



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 79 38 Fax : +91 431 252 00 31 Email : tvenkat@bheltry.co.in Web : www.bhel.com
NOTICE INVITING TENDER	

TWO PART BID	Enquiry Number:	Enquiry Date:	Due date for submission of quotation:
Tender to be submitted in two Parts	2631300105	04.09.2013	05.10.2013

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 is reaching physically our office before 14.00 hrs on the Date of tender opening.

Item	Description	Quantity
10	25T Driver Rotator	4.00 Nos.
20	50T Driver Rotator	2.00 Nos.
30	75T Driver Rotator	3.00 Nos.
40	75T Idler Rotator	2.00 Nos.

All items as per the technical specification & commercial conditions applicable (to be downloaded from web site www.bhel.com or <http://tenders.gov.in>)

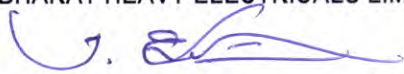
Important points to be taken care during submission of offer

1. Delivery required 10 weeks from the date of purchase order.
2. EMD for this Tender will be (INR) : 2,00,000/-
3. Checklist No.TRY/IND/02A to be filled and enclosed along with the offer failing which, the offer will not be considered for evaluation.
4. 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 / 001 - EMD) including bank guarantee formats and list of consortium banks, commercial terms check-list can be downloaded from BHEL web site <http://www.bhel.com> or from the Government tender website <http://tenders.gov.in> (public sector units > Bharat Heavy Electricals Limited page) under Enquiry reference "2631300105".

Tenders should reach us before 14:00 hours 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


Sr. Manager / Capital Equipment / MM

T. VENKATESWARAN
-Senior Manager
Capital Equipment / MM
BHEL, Tiruchirappalli - 620 014.

PART A**QUALIFYING CRITERIA FOR THE SUPPLY OF “ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS” AS PER PART-B OF TECHNICAL SPECIFICATION.****SECTION – I**

The BIDDER is expected to give complete details against each clause in the table given below, with additional sheets those may be attached (giving clear reference number) to furnish and cover the requisite details / documents.

S. No.	PARTICULARS	BIDDER's RESPONSE
1	BIDDER to provide the Profile of their Company	
2	The Bidder (OEM) shall have a minimum of TEN Years of Continuous Experience in the field of Design, Manufacture and Supply of“ ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING</u> JOB ROTATORS ”.	
3	List of customers to whom “ ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING</u> JOB ROTATORS ”weresupplied, installed and commissioned till date.	
4	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India.	
5	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – II

The BIDDER has to compulsorily meet the following requirements to get qualified for submitting an offer for the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**”

S. No.	REQUIREMENTS	BIDDER's RESPONSE
1	Only those Bidders (OEMs) should quote, who have supplied and commissioned at least Five SETS OF“ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING</u> JOB ROTATORS” , of capacity 50,000 kg or higher, in the past five years (on the date of opening of Tender) and such machine should presently be working satisfactorily for more than one year after commissioning (on the date of opening of Tender),.	
	The Bidder should submit following information where the “ ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING</u> JOB ROTATORS ” have been supplied:	
1.1	Name and postal address of the customer or company where similar equipment is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the equipment.	
1.5	Application for which the equipment is supplied	
2	Along with the Technical offer, the Bidder should submit the <u>Performance certificates from at least one of their customers for the satisfactory performance of the equipment having a capacity of 50 Ton or more for for minimum period of 1 year from date of commissioning (as on date of opening of the tender) supplied as per clause 1.0 above.</u> (For obtaining the Performance certificate, a suggestive format is provided in SECTION – IV)	
3	Offers of only those Bidders who meet the above Qualifying Criteria will be considered for further evaluation.	
4	BHEL reserves the right to verify the information provided by Bidder. In case the information provided by Bidder is found to be false/ incorrect, the offer shall be rejected.	

SECTION – III

The BIDDER has to comply with the following, for accepting the Technical Offer for scrutiny by the Purchaser:

S.No.	REQUIREMENTS	BIDDER'S COMPLIANCE
1	The BIDDER shall submit the offer in TWO PARTS-Technical [with PART A & PART B]& Commercial and Price Bid.	
2	The offer shall contain a comparative statement of Technical Specifications given by BHEL and the offered details submitted by the Bidder, against each clause. Merely stating 'CONFIRMED' or 'COMPLIES' or 'YES' or 'NO-DEVIATION' or similar words wherever 'Bidder to Specify' details in the technical comparative statement may lead to disqualification of the Technical Offer.	
3	The Technical Offer shall be supported by product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.	
4	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 of the inclusion of all the accessories, tooling's, attachments, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
5	BIDDER has to indicate the Country of Origin for the supply of equipment.	

SECTION – IV

PERFORMANCE CERTIFICATE

(On Customer's Letter Head)

1. Supplier of the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**” :

2. Make & Model of the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**” :

3. Month & Year of Commissioning :

4. Application for which the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**” is used:

5. Size & weight carrying capacity of the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**”

6. Performance of the equipment : Satisfactory / Good / Average /
(Strike off whichever is not applicable) Not Satisfactory

7. After Sales Service : Satisfactory / Good / Average /
Not Satisfactory

8. Any other remarks :

Date:

Signature & Seal of the Authority
issuing the Performance Certificate

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
1.0	<p><u>APPLICATION:</u></p> <p>a. For use in heavy fabrication of Pressure Vessels and Heat Exchangers which are cylindrical in shape and welded with attachments and nozzles.</p>	Vendor to note	
2.0	<p><u>Scope of Supply: Supply, Erection and Commissioning of</u></p> <p>A. 25 T Capacity Electronically controlled, Variable Speed, Self centering Driver Rotator – 4 No</p> <p>B. 50 T Capacity Electronically controlled, Variable Speed, Self centering Driver Rotator – 2 No</p> <p><u>which includes:</u></p> <p>a. Detailed Design, Manufacture and supply as per BHEL specifications</p> <p>b. Assembly and Testing before Dispatch</p> <p>c. Supply of Electric & Mechanical Spares</p> <p>d. Erection (Assembly), Commissioning and Performance Prove-Out at BHEL</p> <p>e. Training on Maintenance for BHEL personnel</p> <p>f. Performance Guarantee for 12 months, from the date of commissioning</p> <p>g. O & M Manuals and related documents</p>	Vendor to Confirm	
3.0	TECHNICAL SPECIFICATIONS		
3.1.0	ROTATOR DRIVE UNIT:		
3.1.1	Weight Carrying Capacity should be designed to rated capacity as mentioned in the clause no. 2.0 scope of supply.:	Vendor to Confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
3.1.2	Rotating Capacity : A. 50 Metric Tons B. 100 Metric Tons	Vendor to Confirm	
3.1.3	Eccentric Loading: 10 % of the Job Weight	Vendor to Confirm	
3.1.4	Rotation direction: Both Clockwise and Anti clock wise rotation	Vendor to Confirm	
3.1.5	Wheel Surface Speed: 60 mm to 1200 mm / minute (approx.), with step less speed variation and uniform speed at set value.	Vendor to Confirm	
3.1.6	Wheel Drive Mechanism: Electronically Controlled Drive System giving mechanical drives through electric motor.	Vendor to Confirm	
3.1.7	Electric Motor & Drive: AC Motor with suitable Variable Speed Drive, to take care of eccentric loading and uniform job rotation in either direction. The induction motor shall be suitable for VFD application. All the electrical components like motor, etc. shall be properly earthed.	Vendor to Confirm & provide motor & VFD details (like make, model)	
3.1.8	Rotator Operation: Shall be controllable either from Main control panel or from the hand held remote pendant. A Key type selector switch has to be provided for Local / Remote selection at Main control panel.	Vendor to Confirm	
3.1.9	A hand held remote unit with the following features has to be provided: (a) Remote ON / OFF selector switch (b) Single turn Potentiometer for speed variation (c) Emergency Off Push button (d) 2 way selector switch for rotator forward / reverse operation The remote cable shall be connected to the Main control panel through easily detachable Plug & sockets and length of the connecting cable shall be 15 mtrs. The cable shall be routed through a metallic braided hose and suitable provision shall be provided on the rotator to wind and keep the remote cable safely when the remote is not in use.	Vendor to Confirm & to provide the layout / sketches	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
3.1.10	The control cables & power cables shall be routed through metallic cable tray / flexible conduit and they shall be properly clamped on the positioner.	Vendor to confirm	
3.1.11	Electro - Mechanical Drive Details: BIDDER to give details on the mode of power transmission from the electric motor to the gear-box driving the rotator wheel along with offer.	Vendor to provide	
3.1.12	Gear Box Details: BIDDER to furnish complete technical details of the Gear Box used for mechanical power transmission. BHEL prefers vendor to use standard gear boxes rather than built in gear boxes. Planetary Gears not permitted.	Vendor to provide	
4.0	GENERAL FEATURES / INPUTS for DESIGN & FABRICATION:		
4.1	Outer Diameter Range of Job (approx.): A. 400 to 4000 mm B. 400 to 4000 mm	Vendor to confirm & provide details	
4.2	Size of Wheel (Diameter X Width (approx.): A. 500 X 140 mm B. 500 X 200 mm	Vendor to confirm & provide details	
4.3	Wheel Material : Solid Steel Forging	Vendor to confirm	
4.4	Wheel Contact Surface Hardness : 300-350 BHN	Vendor to confirm	
4.5	Wheel Surface Profile : Crowning Surface	Vendor to confirm	
4.6	Wheel Pitch Adjustment : Each wheel assembly with Housing/Bracket and Integral Drive Unit shall be movable on the Rotator Base Frame, through a manually driven screw-rod in Drive Unit . It shall be possible to position and lock each wheel assembly on the Rotator Base Frame at required pitches to cover the job diameter range. The drive arrangement to be designed to avoid loading on the screw-rod while loading / after loading the job on the wheels.	Vendor to confirm & provide details	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
4.7	Hardness and finish of Base frame slide: The sliding surfaces of the base frame in Drive units shall be hardened and machined.	Vendor to confirm	
4.8	Wheel Alignment: The alignment of the wheel face in the plane perpendicular to the wheel shaft axis to be maintained within 1mm for the entire stroke of the wheel assembly positions on the base frame.	Vendor to confirm	
4.9	Wheel Positioning: There shall be suitable provision for locking the wheel assembly with the base frame, to prevent movement under working/loaded conditions.	Vendor to confirm & provide details	
4.10	Wheel Shaft Assembly: The high grade shafts are to be shrunk fit into wheel assemblies / with shrink disc, to eliminate the provision of key arrangement	Vendor to confirm	
4.11	Wheel Support: Wheels are to be supported on Heavy Duty Roller Bearings	Vendor to confirm	
4.12	Lifting Hook: Four numbers of Lifting Hook are to be provided at suitable locations for facilitating lifting the entire rotator unit by EOT Crane in a geometrically balanced state.	Vendor to confirm	
4.13	Cover for Gears: Suitably profiled steel outer-covers (with easily replaceable provisions) are to be provided for the spur gears, to protect from welding flux, slag and other foreign particles, while in operation. The thickness of the cover plate shall be minimum 3mm.	Vendor to confirm	
4.14	Cover for base frame: Suitably profiled steel covers (with easily replaceable provisions) are to be provided to cover the sliding surface (top face) of the base frame, to protect from welding flux, slag and other foreign particles falling on it, while in operation. The thickness of the cover plate shall be minimum 3mm.	Vendor to confirm	
4.15	Job Temperature: The ROTATORS will be used in the Fabrication Shop floors, where the jobs are pre-heated / post-heated to a temperature of maximum 300 °C and hence the mechanical parts coming in contact with the jobs are to be designed to withstand this high temperature.	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
4.16	Electric Power Input: A 3 phase, 415 ± 10% V, 50 ± 2% Hz AC input supply will be provided at machine terminals. 3 wire system without neutral.	Vendor to confirm	
4.17	The Main Control Panel shall have the following features: (a) A suitable capacity MCB as Main switch for On/ Off. The MCB shall be operable without opening the control panel door. (b) Indication lamp for the indication of Main On / Power On, Drive Trip. (c) Emergency Stop Push button. (d) 2 - way selector switch for rotator Forward / Reverse selection (e) A single turn POT for setting the RPM. (f) Key type Local / Remote selector switch. (g) Sufficient capacity Cooling fan with required Air filter. All the electrical components shall be of 'DIN rail' mountable type and the panel shall have IP 54 protection.	Vendor to confirm	
4.18	Ambient Condition: Indoor Working Environment with temperature up to 50 ° C and Humidity up to 85%, but both not occur simultaneously. Hence, the offered equipment shall be of tropicalized in design.	Vendor to confirm	
4.19	Control Voltage: The control Voltage shall be 24 V AC / DC.	Vendor to confirm	
5.0	Bought-Out Items: a. BIDDER has to list down all the Bought- Out Items and their makes / brand names with technical specifications. b. Bought-Out Items / Components supplied make shall be ABB / SIEMENS / GE / BALDOR / KIRLOSKAR for Electric Motors and TIMKEN / FAG / SKF for Bearings. c. The variable speed drive shall be of ABB / SIEMENS / ALLEN BRADLEY / L&T / Danfoss / AMTECH make. d. The Gear boxes shall be of Greaves / Elecon / Bonfiglioli/ Radicon / New Allenbury.	Vendor to confirm & provide details	
6.0	STRUCTURAL FABRICATION		

Part B-SPECIFICATION FORELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERINGJOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION	BIDDERS OFFERWith
6.1	Rotator Base Frame and Heavy Wheel Bracket / Housing: Steel Fabrication Procedures to be followed. The Base Frame work shall be with steel plates of sufficient thickness, including REINFORCING RIBS.	Vendor to confirm & provide details
6.2	Raw Material: Only steel plates tested and certified for quality by reputed inspection authorities, shall be used. Test Certificates to be produced for BHEL verification and form part of the documentation.	Vendor to confirm
6.3	Welded Joints: No Butt Joints are allowed for Plate Build-Up to increase effective length	Vendor to confirm
6.4	Welding Electrodes: For all Welding E 7018 Electrode/higher grade shall be used.	Vendor to confirm
6.5	Welded Joint Testing: All Fillet Welded Joints shall be subjected to Non Destructive Testing like Liquid Penetrant Test (LPI) and Magnetic Particle Inspection (MPI). Testing Documents to be produced for BHEL evaluation and form part of the documentation. Random MPI / LPI to be shown to BHEL inspectors at the time of inspection at vendor's works.	Vendor to confirm
6.6	Heat Treatment & NDT Examination: The Structural Items (Base Frame / Wheel Housing, etc.) shall be Stress Relieved by thermal heat-treatment process after welding and NDT examinations. All welding shall be tested by NDT means [MPI or LPI] after Stress Relieving operation.	Vendor to confirm
6.7	Machining Operation: All mechanical mating sliding surfaces are to be machined and ground to the required finish after heat treatment and protected.	Vendor to confirm
6.8	Surface Cleaning: All steel parts are to be shot blasted or chemically treated for surface cleaning, after completion of all operations but prior to painting.	Vendor to confirm
6.9	Painting: The ROTATORS are to be painted as follows : a. One coat of Primer (Zinc Chromate) with 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint [Colour Apple Green] . c. Weight carrying capacity shall be painted legibly in each unit.	Vendor to confirm

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
6.10	Frame Dimensions: BIDDER has to indicate the tentative DIMENSIONS for the Base Frame of Drive Units and Wheel Brackets	Vendor to provide details	
7.0	SPARES SUPPLY: BIDDER to Quote for the following spares along with the rotator for two years of trouble free operation: a. Bearings for each wheel assembly (Taper Lock bushes – 2 sets) b. Seals, gaskets & Belts used in the Rotator c. Pulleys & Couplings used in the Rotator d. Variable Frequency Drive for each capacity rotator	Vendor to provide a separate un priced complete list of spares	
7.1	The following Electrical maintenance tools kit & instrument – 2 Nos. for each capacity rotator has to be supplied: (a) Electrical maintenance Tool kit (DAYTON make, 41 pcs, 3 way screwdriver bit socket set, DAYTON model no: SD-192-HS) (b) MECO make digital Multimeter, Model: 801 Auto) (c) Hand wheel / Ring spanner for driving the lead screw for pitch adjustment of wheels – 2 No./each	Vendor to confirm	
8.0	DRAWINGS / DOCUMENTS / DETAILS:		
8.1	<u>Drawings and Documents after receipt of P.O.:</u> The following documents and details are to be submitted for BHEL Approval, with in one month after the receipt of PO - prior to taking up the manufacture of the ROTATORS: a. GA Drawing of the ROTATOR showing design of prove out of job sizes. b. GA Drawing of Wheel Drive Mechanism		

Part B-SPECIFICATION FORELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERINGJOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFERWith
8.1 Contd..	c. GA drawing of wheel shifting mechanism in Drive Units. d. GA Drawing of Electric/Electronic System. e. Sub-Assembly Drawing for Wheels. f. Calculations for Selection of Electric Motors, Gear Reducers, etc. g. Wiring Diagram with Logic Circuits. h. Weight of the ROTATOR (Drive Unit) including all Electrical Equipment. Note: All the drawings should have the major & critical dimensions and list of bought out items with make and specification.	Vendor to confirm	
8.2	<p><u>Drawings and Documentsalong with Equipmentsupply:</u> Each ROTATOR shall be provided with THREE Copies of Erection / Assembly, Operation & Maintenance Manual, containing the following technical details :</p> a. General Arrangement and Sub-assembly Drawings b. Electrical Wiring Schematics c. Detailed Wiring Diagrams for Control Panels and Remote Control d. Rotator Wheel Sub- Assembly Drawing e. Gear Box Details / Drawings. f. Specifications / Ratings of Bought-Out Items g. Warranty Card for all Bought-Out Items h. Trouble Shooting Chart for all Sub-Systems i. Electrical circuit diagram of the panel j. VFD drive Programming / User manual k. VFD drive Parameter manual l. Mechanical manufacturing drawings for all wearing components. m. Operation & Maintenance manual with complete specification of the equipment and Preventive Maintenance check list. Note: 1. One soft copy of the entire documents stated above to be provided in Pen drive.		

Part B-SPECIFICATION FORELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERINGJOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFERWith
8.2 Contd..	2. One Hard copy and one soft copy to be submitted at the time of inspection at suppliers works for checking the sufficiency of the documents. If any additional requirements are found needed for maintenance, it should be provided.	Vendor to confirm	
9.0	<p><u>Inspection :</u> The following Schedule of Inspection is to be carried out, prior to dispatch from the Supplier's Works :</p> <ul style="list-style-type: none"> a. Verification of Test Certificate for Raw Materials & Bought-Out Items used. b. Random Testing on the Welds, by physical examination and NDT c. Wheel alignment as per clause 6.10. d. Idle Run Test and Test under simulated conditions (on mutually agreed e. Verification of O&M Manuals. 	Vendor to confirm	
10.0	ROTATOR ERECTION & COMMISSIONING		
10.1	Erection / Assembly: Erection / Assembly of the ROTATORS will have to be done by the Qualified Technical Representative of the Supplier at BHEL Works	Vendor to confirm	
10.2	Commissioning: Commissioning of the ROTATOR and Performance Prove – Out for Carrying & Rotating Capacity and Smooth Functioning of the ROTATOR (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	Vendor to confirm	
11.0	PERFORMANCE GUARANTEE : The Performance of the ROTATOR in Total and / or the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a period of 12 Months from the date of performance acceptance at BHEL Works or 18 Months from the date of supply whichever is earlier.	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
12.0	Check List : The following documents and details are to be submitted along with offer for technical evaluation of the ROTATORS (without which the offer could not be considered)		
	a. All documents mentioned in PART A of technical Specification including “Performance certificate”	Vendor to submit	
	b. GA Drawing of the ROTATOR.		
	c. GA Drawing of Wheel Drive Mechanism		
	d. GA Drawing of Electric/Electronic System.		
	e. Sub-Assembly Drawing for Wheels.		
	f. Calculations for Selection of Electric Motors, Gear Reducers, etc.		
	g. Weight of the ROTATOR (each item separately) including all Electrical Equipment.		
	Note: All the drawings should have the major & critical dimensions and list of bought out items with make and specification.		

PART A**QUALIFYING CRITERIA FOR THE SUPPLY OF “ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS” AS PER PART-B OF TECHNICAL SPECIFICATION.****SECTION – I**

The BIDDER is expected to give complete details against each clause in the table given below, with additional sheets those may be attached (giving clear reference number) to furnish and cover the requisite details / documents.

S. No.	PARTICULARS	BIDDER's RESPONSE
1	BIDDER to provide the Profile of their Company	
2	The Bidder (OEM) shall have a minimum of TEN Years of Continuous Experience in the field of Design, Manufacture and Supply of“ ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING</u> JOB ROTATORS ”.	
3	List of customers to whom “ ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING</u> JOB ROTATORS ”weresupplied, installed and commissioned till date.	
4	Details on SERVICE-AFTER-SALES Set-Up in India including the Addresses of Agents / Service Centres in India.	
5	Any Additional Data to supplement the manufacturing capability of the BIDDER for the subject equipment.	

SECTION – II

The BIDDER has to compulsorily meet the following requirements to get qualified for submitting an offer for the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**”

S. No.	REQUIREMENTS	BIDDER's RESPONSE
1	Only those Bidders (OEMs) should quote, who have supplied and commissioned at least Three SETS OF“ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING JOB ROTATORS</u>” , of capacity 75,000 kg or higher, in the past five years (on the date of opening of Tender) and such machine should presently be working satisfactorily for more than one year after commissioning (on the date of opening of Tender),.	
	The Bidder should submit following information where the “ ELECTRONICALLY CONTROLLED VARIABLE SPEED <u>SELF CENTERING JOB ROTATORS</u> ” have been supplied:	
1.1	Name and postal address of the customer or company where similar equipment is installed.	
1.2	Name and designation of the contact person of the customer.	
1.3	Phone, FAX no and email address of the contact person of the customer.	
1.4	Month and Year of commissioning of the equipment.	
1.5	Application for which the equipment is supplied	
2	Along with the Technical offer, the Bidder should submit the <u>Performance certificates from at least one of their customers for the satisfactory performance of the equipment having a capacity of 75 Ton or more for for minimum period of 1 year from date of commissioning(as on date of opening tender) supplied as per clause 1.0 above.</u> (For obtaining the Performance certificate, a suggestive format is provided in SECTION – IV)	
3	Offers of only those Bidders who meet the above Qualifying Criteria will be considered for further evaluation.	
4	BHEL reserves the right to verify the information provided by Bidder. In case the information provided by Bidder is found to be false/ incorrect, the offer shall be rejected.	

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3	The Technical Offer shall be supported by product Catalogues & Data Sheets and also technical details of Bought-Out-Items with copies of Product Catalogue to the extent possible.	
4	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 of the inclusion of all the accessories, tooling's, attachments, auxiliary parts, spares, consumables, etc. with the main and basic equipment, to meet the technical specification requirements.	
5	BIDDER has to indicate the Country of Origin for the supply of equipment.	

SECTION – IV

PERFORMANCE CERTIFICATE
(On Customer's Letter Head)

1. Supplier of the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**” :

2. Make & Model of the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**” :

3. Month & Year of Commissioning :

4. Application for which the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**” is used:

5. Size & weight carrying capacity of the “**ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS**”

6. Performance of the equipment : Satisfactory / Good / Average /
(Strike off whichever is not applicable) Not Satisfactory

7. After Sales Service : Satisfactory / Good / Average /
Not Satisfactory

8. Any other remarks :

Date:

Signature & Seal of the Authority
issuing the Performance Certificate

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
1.0	APPLICATION: a. For use in heavy fabrication of Pressure Vessels and Heat Exchangers which are cylindrical in shape and welded with attachments and nozzles.	Vendor to note	
2.0	Scope of Supply: Supply, Erection and Commissioning of A-75 T Capacity Electronically controlled, Variable Speed, Self centering Driver Rotator – 3 No B-75 T Capacity Self centering Idler Rotator – 2 No (75 T Idler rotator (Item B) should be able to pair up with 75T drive rotator (Item A) for loading of cylindrical shells) which includes: a. Detailed Design, Manufacture and supply as per BHEL specifications b. Assembly and Testing before Dispatch c. Supply of Electric & Mechanical Spares d. Erection (Assembly), Commissioning and Performance Prove-Out at BHEL e. Training on Maintenance for BHEL personnel f. Performance Guarantee for 12 months, from the date of commissioning g. O & M Manuals and related documents	Vendor to Confirm	
3.0	TECHNICAL SPECIFICATIONS		
3.1.0	ROTATOR DRIVE UNIT:		
3.1.1	Weight Carrying Capacity should be designed to rated capacity as mentioned in the clause no. 2.0 scope of supply.:	Vendor to Confirm	
3.1.2	Rotating Capacity : A. 150 Metric Tons	Vendor to Confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
3.1.3	Eccentric Loading: 10 % of the Job Weight	Vendor to Confirm	
3.1.4	Rotation direction: Both Clockwise and Anti clock wise rotation	Vendor to Confirm	
3.1.5	Wheel Surface Speed: 60 mm to 1200 mm / minute (approx.), with step less speed variation and uniform speed at set value.	Vendor to Confirm	
3.1.6	Wheel Drive Mechanism: Electronically Controlled Drive System giving mechanical drives through electric motor.	Vendor to Confirm	
3.1.7	Electric Motor & Drive: AC Motor with suitable Variable Speed Drive, to take care of eccentric loading and uniform job rotation in either direction. The induction motor shall be suitable for VFD application. All the electrical components like motor, etc. shall be properly earthed.	Vendor to Confirm & provide motor & VFD details (like make, model)	
3.1.8	Rotator Operation: Shall be controllable either from Main control panel or from the hand held remote pendant. A Key type selector switch has to be provided for Local / Remote selection at Main control panel.	Vendor to Confirm	
3.1.9	A hand held remote unit with the following features has to be provided: (a) Remote ON / OFF selector switch (b) Single turn Potentiometer for speed variation (c) Emergency Off Push button (d) 2 way selector switch for rotator forward / reverse operation The remote cable shall be connected to the Main control panel through easily detachable Plug & sockets and length of the connecting cable shall be 15 mtrs. The cable shall be routed through a metallic braided hose and suitable provision shall be provided on the rotator to wind and keep the remote cable safely when the remote is not in use.	Vendor to Confirm & to provide the layout / sketches	
3.1.10	The control cables & power cables shall be routed through metallic cable tray / flexible conduit and they shall be properly clamped on the positioner.	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
3.1.11	Electro - Mechanical Drive Details: BIDDER to give details on the mode of power transmission from the electric motor to the gear-box driving the rotator wheel along with offer.	Vendor to provide	
3.1.12	Gear Box Details: BIDDER to furnish complete technical details of the Gear Box used for mechanical power transmission. BHEL prefers vendor to use standard gear boxes rather than built in gear boxes. Planetary Gears not permitted.	Vendor to provide	
3.2.0	ROTATOR IDLER UNIT:		
3.2.1	Weight Carrying Capacity : B. 75 Metric Tons (minimum capacity for design)	Vendor to confirm & provide details	
3.2.2	Eccentric Loading : 10 % of the Job Weight	Vendor to Confirm	
3.2.3	Welding return cable connection on the positioner: Suitable arrangement to be provided on the idler unit for connecting the welding return cables and to ensure the proper conductivity of welding current through job, rotator wheels to the welding machine. The maximum welding current to be carried is 1200A.	Vendor to confirm & provide details	
4.0	GENERAL FEATURES / INPUTS for DESIGN & FABRICATION:		
4.1	Outer Diameter Range of Job (approx.): A. 500 to 5000 mm B. 500 to 5000 mm	Vendor to confirm & provide details	
4.2	Size of Wheel (Diameter X Width -approx.): A. 500 X 200 mm B. 500 X 200 mm	Vendor to confirm & provide details	
4.3	Wheel Material : Solid Steel Forging	Vendor to confirm	
4.4	Wheel Contact Surface Hardness : 300-350 BHN	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
4.5	Wheel Surface Profile : Crowning Surface	Vendor to confirm	
4.6	Wheel Pitch Adjustment : Each wheel assembly with Housing/Bracket and Integral Drive Unit shall be movable on the Rotator Base Frame, through a manually driven screw-rod in Drive Unit and Idler Unit. It shall be possible to position and lock each wheel assembly on the Rotator Base Frame at required pitches to cover the job diameter range. The drive arrangement to be designed to avoid loading on the screw-rod while loading / after loading the job on the wheels.	Vendor to confirm & provide details	
4.7	Hardness and finish of Base frame slide : The sliding surfaces of the base frame in Drive and idler units shall be hardened and machined.	Vendor to confirm	
4.8	Wheel Alignment : The alignment of the wheel face in the plane perpendicular to the wheel shaft axis to be maintained within 1mm for the entire stroke of the wheel assembly positions on the base frame.	Vendor to confirm	
4.9	Wheel Positioning : There shall be suitable provision for locking the wheel assembly with the base frame, to prevent movement under working/loaded conditions.	Vendor to confirm & provide details	
4.10	Wheel Shaft Assembly : The high grade shafts are to be shrunk fit into wheel assemblies / with shrink disc, to eliminate the provision of key arrangement	Vendor to confirm	
4.11	Wheel Support : Wheels are to be supported on Heavy Duty Roller Bearings	Vendor to confirm	
4.12	Lifting Hook : Four numbers of Lifting Hook are to be provided at suitable locations for facilitating lifting the entire rotator unit by EOT Crane in a geometrically balanced state.	Vendor to confirm	
4.13	Cover for Gears : Suitably profiled steel outer-covers (with easily replaceable provisions) are to be provided for the spur gears, to protect from welding flux, slag and other foreign particles, while in operation. The thickness of the cover plate shall be minimum 3mm.	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
4.14	Cover for base frame: Suitably profiled steel covers (with easily replaceable provisions) are to be provided to cover the sliding surface (top face) of the base frame, to protect from welding flux, slag and other foreign particles falling on it, while in operation. The thickness of the cover plate shall be minimum 3mm.	Vendor to confirm	
4.15	Job Temperature: The ROTATORS will be used in the Fabrication Shop floors, where the jobs are pre-heated / post-heated to a temperature of maximum 300 °C and hence the mechanical parts coming in contact with the jobs are to be designed to withstand this high temperature.	Vendor to confirm	
4.16	Electric Power Input: A 3 phase, 415 ± 10% V, 50 ± 2% Hz AC input supply will be provided at machine terminals. 3 wire system without neutral.	Vendor to confirm	
4.17	The Main Control Panel shall have the following features: (a) A suitable capacity MCB as Main switch for On/ Off. The MCB shall be operable without opening the control panel door. (b) Indication lamp for the indication of Main On / Power On, Drive Trip. (c) Emergency Stop Push button. (d) 2 - way selector switch for rotator Forward / Reverse selection (e) A single turn POT for setting the RPM. (f) Key type Local / Remote selector switch. (g) Sufficient capacity Cooling fan with required Air filter. All the electrical components shall be of 'DIN rail' mountable type and the panel shall have IP 54 protection.	Vendor to confirm	
4.18	Ambient Condition: Indoor Working Environment with temperature up to 50 ° C and Humidity up to 85%, but both not occur simultaneously. Hence, the offered equipment shall be of tropicalized in design.	Vendor to confirm	
4.19	Control Voltage: The control Voltage shall be 24 V AC / DC.	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
5.0	<p><u>Bought-Out Items:</u></p> <p>a. BIDDER has to list down all the Bought- Out Items and their makes / brand names with technical specifications.</p> <p>b. Bought-Out Items / Components supplied make shall be ABB / SIEMENS / GE / BALDOR / KIRLOSKAR for Electric Motors and TIMKEN / FAG / SKF for Bearings.</p> <p>c. The variable speed drive shall be of ABB / SIEMENS / ALLEN BRADLEY / L&T / Danfoss / AMTECH make.</p> <p>d. The Gear boxes shall be of Greaves/ Elecon / Bonfiglioly/ Radicon / New Allenbury</p>	Vendor to confirm & provide details	
6.0	STRUCTURAL FABRICATION		
6.1	Rotator Base Frame and Heavy Wheel Bracket / Housing: Steel Fabrication Procedures to be followed. The Base Frame work shall be with steel plates of sufficient thickness, including REINFORCING RIBS.	Vendor to confirm & provide details	
6.2	Raw Material: Only steel plates tested and certified for quality by reputed inspection authorities, shall be used. Test Certificates to be produced for BHEL verification and form part of the documentation.	Vendor to confirm	
6.3	Welded Joints: No Butt Joints are allowed for Plate Build-Up to increase effective length	Vendor to confirm	
6.4	Welding Electrodes: For all Welding E 7018 Electrode/higher grade shall be used.	Vendor to confirm	
6.5	Welded Joint Testing: All Fillet Welded Joints shall be subjected to Non Destructive Testing like Liquid Penetrant Test (LPI) and Magnetic Particle Inspection (MPI). Testing Documents to be produced for BHEL evaluation and form part of the documentation. Random MPI / LPI to be shown to BHEL inspectors at the time of inspection at vendor's works.	Vendor to confirm	
6.6	Heat Treatment & NDT Examination: The Structural Items (Base Frame / Wheel Housing, etc.) shall be Stress Relieved by thermal heat-treatment process after welding and NDT examinations. All welding shall be tested by NDT means [MPI or LPI] after Stress Relieving operation.	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
6.7	Machining Operation: All mechanical mating sliding surfaces are to be machined and ground to the required finish after heat treatment and protected.	Vendor to confirm	
6.8	Surface Cleaning: All steel parts are to be shot blasted or chemically treated for surface cleaning, after completion of all operations but prior to painting.	Vendor to confirm	
6.9	Painting: The ROTATORS are to be painted as follows : a. One coat of Primer (Zinc Chromate) with 48 hours of compulsory curing after painting. b. Two coats of Enamel Paint [Colour Apple Green]. c. Weight carrying capacity shall be painted legibly in each unit.	Vendor to confirm	
6.10	Frame Dimensions: BIDDER has to indicate the tentative DIMENSIONS for the Base Frame of Drive and Idler Units and Wheel Brackets	Vendor to provide details	
7.0	SPARES SUPPLY: BIDDER to Quote for the following spares along with the rotator for two years of trouble free operation: a. Bearings for each wheel assembly (Taper Lock bushes – 2 sets) b. Seals, gaskets & Belts used in the Rotator c. Pulleys & Couplings used in the Rotator d. Variable Frequency Drive for each capacity rotator	Vendor to provide a separate unpriced complete list of spares	
7.1	The following Electrical maintenance tools kit & instrument – 2 Nos. for each capacity rotator has to be supplied: (a) Electrical maintenance Tool kit (DAYTON make, 41 pcs, 3 way screwdriver bit socket set, DAYTON model no: SD-192-HS) (b) MECO make digital Multimeter, Model: 801 Auto) (c) Hand wheel / Ring spanner for driving the lead screw for pitch adjustment of wheels – 2 No./each	Vendor to confirm	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
8.0	DRAWINGS / DOCUMENTS / DETAILS:		
8.1	<p><u>Drawings and Documents after receipt of P.O.:</u> The following documents and details are to be submitted for BHEL Approval, with in one month after the receipt of PO - prior to taking up the manufacture of the ROTATORS:</p> <ol style="list-style-type: none"> a. GA Drawing of the ROTATOR showing design of prove out of jobsizes. b. GA Drawing of Wheel Drive Mechanism c. GA drawing of wheel shifting mechanism in Drive & Idler Units. d. GA Drawing of Electric/Electronic System. e. Sub-Assembly Drawing for Wheels. f. Calculations for Selection of Electric Motors, Gear Reducers, etc. g. Wiring Diagram with Logic Circuits. h. Weight of the ROTATOR (Drive Unit & Idler Unit separately) including all Electrical Equipment. <p>Note: All the drawings should have the major & critical dimensions and list of bought out items with make and specification.</p>		Vendor to confirm

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With	
8.2	<p><u>Drawings and Documents along with Equipment supply:</u> Each ROTATOR shall be provided with THREE Copies of Erection / Assembly, Operation & Maintenance Manual, containing the following technical details :</p> <ol style="list-style-type: none"> a. General Arrangement and Sub-assembly Drawings b. Electrical Wiring Schematics c. Detailed Wiring Diagrams for Control Panels and Remote Control d. Rotator Wheel Sub- Assembly Drawing e. Gear Box Details / Drawings. f. Specifications / Ratings of Bought-Out Items g. Warranty Card for all Bought-Out Items h. Trouble Shooting Chart for all Sub-Systems i. Electrical circuit diagram of the panel j. VFD drive Programming / User manual k. VFD drive Parameter manual l. Mechanical manufacturing drawings for all wearing components. m. Operation & Maintenance manual with complete specification of the equipment and Preventive Maintenance check list. 			
	<p>Note:</p> <ol style="list-style-type: none"> 1. One soft copy of the entire documents stated above to be provided in Pen drive. 2. One Hard copy and one soft copy to be submitted at the time of inspection at suppliers works for checking the sufficiency of the documents. If any additional requirements are found needed for maintenance, it should be provided. 		Vendor to confirm	

Part B-SPECIFICATION FORELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERINGJOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFERWith
9.0	<p>Inspection : The following Schedule of Inspection is to be carried out, prior to dispatch from the Supplier's Works :</p> <ul style="list-style-type: none"> a. Verification of Test Certificate for Raw Materials & Bought-Out Items used. b. Random Testing on the Welds, by physical examination and NDT c. Wheel alignment as per clause 6.10. d. Idle Run Test and Test under simulated conditions (on mutually agreed e. Verification of O&M Manuals.. 	Vendor to confirm	
10.0	ROTATOR ERECTION & COMMISSIONING		
10.1	Erection / Assembly: Erection / Assembly of the ROTATORS will have to be done by the Qualified Technical Representative of the Supplier at BHEL Works	Vendor to confirm	
10.2	Commissioning: Commissioning of the ROTATOR and Performance Prove – Out for Carrying & Rotating Capacity and Smooth Functioning of the ROTATOR (at BHEL Works) shall be the RESPONSIBILITY of the supplier.	Vendor to confirm	
11.0	PERFORMANCE GUARANTEE : The Performance of the ROTATOR in Total and / or the Components / Sub-Assemblies / Bought-Out-Items shall be guaranteed for a period of 12 Months from the date of performance acceptance at BHEL Works or 18 Months from the date of supply whichever is earlier.	Vendor to confirm	
	Check List : The following documents and details are to be submitted along with offer for technical evaluation of the ROTATORS (without which the offer could not be considered)	Vendor to submit	

Part B-SPECIFICATION FOR ELECTRONICALLY CONTROLLED VARIABLE SPEED SELF CENTERING JOB ROTATORS

Clause	PARTICULARS AND BHEL SPECIFICATION		BIDDERS OFFER With
12.0	a. All documents mentioned in PART A of technical Specification including “Performance certificate”		
	b. GA Drawing of the ROTATOR.		
	c. GA Drawing of Wheel Drive Mechanism		
	d. GA Drawing of Electric/Electronic System.		
	e. Sub-Assembly Drawing for Wheels.		
	f. Calculations for Selection of Electric Motors, Gear Reducers, etc.		
	g. Weight of the ROTATOR (each item separately) including all Electrical Equipment.		
Note: All the drawings should have the major & critical dimensions and list of bought out items with make and specification.			