

Specification No.: QC-T/2019-20/FFT/01, Rev:01, Date:04-01-2020;			Indent no. : 20191198
Sr.No.	Description	Required	Offered
1	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	Input:		Vendor to comply & provide details
	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	Analysis Section:		Vendor to comply & provide details
	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	Displays:		Vendor to comply & provide details
	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	Computer System (as per latest in market)		Vendor to comply & provide details
	PC (Compatible in India)	Intel Core i7, 3GHz processor or better, 8 GB RAM, not less than 500 GB Hard disk, optical scroll mouse, USB Keyboard, suitable display screen (not less than 15"), MS office 2013 or better, Latest & suitable version of Adobe reader.	
	Power & Network Cable	Suitable Power & Network Cable.	
	Pen Drive	Pen Drive 4GB or More.	
	Operating system	Licensed OS shall be based on Windows 10 Pro or Enterprise or latest one.	
	Softwares/Drivers.	Licensed Installation CDs of Windows, software package for data acquisition & reporting and any other Softwares/Drivers shall be provided as a Back-up.	
6	General Specification:		Vendor to comply & provide details
	Operating Temperature	0° to 50° C.	
	Relative humidity	93% RH at 40° C non-condensing.	
7	Accessories:		Vendor to comply & provide details

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	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 with connector	Suitable flexible cable (dia. 2-3mm) of length atleast 3 meter with both connector adjustable to accelerometer on one end and instrument at other end.	
	Battery (if required)	Suitable battery to be provided (if required).	
	AC adapter (if required in instrument)	AC adaptor for running analyzer for AC supply.	
	Magnet base 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	General Conditions:		Vendor to Comply
	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	Spares:		Vendor to Comply
	ICP Type accelerometers	Mentioned in accessories.	
	Cable with connector	Mentioned in accessories.	
	Battery (if required)	Mentioned in accessories.	
	AC adapter (if required)	Mentioned in accessories.	
	Magnet base for clamping	Mentioned in accessories.	
10	Reporting software:		Vendor to Comply
	Instrument should be capable to transfer data in PC.		
11	Accuracy Test:		Vendor to Comply
	Accuracy tests shall be done with minimum two sets of blades.		
	Repeatability of measured values shall be proved at BHEL within +/-0.5Hz.		
12	Training:		Vendor to Comply
	Competent, English & Hindi speaking experts for two training man days shall be arranged by the vendor for satisfactory & effective training of BHEL personnel during commissioning of instrument at BHEL works.		
13	Commissioning:		Vendor to Comply
	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.		

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	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 for commissioning should be furnished in detail separately by vendor along with offer.	
14	Final machine acceptance:	Vendor to Comply
	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	Packing:	Vendor to Comply
	Suitable 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	Guaranty/Warranty:	Vendor to Comply
	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/warranty period shall have to be arranged by the vendor free of cost and duty levied have to be borne by the vendor.	
17	Additional information:	Vendor to comply & provide details
	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.	
18	Qualifying Conditions :	Vendor to comply & provide details
	Only those vendors (OEMs or its authorized agencies), who have supplied and commissioned at least one number of instrument of similar or higher model within the past 10 years (from date of opening of tenders) and the referred instrument is presently working satisfactorily for more than one year after commissioning, should quote. However, if referred instrument has/ had been supplied to BHEL, then such instrument should be presently working satisfactorily for more than six months (from date of opening of tenders) after its commissioning and acceptance in BHEL.	
	The following information should be submitted by the vendor about the companies where referred instruments have been supplied. This is required from all vendors for qualification of their offer.	
	Name of the customer / company, where referred instrument(s) is (are) installed.	
	Complete postal address of the customer.	
	Month & Year of Commissioning.	
	Specific application if any for which the instrument is supplied.	
	Name and designation of the contact person of the customer.	
	Phone, FAX no. and email address of the contact person of the customer.	
	Performance certificate from the customer regarding satisfactory performance of instruments supplied to them (original certificate or through e-mail directly from the customer). Original certificate may be returned after verification by BHEL, if required.	
	BHEL reserves the right to verify information submitted by vendor. In case the information is found to be false/incorrect, the offer shall be rejected.	

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