

Sr. No.	Description	Required	Offered
1.0	Application:		
	PC based vibration frequency measuring instrument (FFT Analyser) is intended to be used in Blade shop for natural frequency testing of turbine blades in static conditions. Blade types: Maximum blade length will be up to 1500mm, width up to 450 mm and weight up to 100 Kg. The machine will be used for blades having different sizes of roots of curved fir-tree, T-root, fork & dove-tail.		Vendor to comply this column
2.0	Input:		
	No. of Channels	Two Nos. active at least.	
	Connector Type:		
	For ICP type Accelerometer	BNC Type or 10-32UNF female	
	For Voltage Input	BNC Type	
	Dynamic range	≥ 120 dB	
	Coupling	AC/DC/ICP coupling	
3.0	Analysis Section:		
	Frequency Range	Suitable instrument to measure frequency 20Hz to 2000Hz at least.	
	Frequency resolution	6400 lines or more	
	Window Function	Hanning at least	
	Average Mode	Time (STA), Spectral, Linear Exponential peak hold and reference peak hold modes.	
	Measurement Mode	On-line and Off-line	
	Measuring accuracy	All input ranges at 1KHz: ± 0.05 dB (typical 0.015 dB) Temperature variability : < 0.1 dB/10° C	
	Analyser type	Channel processing should be real time.	
4.0	Displays:		
	Display Type	Time signal, Spectral, monitoring waterfall, Monitoring/ Compressed signal, Constant Band Tracking at least.	
	Resolution	Input resolution: 24 bits (144dB) or better	
	Display Mode	Time signal, Spectral, Orbit, waterfall, Monitoring/ Compressed signal, Profile, Complex profile, Constant Band Tracking at least.	
	Y/ Vertical axis unit	Any physical quantity in any physical unit (in Linear, Log and dB). Display in RMS, Peak, Peak-peak, and RMS at least.	
	X/Horizontal axis	Linear, Logarithmic of frequency	
5.0	Computer System (as per latest in market)		
	PC	Intel Core i7, 3GHz processor or better, 8 GB RAM, not less than 500 GB Hard disk, optical scroll mouse, suitable display screen (not less than 15"), MS office 2013 or better, Adobe reader, three years warranty in India.	
	Power & Network Cable	Power & Network Cable.	
	Pen Drive	Pen Drive 4GB or More.	

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	Licensed installed operating system with software	Shall be based on Windows 10 Pro or Enterprise or latest one.	
	Licensed Installation CDs of Windows, software package for data acquisition & reporting and any other Softwares/Drivers.	Shall be provided as a Back-up.	
6.0	General Specification:		
	Operating Temperature	0° to 50° C	
	Relative humidity	93% RH at 40° C non-condensing	
7.0	Accessories:		
	ICP Type accelerometers	ICP Type with 10mV/g sensitivity, more than 7KHz frequency range, weight not more than 10gms, measuring range minimum 250 gpk, Connection 10-32 UNF or BNC at side or top mounting 10-32 UNF thread hole.	
	Cable (3 meter) of 2-3mm dia. assembled with connector	Suitable flexible cable with both connector adjustable to accelerometer on one end and instrument at other end.	
	AC adapter (if required in instrument), Battery (Ni-Cd) is not preferable.	AC adaptor for running analyzer for AC supply.	
	Magnet base/ clip for clamping	Magnet base should be very light.	
	Other essential supply	Any other essential supply of items required for proper functioning of the machine.	
8.0	General Conditions:		
	Vendors to comply that quotation covers all the items (i.e. software, cables, Connectors, Adapters, magnet, accelerometer, computers etc.) even it is not specified in item list. The price quotation at 7.0 & 9.0 must be on single piece basis.		
	Vendors to comply that they shall commission the instruments at our works and build templates on each design of full set of blades for future testing. During commissioning Party should also demonstrate interfacing of instrument with personal computer & details of software. The party will provide service in future if any problem arises during operation.		
	The party will provide two sets of operation, installation, commissioning, service and trouble-shooting manuals containing detailed circuit diagram in English language in hard copy and one set in soft copy.		
	The party will quote necessary spare parts / accessories items for minimum 05 years of satisfactory operation of Equipment even if not included at chapter 7.0 and 9.0.		
	The party shall provide calibration certificate of instruments and accelerometer and explain the calibration procedures of instrument during commissioning. The party should quote for a contract of calibration in future.		
	The party can demonstrate the instrument at our works if required.		
9.0	Spares:		
	ICP Type accelerometers	Mentioned in accessories	
	Cables (3 meter) assembled with connector	Mentioned in accessories.	
	Battery if required		
	AC adapter if required		
	Magnet base/clip for clamping	Mentioned in accessories	

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10.0	Reporting software:	
	Instrument should be capable to transfer data in PC.	
11.0	Accuracy Test:	
	Accuracy tests shall be done with minimum two sets of blades.	
	Repeatability of measured values shall be proved at BHEL within +/-0.5Hz.	
12.0	Training:	
	Competent, English & Hindi speaking experts shall be arranged by the vendor for satisfactory & effective training of BHEL personnel during commissioning of instrument at BHEL works.	
13.0	Commissioning:	
	Supplier to take full responsibility for carrying out commissioning & all types of other supplied equipment/accessories, etc. Service requirement like power shall be provided by BHEL at only one point. Helping personnel shall be provided by BHEL. Details of these requirements should be informed / discussed by vendor and agreed with BHEL in advance.	
	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, as mentioned at clause no.-11.0, shall also be part of the commissioning activity.	
	Tools, Tackles, Test mandrels, instruments and other necessary equipment required to carry out all commissioning activities should be arranged and brought by the supplier.	
	Commissioning spares, required for commissioning of the machine within stipulated time, shall be brought by the supplier on returnable basis.	
	Broad schedule of commissioning shall be submitted with the offer.	
	Charges, duration, terms & conditions for commissioning should be furnished in detail separately by vendor along with offer.	
14.0	Final machine acceptance:	
	Final acceptance shall be made by BHEL Haridwar after commissioning of equipment, testing as per clause no.-11.0 and training of BHEL personnel as per clause no.-12.0.	
15.0	Packing:	
	Sea worthy & rigid packing for all items of complete machine, all accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all small loose items shall be suitably packed in boxes.	
16.0	Guaranty/Warranty:	
	Guaranty/Warranty for complete machine, software and all supplied accessories/equipment for 12 months from the date of final acceptance of the machine OR 18 months from the date of dispatch. Any spare required during guaranty period shall have to be arranged by the vendor free of cost and duty levied have to be borne by the vendor.	
17.0	Additional information:	
	Machine model no.	
	Total connected load (KVA)	
	Catalogue of the machine	
	Total weight of the machine	
	Dimension of the machine	
	Detailed catalogue, sketch/photographs of the machine and accessories/attachments should be submitted with the offer.	

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