



BHARAT HEAVY ELECTRICAL LIMITED		Enquiry No.:	
HEAVY ELECTRICAL EQUIPMENT PLANT, RANIPUR, HARDWAR - 249403, UTTARANCHAL, INDIA		Due Date:	
CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPTT.)		Supplier's Qtn. No.:	
SHRI GURMIT SINGH AGM (PPX-CAP.)		Date:	
PHONE NO.:			
E-MAIL ID.			

TECHNICAL SPECIFICATION OF 120 TON CAPACITY ROTATOR SET
Specification no. NO. EMT- 6777 REV. 00

NOTE:-

1. Vendor (OEM) must submit complete information against clause no. 16 ((Qualifying condition). The offer meeting this clause would only be processed (OEM : Original Equipment Manufacturer).
2. This technical specification is for one set of 120 Ton Rotators.
3. The following format must be completely filled and deviations mentioned in the appropriate columns. Inadequate /incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.
4. The offer and all documents enclosed with offer should be in English language only.

NAME & ADDRESS OF THE SUPPLIER :

FAX NOS.:

E-MAIL ADDRESS :

(Signature)
(AJIT KUMAR)
Dy. Mgr (EMT)

(Signature)
(PANKAJ RAWAT)
Dy. Mgr (BK-I)

(Signature)
(R K VERMA)
Dy. Mgr (WEX-I)

(Signature)
(P.K GUPTA)
Dy. Mgr (WEX-I)

SCOPE: DESIGN, MANUFACTURING, SUPPLY, ERECTION & COMMISSIONING OF 120 TON CAPACITY ROTATOR SET COMPLYING WITH SPECIFICATIONS AS BELOW :				
Sl. NO.	DESCRIPTION FOR BHEL REQUIREMENT	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE :			
1.1	120 Ton capacity rotator set will be used for the rotation of the various rotors of large size Turbogenerators to facilitate machining and other assembly operations on the rotor.	Vendor to accept		
1.2	ONE SET OF ROTATOR CONSISTS OF :			
1.2.1	One Motorised Rotator block (Capacity 60 Tons).	Vendor to confirm		
1.2.2	One Free (Without motor) Rotator block (Capacity 60 Tons).	Vendor to confirm		
2.0	DIMENSIONAL DETAILS OF THE ROTOR & JOB REQUIREMENT :			
2.1	Length of Rotor: 5,000mm to 15000mm Maximum. Weight : 120.0 Ton maximum; Seating diameter of Rotor on the rotator : 200.00mm Minimum; 650.00 mm Maximum	Vendor to accept & confirm		
3.0	DESIGN CONSIDERATION :			
3.1	The rotator set should be suitable for 120 Ton operating load i.e each rotator block shall have operating load carrying capacity of 60 Ton. The capacity of the individual rotator i.e. 60 T should be painted / engraved on them which should be easily visible.	Vendor to confirm		
3.2	OPERATIONAL DETAILS :			
3.2.1	One set of 120 Ton capacity rotator, will consist of two nos. rotator blocks as per cl. No. 1.2.1 & 1.2.2 capacity 60 Tons each.	Vendor to confirm		
3.2.2	Rotator set shall be suitable for both clockwise and anticlockwise rotation of the job. Speed of rotation of ROLLER should be around - 1 rpm. Rotator blocks will be kept directly on the floor of shop without any grouting.	Vendor to confirm & furnish the rpm of the roller.		
3.2.3	Rotator shall be having suitable provision for clamping with floor plates and shall be supplied with suitable fasteners.	Vendor to confirm		

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3.2.4	The driving roller of the rotator block (ref 1.2.1) shall be motor operated through gears, worm wheel, worm shaft & bearing arrangement. Chain Pulley or belt driven arrangement shall not be accepted.	Vendor to confirm			
3.2.5	The design of Rotators shall be such that there is no slippage of TG Rotor over the Rollers of rotating blocks.	Vendor to confirm			
3.2.6	The design of Rotators shall be such that it does not spoil / damage the rotating surfaces of the TG Rotor coming in contact with the Rollers of rotating blocks.	Vendor to confirm			
3.2.7	Maximum Run out on each roller rotated under full load	0.02 mm (Max.)			
3.3	STRUCTURE OF ROTATOR BLOCKS:				
3.3.1	Fabricated steel structure shall be provided in the manufacture of rotator block, duly stress relieved after fabrication. A certificate in this regard is to be submitted along with the supporting documents before despatch of the rotator.	Vendor to confirm			
3.3.2	Size of the bottom supporting base of the rotator blocks.	Approx. 1000 mm X 800 mm.			
3.3.3	Suitable lifting hooks shall be provided at suitable location of the rotator block for lifting the rotator block with the help of overhead crane.	Vendor to confirm			
3.3.4	Rotators should have suitable size levelling jacks for levelling the rotators at shop floor.	Vendor to confirm			
3.3.5	Drive motor, Gear box etc. shall be placed such that these are easily accessible for maintenance	Vendor to confirm			
3.4	ROLLERS and DRIVE:				
3.4.1	One Rotator block (as per 1.2.1) shall be designed with 1 no. driving roller and 1 no. idler roller. Thus, there will be total 2 nos. rollers and 1 no. drive motor in this rotator block to drive TG rotors in either direction (clockwise or anticlockwise).	Vendor to confirm & submit the details in the offer as per Sl. No. 4.1			
3.4.2	One Rotator block (as per 1.2.2) shall be designed with 2 nos. idler rollers i.e without any motor for free movement of TG rotors in either direction (clockwise or anticlockwise) with suitable provision to rotate the rollers by hand (using detachable handle) for checking their free movement manually	Vendor to confirm & submit the details in the offer as per Sl. No. 4.1			

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3.5	ROLLER DIMENSIONS :				
3.5.1	Roller Diameter	400mm Approx.			
3.5.2	Roller Width	230mm Approx.			
3.5.3	Horizontal centre to centre distance in between the rollers :	500.00 mm Approx.			
3.5.4	Centre height of rollers from the base of the rotator block :	1000.00 mm Approx.			
3.6	MATERIAL SPECIFICATION:				
3.6.1	Rollers shall be manufactured using suitable grade of Alloy Steel Forging.	Vendor to inform material grade.			
3.6.2	The rollers shall be shrink fitted with 30 mm thick bronze lining locked externally from both sides by locking rings. Material Certificate of the rollers & bronze lining is to be submitted to BHEL before despatch of the rotator.	Vendor to confirm			
3.6.3	All the Hell-Worm units should be of Shanti / New Allenberry / Radicon/ Elecon make. The gears, worm wheels, worm shaft and bearing arrangement should be lubricated properly with suitable lubricating grease / oil. In case of lubricating oil, effective double seal system should be provided to avoid the leakage / seepage of oil. The oil filling point and oil sight glass should be easily accessible and visible during normal running condition .	Vendor to confirm & Details of the worm wheel and worm shaft, is to be furnished in General Arrangement of drawing (Sl. No. 4.1)			
3.6.4	Suitable capacity of motor Siemens / Bharat Bijlee / Kirloskar make is to be provided on one rotator block (ref 1.2.1). Technical Specification of motor is to be indicated in General Arrangement Drawing (Ref. Sl. No.4.1). The motor shaft will be coupled to hell worm reducer with suitable speed reduction ratio to achieve offered RPM of the roller(Ref. Sl. no. 3.2.2).	Vendor to confirm & Details of the motor to be furnished in the offer - refer Sl. No. 4.1			
3.6.5	BEARINGS : Only SKF / FAG/ NTN / INA make bearings shall be fitted in the rotater.	Vendor to confirm & Relevant details are to be furnished in the offer - Reference Sl. No. 4.1			

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4.0	GENERAL ARRANGEMENT DRAWING:			
4.1	General arrangement drawing (including kinematic diagram) of 120 Ton capacity Rotator set indicating all the details such as overall size and weight of each rotator block, dimensional details of fabricated steel body, roller dimensions, location of motor and gear - worm shaft arrangement, make and article number of the bearings, location of DOL starter, make and specification of motor, location of lifting hook (Sl. no. 3.3.3) etc. are to be furnished in the offer.	Vendor to submit the details in the offer		
4.2	Finally Designed General Arrangement Drawing with details as mentioned in Sl. No. 4.1, is to be submitted by the vendor for BHEL approval within one month after placement of Purchase Order.	Vendor to confirm		
5.0	OPERATION & MAINTENANCE MANUALS :			
5.1	3 sets of Operation and Maintenance (O&M) manual to be supplied along with the rotator set. Operational & Maintenance manual shall be in English language.	Vendor to confirm		
5.2	NOTE : In addition to other information, O&M Manual should contain the following also :	Vendor to confirm		
5.2.1	Detail Maintenance Manual, instruction for assembly and dis-assembly of the main items of 120 Ton capacity rotator set.	Vendor to confirm		
5.2.2	Electrical wiring circuit of the rotator set	Vendor to confirm		
5.2.3	Constructional and general arrangement drawing of the rotator set	Vendor to confirm		
5.2.4	Make, article no., torque, KW and other technical specification details of the motor	Vendor to confirm		
5.2.5	Complete Assembly drawing of the gearbox and worm wheel arrangement showing the bearing arrangement, oil seals/ rings/ spacers etc with their marking that matches with the attached parts list having full description of the items. The above drawings are to be supported by the detailed kinematic diagram and sectional views of the worm wheel and worm shaft with details including the material, module, number of teeth of gear etc.	Vendor to confirm		
5.2.6	Make and details of worm wheel and worm shaft.	Vendor to confirm		
5.2.7	Material specification and dimensional details of the rollers	Vendor to confirm		

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5.2.8	Make and specification details of the grease / lubricating oil preferably IOC make	Vendor to confirm			
5.2.9	Make and specifications of the parts like gears, worm wheels, worm shaft, bearings, seals etc. are to be provided in the parts list with cross reference to the assembly drawing of rotator set.	Vendor to confirm			
5.2.10	Safety instruction for the operation of the 120 Ton capacity rotator set				
6.0	POWER SUPPLY :				
6.1	BHEL will provide input power supply 3 phase, 3 wire, 415 + / - 15% volt, 50 + / - 3% Hz to Isolator Switch (BHEL scope) nearby 120 Ton capacity rotator set. Cable connection (approx. 10.0 meters) from isolator switch (BHEL scope) to DOL starter of the rotator block of 120 Ton capacity motorized rotator set, will be in the scope of vendor. There will be no neutral wire and earthing will be provided through shop structure column.	Vendor to note & accept this point			
7.0	SPARES :				
7.1	List of spares required for 2 years trouble free operation for each set of 120 Ton capacity rotator to be supplied.	Vendor to furnish the list of spares in the offer .			
7.2	The offer for the spares should be valid for 2 years after erection and commissioning of the 120 Ton capacity rotator set.	Vendor to confirm			
7.3	Following spares are to be supplied along with the rotators.				
7.3.1	Gear Box as specified in 3.6.3 (01 no.)	Vendor to confirm			
7.3.2	One set of bearing as in point no. 3.6.5 (01 no.)	Vendor to confirm			
7.3.3	One set of worm shaft and worm wheel as in point no. 5.2.6 (01 No.)	Vendor to confirm			
8.0	PAINTING :				
8.1	120 Ton capacity rotator set will be painted to RAL 7038 Grey paint or mutually agreed.	Vendor to confirm			
8.2	NOTE : Vendor will repair the paint with original paint in case the same is damaged in transit / erection, before commissioning the 120 Ton capacity rotator set .	Vendor to confirm			

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9.0	PRE-ACCEPTANCE AT VENDOR'S WORKS :				
9.1	120 Ton capacity rotator set will be inspected by BHEL engineers on following points at vendor's works	Vendor to confirm			
9.1.1	Overall dimensions of each rotator block & its operation, location of motor and coupling arrangement, make and specification of motor, details of worm wheel-worm shaft etc with reference to the approved General Arrangement Drawing (Sl. no. 4.2).	Vendor to confirm			
10.0	ERECTION & COMMISSIONING:				
10.1	Vendor shall take full responsibility for carrying out the erection and commissioning of the rotator set at BHEL Haridwar works.	Vendor to confirm			
11.0	JOB PROVING AND FINAL ACCEPTANCE AT BHEL HARIDWAR WORKS :				
11.1	Final acceptance testing of 120 Ton capacity rotator set shall be made at BHEL Haridwar works with TG rotor available in the shop (which will be provided by BHEL), after completion of the job proving of the rotator set.	Vendor to confirm			
12.0	FIRST FILLING OF OIL:				
	First filling of all oils, grease etc. shall be in the vendor's scope of supply.	Vendor to confirm			
13.0	GUARANTEE :				
	Guarantee for the 120 ton capacity rotator set for 24 months from the date of final acceptance of the rotator set. Any spares required during the guarantee period shall have to be arranged by the vendor free of cost (up to BHEL Haridwar stores) and duty levied have to be borne by the vendor.	Vendor to confirm			
14.0	QUALITY PLAN :				
	Vendor shall submit Quality Plan within one month after issue of Purchase Order.	Vendor to confirm			
15.0	PACKING :				
	Rigid packing shall be provided for each rotator block of 120 Ton capacity rotator set to avoid any damage / loss in transit. All spares other loose items if any, should be suitably packed in separate wooden boxes.	Vendor to confirm			

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16.0	Qualifying Conditions :				
16.1	Only those vendors (OEMs) should quote, who have supplied and commissioned at least one number 100 Ton capacity motorized rotator set in last 10 years (from the date of opening of tender) and the same is working satisfactorily for more than one year (from the date of opening of tender) after commissioning. However, if referred equipment (s) has/ had been supplied to BHEL, then the equipment should be presently working satisfactorily for more than six months (on the date of opening of Tender) after its commissioning and acceptance in BHEL. The following information should be submitted by the vendor about the companies where referred equipment (s) have been supplied. This is required from all the vendors for qualification of their offer.				
16.2	Name of the company / customer, where such / similar 100 Ton capacity motorized rotator set (s) is (are) commissioned.	Vendo to furnish the details			
16.3	Performance certificate from the customers regarding satisfactory performance of equipment supplied to them (Original Certificate or Through E-mail directly from the customer). The original performance certificate may be returned after verification by BHEL, if required.	Vendor to furnish the details in the offer			
16.4	Complete postal address of the company / customer	Vendor to furnish the details in the offer			
16.5	Year of commissioning	Vendor to furnish the details in the offer			
16.6	Type of application for which the such / similar 100 Ton capacity motorized rotator set is supplied and commissioned	Vendor to furnish the details in the offer			
16.7	Name and designation of the contact person of the company / customer	Vendor to furnish the details in the offer			

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