

# Applications for Fiber Optic Microphones SOM3/SOM4/SOM5



## Key Applications

- Security
- Industrial
- Oil & Gas
- Power Utilities
- Medical/MRI







Our aim is to offer customers worldwide a range of quality, cost effective systems that are designed for specific applications.

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Winkelmann manufactures a wide variety of fiber optic microphones, suitable for a broad range of settings and applications. All of our microphones are engineered to the most demanding environment and safety requirements. Being completely passive, they are ideal for locations and applications where conventional microphones and sensors cannot be used.

Today, KINGFISHER high performance microphones provide a complete set of solutions for law enforcement, industry, medicine, power generation, energy production, instrumentation monitoring and public safety.

### Technology

Winkelmann's core platform blends the natural physical intelligence of optics and acoustics. It's built around a tiny MEMS membrane and two optical fibers. When acoustic waves impinge on the membrane they cause it to vibrate, changing the intensity of light that is reflected from incoming to outgoing fibers. This mechanism detects even the slightest changes in membrane displacement, with resolutions at a fraction of an Angstrom. Such precision translates to clear sound and low self-noise, and produces exceptional microphone performance.

### Kingfisher System Components

Each SOM is delivered as a complete, plug-and-play system comprised of our advanced optical microphone attached to 10 meters of fiber optic cable, electro-optical unit, audio cable, DC power supply and carrying case.

The SOM system is purely analog with standard line output. It does not require any additional pre-amplifiers or amplifiers. Each microphone is calibrated individually to its nominal performance specifications at the factory, and is guaranteed to perform flawlessly throughout its lifetime. A wide selection of cable types and optional accessories is available.



## Winkelmann Fiber Optic Microphone Products



### SOM3/4/5

Basic fiber optic microphone



### SOM3/4/5SPL

For monitoring acoustic signals with high Sound Pressure Levels (SPL) up to 140 dB



### SOM3/4/5EXF

For monitoring acoustic signals with extended frequency range



### SOM4/5EXTF

For operation over an extended temperature range



### SOM4STE

Stereo fiber optic microphones with extended frequency range



### SOM4/5SNREXTF

High SNR for long distances and demanding applications plus optional extended frequency & temperature



### SOM5ISEXF

Ruggedized infrasound fiber optic microphone with extended frequency range



### SOM5WP

Fully sealed fiber optic microphone for remote monitoring applications with humid/wet/sea environments

## Differences between SOM(3), SOM(4) & SOM(5)



EOU100

The **SOM(3)** is supplied with extremely compact electro-optic unit (EOU100). It features a pair of ST-style fiber optic connectors; a 3.5mm socket for analog output & green LED voltage indicator. Unit is powered by external DC power supply.



EOU200

The **SOM(4)** is supplied with enhanced electronics box, electro-optic unit (EOU200). It features two analog outputs (one with volume control for headphones, another with fixed gain for monitoring equipment); one pair of ST-style fiber optic connectors; two 3.5mm sockets (one for analog output, another for headphones); green/red LED voltage indicator. DSP model (EOU250) provides up to 22dB of real-time ambient noise removal (three levels: low, mid, high). Unit is powered either by internal battery or external DC power supply.



EOU300

The **SOM(5)** is a ruggedized fiber optic microphone supplied with enhanced electronics box, electro-optic unit (EOU200).





### > Security

**In overt or covert security surveillance, whether used as a back-up device supporting other overt recording technology, or as a concealed covert device, the combination of innovative optics and acoustic technology with advanced signal processing and conditioning has produced a device with many advantages over more traditional approaches.**

The recordings achieved are of sufficient quality to be admissible as evidence in legal proceedings if required. For applications where evidence gathering is the primary objective, the high quality of the captured sound recording and the wide coverage achieved by the unit make it a very useful addition to the equipment portfolio.

Typically, the fiber optic microphone can be unobtrusively mounted to casino tables, installed in offices where fraud is suspected, can be used as a covert back up for interview recording and so on – the possibilities opened up by the technology of the fiber optic microphone are endless.

### > Industrial

**Well established as an ideal technology for acquiring measurements in harsh environments, photonic sensors are tolerant to extreme temperatures, EMI, shock and vibration, and resistant to corrosion.**

Optical fiber-based sensors are also lighter, more accurate and more versatile than conventional instrumentation. Typical applications include; monitor acoustic equipment during electromagnetic compatibility testing & test immunity with devices inside a GTEM cell.



### > Oil & Gas

**In an industry where even the smallest gas leak or equipment fault are life-threatening and costly, engineering managers demand sensing systems that reduce hazards, increase efficiency and are easy to install and maintain.**

Only photonic-based systems can effectively meet these tough demands. They are completely passive and free of metal and electronics which could cause explosions and interference, they can endure the most extreme environments, they are especially compact, and they are simple and reliable. Typical applications include for gas analysis in harsh industrial applications & measuring static pressure changes.

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### Power Utilities

With critical equipment worth many millions of dollars and a long, demanding supply chain, power generation facilities are on a constant vigil for early warnings.

When equipment fails unexpectedly, it can be a direct hit to the bottom line. When equipment performs poorly, it can be bad for the environment. Our photonic-based systems make pre-emptive performance monitoring smart, reliable and economical. Because their sensor heads are free of electronics, the systems don't cause interference with strong EM fields. Their non-metallic fiber optic cable also makes them completely safe for monitoring high voltage parts in power generators. Optical sensors also reduce costs of installation and maintenance, because they don't require explosion-proof conduits or containment.

### Medical/MRI

The fiber optic microphone is among the most exciting developments in recent years for medical resonance imaging environments, solving one of the most challenging MRI problems – hearing the patient.

MRI operations produce acoustic noise levels as great as 130 dB, as well as very high electromagnetic and radio frequency noise. These noises are not just discomforting to the patient, they render standard microphones useless for simple patient communications.

Our line of FOMRI advanced noise canceling optical microphones can be used in combination with any noise reduction headset to enable simple, crystal-clear verbal communications once again between the patient and MRI staff, and between MRI operators. Typical applications include measurement of the noise within the head of an MRI scanner, frequency response tolerances, and the level of distortion at the specified maximum acoustic sound pressure. ■



### Advantages of the Fiber Optic Microphone over Conventional Microphones

- The optical part does not contain metal nor active components; therefore it cannot be detected by conventional methods
- Does not contain metal and is completely passive, therefore is immune to EMI/RFI
- It can work in high humidity and extreme temperature conditions, long operational life. High reliability and environmental stability
- Optional extension tube for concealment and better installation through walls and objects
- Small, lightweight MEMS design produces excellent sound accuracy, high audio clarity and sound clarity
- Optical fiber connection over extended lengths, over 1Km, without signal loss. High SNR over long distances

#### For further information contact

Winkelmann (UK) Limited  
T: +44 (0) 1342 719024  
F: +44 (0) 1342 719030  
E: sales@winkelmann.co.uk  
www.winkelmann.co.uk