



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

CAPITAL EQUIPMENT / MATERIALS MANAGEMENT

ENQUIRY	Phone: +91 431 257 74 21
NOTICE INVITING TENDER	Email : vkarna@bhel.in
	spss@bhel.in
	Web : www.bhel.com

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2621800003	30.07.2018	31.08.2018

You are requested to quote the Enquiry number date and due date in all your correspondence. This is only a request for quotation and not an order.

Please note that under any circumstances both delayed offer and late offers will not be considered. Hence vendors are requested to ensure that the offer should reach physically on or before 14.00 Hrs(IST) on the Date of tender opening. Tenders received after 14.00Hrs (IST) will not be considered for evaluation.

Item	Description	Quantity	(Indigenous Vendors) Matl. Will be Delivered to
10	Vertical Turning (Turret) Lathe as per the technical specification & commercial conditions applicable (To be downloaded from web site www.bhel.com or http://tenders.gov.in)	1.00 No.	FOR, BHEL, Stores, High Pressure Boiler Plant, Tiruchirappalli - 620014

Important points to be taken care during submission of offer

- 1) Material shall be delivered to (By Indigenous vendors): As stated above.
- 2) By Foreign Vendors: CFR Chennai Seaport / Airport
- 3) Delivery required 10 Months (including PDI) from the date of purchase order.
- 4) Erection & Commissioning period required 3 Months from the date of intimation by BHEL to vendor for deputation of their Engineers for E&C.
- 5) EMD for this Tender will be (INR): 2,00,000.00
- 6) Compliance Forms. TRY/IMP/01 & TRY/IND/01A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
- 7) All updates, amendments, corrigenda, etc., (if any), for each tender will be posted only on the above websites from time to time, as and when required, until each tender is opened. There will be no publication of such updates, amendments, corrigenda, etc., through newspapers or any other media.

BHEL's General guidelines / instructions (refer MM / CE / GENL / GENL / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site www.bhel.com/tender/tender_home.php or from the Government tender website <https://eprocure.gov.in/epublish/app>) under Enquiry reference .

Tenders should be submitted before 14.00Hrs (IST) on the due date
Tenders will be opened at 14:30 hours on the due date
Tenders would be opened in presence of the tenderers who have submitted their offers and who may like to be present.

Yours faithfully,
For **BHARAT HEAVY ELECTRICALS LIMITED**

DGM / Capital Equipment / MM

S.PARTHASARATHY
MANAGER
CAPITAL EQUIPMENT / MM
BHEL, TRICHY-620014

PART - A
QUALIFYING CRITERIA FOR
CNC VERTICAL TURNING LATHE

S.No	BHEL Specification	Bidder's Offer
1.0	QUALIFYING CRITERIA	
1.1	Bidder / OEM must have manufactured, supplied and commissioned at least ONE CNC VERTICAL TURNING LATHE are eligible to quote.	
1.2	Bidder has to submit at least ONE Performance Certificate from their customer (end user), for satisfactory performance of CNC VERTICAL TURNING LATHE with turn table of dia 2500mm or higher meeting the following conditions: a) The Equipment must have been supplied within the last TEN ^{five} years as on the first date of tender opening. b) The Equipment must have performed satisfactorily for at least one year during this period. For obtaining the Performance certificate, a suggestive format is provided at the end of part-A.	
1.3	PO document for the above mentioned supplied equipment to be enclosed	
1.4	BHEL reserves the right to verify the information provided by the Bidder. In case the information provided is found to be false/ incorrect, the offer is liable for rejection.	

2.0	INFORMATION TO BE PROVIDED BY BIDDER	
2.1	Bidder shall provide contact details(phone no & email id) including the address of his Agents / Service Centres in India	
2.2	Details of CNC VERTICAL TURNING LATHE supplied to other BHEL units if any	
2.3	The BIDDER to furnish Reference List of Customers(max 10 customers) including Contact details(phone no & email id).	

SECTION 3

The BIDDER to note:

S. No.	PARTICULARS	Bidder's offer
3.1	The BIDDER shall submit the offer in Two Parts – 1. Technical [with PART A & PART B] & 2. Commercial and Price Bid.	
3.2	The Bidder's offer against each clause in PART A & B of the offer should be filled by the BIDDER compulsorily with complete details.	
3.3	The BIDDER shall assure a continuous support for Spares and Service for Ten Years, from the date of commissioning of the equipment at BHEL Works.	
3.4	The Technical Offer shall be supported by Product Catalogue and Data Sheets in original and complete technical details / literature on the quoted model of equipment.	
3.5	The Commercial Offer (given with the Technical Offer) shall contain the Scope of Supply and the Un-Priced Part of the Price-Bid, for confirmation.	

V. Senthil Kumar
V Senthil Kumar/Er/ATP

N. Padmanabhan
N Padmanabhan/DM/M&S

C. Obliraj
C Obliraj/Sr.Er/M&S

Kotireddy CH
Kotireddy CH/Sr.Er/Modn

Palash Dolai
Palash Dolai/Sr.Er/Tool

Suggestive Format of Performance Certificate:

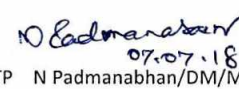
The performance certificate to be produced **on Customer's Letter Head.**

PERFORMANCE CERTIFICATE

- 1 Make & Series of the equipment
- 2 Month & Year of Commissioning
- 3 Equipment type: CNC Vertical Turning lathe Yes/No
(Strike off whichever is not applicable)
- 4 Turning table diameter in mm:
- 5 Application for which the equipment is used
- 6 Performance of the equipment Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
- 7 Service support after sales Satisfactory / Not Satisfactory
(Strike off whichever is not applicable)
- 8 Any Other remarks
- 9 This performance certificate was issued on: (DD/MM/YYYY)

Signature & Seal of the Authority
Issuing the Performance Certificate

Contact details of issuing authority
Name & Designation:
Office No/ Mobile no:
Email ID:

 V Senthil Kumar/Er/ATP  N Padmanabhan/DM/M&S  C Obliraj/Sr.Er/M&S  Kotireddy CH/Sr.Er/Modn  Palash Dolai/Sr.Er/Tool Page 3 of 3

PART- B

TECHNICAL SPECIFICATION FOR CNC VERTICAL TURNING LATHE

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDER'S OFFER With Technical Details									
1.0	PURPOSE: This machine is intended for machining of different size of BHEL products including castings, forging, welded jobs. The operations to be carried out are: Facing, OD Turning, Boring, Cylindrical Grinding (Internal), and Thread cutting (Internal and External).										
1.1	JOB MATERIAL SPECIFICATION: <table border="1"> <thead> <tr> <th>Specification</th><th>Hardness (HBW)</th><th>Hardness at Welded condition(HBW)</th></tr> </thead> <tbody> <tr> <td>20MnMoNi55</td><td>220</td><td>330</td></tr> <tr> <td>SA-350 Gr.L F2</td><td>200</td><td>300</td></tr> </tbody> </table>	Specification	Hardness (HBW)	Hardness at Welded condition(HBW)	20MnMoNi55	220	330	SA-350 Gr.L F2	200	300	
Specification	Hardness (HBW)	Hardness at Welded condition(HBW)									
20MnMoNi55	220	330									
SA-350 Gr.L F2	200	300									
2.1	Vendor to furnish constructional details of the machine including explanatory drawings of various components or assemblies like Column, Cross rail, Ram head, Table, Turret Head, Automatic Tool Changer and Machine Bed with details of material & their hardness. Feed Transmission System, Feed back System etc. of the machine is also to be explained.	Vendor to furnish									
2.1.1	Video images on CD / Hard copy of literature with photographs & drawings explaining the technical features shall be enclosed with the offer	Vendor to specify Vendor to furnish									
2.1.2	Movable Chip / Splash Guard: Movable type chip/ splash Guard of sufficient height with transparent windows and safety interlocks should be provided for the Table to avoid splashing of Coolant and scattering	Vendor to specify									

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	of Chips on the Operator's Platform and on the Shop Floor.		
	The opening width of the guard should be sufficient for easy loading and unloading of job on the table.	Vendor to confirm	
2.1.3	Machine should be Metric execution.	Vendor to confirm	
2.2	CAPACITY AND SIZE:		
2.2.1	Largest Work piece Diameter:	3000 mm	
2.2.2	Min and Max Work piece Height:	500 and 3000 mm	
2.2.3	Maximum Work piece Weight:	10 Tons	
2.2.4	Max. Turning dia & Max. Swing dia	3000 mm	
2.2.5	Minimum Boring Diameter:	340 mm	
2.2.6	Maximum Height of Turning and Facing	Not less than 3000mm.	
2.3	TABLE	Vendor to specify	
2.3.1	Table Diameter	2500 mm or above	
2.3.2	Maximum Load on table (Not less than 10T)	Vendor to specify	
2.3.3	Table Speed range (Steplessly Variable type):	Up to 150 rpm or higher. Vendor to specify range	
2.3.4	Number of stages for table speed change	Vendor to specify	
2.3.5	Power of Main Drive (S1 - Continuous Rating, IE2 or better type)	Vendor to specify	
2.3.6	The main motor and drives shall be of either FANUC / SIEMENS Details of Main Drive viz Type, Make, Model etc.:	Vendor to specify	
2.3.7	Torque Vs Speed characteristics to be submitted.	Vendor to submit	
2.3.8	No. of Jaws:	Four	
2.3.9	External Clamping Diameter range: (Minimum /Maximum)	Vendor to specify	
2.3.10	Internal Clamping Diameter range: (Minimum /Maximum)	Vendor to specify	
2.3.11	Type and size of Bearing of the Table:	Vendor to specify	
2.3.12	Size of T - slots (Preferably M24 standard), their position and accuracy. Drawing of Table showing details of the T - slots etc. should	Vendor to submit	

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	be submitted. 8 set of T-slots must be provided.		
2.3.13	Center Bore on Table Surface (Dia x Depth -with Accuracy)	Vendor to specify	
2.3.14	Table Indexing required	Vendor to confirm	
2.3.15	Rotation: Both clockwise and anticlockwise direction	Vendor to confirm	
2.4	CROSS RAIL		
2.4.1	Vertical Travel of cross rail (To suit Max Job height of 3000mm and minimum job height of 500mm)	Vendor to specify	
2.4.2	Feed Rate of Vertical Traverse:	Vendor to specify	
2.4.3	No. of Positions:	Vendor to specify	
2.4.4	Positioning pitch	Vendor to specify	
2.4.5	Distance of lowest Step from Table Top:	Vendor to specify	
2.4.6	Movement of Cross Rail must be enabled through Program and also by manual Push Buttons:	Vendor to Confirm	
2.5	CROSS RAIL TOOL HEAD AND RAM		
2.5.1	No. of Columns:	Two	
2.5.2	No. of Rams:	One	
2.5.3	Preferred Cross - Section of Ram	240 x240mm	
2.5.4	Vertical travel of ram	1200 mm	
2.5.5	Horizontal travel of ram on +X axis: (to suit job diameter)	Vendor to specify	
2.5.6	Horizontal travel of ram on -X axis: (beyond center)	200 mm	
2.5.7	Min distance from table surface to std turning tool holder (with tool mounted)	Vendor to specify	
2.5.8	Minimum distance from table surface to grinding attachment (with wheel mounted)	Vendor to specify	
2.5.9	Thread Cutting Capacity – Pitch range:	Vendor to specify	
2.5.10	Clamping detail for mounting Turning tool holder on ram	Vendor to specify	
2.5.11	Mounting of Turning Tool Holders should be enabled through Program and also by manual Push Buttons.	Vendor to confirm	

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2.6	GRINDING FACILITY:		
2.6.1	Motorized grinding head of suitable capacity to be provided. Vendor to specify the motor capacity, make, model	Vendor to specify	
2.6.2	RPM range- minimum 2000rpm	Vendor to specify	
2.6.3	External Coolant System for Grinding	Vendor to Confirm	
2.6.4	Minimum Internal Grinding Dia =350mm	Vendor to Confirm	
2.6.5	Maximum Grinding depth =500 mm	Vendor to Confirm	
2.6.6	Width of the grinding Wheel:	Vendor to specify	
2.6.7	Provision for Wheel Dressing on the machine	Vendor to specify	
2.7	MACHINE GUIDEWAYS:		
2.7.1	Width of cross rail guide ways	Vendor to specify	
2.7.2	Width of column guide ways	Vendor to specify	
2.8	Metallic Telescopic covers of rust resistant material shall be provided with wipers for guide ways of all axes.	Vendor to Confirm	
2.9	FEEDS AND DRIVE SYSTEM:		
2.9.1	Cutting feed in X axis (Steplessly Variable type):	Vendor to specify	
2.9.2	Rapid feed in X axis:	Vendor to specify	
2.9.3	Cutting feed in Z axis (Steplessly Variable type):	Vendor to specify	
2.9.4	Rapid feed in Z axis:	Vendor to specify	
2.9.5	Simultaneous control of X and Z axes	Vendor to confirm	
2.9.6	X and Z -Axes drives & motors shall be AC servo drives of digital type and AC servo motors respectively. The make shall be of Siemens/Fanuc (Details like model, make, type etc. to be submitted with the offer)	Vendor to specify	
2.9.7	Feed back system: Fanuc / Siemens / Heidenhain encoders/ any other make acceptable to BHEL (Details to be furnished in the offer)	Vendor to submit	
2.9.8	Mechanism for locking X & Z axis:	Vendor to specify	
2.9.9	Type of power transmission: Pre-loaded backlash-free recirculating	Vendor to specify	

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	ball screw drive or better for feed drive axes. Details of ball screw or equivalent used in the machine shall be submitted.		
2.10	OPERATOR'S PLATFORM: Vendor to describe the details of the operator platform. The platform shall be ergonomically designed for the ease of operator to operate the machine control panel. It should also aid for safe and easy visibility of the operations being carried out	Vendor to specify	
2.11	CHIP CONVEYOR AND CHIP BINS:		
2.11.1	Suitable chip conveyor to carry both short and curly chips effectively to the chip bin on floor should be provided. Two Chip bins of appropriate size with wheel & handle should be supplied.	Vendor to Confirm	
2.11.2	Type of chip conveyor:	Vendor to specify	
2.11.3	Width of conveyor:	Vendor to specify	
2.11.4	Elevation of chip conveyor from floor level	Vendor to specify	
2.11.5	Operations of chip conveyor (forward & reverse) through push buttons on operator's panel.	Vendor to Confirm	
2.11.6	Layout showing location of chip conveyor should be submitted.	Vendor to specify	
2.12	AUTOMATIC TOOL CHANGER		
2.12.1	Type:	Vendor to specify	
2.12.2	No. of storage locations:	10 or more	
2.12.3	Tool shank: 40mm×40mm (for turning/facing), 25mm×25mm (for boring bars)	Vendor to Confirm	
2.12.4	Max tool diameter or Width (when all pockets filled):	Vendor to specify	
2.12.5	Max tool length:	Vendor to specify	
2.12.6	Tool selection method: Random.	Vendor to Confirm	
2.12.7	Maximum Permissible Weight on each Pocket:	Vendor to specify	
2.12.8	Automatic Tool Changer(ATC) Drawing should be submitted:	Vendor to submit	
2.13	OPERATION AND CONTROL SYSTEM:		
2.13.1	OPERATOR'S PANEL: Operator's panel having complete CNC and machine control system with monitor of required configuration shall be	Vendor to submit	

	provided on the Operators platform. All switches with suitable interlock with table rotation should be within reach of operator for easy, & safe operation. All displays/indications should also be ergonomically placed. Layout showing complete details to be submitted.		
2.14	CNC SYSTEM & FEATURES:		
2.14.1	Make : Fanuc / Siemens	Vendor to specify	
2.14.2	Type : PC based latest version	Vendor to specify	
2.14.3	Model: Latest version -with simultaneous interpolation of two axes	Vendor to specify	
2.14.4	Details of Standard features:	Vendor to specify	
2.14.5	Details of optional features, recommended by vendor to be submitted.	Vendor to submit	
2.14.6	The system should have full alphanumeric keyboard, TFT/Equivalent colour display (preferably 17"), additional draw-out type QWERTY Key Board and mouse in suitable enclosure, RS232C serial interfaces, parallel interface for printer, COM port for telediagnosics, network ready with LAN, electronic hand wheels for all axes, graphic simulation and preinstalled system software & other required software etc. (Details should be submitted by Vendor).	Vendor to Confirm & Vendor to submit	
2.14.7	The system should have a meter for showing the spindle power.		
2.14.8	The CNC system should have a feature for locking axes through M codes.		
2.15	MANUAL CONTROL: Complete manual control of machine with required switches / keys should be provided on operator's panel for selection of axis, axis direction, cutting feed, table / spindle rpm, cutting feed on/off, display of axis position values etc, for manual operation without using CNC program, CNC option Manual Turn or MDI mode. Diagram / Sketches for switches / keys provided on operators pendant should be submitted.	Vendor to specify	
2.15.1	Hand Held unit: Hand held unit for axis selection and movement with pulse generator is to be offered with complete details. This is required for job setting.	Vendor to confirm	

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2.16	UPS FOR CNC SYSTEM: UPS of 10 minutes for CNC system with inbuilt cooling and charge status display:	Vendor to confirm	
2.17	MACHINE LIGHTS:		
2.17.1	Machine Lights for sufficient illumination of complete working area on both sides of operator's platform should be provided for clear visibility. 24V LED light fitting preferred.	Vendor to confirm	
2.17.2	A magnetic base portable light with sufficiently long cable shall be provided.	Vendor to confirm	
2.17.3	All light fittings, consumables, adapters/receptacles should have compatibility with Indian equivalents	Vendor to confirm	
2.17.4	Flashing / rotary type- End of Cutting and Program Stop Light.	Vendor to confirm	
2.17.5	Voltage shall be 24V for hand lamp.	Vendor to confirm	
2.18	AIR CONDITIONERS:		
2.18.1	Air Conditioners with Dehumidifiers of suitable capacity to be provided for all Electrical / Electronic Panels / Cabinets including Operator's Panel considering specified ambient conditions.	Vendor to Submit	
	Make: Rittal / Warner & Finley or any other reputed make acceptable to BHEL. Detailed specifications to be submitted.		
2.19	HYDRAULIC SYSTEM: Details should be submitted by the Vendor	Vendor to submit	
2.19.1	The System should be centralized.	Vendor to confirm	
2.19.2	Hydraulic Tank shall preferably be located at floor level:	Vendor to confirm	
2.19.3	Make: Rexroth / Vickers or any other reputed make acceptable to BHEL	Vendor to specify	
2.19.4	Filtration System:	Vendor to specify	
2.19.5	Failure indication:	Vendor to specify	
2.19.6	Automatic shut off provision. Details should be submitted.	Vendor to submit	
2.19.7	Refrigerated type cooling system of sufficient capacity to maintain complete Hydraulic System, including lubrication oil, hydraulic oil and gearbox oil, etc. at a temperature not exceeding 50 °C irrespective of	Vendor to specify	

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	the ambient conditions. Vendor should submit complete details.		
2.19.8	Hydraulic pump capacity (flow / pressure):	Vendor to specify	
2.19.9	Each pump should have an independent motor.	Vendor to specify	
2.20	First filling of all required Oils & Grease etc. Should be supplied by vendor. Oil grade: ISO VG 46 or 68/equivalent Grease: Servo gem grade 2 (preferred) Indigenous (Indian) source or Indian equivalent and specifications of oils/ greases are also to be provided by the vendor.	Vendor to Confirm	
2.21	COOLANT SYSTEM:		
2.21.1	Re-circulating type Flood Coolant System with all accessories shall be provided.	Vendor to specify	
2.21.2	All attachments, tool holders, boring bars, cassettes, adapters etc. shall have the provision so that coolant is available directly at the tool-cutting tip.	Vendor to confirm	
2.21.3	Coolant collection and re-circulation system should be leak-proof to avoid any spillage on shop floor, trenches for cables & foundation pit of the machine etc.	Vendor to Confirm	
2.21.4	Coolant Filtration System: Re-circulating type with suitable filtration unit. Vendor shall give details of offered filtration unit.	Vendor to submit	
2.21.5	Coolant flow diagram showing filters, pumps, valves, tank etc. to be submitted.	Vendor to submit	
2.21.6	Coolant pump & motor details:	Vendor to specify	
2.21.7	Coolant Tank Capacity:	Vendor to specify	
2.21.8	The coolant tank should be fitted with skimmer for regular cleaning of coolant from contamination with tramp oil.	Vendor to Confirm	
2.22	ELECTRICAL:		
2.22.1	415V $\pm$ 10%V, 50HZ $\pm$ 3 HZ, 3 Phase AC (3 wire system with out neutral) Power Supply will be provided by BHEL at a single point near the machine. All types of cables, connections, circuit breakers etc.	Vendor to Confirm	

	required for connecting BHEL's power supply point to different parts of the machine/control cabinets, shall be the responsibility of vendor. Requirement of grounding/ earthing with required material details is to be informed by vendor well in advance so that the same could be incorporated during construction of foundation.		
2.22.2	All electrical & electronic control cabinets & panels should be dust and vermin proof.	Vendor to Confirm	
2.22.3	All electrical components in the cabinets should be mounted on DIN Rail	Vendor to Confirm	
2.22.4	All electrical and electronic panels including operator's panel should be provided with fluorescent lamps for sufficient illumination and power receptacles of 220Volts, 5/15 Amp AC. All adapters/receptacles should have compatibility with Indian equivalents.	Vendor to Confirm	
2.22.5	Motors shall conform to IEC or Indian Standards	Vendor to Confirm	
2.22.6	All Electric & Electronic enclosures shall have IP 54 protection	Vendor to Confirm	
2.22.7	All cables moving with traversing axes should be installed in caterpillar / Drag chain. Additionally, all cable trays required for laying the cables should be included in the offer.	Vendor to Confirm	
2.22.8	Vendor should ensure the proper earthing for the machine and its peripherals.	Vendor to Confirm	
2.22.9	In-cycle hour counter with reset facility and also digital energy meter with RS485 communication facility shall be provided	Vendor to Confirm	
2.23	SAFETY ARRANGEMENTS:		
2.23.1	Machine should have adequate and reliable safety interlocks or devices to avoid damage to the machine, work piece and the operator due to the malfunctioning or mistakes. Machine functions should be continuously monitored and alarm / warning indications through lights/ alarm number with messages (on CNC display and panels) should be available.	Vendor to Confirm	

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2.23.2	A detailed list of all alarms / indications provided on machine should be submitted by the supplier.	Vendor to specify	
2.23.3	All cables, Pipes etc. on the machine should be well supported and protected. These should not create any hindrance to machine operation.	Vendor to Confirm	
2.23.4	All rotating parts of the machine should be provided with guards and should be statically & dynamically balanced to avoid undue vibration.	Vendor to Confirm	
2.23.5	Emergency Switches at suitable locations as per International Norms should be provided.	Vendor to Confirm	
2.23.6	Oil & water lines should not run with electric cable in the same trench.	Vendor to Confirm	
2.24	ENVIRONMENTAL PERFORMANCE OF THE MACHINE:		
2.24.1	Maximum noise level shall not exceed 85 dB (A) at normal load condition, 1 meter away from the machine	Vendor to Confirm	
2.24.2	If any safety / environmental protection enclosure is required it should be built in the machine by the vendor.	Vendor to Confirm	
2.24.3	Paint of the machine should be oil / coolant resistant and should not peel off and mix up with coolant.	Vendor to Confirm	
3.0	SERVO VOLTAGE STABILIZER:		
3.1	Indian make Oil / Air Cooled servo Controlled Voltage Stabilizer suitable for complete machine, its drives, controls, PLC etc with no undesirable Harmonics in the stabilizer output.	Vendor to specify	
3.2	Make : NEEL / Servo max or Any other make acceptable to BHEL	Vendor to specify	
3.3	Model & Rating (Suitable for the machine load. Vendor to specify noise level also.)	Vendor to specify	
3.4	Spares Package for the Voltage Stabilizer for 2 years working should also be offered.	Vendor to Confirm	
3.5	Catalogue of Voltage Stabilizer to be submitted.	Vendor to Submit	
4.0	ULTRA ISOLATION TRANSFORMER		
4.1	Ultra Isolation Transformer (Indian make) suitable for complete machine, its drives, controls & PLC etc. shall be supplied.	Vendor to Confirm	

4.2	Make. : NEEL / Servo max or Any other make acceptable to BHEL	Vendor to specify	
4.3	Model and Rating:	Vendor to specify	
4.4	Spares Package for the Ultra Isolation Transformer for 2 years working should also be offered.	Vendor to Confirm	
4.5	Catalogue of the Ultra Isolation Transformer to be submitted	Vendor to Submit	
5.0	Compressed air points: Compressed air at around 4 to 5 bar will be made available at one point. Any pressure booster if required is in vendor scope. The vendor shall indicate the inlet point for compressed air in the layout drawing of the machine. Air drier unit shall be provided.	Vendor to Confirm	
6.0	TOOLING:		
6.1	List of Tools required 1) Facing and turning tool holder (narrow)-2 Nos 2) Facing and turning tool holder (wide)-2 Nos 3) Angle tool holder for turning tools (left): 1 No 4) Angle tool holder for turning tools (right): 1 No 5) Tool holder for boring bars: 5 Nos 6) Boring bar of diameter 125mm and effective length 500mm: 1 No 7) Boring bar of diameter 70mm and effective length 350mm: 1 No 8) Boring bar of diameter 50mm and effective length 300mm: 1 No	Vendor to specify and provide details of the standard adopted if any.	
6.2	Any additional cutting tools, tool holders, boring bars etc if required shall be supplied for machining the prove out components-refer Annexure-II	Vendor to Confirm	
	Itemized pricing of the tools, tool holders, boring bars etc. Should be separately listed in the commercial offer		
7.0	MEASURING SYSTEM: Automatic job measuring system, comprising of Ram Mounted Renishaw make Wireless system, with measuring cycles, calibration system and all types of probes/ stylus required for measuring all machined dimensions of the prove-out components. Vendor to furnish detailed description of the system along with offer.	Vendor to specify	

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C. Obhraj

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Palash Dolai/Sr. Er/Tool

8.0	FAULT DIAGNOSTIC SYSTEM:		
8.1	Supplier's own diagnostic system with required hardware and software should be supplied and installed on the CNC system.	Vendor to specify	
8.2	Help guide should be provided for diagnostic systems	Vendor to Confirm	
9.0	LEVELING & ANCHORING SYSTEM: Complete anchoring system including foundation bolts, anchoring materials, fixators, leveling shoes etc shall be supplied for the Machine, Rotary Table, floor Plates etc.	Vendor to Confirm	
10.0	TOOLS FOR OPERATION & MAINTENANCE: The vendor shall supply special tools required for the operation and maintenance of the machine. The vendor shall also supply necessary standard tools like Torque Wrench, Spanners, Keys, grease guns etc. for operation and maintenance of the machine. List of all such Special and standard tools shall be submitted with offer	Vendor to Confirm Vendor to Submit	
11.0	SPARES:		
11.1	The Vendor shall recommend and submit list of spares required for the machine for two years of trouble free operation on three shifts/day basis under two headings as a) Mechanical & hydraulic spares and b) Electrical & electronic spares. The list shall generally include the following items. a) Mechanical & Hydraulic Spares: All types of pumps, All types of Valves, All types of pressure switches / transducers, All types of filters, All types of seals, gears etc. b) Electrical & Electronic Spares: All types of Relays, Contactors, Proximity Switches, Push Buttons, Indicating Lamps, Semiconductor Fuses, Special Fuses, Circuit Breakers, Main Power Switch, Encoders, Scanning Heads for Linear Scales, MMC module, NCU module, Operator's panel with Display Unit, I/O Cards for PLC, Servo Motors for Feed Drives, Power Module &	Vendor to Submit	

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	Control Cards for Main Drive as well as Feed Drives etc.		
	c) Unit Price of each item of spares shall be submitted with the commercial bid. d) Un-priced list should be submitted with technical offer.		
11.2	In case of ordering, a complete list of spares for the machine and its accessories along with spares specification / type / model, and name & address of the spare supplier shall be submitted along with documentation while supplying the machine.	Vendor to Confirm	
12.0	DOCUMENTATION:		
12.1	Following listed documents (3 Hard copies and one softcopy in Pen drive) in English language should be supplied along with the machine	Vendor to confirm	
12.2	Operating manuals of Machine & CNC system	Vendor to confirm	
12.3	Programming Manuals of Machine & CNC system	Vendor to confirm	
12.4	Detailed Maintenance manual of machine with all drawings of machine assemblies/sub-assemblies/parts including Electrical / Pneumatic/ Coolant / Hydraulic / Lubricating circuit diagrams.	Vendor to confirm	
12.5	Maintenance, Interface & commissioning manuals for CNC system, spindle & feed drives.	Vendor to confirm	
12.6	Manufacturing drawings for all supplied tool holders, coolant connections, adapters, sleeves, fixtures etc.	Vendor to confirm	
12.7	Catalogues / O&M Manuals of all bought out items.	Vendor to confirm	
12.8	Detailed specification of all rubber items and hydraulic/lube fittings	Vendor to confirm	
12.9	Bearings: Make& Specification for all bearings used in the machine.	Vendor to Specify	
12.10	Ball Screws: Detailed Specification for all ball screws used in the machine shall be submitted. The specification shall address the following points: (a) Diameter, (b) Pitch (c) Length (d) Make (e) Model Also Mounting drawings of these ball screws to be provided.	Vendor to specify	
12.11	Operating Manuals, Maintenance Manuals & Catalogues for Isolation	Vendor to confirm	

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06/11/18

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07/07/18

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6/7/18

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9.3.18

	Transformer and voltage stabilizer.		
12.12	PLC program printouts (Ladder diagram & Statement list) with comments in English.	Vendor to confirm	
12.13	PLC backup, NC backup in pendrive.	Vendor to confirm	
12.14	Complete back up of hard disk on GHOST CD and clear written Instructions (1 copy) to take back up and reloading of a new hard disk.	Vendor to confirm	
13.0	TRAINING:		
13.1	The Vendor shall arrange training at CNC manufacturer's works in India a) For 2 BHEL Operators Persons on CNC Programming and operational aspects for four days and d) For 2 Maintenance persons on Maintenance & troubleshooting aspects for four days. The Boarding, Lodging & travelling expenses of BHEL personal will be borne by BHEL.		
13.2	The Vendor shall impart training to BHEL's Machine Operators and Maintenance crew in Operation and Maintenance during commissioning of the Machine at BHEL works.	Vendor to confirm	
13.3	Competent, English speaking experts shall be arranged by the vendor during training for satisfactory & effective training of BHEL personnel	Vendor to confirm	
14.0	FOUNDATION:		
14.1	Vendor shall submit complete foundation details including static and dynamic loads within one month after getting BHEL's purchase order. The layout should consist of all requirements pertaining to complete machine including space requirement for Voltage Stabilizer, Isolation Transformer, & any other accessories. BHEL shall construct complete foundation for the machine as per the Vendor's recommendation.	Vendor to confirm	
14.2	The Vendor shall indicate detailed specifications of grouting compound and Grouting procedure etc. for foundation bolts of the machine.		

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15.0	ERECTION & COMMISSIONING:		
15.1	1. Supplier to take full responsibility for supervision of the erection, start up, testing of machine, it's control system & all other supplied equipment, machining of test pieces etc. 2. Service requirement like power, air & water will be provided by BHEL at only one point 3. Other requirements like crane and helping personnel will be provided by BHEL, free of cost.	Vendor to confirm	
15.2	Erection & Commissioning of Voltage stabilizer, Isolation Transformer shall also be responsibility of the vendor.	Vendor to confirm	
15.3	Successful proving of BHEL components by the supplier shall be considered as part of commissioning. All tests, mentioned under the clause "Machine Acceptance" should form part of the commissioning activity.	Vendor to confirm	
15.4	Tools, Tackles, instruments and other necessary equipment including Laser equipment required to carry out all above activities should be brought by the supplier.	Vendor to confirm	
15.5	The supplier shall arrange commissioning spares required for commissioning of the machine.	Vendor to confirm	
15.6	Portion, if any, of the machine, accessories and other supplied items where paint has rubbed off or peeled during transit or erection should be repainted and merged with the original surrounding paint by the vendor. For this purpose, the vendor should supply sufficient quantity of touch-up paint of various colors of paint used.	Vendor to confirm	
16.0	ACCURACY TESTS:		
16.1	GEOMETRICAL ACCURACY:		
16.1.1	Geometrical Accuracy Tests shall be in accordance with ISO 3070 standard or equivalent applicable standard. Detailed Test Charts for the same, clearly showing the accuracies to be achieved on the machine, shall also be submitted with the offer.	Vendor to confirm	

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07.07.18

07.07.18

6/7/18

6/7/18

9.7.18

16.1.2	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance tests at Suppliers works and during Erection & Commissioning at BHEL Works.	Vendor to confirm	
16.2	Machine positioning accuracies & repeatability should be measured as per VDI/DGQ 3441 / ISO 230 - 2 (Latest Revision) using necessary equipment	Vendor to confirm	
16.2.1	Positioning Accuracy on traversing axes (Pa per 1000mm)	± 0.03 mm	
16.2.2	Repeatability on traversing axes (Ps per 1000mm)	± 0.015 mm	
16.2.3	All the above accuracies to be demonstrated to BHEL engineers during pre-acceptance at Suppliers works and during Erection & Commissioning at BHEL Works	Vendor to specify	
17.0	AMBIENT CONDITIONS & THERMAL STABILITY:		
17.1	Power Supply : AC 415 V $\pm 10\%$ Frequency : 50 Hz ± 3 Hz Phases : 3 phase 3 wire system Compressed air supply: 4 to 5 bar Ambient Temperature: max 45 °C Relative Humidity = 85% (Vendor to confirm that machine is suitable for above conditions)	Vendor to confirm	
17.2	Weather conditions are tropical. Atmosphere may be dust laden during some part of the year. Machine will be installed in the normal shop floor condition. Vendor to confirm that machine is suitable for above conditions	Vendor to confirm	
17.3	Thermal Stability of the machine shall be good enough to withstand the specified ambient conditions in order to meet the accuracy requirements of BHEL components. Vendor to confirm that machine is suitable for above conditions.	Vendor to confirm	
17.4	The Vendor should confirm that the machine and its accessories is suitable for continuous operation at its full capacity for 24 hours a day and 7 days a week through out	Vendor to confirm	

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 06.01.18 07.07.18 6/17/18 9.2.18

18.0	PROVEOUT OF BHEL COMPONENTS:		
18.1	1. Job for prove out will be provided by BHEL.Refer Annexure-II 2. For machining of prove-out components, Job setting plan, Machining process plan and Requirement of tools etc. shall be discussed and agreed mutually 3. Using CNC programs of the vendor, Complete machining of prove-out components shall be done by vendor at BHEL works to the specified design accuracy and surface finish. 4. The vendor shall supply all cutting tools, tool holders, arbors, boring bars etc. necessary for machining of prove-out components. 5. Vendor shall submit final job setting plan, machining process plan, tool layout & list with complete description, time studies etc. within two months of placement of order for the prove- out components. Vendor shall submit CNC Programs prior to start of erection of machine at BHEL Works.	Vendor to Confirm	
19.0	MACHINE ACCEPTANCE:		
19.1	Tests/Activities to be carried out at supplier's works on the machine before dispatch:	Vendor to Confirm	
19.1.1	Geometrical Accuracy Tests as per test chart provided by the vendor.	Vendor to Confirm	
19.1.2	Positioning Accuracy Tests as per VDI-DGQ/3441 / ISO 230 - 2	Vendor to Confirm	
19.1.3	Demonstration of all features of the machine, CNC system and all Accessories.	Vendor to Confirm	
19.1.4	Machining of NAS Test Piece. Vendor to supply sample test piece and tooling for it's machining.	Vendor to Confirm	
19.2	Tests/Activities to be carried out at BHEL works while commissioning the machine:	Vendor to Confirm	
19.2.1	Geometrical Accuracy Tests as per test chart	Vendor to Confirm	
19.2.2	Positioning Accuracy Tests as per VDI-DGQ/3441 / ISO 230 - 2	Vendor to Confirm	
19.2.3	Full load test to demonstrate the maximum power & cutting capacity of	Vendor to Confirm	

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 07.07.18 07.07.18 07.07.18

	the machine.		
19.2.4	Demonstration of all features of the machine, CNC system & all accessories.	Vendor to Confirm	
19.2.5	Demonstration by actual use of all supplied attachments and accessories to their full capacity.	Vendor to Confirm	
19.2.6	Machining of NAS Test Piece. Vendor to supply test piece and tooling for it's machining.	Vendor to Confirm	
19.2.7	Prove-out of BHEL components.	Vendor to Confirm	
20.0	PACKAGING: Sea worthy & rigid packing for all items of complete machine, CNC System, all Accessories and other supplied items to avoid any damage/loss in transit. When machine is dispatched in containers, all loose items shall be suitably packed in boxes	Vendor to Confirm	
21.0	GUARANTEE: 12 months from the date of acceptance of the machine or 18 months from the date of dispatch whichever is earlier	Vendor to Confirm	
22.0	GENERAL:		
22.1	The vendor should submit the following information:	Vendor to confirm	
22.2	Machine Model	Vendor to specify	
22.3	Total connected load (KVA):	Vendor to specify	
22.4	Over all size of machine& accessories (Length x Width x Height)	Vendor to specify	
22.5	Painting of Machine/ Electrical Panels: RAL 6011 Apple Green (Polyurethane Paint)	Vendor to Confirm	
22.6	Approximate total weight of the machine	Vendor to specify	
22.7	Weight of heaviest part of machine	Vendor to specify	
22.8	Weight of the heaviest assembly/ subassembly of the Machine	Vendor to specify	
22.9	Dimensions of largest part/ subassembly of the machine	Vendor to specify	

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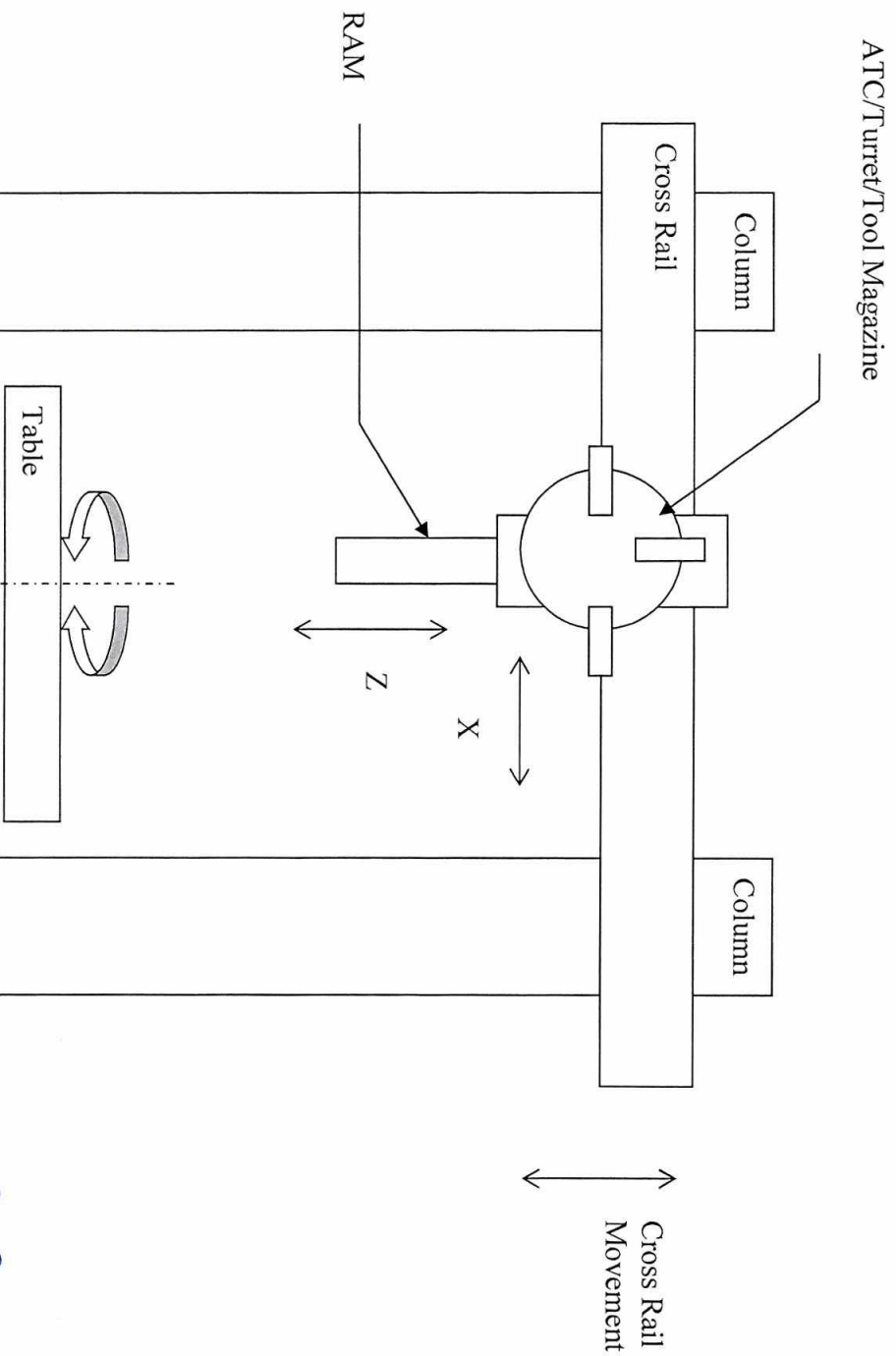
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Annexure - 1: Sketch showing approximate configuration of the machine.

Annexure 1: Approximate Configuration of CNC Vertical Lathe

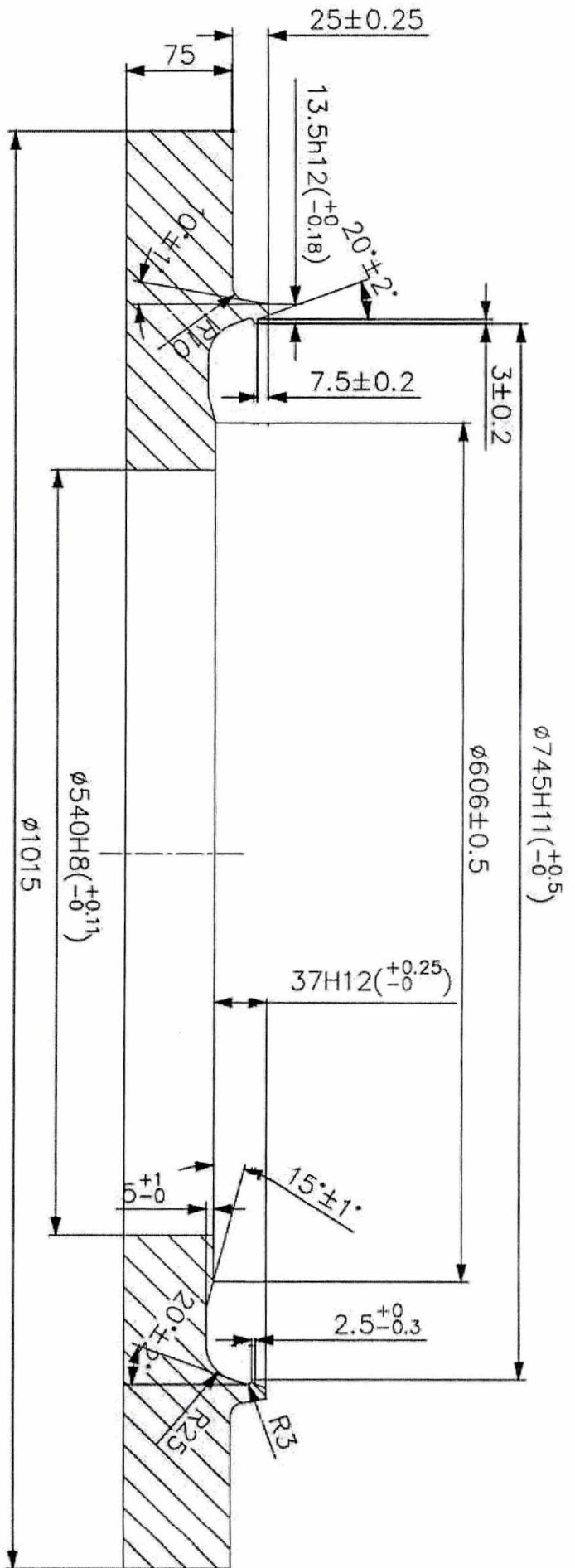


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Annexure-II



28/07/18

6/7/18