



BHARAT HEAVY ELECTRICAL LIMITED
RAMACHANDRAPURAM :: HYDERABAD 502 032.

Enquiry No. :

UNIT'S PHONE NOS.

Due Date :

CONTACT PERSON'S NAME/DESIGN/PHONE NO./E-MAIL (FROM PURCHASE DEPT.)

Supplier Qtn.

No.:

Date :

SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR
'THYRISTOR CONVERTOR SYSTEM FOR ROTOR HEATING' FOR 125T BALANCING TUNNEL AT BHEL, HYDERABAD
(01BT/SPEC/1004, REV.01)

NOTE:-

1. Vendor must submit complete information against clause no. 18. The offer meeting this clause would only be processed.
2. The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.
3. The offer and all documents enclosed with offer should be in English language only.

ADDRESS OF THE SUPPLIER :

ADDRESS OF THE INDIAN AGENTS :

TELEPHONE NOS.:

TELEPHONE NOS.:

FAX NOS.:

FAX NOS.:

E-MAIL ADDRESS :

E-MAIL ADDRESS :

SCOPE: ESTABLISHMENT OF 'THYRISTOR CONVERTOR SYSTEM FOR ROTOR HEATING' FOR 125T
BALANCING TUNNEL COMPLYING WITH THIS SPECIFICATION.

SPECIFICATION NO. 01BT/SPEC/1004, REV.01

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS (if any)	REMARKS
1.0	Scope:				
1.1	This specification is intended to cover the design, manufacture, assembly, testing at manufacturer's works in presence of our representative, delivery to site and commissioning of Thyristor based converter (DC Drive) system, complete with all accessories.	Vendor to confirm			
2.0.	Purpose Of The Equipment & Description:				
2.1	The Thyristor converter system for Rotor heating is required to conduct heat cycles (Thermal Stabilisation) on Generator rotors as part of dynamic balancing of these rotors. The thyristor converter system should provide a variable DC voltage (0 to 400V) with a current capacity of 500A, which shall be applied on the Generator rotor winding under balancing. The temperature of the rotor is indirectly calculated by calculating the rotor resistance at regular intervals. The increase in temperature is attained by gradually increasing the applied DC voltage from the thyristor converter.	Vendor to confirm			
2.2	The measured parameters shall be DC voltage & DC current whereas the Rotor Resistance and Rotor Temperature shall be calculated values.	Vendor to confirm			
2.3	The DC Voltage & DC Current will be measured and the rotor resistance shall be calculated as per the following formula: $RT1 = V/I$, where V is the voltage measured at the job end and I is the current measured thru' shunt.	Vendor to confirm			
2.4	The temperature of the rotor winding is indirectly calculated as per the following formula : $RT1/RT2 = (235+T1)/(235+T2)$, where T1 is the temperature of the rotor to be calculated. RT2 is the design value of rotor resistance at T2 deg. C. The temperature measurement accuracy shall be +/- 0.5%.	Vendor to confirm			

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SPECIFICATION NO. 01BT/SPEC/1004, REV.01

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS (if any)	REMARKS
3.0	Technical requirements of the system:				
3.1	Type: Thyristor based convertor system.	Vendor to confirm			
3.2	Output Rating : 400V DC, current as required by the Generator rotor under heating upto 500A	Vendor to confirm			
3.3	Input Supply : 3 Phase, 415V 50Hz AC from existing PCC Voltage fluctuation : +/- 10% Frequency fluctuation : +/- 5% Ambient Temperature : 50 deg. C	Vendor to confirm			
3.4	Degree of protection : IP 42	Vendor to confirm			
3.5	Duty : Continuous	Vendor to confirm			
4.0	Scope of supply : The Drive system should consist of the following:				
4.1	Input MCCB of suitable rating.	Vendor to provide details			
4.2	Input line choke	Vendor to provide details			
4.3	Auxiliary circuit for controls	Vendor to provide details			
4.4	Auxiliary circuit for convertor fans	Vendor to provide details			
4.5	DC Voltmeter & Ammeter on panel door	Vendor to provide details			
4.6	System shall have inbuilt DC side protection in circuit or separately provided with fuse.	Vendor to provide details			
4.7	Drive run & drive trip lamp(indication)	Vendor to provide details			
4.8	Local Junction Box (located near test bed): Terminations for voltage & current shall be made in this junction box.	Vendor to provide details			

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SPECIFICATION NO. 01BT/SPEC/1004, REV.01

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4.9	Shunt for current measurement with accuracy class: 0.2. This shall be exclusively used for measurement of current for rotor temperature evaluation (refer clause 2.3 & 2.4 above)	Vendor to provide details			
4.10	PLC shall be part of the supply. The Drive system shall be operated thru' PLC. Sufficient DI/DO & AI/AO modules shall be incorporated which will communicate with the drive. The following features shall be provided:	Vendor to provide details			
4.10.1	Drive should have inbuilt PC communication tool for programming and diagnostics.	Vendor to provide details			
4.10.2	Function block programming should be available for temperature calculation (refer clause 2.3 & 2.4 above).	Vendor to provide details			
4.10.3	Drive should have display for displaying output parameters & fault indications in Real time.	Vendor to provide details			
4.10.4	Facility for Online parameter modification.	Vendor to provide details			
4.10.5	Adaptability for higher level automation.	Vendor to provide details			
4.11	Suitable HMI with touch screen shall be supplied, which will be mounted on existing control desk in the control room. The HMI will be suitable for configuration & operation of the drive and also for display & storage of all the parameters.	Vendor to provide details			
5.0	Provision shall be made in the system to input design values of rotor under test (RT2 & T2) for calculating temperature T1.	Vendor to confirm			
6.0	The parameters to be displayed include DC voltage, DC current, Rotor resistance and Rotor Temperature.	Vendor to confirm			
7.0	Suitable protection shall be incorporated in the system for protecting the devices against all kinds of faults & feedback provided for monitoring.	Vendor to confirm			

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8.0	PLC/converter/HMI should be of same make for better service support	Vendor to confirm			
9.0	Quality: Vendor shall apply good engineering practices during all stages of design, manufacturing, testing & commissioning of the entire system.	Vendor to confirm			
10.0	Name Plate Details: All items shall be fixed with Name plates indicating the details of the item in English language.	Vendor to confirm			
11.0	Corrosion protection:				
11.1	-Base frame with mineral oil-resistant zinc dust primer after sandblasting 40 µm -Intermediate coating: With 2 component DD universal primer; Coating thickness 40 µm; colour open -Finish coating: With 2 component DD sleek lacquer; Colour RAL 7035 light grey; Coating thickness 40 µm	Vendor to confirm			
12.0	Documentation:				
12.1	Vendor shall furnish drawings & documents for approval by BHEL before taking up manufacturing activity.	Vendor to confirm			
12.2	At the time of delivery, complete component documentation in English language to be submitted, composed of: -Power circuit diagram -Control circuit diagram -PLC Logic diagrams -Part list -Operation and maintenance manual -Certificate of quality and test certificate -Spare part list -Documentation on digital data storage medium as pdf file.	Vendor to confirm			

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SPECIFICATION NO. 01BT/SPEC/1004, REV.01

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS (if any)	REMARKS
13.0	Pre-Acceptance Tests :				
13.1	The acceptance of the entire system will be based on a mutually agreeable Acceptance Test Procedure (ATP). Vendor shall submit detailed applicable test procedures along with the offer.	Vendor to confirm			
13.2	Vendor shall furnish the detailed Quality Plan for approval by BHEL within 15 days from the date of order acceptance.	Vendor to confirm			
13.3	BHEL representatives will witness the tests at vendors' works.	Vendor to confirm			
14.0	Guarantee:				
14.1	Guarantee period shall be as per BHEL Terms and Conditions. At the time of delivery, Vendor shall furnish Guarantee Certificate for trouble free performance of the entire system indicating the Guarantee period as specified in the BHEL Terms and Conditions. If any malfunction or defects occur during the Guarantee period, vendor shall make necessary alteration, repairs or replacement free of charge.	Vendor to confirm			
15.0	Erection, Commissioning & Prove-out :				
15.1	The supervision of Erection of entire system will be in scope of the vendor.	Vendor to confirm			
15.2	Commissioning of entire system at BHEL works will be in the scope of the vendor.	Vendor to submit			
15.3	The complete responsibility of the system prove out shall be in the scope of the vendor.	Vendor to confirm			
16.0	Packing:				
16.1	The equipment shall be properly packed to withstand mechanical damage and rust during transit. In general, the packing is to be sea worthy.	Vendor to confirm			

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17.0	Training:	By Vendor			
17.1	BHEL Engineers should be trained at supplier's Works for 14 man-days in the area of Operations and trouble shooting of the Thyristor drive.	Vendor to confirm			
18.0	QUALIFYING CONDITIONS/ REFERENCE LIST:				
18.1	Only those vendors (OEMs or Authorized representatives only), who have supplied and commissioned at least ONE such rating (as per parameters mentioned in clause 3.0) or higher rating of Thyristor drive systems and such systems are presently working satisfactorily for more than one year after commissioning (as on the Date of Opening of tender), should quote. Vendor shall furnish details of such customer (as per clause 18.1.1) and also order copies. This is required from all the Vendors for qualification.	Vendor to confirm			
18.1.1	1. Name of the customer- I / company- I where referred thyristor drive system is installed.	Vendor to inform.			
	2. Complete postal address of the customer- I.	Vendor to inform.			
	3. Month and year of commissioning.	Vendor to inform.			
	4. Parameters of thyristor drive system supplied as per clause 3.0.	Vendor to inform.			
	5. Name and designation of the contact person of the customer.	Vendor to inform.			
	6. Phone, FAX no. and email address of the contact person of the customer.	Vendor to inform.			

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SPECIFICATION NO. 01BT/SPEC/1004, REV.01

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS (if any)	REMARKS
18.2	Performance certificate from the above customer regarding satisfactory performance of thyristor drive system 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 submit.			
18.3	BHEL reserves the right to verify the information provided by vendor. In case the information provided by vendor is found to be false/incorrect, the offer shall be rejected.	Vendor to accept & confirm.			