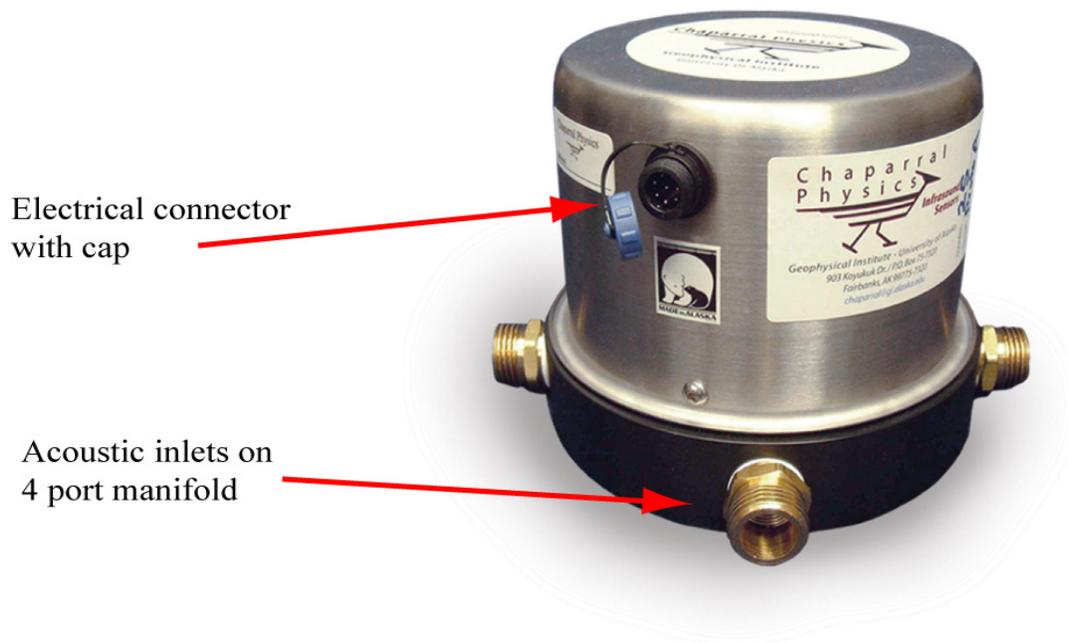


## Model 21 / 25 Infrasound Sensor



Chaparral Physics sensors combine rugged construction with wide bandwidth and low noise to ensure accurate measurements in the most demanding of environments. They have no need for altitude adjustments, and are carefully designed to reduce the effect of environmental temperature variations and mechanical vibrations. From the Ross ice-shelf in Antarctica through the rain forests of Central America to Alaska's tundra, Chaparral Physics microphones have proven their reliability and value as the finest infrasound measuring instruments in the world.

# Features

Some of the important features which give our sensors an advantage in real world installations include:

- Robust physical build quality with stainless steel and sealed electronics
- Built in manifold for connecting to a noise reduction array (M25 only)
- High dynamic range
- Low noise floor
- Low power consumption
- Differential output
- 11 octave bandwidth that includes the low audio spectrum (0.10 Hz to 200 Hz)
- On the fly switching between two sensitivity options
- Remotely operable self diagnostics

The Model 21 and 25 are an excellent choice for any application requiring a high resolution infrasound sensor in a small form factor at a moderate cost. It excels at accurately recording signals which span the low audio/infrasound boundary, such as explosions and avalanches, and makes an excellent sensor for campaign style experiments because of its rugged construction. If your application requires a high quality infrasound sensor, the Chaparral Physics Model 21/25 provides you with a compact, robust solution with excellent value.

These sensors are export controlled under the U.S. Bureau of Industry and Security (BIS). All Chaparral Physics sensors are classified as EAR99 and only require an export license for Cuba, Iran, North Korea, Sudan, and Syria, or for someone on the Denied Persons List. It is the responsibility of the purchaser to insure compliance with all applicable U.S. export regulations after the sensors are received.

# SPECIFICATIONS

## Nominal Sensitivity:

High	2.0 volts/Pa @ 1 Hz, 18 Pa full scale range
Low	0.4 volts/Pa @ 1 Hz, 90 Pa full scale range

Individual sensor's calibrated value is +/-5% from nominal. Calibration value is traceable to the Los Alamos National Laboratory (LANL) calibration chamber.

## Output:

Output type	Differential
Maximum	36 volts peak-to-peak (signal+ to signal-) ±9 volt max, signal to ground
Frequency Response	Flat to within +0, -3 dB from 0.1 Hz to 200 Hz Flat to within +0, -0.5 dB from 0.3 Hz to 50 Hz
Self noise	Less than $0.63\mu\text{Pa}^2/\text{Hz}$ @ 1 Hz (-62dB $\text{Pa}^2/\text{Hz}$ , rel to 1 Pa) Less than 3 mPa RMS 0.1 to 40 Hz Less than 0.8mPa RMS 0.5 to 2 Hz
Dynamic range	101dB low gain (@ 0.8mPa RMS self noise)
Output Impedance	150 $\Omega$ non-reactive (recommended load > 10 k $\Omega$ ) (Recommend less than 10,000pf capacitive loading)
Short circuit protected	signal+ to signal- and signal to ground

## Power Requirements:

DC Source	12 volts, (9-18 volts) DC, reverse voltage protected.
Current Drain	Less than 40 ma @ 12 v

## Physical:

	Sensor will function in any position or attitude. Sealed to IP-67 with acoustic inlets sealed and mating electrical connector or cap installed
Operating Temperature	-40° C to +65° C
Humidity	95% (non-condensing)
Dimensions M25	5.5" (14 cm) maximum height, 9" (23 cm) maximum diameter
Weight M25	5.3 lbs (2.4 kg), for 4-port version
Std Acoustic inlets M25	4 ports (maximum 12), male, Garden-Hose-Thread.
Dimensions M21	7" (18 cm) maximum height w/ legs, 5.75" (14.6 cm) w/o legs, 7" (18 cm) maximum diameter
Weight M21	3.25 lbs (1.5 kg) w/legs, 2.75 lbs (1.25 kg) w/o legs
Std Acoustic inlet M21	1 port, right angle, male, Garden-Hose-Thread.

We reserve the right to modify and improve the sensor's performance.

## Standard OPTIONS

Option	Approximate Price
On M25 - 2 to 12 port custom manifold. Ports can be together or evenly spaced.	There is a fixed setup charge of \$200 per order plus a per port fee of \$25 for each port over four.
On M21 – Straight Port	A straight port can be installed instead of the standard right angle port. This makes the sensor w/o legs slightly smaller and can make the routing of hoses easier when in a enclosure.
Plastic Connector	(-\$50 per sensor) In a fixed installation the ruggedness of the Mil. Spec. connector is not required.
“Volcano Mod”	(no extra charge) The V mod changes several items inside the sensor and reduces the sensitivity to maximize the dynamic range. For the details of the differences see the M25V manual on the website.
Custom Sensitivity	(no extra charge) Sensitivity can be set to any value requested by the user. Standard range is 0.05 to 5 V/Pa. A value outside the standard range may result in a per sensor charge.
Pelican Shipping Box	Sensors can be shipped in a reusable Pelican case. Inquire for details and pricing.

Chaparral Physics is able to customize the sensor to your needs. Please inquire about other modifications to make the sensor best fit your application.



**Chaparral Physics**

A Division of the Geophysical Institute of the University of Alaska  
Development, Calibration, and Production of Fine Infrasound Sensors