supply Voltage [V]	8-15	12	100/220
Current Drain (max) [mA]	80	300	100
Power Supply Connector	3.5 mm	5.5 mm	Mains Plug
Line Out Connector	3.5 mm	BNC	BNC
Optical Connector Type	ST	ST	ST
Adjustable Gain Range [dB]	None	None	None
Display Type	None	None	None
Channel-Level Test Points	No	No	No
Channel-Level Trimmers	No	No	No
Operating Temperature	-20 to +60 °C (-4 to +140 °F)		
EOU Box			
Material	Zinc Alloy	Metal	
Weight [g]	75	500	2000
Dimensions [mm]	W 45	W 170	W 310
	D 65	D 170	D 200
	H 16	H 70	H 70