

## Calibration, Dynamic Pressure Transducer, 503.XX

### Main Characteristics

- frequency from quasi static to 5 Hz
- sinusoidally varying pressure from 0 to 2 Bars
- Calibration of most pressure transducer :
- piezoelectric charge (single ended or differential)
- constant current excitation
- constant voltage excitation
- Compensation for electrical gain (substitution method)

### Introduction

The VibraSens PC based automated dynamic pressure calibration system provides calibration of piezoelectric dynamic pressure transducer. It consists of a sinusoidal air generator, a PC and a 12 bit two channels 5 MS/s data acquisition card. Its operationall software is based on National Instrument Labview. With 2 bars (31 PSI) dynamic, our system provides better signal noise ratio at low frequency than pistonphone used to calibrate microphones and other acoustic sensors.

### Description

Piezoelectric pressure transducer cannot be calibrated statically. VibraSens has therefore developed its own calibration system using a periodic sine wave pressure generator.

This system provides a significant improvement in dynamic pressure calibration. Data acquisition associated with Labview allow compensation of parameters that were not possible with analog system.

#### Comparison calibration with substitution.

Our system includes comparison calibration with substitution. This technique greatly improved the accuracy of the measurement using 2 reference pressure sensor. The first one is a piezoresistive pressure sensor calibrated using a dead weight tester. The second one is a stable piezoelectric quartz transducer. The 2 reference pressure transducer are first installed and the system calculates a first transfer function. The Unit Under test is then installed and a second transfer function is calculated. The PC is therefore able to compensate for the difference in the electrical gain of the signal conditioning system. It virtually eliminates uncertainties due to temperature variation and signal conditioner gain on the entire frequency range.

#### Filtering technique

Digital system uses more powerful signal processing to reduce the signal noise ratio. The reference and Unit under test transducer are both stimulated with a sinusoidal signal. Unfortunately, the system is poised with noise and harmonic distorsion mainly due to the system used to generate the sinusoidal wave. Our calibration is performed in the frequency domain where we apply a cross correlation technique between the input and output signal. This almost removes all signal not correlated with the input signal sent to our harmonic air generator device.

#### Data Storage and output

The system automatically generates a report of the test. The user can then print or saved it in Acrobat PDF format.

### Ordering information

To order, specify part number and pressure parameters :

**503.01**, Calibration, Dynamic Pressure Transducer, pressure parameters to be defined

#### Ordering example :

**503.01**, Calibration, Dynamic Pressure Transducer, 2 bars 5Hz

### Specifications

#### Principle

Comparison calibration by substitution  
Sinusoidal wave pressure generator

#### Electrical Input

##### type

Charge for piezoelectric transducers (single ended or differential)  
Voltage with constant current supply (ICP type)  
Current input with constant voltage supply

##### range, transducer

Charge : ..... 0.02-5000 pC/bar  
Voltage : ..... 1-10 000 mV/bar  
Current : ..... 0.01 to 100 uA/bar

#### Frequency range

pressure transducer.....0Hz to 5Hz

#### Pressure range

Static ..... 0.1 to 2 bars  
Dynamic ..... 1 to 2 bars

#### Accuracy

Absolute errors are as follows :

1Hz-5Hz..... 1.5%