

## 'ANNEXURE-A'

### RETROFITTING OF AC SERVO DRIVE AND PLC SYSTEM ON TWO NUMBRES OF VERTICAL BORING MACHINES, MODEL-1M553( PLAN NOS. 0-205,BLOCK-2 AND 2-106, BLOCK-3)

#### A. SCOPE OF SUPPLY:

S.No.	Items	Quantity for machine- 1 ( Plan No.-0-205)	Quantity for machine- 2 ( Plan No.-2-106)	Vendor's Remarks	Compliance (Yes/No)
1.	<b>Servo Drive System of Siemens/Rexroth Bosch/ABB/ Baumuller make having capability to run Servo motors, AC asynchronous motors and inverter grade induction motors with or without encoder feedback with regenerative braking for 4-Quadrant operation of 3-phase asynchronous Table motor of 40 kW (at S1 duty) having following features :</b> <ul style="list-style-type: none"><li>• Input Supply 415 V +/- 10%, 3 phase, 3 wires AC, 50 Hz</li><li>• Output Voltage: 0 to 415 V, 3 phase, 3 wire</li><li>• Current Rating 72 Amps at S1 duty</li><li>• Drive shall have the capability for the speed control of the motor from zero to base speed and base speed to maximum speed</li><li>• Drive shall have regenerative braking.</li><li>• System shall have min. 4 nos. digital inputs, 4 nos. digital outputs,2 nos. analog inputs and 2 nos. analog outputs</li><li>• Drive shall have the capability to run the motor with and without encoder feedback</li></ul>	01	01		
2.	<b>PLC System of Siemens /ABB</b> having minimum 64 nos. inputs and 52 nos. outputs (All outputs to be of relay type)	1 Set	1 Set		
3.	<b><u>Electrical Cabinet and following accessories</u></b>				
3.1	Electrical cabinet (2000x1200x500) with two nos. ebm-make exhaust fans (1800 m <sup>3</sup> /hr) and fitted with accessories as stated below.	01 Set	01 Set		
3.2	Siemens/ABB/L&T make MCCB of rating 100 Amps	01 No.	01 No.		
3.3	Power contactor of suitable rating for drive incoming	01 No.	01 No.		
3.4	Suitable rating semiconductor fuses on input side	01 Set	01 Set		

3.5	Suitable rating Three Phase High frequency line reactor on input side of drive. If in-built into servo drive, then it should be mentioned.	01 No.	01 No.																									
3.6	The cabinet shall have digital energy meter, preferably of Siemens SENTRON-make to measure active, reactive, apparent power, level of harmonics, voltage & current. Energy meter shall be supplied along with CT.	01 Set	01 Set																									
3.7	Cabinet to be equipped with door operated panel tube lights with bypass switch and 5 Amp 3-pin service socket and switch.	01 Set	01 Set																									
3.8	Switched Mode Power Supply 24VDC, 5 Amps of Siemens/Meanwell/M-System/Phoenix make.	01 No.	01 No.																									
3.9	Suitable rating Contactors coil voltage (110VAC), MPCBs etc. of Schneider/Siemens /ABB / L&T make required for the control of following induction motor for different machine operations as per existing Electrical Schematic	01 Set	01 Set																									
	<table border="1"> <thead> <tr> <th>Sl.No.</th> <th>Induction motors</th> <th>Rating</th> <th>Control for</th> </tr> </thead> <tbody> <tr> <td>i)</td> <td>Cross Rail Traverse</td> <td>7.5 kW, 400V</td> <td>both direction</td> </tr> <tr> <td>ii)</td> <td>Right Head</td> <td>2.2 kW, 400V</td> <td>single direction</td> </tr> <tr> <td>iii)</td> <td>Left Head</td> <td>2.2 kW, 400V</td> <td>single direction</td> </tr> <tr> <td>iv)</td> <td>Rail Clamp/Unclamp</td> <td>1.1 kW, 400V</td> <td>both direction</td> </tr> <tr> <td>v)</td> <td>Hydraulic motor</td> <td>1.5 kW, 400V</td> <td>single direction</td> </tr> <tr> <td>iv)</td> <td>Lubrication motor</td> <td>1.0 kW, 400V</td> <td>single direction</td> </tr> </tbody> </table>					Sl.No.	Induction motors	Rating	Control for	i)	Cross Rail Traverse	7.5 kW, 400V	both direction	ii)	Right Head	2.2 kW, 400V	single direction	iii)	Left Head	2.2 kW, 400V	single direction	iv)	Rail Clamp/Unclamp	1.1 kW, 400V	both direction	v)	Hydraulic motor	1.5 kW, 400V
Sl.No.	Induction motors	Rating	Control for																									
i)	Cross Rail Traverse	7.5 kW, 400V	both direction																									
ii)	Right Head	2.2 kW, 400V	single direction																									
iii)	Left Head	2.2 kW, 400V	single direction																									
iv)	Rail Clamp/Unclamp	1.1 kW, 400V	both direction																									
v)	Hydraulic motor	1.5 kW, 400V	single direction																									
iv)	Lubrication motor	1.0 kW, 400V	single direction																									
3.10	Two winding Transformer (750VA, Pri. 400V / Sec. 127V, 24V tapping)	01 No.	01 No.																									
3.11	Two winding Transformer (500VA, Pri. 400V / Sec. 220V)	01 No.	01 No.																									
3.12	Bridge rectifier (5 Amps & PIV 2200 V) mounted on proper heat sink	02 Nos.	02 Nos.																									
3.13	Suitable rating MCBs of Siemens/ABB/L&T/ Schneider make for item no. 3.8, 3.10, 3.11, 3.12 and 4	01 Set	01 Set																									
3.14	AC Over Current Relay (0.5 – 5 Amps) with CT (5Amps) of Siemens/ABB/Rishabh/ Minilec make with automatic reset facility.	02 No.	02 No.																									
3.15	3 phase 16Amps MCB DB box mounted on outer left side of panel	01 No.	01 No.																									
3.16	Cabinet shall be supplied with a set of additional keys.	01 Set	01 Set																									
4.	Machine light having halogen lamp with flexible arm to be installed on the heads	02 No.	02 No.																									

5.	Design and supply of Hanging operator panel with engraved front plate (Anodized Aluminium 3 mm thick) and its control switchgears such as push buttons, LED indicating lamps, selector switches, POTs(single turn 10k) with suitable Vernier dial knob etc. as per requirement of different machine operations. Final lay out of the Hanging operator panel shall be approved by BHEL before dispatch of material.	01 set	01 set		
6.	Diagnostic device for measurement of drive parameters, Motwane DM-352 with probe and carry case	01 No.	01 No.		
7.	Following accessories for wiring of machine, control cabinet & operator pendant - PVC insulated multistrand copper Wires/Cables LAPP/IGUS/SAB-make - Shielded signal cable (0.5 sq.mm, 4 core) - Lapp make Hose pipes - Phoenix Terminal Blocks - Phoenix DIN Rails - Cable Glands - Insulated pin type lugs. - Printed ferrules on all wire terminations <b>(Note : Quantity of above items as per requirement of machine wiring)</b>	01 set	01 set		
8.	<b>Spares: Following items shall be offered priced item wise:</b>				
8.1	Complete PLC system as offered & supplied against SI.No.2	01 set	01 set		
8.2	Complete drive system as offered & supplied against SI.No.1.0	01 set	01 set		
8.3	Switched Mode power supply as offered & supplied against SI.No.3.8	01 No.	01 No.		
8.4	AC over current relay as offered & supplied against SI.No.3.14	01 No.	01 No.		
8.5	Exhaust fans as offered & supplied against SI.No.3.1	01 No.	01 No.		

## B. SCOPE OF WORK

S.No.	Activities	machine - 1 ( Plan No.-0-205)	machine - 2 ( Plan No.-2-106)	Vendor's Remarks	Compliance (Yes/No)
1.0	Connections inside the main electrical cabinet for Drives, PLC & other accessories mentioned at S.No. A./3 of Annexure 'A'	01 set	01 set		

2.0	Servo Drive & PLC system shall be commissioned incorporating all the operational requirements of the machine and the same shall be demonstrated by the vendor. PLC programming required for all the operational requirements of the machine has to be developed by the vendor.	01 set	01 set		
3.0	Trial run to be done to ensure smooth functioning of all supplied parts and successful handing over.	01 set	01 set		

C.	<b><u>DOCUMENTATION:</u></b>	<b>Quantity for machine - 1 ( Plan No.-0-205)</b>	<b>Quantity for machine- 2 ( Plan No.-2-106)</b>	<b>Vendor's Remarks</b>	<b>Compliance (Yes/No)</b>
1	Following documents shall be supplied by the Party:				
1.1	Commissioning and service manuals of the Servo Drive	02 Sets	02 Sets		
1.2	Commissioning and service manuals of the PLC	02 Sets	02 Sets		
1.3	PLC program hard copy	03 Sets	03 Sets		
1.4	PLC program on CD	01 Copy	01 Copy		
1.5	Modified electrical schematic of the machine	03 Sets	03 Sets		
<b>D.</b>	<b><u>WARRANTY:</u></b>				
	Vendor shall stand warranty for all the supplied material and work done for a period of one year from the date of successful commissioning of the machine.				
<b>E.</b>	<b><u>TRAINING:</u></b>				
<b>1.0</b>	Vendor shall provide training to BHEL staff for operation & maintenance of the system supplied by them during installation & commissioning.				
<b>2.0</b>	Vendor shall provide training for maintenance and commissioning of Servo Drives at Manufacturers Training center/Manufacturer Authorized <i>training</i> center for one BHEL Engineer				
<b>3.0</b>	Vendor shall provide training in PLC programming at Manufacturers Training center/Manufacturer Authorized <i>training</i> center for two BHEL Engineers				
<b>F.</b>	<b><u>ACCEPTANCE:</u></b>				
	Vendor shall demonstrate operation of all parts of the system supplied along with all the features as specified above. Final Acceptance shall be at BHEL, Hardwar after successful commissioning, testing of the supplied system for all operations of the machines.				
<b>G.</b>	<b><u>DELIVERY:</u></b>				
1.	<b>Material:</b> Max. 4 months from the date of award of contract. Early delivery shall be acceptable subject to prior approval by BHEL.				
2.	<b>Work</b> : Within 30 days from the date of release of each machine for work. It may be noted that both the machines may not be released by production department at the same time.				

2.1	An activity chart shall be submitted by the vendor detailing all the activities scheduled and time taken to complete the commissioning of each machine.		
<b>H.</b>	<b>LATE DELIVERY (LD) CLAUSE:-</b>		
1.	LD @ ½% per week subject to a maximum of 10% of the Material cost including spare parts shall be applicable for delay in deliveries. The time period from invitation date for Pre dispatch inspection from vendor to the date of arrival of Pre Dispatch Team to vendor's works and delay for any other reasons attributable to BHEL will not be accounted for in delivery period. This period will be excluded for the purpose of calculating LD. Vendor should intimate BHEL about PDI at least seven days in advance.		
2.	LD @ ½ % per week subject to a maximum of 10% of the Commissioning Charges shall be applicable for delay beyond scheduled commissioning date for reasons attributable to the vendor.		
<b>I.</b>	<b>PRE-DISPATCH INSPECTION</b>		
1.	Pre-dispatch inspection of all the items covered under Scope of Supply at Para (A) shall be carried out by BHEL at vendor's works.		
2.	Vendor shall invite BHEL for carrying out pre- dispatch inspection.		
3.	Deputed BHEL persons shall do pre acceptance at vendor works and give despatch clearance.		
4.	Expenses of Boarding and lodging of BHEL personnel during PDI shall be borne by BHEL.		
<b>J.</b>	<b>SUBMISSION OF BILL OF MATERIAL (BOM)</b>		
	Before inviting BHEL for Pre-dispatch inspection, vendor shall submit to BHEL the Bill of Material (BOM).		
<b>K.</b>	<b><u>EARNEST MONEY DEPOSIT ( EMD):</u></b>		
1.	Vendors have to deposit Rs 1.0Lacs as EMD. EMD may be deposited in cash, through pay order or through demand draft in favor of Accounts Officer, HEEP, BHEL, Haridwar.		
2.	EMD shall be converted to security deposit if the work is awarded.		
3.	EMD of unsuccessful bidders shall be refunded back normally within fifteen days of acceptance of award of work by the successful bidder.		
4.	EMD shall not carry any interest.		
5.	EMD by bidder will be forfeited as per tender document, if		
i)	After opening the tender, the tenderer revokes his tender within the validity period or increases his earlier quoted rates		

ii)	The tenderer does not commence the work within the period as per LOI/contract.		
6.	<p>Offers without EMD will be rejected and will not be considered for evaluation. However “The units registered under Single Point Registration Scheme of NSIC are eligible to get the following benefits under “Public Procurement Policy for Micro &amp; Small Enterprises (MSEs) Order 2012” as notified by the Government of India, Ministry of Micro Small &amp; Medium Enterprises, New Delhi vide Gazette Notification dated 23.03.2012.</p> <ul style="list-style-type: none"> <li>• Issue of the Tender Sets free of cost;</li> <li>• Exemption from payment of Earnest Money Deposit (EMD).</li> </ul> <p><b>Note:</b> - MSE suppliers can avail the intended benefits only if they submit along with their offer, attested copies of EM-II certificate having deemed validity (five years from date of issue of acknowledgement in EM-II) or valid NSIC certificate or EM-II certificate along with attested copy of a CA certificate (Format enclosed Annexure –‘C’ attached where deemed validity of EM – II certificate of five years has expired) applicable for the relevant financial year (latest audited). Date to be reckoned for determining deemed validity will be the date of bid opening (Part 1 in case of two part bid). Non submission of such documents will lead to consideration of bid at par with other bidders. No benefit shall be applicable for this enquiry if any deficiencies in above required documents are not submitted before price bid opening. If tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.”</p> <p><b>Documents should be notarized or attested by Gazetted officer.</b></p>		
<b>L.</b>	<b><u>SECURITY DEPOSIT (SD):-</u></b>		
1.	<p>Successful vendor shall deposit security. The rate of security deposit will be as below:</p> <ul style="list-style-type: none"> <li>• For work Up to Rs. 10 Lakhs : <u>10% of work order value</u></li> <li>• Above Rs. 10 Lakhs up to Rs. 50 Lakhs : Rs. <u>1 Lakh + 7.5% amount exceeding Rs. 10 Lakhs</u></li> <li>• Above Rs. 50 Lakhs: Rs. <u>4 Lakhs + 5% amount exceeding Rs. 50 Lakhs</u></li> </ul>		
2.	<p>The security deposit should be submitted before the start of work in the following forms:</p> <ol style="list-style-type: none"> <li>i) Cash (As permissible under the Income Tax Act)</li> <li>ii) Pay Order, Demand Draft in favour of BHEL, Hardwar</li> <li>iii) Local cheques of Scheduled Banks, subject to realization.</li> <li>iv) Bank Guarantee from Scheduled Banks/Public Financial Institution as defined in the companies Act. The Bank guarantee format should have the approval of BHEL</li> </ol>		
3.	Security Deposit shall not carry any interest.		
4.	EMD of successful tenderer can be converted and adjusted against the Security Deposit.		

5.	100% of the Security Deposit amount shall be refunded to the vendor after post commissioning successful running of the machine for one month. <b>SD shall be released after the submission of Performance Bank Guarantee(PBG) by the vendor</b>		
<b>M.</b>	<b><u>Performance Bank Guarantee (PBG):</u></b>		
1.	Vendor shall be required to submit a Performance Bank Guarantee (PBG) for 10% of the total work order/ contract value which shall be valid for a period of 12 months from the date of final acceptance for both the machines (Date of Final acceptance of last machine will be taken for this purpose).		
2.	The PBG shall be submitted on a non-judicial stamp paper of value not less than Rs.100/- issued by any one of the nationalised banks.		
<b>N.</b>	<b><u>PAYMENT TERMS:</u></b> <b>(Note: No advance payment shall be made to the vendor.)</b>		
1.	Part payment will be made after completion of following milestones		
1.1	Vendor may please note that this is a composite tender for retrofitting of two nos. of machines. First payment of 80% of material cost along with 100% taxes & duties shall be payable after receipt and acceptance of material at BHEL store.		
1.2	Final payment of balance 20% of material cost, 100% of commissioning cost and refund of 100% of the Security Deposit amount will be made after post commissioning successful running of the machine for one month, subject to submission of PBG as per Para 'M'		
2.	All the payments shall be made through e-payment after submission of following documents along with first bill i) E-payment form duly filled (Form will be provided by BHEL) ii) Income tax exemption letter( if applicable)		
3.	Excise duty & CST/VAT will be paid on material cost and service tax will be paid on commissioning charges at actual. Related original documents to be submitted for availing MODVAT credit by BHEL.		
4.	Timely Submission of CENVATABLE invoices along with necessary documents to enable availment of CENVAT (Excise duty, Service Tax & VAT) credit by BHEL. <b><u>Note:-Whenever CENVAT credit cannot be availed within given time limit due to delay in submission of invoices or, any other reasons attributed to vendor, loss of such CENVAT credit will be recovered from such vendor</u></b>		
<b>O.</b>	<b><u>COMMERCIAL TERMS :-</u></b>		
1.	Prices shall be quoted on "Firm Price" basis only. The prices should only on F.O.R BHEL, Haridwar basis inclusive of Packing & Forwarding charges. Applicable % of ED & Sales Tax, Freight & Insurance, Installation & Commissioning Charges should be clearly indicated in attached Price bid format as per "Annexure-B"		
2.	Validity of offer shall be for a minimum period of 120 days from the date of Tender Opening		
3.	Freight & transit insurance charges from Dispatching station to BHEL, Haridwar shall be borne by vendor		

4.	BHEL Reserves right for doing reverse auction (RA).If BHEL opts for RA, then the formalities regarding it will be informed accordingly		
<b>P.</b>	<b><u>QUALIFYING CRITERIA:-</u></b>		
1.	Average Annual financial turnover during the last 3 years, ending 31st March 2014, should be at least 11 Lacs. Vendor should submit Audited balance sheets for the last three years.		
2.	Experience of having successfully completed similar works within last 7 years should be either of the following. i) Three similar completed projects with each project costing not less than 14 Lacs. <b>OR</b> ii) Two similar completed projects with each project costing not less than 18 Lacs. <b>OR</b> iii) One similar completed project with project costing not less than 29 Lacs.		
2.1	<b>Definition of Similar works:</b> Retrofitting of <b>Horizontal Borer/ Vertical Borer/ HMC / VMC/ Centre Lathe machine</b> with servo drive and PLC system within last 7 years from the date of inquiry.		
2.2	Above similar retrofitted machines should be running satisfactorily for at least 6 months after successful commissioning prior to the date of enquiry.		
2.3	Vendor to provide P.O. / W.O copies and commissioning/ performance certificates/handling over minutes of meeting for satisfactory operation of the above retrofitted systems along with name, address & contact details of their customer. BHEL reserves the right to verify the information provided.		
<b>Q.</b>	<b><u>BHEL'S OBLIGATION:</u></b>		
1.	Existing electrical schematic of the machine shall be provided by BHEL to the vendor.		
2.	Crane facility and lifting tackles like slings, rope, D-Shackles shall be provided.		
3.	Any machining facility required for rectification/fitting of supplied material, subject to the extent available in BHEL, shall be provided.		
4.	Any civil work required for the erection of panel shall be done by BHEL.		
5.	Electricity, water, fasteners, welding sets, Gas cutting equipment, general purpose welding rods and holders required during commissioning shall be provided.		
<b>R.</b>	<b><u>GENERAL CONDITIONS</u></b>		
1.	A point wise compliance statement shall be submitted by the party with reference to the above scope of supply against each clause/ sub-clause with relevant details & comments. Non-compliance to any of the clauses & quoting inadequate quantity can lead to dis-qualification of the offer.		
2.	Complete specifications such as part no./Model/Type, power, torque, Rated and maximum RPMs, Rated and max. Currents of the motor and drive controllers shall be stated in the offer by the vendor. Ordering brochure/catalogue should be attached in which offered parts are highlighted.		
3.	The Vendor is advised to inspect the machine prior to quoting in order to ascertain all the relevant		

	details required for successful completion of the work.		
4.	The proposed electrical schematic & Bill of material shall be provided by the vendor sufficiently in advance of the delivery date so as to enable BHEL to study the same and comment.		
5.	Vendor must compulsorily quote the quantity exactly as per the Scope of supply. No reduction in quantity as per the above Scope of supply is permissible.		
6.	The offers of the bidders who are on the banned list as also the offer of the bidders, who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL web site www.bhel.com		
7.	The L1 vendor will be decided on basis of the total cost to BHEL including Material cost, Spare Parts cost, Commissioning charges, Transportation, insurance, P&F and taxes/duties as applicable		
8.	The Vendor should submit their best price at this stage itself and they will not be allowed to revise the price. Any revision / discount given by the vendor subsequently will be ignored		
9.	Check List as per Annexure 'D' must be enclosed with techno-commercial bid		
10.	Any material not specified in scope of supply but required for successful commissioning shall be provided by the vendor free of charge.		
11.	Material to be used should be of reputed make or as per IS standards.		
12.	Vendor shall bring all tools and testing equipment with them during erection and commissioning.		
<b>S.</b>	<b><u>OFFER :-</u></b> The offer should be submitted in two parts and in following manner.		
1.	<b><u>Techno-commercial Bid :</u></b>		
1.1	The envelop shall contain the Techno-commercial Bid with technical details and commercial terms & conditions along with relevant documents like copies of ESI, PF code, PAN No., Service Tax Regn. No., TIN No., CST No., Experience Certificates, Audited Balance Sheet of last 3 years and <b>EMD</b> .		
1.2	The envelop shall be super scribed with "Techno-Commercial Bid", Name of work & NIT No.		
1.3	Point-wise compliance of this scope of supply and work is to be given by vendors while submitting their techno-commercial offer.		
2.	<b><u>Price Bid :</u></b>		
2.1	The second envelope shall contain only the price bid with separate price for material & work on Price Bid Format as per <b>ANNEXURE 'B'</b> .		
2.2	Any other information in the price bid shall not be considered and the quotation is likely to be rejected. Price bid document shall be signed by the bidder at the bottom of the page.		
2.3	The envelope shall be sealed and super scribed with "Price Bid", Name of work & NIT No.		
2.4	Price bids of techno commercially accepted vendors shall be opened.		

3.	Both the above two envelopes shall be kept in another sealed cover. The cover shall be super-scribed with "Quotation for (name of work), NIT No. & due date and shall be submitted in Tender Box kept in the Tender room of Purchase department at the 4th floor of the Main Administrative Building of BHEL, HEEP, Haridwar and it should also contain Bidder address.		
<b>T.</b>	<b><u>PACKING:</u></b>		
1.	Supplier shall arrange for adequate protection and packing of the consignment so as to avoid loss and damage during transit and also take appropriate measures to prevent metal parts from rusting and corrosion during transit. Handling instructions shall be clearly printed /painted on the packages. Each package should carry a detailed packing slip. Supplier shall be responsible for any loss/damage during transit due to defective/inadequate packing.		