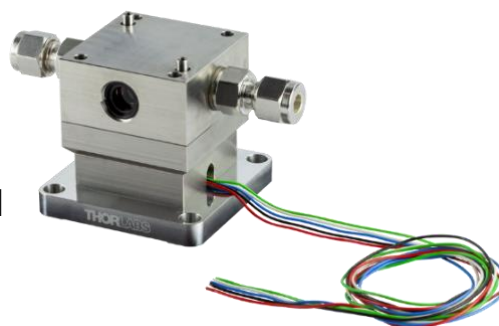


ADM01



### Description

The ADM01 Acoustic Detection Module offers a compact, shielded solution for quartz-enhanced photoacoustic spectroscopy (QEPAS) gas analysis. A complete QEPAS setup requires several components not included with this module, such as a light source, sample gas, gas tubes, data acquisition, and software analysis. In principle, the gas is fed into the module through tubes attached to a G1/8 fitting. The light source is then directed to the quartz tuning fork (QTF) through two wedged windows and two microresonator tubes. The laser light excites the gas and the relaxation of the gas creates an acoustic wave that is picked up by the custom QTF. The QTF acts as the transducer via the piezoelectric effect and returns a voltage proportional to the amount of gas molecules. The integrated preamplifier enhances the transmitted signal.

The core of the acoustic detection module is the customized low-frequency QTF. The QTF operates in a small sample volume, enabling fast, real-time gas analysis. The microresonator tubes for signal enhancement are glued in and optimized for a N<sub>2</sub> gas matrix. The combination of the optimized QTF and the high-gain preamplifier enables the acoustic detection module to have a high signal-to-noise ratio. The module is delivered with preinstalled, uncoated BaF<sub>2</sub> wedged windows (Item # WW00530). The wedged windows of the ADM01 module can be exchanged to accommodate excitation at different wavelengths. Please email [europe@thorlabs.com](mailto:europe@thorlabs.com) for details.

### Specifications

ADM01	
Resonance Frequency $f_0^a$	12455 Hz (Typ.)
Q Factor <sup>a</sup>	>12000 (Typ.)
Volume Sample Chamber	7 cm <sup>3</sup>
Microresonator Tubes	Inner Diameter: 1.6 mm Length, Each: 12.4 mm
Wedged Windows <sup>b</sup>	BaF <sub>2</sub> 200 nm - 11 $\mu$ m Transmission Range
Gas Connectors	G1/8 Straight for 6 mm Tubing
Recommended Gas Flow	<200 sccm
Maximum Gas Pressure	1.5 bar

a. At Atmospheric Pressure

b. Wedged windows can be exchanged to accommodate a different excitation wavelength. Contact [europe@thorlabs.com](mailto:europe@thorlabs.com) for more information.



## Electrical Connections

Color	Purpose	Comment
Red	+12 V	Recommended Voltage, up to 24 V Maximum
Black	GND	-
Blue	-12 V	Recommended Voltage, up to -24 V Maximum
White	MODULATION IN	Electrical Modulation (sine) IN for QTF Characterization
Green	SIGNAL OUT	Amplified QTF Signal OUT Linear up to 1.8 V, 50 $\Omega$ Termination

## Operation

**Mounting:** We recommend mounting the ADM01 module on the Thorlabs PY005(/M) 5-Axis Stage with the PY005A1(/M) slotted mounting plate. First mount the PY005 stage to the PY005A1 plate and then mount the ADM01 module on top of the stage. Lastly, mount the entire assembly to the breadboard using the slots in the PY005A1 plate. Please see the product web page for more information.

Please ensure that the laser beam is guided through the mounted microresonator tubes. Noise may increase if the laser beam hits the tube walls. Please contact [europe@thorlabs.com](mailto:europe@thorlabs.com) with questions.

Please ensure sufficient measuring gas flow (see Specifications).

## Maintenance and Service

The ADM01 module is not water resistant and must be protected from adverse weather conditions. To avoid damage, do not expose it to sprays, liquids, or solvents. The module does not contain any parts serviceable by the user and does not require regular user maintenance. If a malfunction occurs, contact [europe@thorlabs.com](mailto:europe@thorlabs.com) for return instructions.

In order to enhance light transmittance, the wedged windows may be exchanged. For a significant change in gas matrix, the microresonator tubes may be exchanged. Damage incurred due to opening the ADM01 module is the sole responsibility of the user. For service to exchange wedged windows or microresonator tubes, please email [europe@thorlabs.com](mailto:europe@thorlabs.com).

## Warnings and Safety

The safety of any system incorporating the equipment is the responsibility of the assembler of the system. It is the full responsibility of the user to ensure safety. This includes, but is not limited to laser safety and safety regarding the gas to be analyzed, including valves and tubing. The device must not be operated in explosion endangered environments!

This precision device is only serviceable if returned and properly packed into the complete original packaging including the plastic foam sleeves. If necessary, ask for replacement packaging.

Thorlabs GmbH is not responsible for any radio television interference caused by the attachment of connecting cables and equipment, or surrounding equipment. The correction of interference will be the responsibility of the user.