

**MECHANICAL ENGINEERING DEPARTMENT**  
**INDIAN INSTITUTE OF TECHNOLOGY KANPUR, KANPUR 208016**

Ref: SSG/2014/002

Date: 05/12/2014

Quotations are invited for **electro-dynamic modal shaker system and transducers**

Dear Sir/Madam,

Please submit quotations (Technical and Commercial) for the following items:

<b>S. NO</b>	<b>Description</b>	<b>Quantity</b>
1.	Electro-dynamic modal shaker system (shaker and power amplifier)	01
2.	Accelerometer	01
3.	Force transducer	01

The quotations should indicate make, delivery period, exact taxes applicable, installation charges warranty etc. Please mention your VAT/ST/CST Registration numbers on the quotation, proforma invoice and bills.

The Tender Technical Bid (Part 'A') and Commercial Bid (Part 'B') should be submitted in two separate sealed envelope duly subscribing our enquiry reference and due date in bold letters, addressed to

Dr. Shakti S Gupta  
Associate Professor  
Department of Mechanical Engineering  
IIT Kanpur-208016

**Revised due date for submitting your offer is on or before 1500 hrs. 17.12.2014.**

## TECHNICAL SPECIFICATIONS FOR MODAL SHAKER SYSTEM

### 1. DETAILED TECHNICAL SPECIFICATIONS

#### Ambient air-cooled electro-dynamic modal shaker:

Sl. No	Parameter / Feature	Specification
1.	Sine (Peak)/ Random (RMS)	~100 N/~ 70 N
2.	Useful Frequency range	2 – 5 kHz
3.	Max. Rated Travel	~ 2.5 cm
4.	Max. Acceleration Sine (Peak)	~ 44g
5.	Maximum velocity	~ 1.5 m/s
6.	Rated Current	~ 6.0 A
7.	Effective Moving Mass (Shaker should be designed to have very less force drop-off at resonance)	~ 1/4 kg
8.	Main Resonance Frequency	Above 6 kHz
9.	Overall weight with trunnion	20 kg to 22 kg
10.	Operating temperature range	5 <sup>0</sup> C to 40 <sup>0</sup> C
11.	Operating humidity	In the climate of Kanpur, India from July to September
12.	Other important features	(i) Suitable protection features for over travel and over current (ii) Hole through with trunnion for rotation of shaker for lateral excitation. (iii) Should have European commission standard compliance for EMC standard

**Power amplifier for the electro-dynamic shaker:**

The amplifier should be compatible in all respects with the shaker quoted.

Sl. No	Parameter / Feature	Specification
1	Output power	Suitable for driving the shaker to its specified capacity
2	Frequency Range	40Hz – 15 kHz (full capacity), DC to 150kHz (reduced capacity)
3	Power O/P	120VA with Exciter as specified above
4	Input coupling	AC or DC
5	Input impedance	>10 k $\Omega$
6	Electrical Input: Voltage Frequency	230 V AC ( $\pm 10V$ ) 50 Hz ( $\pm 2$ Hz)
7	Operating temperature	5 $^{\circ}C$ to 40 $^{\circ}C$
8	O/P Voltage	22V RMS
9	Total harmonic distortion at full output capacity	< 1 %
10	Input connector type	BNC
11	Input signal voltage for full power	$\pm 5$ to 10V
12	Weight	< 15 Kg
13	Other important features	(i) Suitable protection features (ii) Should have European commission standard compliance for EMC (iii) Voltage to current mode switching, phase inversion switching, power on/off switch, Continuously variable gain control, functional at 90% RH. (iv) Indicator lamp for clipping, temperature and current overload, voltage and current modes of operation.

**Warranty on the electro-dynamic shaker and associated power amplifier:**

- (i) The mandatory warranty on the system should be that of one year from OEM.
- (ii) Quotation should also include charges for extended warranty for the next year.

## Mandatory accessories to be supplied

The quotation should include mandatory accessories mentioned below:

- a) All the necessary items like suitable push – pull stringers, collets, chuck, adaptor, turnbuckles and any other item required for the operation of modal shaker system.
- b) Suitable cables required as given below
  - i. Suitable cable from shaker to power amplifier
  - ii. Power cables of standard length
  - iii. Any other special cable required should be supplied of sufficient length.

## Important Notes:

- a) All the items should be supplied from single OEM/ authorized representative.
- b) Supplier shall provide the detailed specification data sheets for all items including accessories along with the quote.
- c) User manual should be provided along with the system.
- d) The modal shaker system quoted should have proven heritage of application for modal tests.
- e) The offer should include the brochures, leaflets, sketches, and all the literatures.
- f) The vendor should supply the system with India compatible power cords.

## TECHNICAL SPECIFICATIONS FOR TRANSDUCERS

### 1. Hermetically sealed Uniaxial accelerometer :

Sensitivity (Minimum)	~10 mv/g
Frequency Range	0.2 Hz to 12 kHz or better
Resonance Frequency	~ 40 kHz
Measuring Range	~ ±700g
Maximum Non Destructive Shock Level ( peak)	10000g pk
Weight	< 10 gram
Case Material	Titanium
Mounting	Clip/Adhesive/stud
Connector	10-32 UNF Microdot/ side connector
Operating Temperature Range	-50 °C to +120 °C
<b>Cable</b>	Low Noise, Single Screened with BNC Termination Length : 3 Meter for each input port with accelerometer
<b>Magnetic Mount</b>	Magnetic base to be provided for mounting on ferrous surface

## 2. Force Transducer:

Voltage Sensitivity	20 mv/N (Minimum)
Full scale force range Tension/Compression	220 N(Minimum)
Mounted Resonance Frequency (unloaded)	75 kHz
Linearity Error at full scale	< $\pm 1\%$
Full Scale Output Voltage	$\pm 5V$
Output Impedance	< 150 $\Omega$
Power Supply	2 to 20mA
Grounding	Case grounded
Temperature	-70 <sup>0</sup> C to +120 <sup>0</sup> C
Max. operational Sinusoidal Vibration (peak)	5000 g or better
Max. operational shock(peak)	10000 g or better
Weight	30 gram
Mounting	1/4"- 28UNF thread on top and bottom
Case Material	Stainless steel
Connector	10-32UNF and cable of 3 meter length

### Important Notes:

- (i) Extra wax material to be provided for mounting of accelerometer.
- (ii) Sensitivity chart for the transducers is to be provided.
- (iii) Transducers must be supplied in a protective cushioned boxes.