

	<p align="center"> BHARAT HEAVY ELECTRICALS LIMITED HEAVY POWER EQUIPMENT PLANT RAMACHANDRAPURAM, HYDERABAD - 502 032 </p>	Enquiry No. :	
		Due Date :	
		Supplier Qtn. No.:	
		Date :	

**TENDER DOCUMENTS TO BE FILLED BY THE SUPPLIER FOR SUPPLY OF
 LINE SIDE SOFT STARTER FOR 1.3MW, 6.6KV INDUCTION MOTOR**

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.

ADDRESS OF THE SUPPLIER :

TELEPHONE NOS.:

FAX NOS.:

E-MAIL ADDRESS :

ADDRESS OF THE SUPPLIER :

TELEPHONE NOS.:

FAX NOS.:

E-MAIL ADDRESS :

Sl. No.	Description for BHEL Requirement	Offered	Deviations	Remarks
Title	Line Side Soft Starter for 1300KW / 600KW, 6.6KV Horizontal Induction Motor			
1	Scope:			
1.1	This specification is intended to cover the design, manufacture, assembly, inspection and testing of Line Side Soft Starter for 1300KW / 600KW, 6.6KV 3phase 50Hz Horizontal Induction Motor in all respects for successful and trouble free operation of systems.			
1.2	The Vendor shall, as a minimum, supply equipment and full documentation with the features and performance listed in this specification and accompanying drawings referenced herein (if any)			

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1.3	No deviations from the requirements of this specification are allowed unless itemised in the vendor's quotation and subsequently specifically agreed within the purchase order or order supplement documents. Failure to clearly identify specific deviations will be assumed by the purchaser to be total compliance with the specification.			
1.4	Where alternatives are offered,they shall be fully described and must be accompanied by all pertinent engineering information,to facilitate evaluation of alternatives.			
1.5	It shall be the responsibility of the vendor to inform the purchaser of any errors,ambiguities,inconsistencies or discrepancies which may be found to exist in any document, specification or drawing submitted by the purchaser.Vendor shall be responsible for rectifying at their own cost, any errors and oversights in the system.Any work shown on the reference drawings and not particularly given in the specification or vice versa, shall be included by the Vendor.The omission from the specification of any items essential to the correct functioning of any part of the specified equipment shall be brought to the attention of the purchaser.Failure to do this shall not absolve the vendor from supply,installation and commissioning of any equipment or services required to achieve the full functioning of the system to the intent of this specification.			
2	Applicable Standards:			
2.1	The item supplied against this specification shall be in compliance with relevant latest IEC/IEEE/ISStandards.			
2.2.0	Items supplied against this specification shall confirm to the latest applicable Indian Standards except where modified or supplemented by this specification			
2.2.1	IS-2705(1992) - Current Transformers(Part I-IV)			
2.2.2	IS-1248(1993) - Direct acting indicating electrical measuring instruments and their accessories.			
2.2.3	IS-5578(1985) - Guide for marking insulated conductors			

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2.2.4	IS-694(1990) - PVC insulated cables for votages upto and including 1100V			
2.2.5	IS-6875(1973) - Control switches for voltages upto 1000V AC & 1200 V DC (Part I-IV)			
2.3	It is the Vendor's responsibility to ensure they are in possession of all relevant and referred standards.			
2.4	Equipment confirming to any other statndard which ensures equal of better quality may be accepted.In such case, copies of english version of standard adopted must be submitted with the bid.			
2.5	It is not the intent of this specification to specify completely the details of design, manufacture,configuration, inspection and testing.It is the Vendor's responsibility to ensure that the equipment is designed,manufactured,configured,installed,tested and commissioned in accordance with the referenced standards,statutes,regulations and safety codes and is also consistent with good engineering practice.			
3	General Technical requirements			
3.1	Design Features:			
3.2	The soft starter shall be used for starting of large induction motor of 1300KW / 600KW, 6.6KV (i.e,Provision shall be made to start either 1300KW or 600KW any one motor at a time)			
3.3	The soft starter shall give incremental voltage control during soft start with smooth step-less acceleration.			
3.4	The soft starter shall be used during starting for stepless acceleration only. Once motor gains its full speed the soft starter shall send control command to the By-pass breaker/contactor panel. The soft starter shall be short time rated.			
3.5	The soft starter drive shall consist of the following			
3.5.1	Flux Compensated Magnetic Amplifier (FCMA) unit			
3.5.2	Surge Suppressor			

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3.6	All the line and motor protection will be taken care by others in the main switching VCB. Soft Starter shall have its own protection as follows			
3.6.1	Temperature Protection for FCMA unit			
3.6.2	Supervisory Protection			
3.6.3	Control Supply Interlock			
3.7	Soft Starter panel shall be provided with following Indicating, Metering & control devices			
3.7.1	Phase current indication with suitable ammeter & selector switch			
3.7.2	Auxiliary relays as required			
3.7.3	Audio – Visual alarms / fault indicators			
3.7.4	Alarm acknowledge / reset/ test push buttons			
3.7.5	Provision for wiring external sequential/process interlock/signals for starting permissive / running permissive / tripping etc.			
3.7.6	Terminals for remote control/feedback/ indication			
3.8	Performance Requirements:			
3.8.1	The soft starter shall be designed for operation at design temperature of 45°C.			
3.9	Construction:			
3.9.1	Soft Starter panel shall be Industrial type (Non – hazardous), totally enclosed, dust and vermin proof, floor mounted, free standing cubicle type of construction confirming to the degree of protection (IP 4X) as per standard.			
3.9.2	The panel cubicle shall comprise rigidly structural frame enclosed completely by sheet steel of 14SWG (cold rolled) thickness, smooth finish, leveled and free from flaws. All doors and removable covers shall be provided with neoprene gasket all around to make the cubicle dust & vermin proof.			
3.9.3	Panel shall be fitted with a label and serial number on the front & rear. All devices shall be provided with separate labels to indicate the function			
3.9.4	Main equipment of the panel shall be accessible for maintenance from the front & rear.			

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4	Equipment specification:			
4.1	FCMA Current controller:			
4.1.1	The High Voltage Soft Starter for MV/HV motor will be Flux Compensated Magnetic Amplifier (FCMA) type and shall be installed on Line side of the HV motor.			
4.1.2	The Flux Compensated Magnetic Amplifier (FCMA) shall be rated equivalent to the motor rated power and shall be capable of operating satisfactorily with the motor under various loading and starting condition of the motor over the entire operating range. Soft Starter rating shall not be less than rated KW of the motor.			
4.1.3	The Flux Compensated Magnetic Amplifier (FCMA) shall work on the principle of unsaturated core in the working zone and shall not lead to generation of harmonics.			
4.1.4	The Soft Starter starting duty shall be rated for atleast 4 starts per hour equally spaced.			
4.2	Measuring Instruments:			
4.2.1	Suitable measuring instrument shall be provided as per IS / IEC standards.			
4.3	Control Wiring and terminals			
4.3.1	Feeders for control (DC) / Auxiliary supply shall be provided at one point of the panel. Terminals to receive AC/DC control and auxiliary power shall be provided in cubicle and the terminals shall be adequately rated.			
4.3.2	Adequate rated 2 poles MCB's shall be provided for each of the AC/DC control circuits.			
4.3.3	All wires shall be bunched together and routed through wire ways inside cubicle.			
4.3.4	Low watt consumption LED type indicating lamps shall be provided			
4.4	Earthing			
4.4.1	An earth bus having suitable cross section shall be provided and extended through the length of the panel. All equipments shall be connected to this earth bus.			

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4.4.2	Hinged doors shall be earthed through flexible copper wire of adequate size.			
4.4.3	Bolted joints, splices, taps etc. to the earth bus shall be with at least two bolts.			
5	Accessories			
5.1	Cooling:			
5.1.1	Soft Starter panel shall be Air Natural Cooled.			
5.2	Plug point:			
5.2.1	A 230 V, 1 Phase, 50 HZ AC plug point shall be provided on the door of each soft starter with an ON-OFF switch.			
5.3	Painting:			
5.3.1	Oil grease, dirt and rust from the sheet shall be thoroughly cleaned and removed by sand blasting or acid cleaning.			
5.3.2	The under surface shall be prepared by applying a coat of phosphate paint and a coat of yellow zinc chromate primer.			
5.3.3	After application of primer, two coats of finish epoxy paint shall be applied with each coat followed is stoving. Colour shade shall be RAL-7032 (Siemens grey).			
5.2.4	Panel shall be painted with anti-corrosive paint or powder coated			
6	Inspection and testing:			
6.1	Routine tests shall be carried out at works in presence of BHEL as per relevant Is / IEC standards.			
6.2	Vendor shall furnish all test certificates for CTs, PTs, Instruments etc to BHEL for review.			
6.3	Type Test certificates within last 5 years as per relevant clauses of IEC 62271-200(2003) should be submitted for similar rating soft starter.			
6.4.0	Following Routine tests to be carried out for soft starter			
6.4.1	Shop Test :			
6.4.2	Physical Inspection for dimensional check			
6.4.3	Control circuit operation check			
6.4.4	Insulation resistance test before & after high voltage test.			
6.4.5	High Voltage test.			

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6.4.6	Temperature rise test for FCMA unit.			
6.4.7	Site Test:			
6.4.8	Insulation resistance test			
6.4.9	Control circuit operation check			
6.4.10	Test to demonstrate achievement of starting current as per specification.			
7	Preservation:			
7.1	Preservation should be accomplished in accordance with acceptable commercial practice for the type of supply			
8	Packing and forwarding:			
8.1	Dispatch shall be done in closed packing boxes consistent with requirements of safe transit. It shall be the suppliers responsibility to determine that the package done is adequate to preserve integration of the unit after being met the satisfactory visual check and such that the complete unit shall arrive at its destination in an undamaged condition (No mechanical damages, distortions dust and rain water entry etc.) and the unit is ready for its intended use			
8.2	Packing slips containing full information about the contents of the packing case should accompany the consignment.			
	Commissioning:			
	Vendor shall quote separately for commissioning charges			
9	Documents:			
9.1	Catalogues, Schematics, O&M Manuals of all items including drawings shall be supplied along with the panel			
9.2	2 Nos of Compact Discs containing Catalogues, Schematics, O&M Manuals of all items including drawings shall be supplied			
10	Qualification of vendors:			
10.1	Vendor should have supplied, erected and commissioned the Soft Starter of same rating (6.6 KV grade) or higher for at least five different installation in India in last three years. The Vendor should submit the performance certificates for supplied units which are working satisfactorily.			

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12	Other conditions:			
12.1	The complete offered system will be considered for procurement			
12.2	In case the quoting agency for this system is not OEM, then it is mandatory that the supplier should provide a letter from the respective OEM stating that, they will support the equipment in both technical and logistic for at least two years			
12.3	The complete system engineering is the responsibility of supplier. Vendors who supply in part will be disqualified			
12.4	The system, any unit or parts there in, if found defective during commissioning or there after shall be replaced within a week of detection of such defects			
13	In case of any clarification required, the party taking part in tender shall contact BHEL and obtain written clarification regarding this tender.			

Sl. No.	Description for BHEL Requirement	Offered	Deviations	Remarks
DATA SHEET FOR SOFT STARTER				
Table-01				
sl.no.	PARAMETERS	BHEL Requirements	Vendor's Confirmation(Yes/No) & Data Comments	
1	Method of Connection	Line Side		
2	Supply Voltage level	6.6 kV, 3 phase		
3	Allowable supply voltage variation	6.6 KV ± 1 KV		
4	Supply Frequency	50Hz ± 1Hz		
8	Short circuit withstand current	specify		
9	Starting time	less than 30 seconds		
10	Current Transformer Type & Rating	specify		
11	Temperature Protection for FCMA unit	confirm		
12	Supervisory Protection	confirm		
13	Control Supply Interlock	confirm		
14	Indicating Meters	specify		
15	Starting Duty	confirm Minimum 4 starts (equally spaced) per hour		
16	Insulation Class	specify		
17	Control Voltage	specify		
18	Cooling - Natural Air Cooled	confirm		
19	Housing	specify		
20	Painting Process & Colour shade	specify		
21	Degree of Protection	specify		
22	Bus Bar rating & size	specify		
23	Bus Bar insulation	specify		
24	Cable entry	specify		
25	Reference ambient temperature	specify		
26	Altitude	specify		