C4 PORTABLE ULTRASONIC FLAW DETECTOR

This specification is covered in 2 parts as follows:

1. Technical Specifications Digital Ultrasonic Flaw Detector

2. Probes : SPECIAL AND CONVENTIONAL PROBES REQUIREMENT

TECHNICAL SPECIFICATIONS
DIGITAL ULTRASONIC FLAW DETECTOR

Sl.No.	Particulars	BHEL SPECIFICATIONS	Bidder's OFFER [With Complete Technical Details]
1.0	Application	Digital Ultrasonic Flaw detector used for Testing of materials and welded structures made of Steel .	
2.0	Principle of operation	The UT Flaw Detector works on the principle of Reflection of Ultrasounds at Interfaces of varying acoustic impedance. By using Piezoelectric Transducers, which can convert electric signals to ultrasonic vibrations, Ultrasound is sent to the test objects and the reflected Ultrasonic energy from the defects is converted back to electric signals, which in turn are displayed on the CRT .	
3.0	Design base	Compliant to EN 12668-1,MIL STD-810 F,IEC 60068-2-27,IEC-60068-2-6.	
4.0	**Pulser**	Tunable Square wave pulser. The pulse is to be electronically controlled on both rising and falling edges to maximize probe performance and increasing near surface resolution.	
4.1	Pulse repetition frequency	10 Hz to 1000 Hz.	
4.2	Energy Settings	50 to 475V in 25V increments	
4.3	Pulse width	Adjustable from 30 to 10000 ns(0.1MHz)	
4.4	Damping	50 to 400 Ohms	
5.0	**Receiver**		
5.1	Gain	0 to 110dB-Two user defined gain step adjustments and presets above function keys	
5.2	Total instrument Bandwidth	0.2to26.5MHz@-3dB	
5.3	Digital Filter settings	User selectable narrow band and broad band filter options to be provided to optimize receiver performance	
5.4	Rectification	Full wave, Positive half wave, Negative Half wave,RF	
5.5	System linearity	Horizontal:+/- 0.2% FSW; Vertical:0.25%FSH,Amplifier Accuracy +/- 1dB	
5.6	Reject	0 to 80% full screen height	
6.0	**Measurement**		
6.1	Types	Thickness, Sound path, Projection, Depth, Amplitude, Time of flight for both Gates.	

6.2	Echo to Echo	Standard	
6.3	DAC / TVG Standard	Up to 50 points captured, ASME Section I, Section III, 110 dB dynamic Range, full gain, range and delay adjustments during set up, view switchable between DAC / TVG	
6.4	CUSTOM DAC	With up to three warning curves from +10 dB to –24 dB	
6.5	TVG Table setup	For time varied gain applications. TVG set ups to be built from DGS / AVG diagram	
6.6	Amplitude measurement	0 to100% full screen height with 0.25% resolution	
6.7	Curved Surface correction	For Angle measurements.	
6.8	X-Value correction	Beam index point to front of transducer	
7.0	**Gates**	Two fully independent Gates for Echo Height and Time of flight.	
7.1	Gate start	Variable over entire display range	
7.2	Gate width	Variable from Gate start to end of displayed range.	
7.3	Gate height	Variable from 2 to 95% full screen height	
7.4	Alarms	Positive and Negative thresholds: Minimum Depth on Gate1 and Gate 2.	
8.0	**DISPLAY**	“A” scan display (Rectified as well as RF mode)and optional “B”scan display. Color Liquid Crystal Display with 60Hz update, user defined, user selectable color schemes and brightness, and split screen and full screen modes. Minimum 320 pixels(W)x 240 pixels(H).Auto freeze facility.	
8.1	Base line break mode	All zero cross points on the RF wave form shall be shown as zero points in full wave mode.	
8.2	Amplitude Grid mode	100% Amplitude display	
8.3	Time base grid modes	Standard 0 to 10 major division, each having five equal minor divisions.	
9.0	**Instrument Input / Output**		
9.1	USB Client port	For communication with PC	
9.2	USB Host port	For direct printing to any Laser or inkjet printer as well as data storage on USB drives	
9.3	LEMO Hardware I / O (optional)	Alarm outputs, Trigger In / Out	
9.4	Data Storage	Up to 10000 Ids with Wave forms ,measurement ,and Setup parameters	
10.0	**Calibration**		
10.1	Automated distance Calibration	For velocity and zero offset	

10.2	Test modes	Pulse echo,Dual,or through transmission	
10.3	Units	Millimeters, Inches or Microseconds	
10.4	Range	2 mm to 10000 mm	
10.5	Velocity	600 to 15000 m/s.	
10.6	Zero offset	0 to 4950 μsec	
10.7	Display delay	-50mm 12500mm	
10.8	Refracted angles	10^0 to 85^0 in 0.1^0 resolution	
11.0	**Probes / Accessories**		
11.1	Equipment to be supplied alongwith Normal Beam, Angle Beam (45,60 & 70 Degree) and Twin Crystal Probes(Qty. 1 each). Callibration Blocks shall also be supplied.	Probes as per annexure 1 to this specification	
11.2	Cable and other Accessories also to be supplied**.**		
11.3	Callibration Certificate and Test Certificate shall be supplied with the equipment.		
12.0	**Software Options**	DAC,DGS / AVG, AWS D1.1	
13.0	**General**		
13.1	Weight	< 5kg	
13.2	Transducer connections	BNC or Number 1 Lemo	
13.3	Battery	Lithium ion,Nickel Metal Hydride, and Alkaline C-Cells. The system shall have the provision for Internal rechargeable battery with charger adapter. The battery after charging should work for minimum 5 hours.	
13.4	Power requirement	AC – mains, 200 – 240V (50-60 Hz)	
13.5	Environmental ratings	Temperature: 5 to 45 degree celcious Humidity: RH 30 - 80%	
14.0	Inspection	The system and accessories (consisting of the items) shall be offered for Inspection by BHEL and Performance Prove-Out.	
15.0	Installation and commissioning	The system and accessories (consisting of the items mentioned) is to be installed & commissioned at BHEL Works, FREE OF COST, by the Service Engineer of the SUPPLIER.	

16.0	Documentation in ENGLISH Language	3 Copies (In English) of the Operation & Maintenance Manuals containing Electric Schematics, Circuit Diagrams, Drawings, Trouble Shooting Charts, Mechanical Sub-Assemblies, Rating of Bought-Out Items, etc. shall be supplied, at the time of inspection by BHEL Engineers. In addition, one SOFT COPY in CD to be supplied.	
17.0	Performance Guarantee	The system and accessories (consisting of the items mentioned in the scope of supply) are to be guaranteed for its performance for a minimum period of two years from the date of performance acceptance at BHEL Works.	
18.0	Service and Spares Support Requirements	Vendor shall ensure after the guarantee period, through trained service personnel in India for next 5 years as and when need arise. Spares to be made available with in 1 week.	
19.0	Training on Operation & Maintenance	Complete Training for 2 BHEL Engineers is to be given on Operation & Maintenance of the OFFERED Training has to be provided at BHEL Works, after the successful commissioning of the Equipment & Accessories.	
20.0	Annual Maintenance Contract - AMC	The BIDDER has to QUOTE for AMC with detailed scope of work.	
21.0	Safety and Quality Standards	Supplier to ensure that Safety and Quality of system and accessories (consisting of the items mentioned in the scope of supply) shall conform to International Standards. Conformance certificate to be along with the equipment.	

Annexure 1 to
Techincal specification of
DIGITAL ULTRASONIC FLAW DETECTOR

PROBES

SPECIAL AND CONVENTIONAL PROBES REQUIREMENT :

Description	Probe /Frequency	Quantity
RTD	Selbom 70/ FS18	02nos
RTD	Selbom70/ FS30	02 nos
RTD	Selbom70/ FS40	02 nos
	MSEB4H E series	04 nos
	MSEB4H 0 series	04 nos
	SEB4KF8	02 nos
	MSWQC/2.25 MHz	02 nos
	VRY 45/2 MHz	02 nos
	VRY 60/2 MHz	02 nos
	VRY 70/2 MHz	02 nos
	VSY45/4 MHz	02 nos
	VSY 60/4 MHz	02 nos
	VSY 70/4 MHz WSY 45/4 MHz WSY 60/4 MHz WSY 70/4 MHz MWB 35/N2 MWB 35 /N4 MWB 45/N2 MWB 45/ N4 MWB 60/N2 MWB 60/ N4 MWB 70/N2 MWB 70/ N4 MB2SN MB 4SN WB35 N2 WB 45 N2 WB60 N2 B2SN B4SN	02 nos 02 nos 02 nos 02 nos 02 nos 02 nos 04 nos 04 nos 04 nos 04 nos 04 nos 04 nos 04 nos 04 nos 02 nos 02 nos 02nos 02 nos 02 nos.