

Bharat Heavy Electricals Ltd.,
Electronics Division,
Mysore Road, Bangalore – 560 026

**Tender Document for " Supply and E&C Support services for VFD System for RCF
THAL Project (Ref. NKR0000247)**

TENDER REFERENCE DOC	NKR0000247
TENDER DOCUMENT AVAILABLE FROM	25.07.2018
LAST DATE AND TIME FOR SUBMISSION OF TENDER	17.08.2018 at 13.00Hrs IST
DATE AND TIME FOR TENDER OPENING	17.08.2018 at 13.30Hrs IST
SUBMISSION OF TENDER	Bidder to submit tender in E-procurement website : https://bhel.abcpurchase.com Refer instructions give in tender document for offer submission of bid in E-procurement site.

This Tender Document Contains documents as per below index:

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REQUEST FOR QUOTATION

BHARAT HEAVY ELECTRICALS LIMITED
Electronics Division
PB No. 2606, Mysore Road Bangalore - 560026
INDIA

RFQ NUMBER: NKR0000247
RFQ DATE: 25.07.2018
RFQ DUE DATE: 17.08.2018 at 13.00Hrs IST

(for all correspondence)
Purchase Executive : Nilmani Kumar
Phone :080- 26998663
Fax : 00918026989227
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SI No.	Material Code	Description	Qty	Unit	Delivery
1	PR0900009276	11KV VFD as per PS/445/2606	1	ST	24.12.2018
2	PR0900009276A	VFD output Isolator /Breaker Panel	1	ST	24.12.2018
3	PR0900005100	MANDATORY SPARES FOR VFD	1	ST	24.12.2018
4	PR0900009101	CABLE ACCESSORIES FOR VFD	1	ST	24.12.2018
5	PR0900009110	LOCAL CONTROL STATION FOR VFD	1	NO	24.12.2018
6	VFD_COMM_SP	COMMISSIONING SPARES FOR VFD	1	LOT	24.12.2018
7	PR0900009268	Spares for LCS for VFD	1	ST	24.12.2018

- i). This is only RFQ not an order.
- ii). In all correspondence quote RFQ No. & due date.
- iii). Quotation should remain valid for a minimum period of 90 days from due date.
- iv) The quotation must be enclosed in a sealed envelope superscribed with RFQ no. and due date. It should reach us on or before the due date by 13.00Hrs IST and will be opened at 13.30Hrs IST on the same day.

Pre-Qualification Criteria

Project: VFD for Ammonia Refrigeration Compressor-IV

Customer: RCF, Thal

Consultant: PDIL, Noida

VFD Specification: PS/445/2606

1. The vendor shall be an Original Equipment Manufacturer (OEM) of VFD Equipment. Only the OEM can submit offers.
2. The vendor should have designed, engineered, manufactured, type tested or got type tested, supplied and commissioned or supervised commissioning of at least one (1) number of VFD system (of the type offered) of 11kV, 4800 kW or above rating for feeding squirrel cage induction motor in the last seven (7) years as on 04-06-2018. The Reference List of VFD supplies made giving the ratings, year of supply, application and details of the customers etc. to be provided along with the offer.
3. Necessary documentation in support of commissioning of the 11kV VFD system shall be furnished in support of pt.2 above.
4. The vendor or their authorized service representatives shall have trained engineers for commissioning & service for the offered equipment and shall be in a position to provide prompt after sales service and spares support for our installations. This service network shall necessarily be available in India.
5. The vendor shall be in a position to undertake AMC or provide service support for the equipment supplied, after the expiry of the warranty / guarantee period either directly or through a service representative.
6. Technical clearance of vendor offer will be based on RCF/PDIL acceptance of the vendor credentials.

Note:

- a. Vendor must furnish all necessary supporting documents, as required, along with the bid to satisfy Pre-Qualification criteria as specified above.
- b. The Pre-Qualification criteria are mandatory requirements and the technical bids will be qualified only when the Pre-Qualification criteria are met.

Checklist for Pre-Qualification Criteria

Sl. No.	Vendor Confirmation to the points above	Reference of documents attached
1	Yes / No	
2	Yes / No	
3	Yes / No	
4	Yes / No	
5	Yes / No	
6	Yes / No	



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CONTENTS SHEET

PART-A : BHEL SPECIFICATION

- (A1) VFD PANEL, TRANSFORMER & ISOLATOR SPECIFICATION
- (A2) SINGLE LINE DIAGRAM OF VFD SYSTEM
- (A3) COMPRESSOR CURVE
- (A4) MOTOR DATASHEET AND CURVES

PART-B : PDIL SPECIFICATION

- (B1) PDIL SPECIFICATION FOR VFD
- (B2) VFD DATASHEET
- (B4) TRANSFORMER DATASHEET
- (B3) SPECIFICATION FOR LOCAL CONTROL STATION
- (B5) LCS DATASHEET

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REVISION HISTORY SHEET

REV. NO.	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
00	17-07-2018	FIRST ISSUE	-----		

REVISIONS 00

APPROVED BY
L SUBBALAKSHMI

PREPARED BY
GITESH DAS

ISSUED BY
VFD ENGG

DATE
17-07-2018

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TECHNICAL SPECIFICATION OF IGBT/ IGCT/ SGCT BASED VFD FOR SQUIRREL CAGE INDUCTION MOTOR FOR AMMONIA REFRIGERATION COMPRESSOR

1. Project Details

Sl. No.	Parameter	Specification
1	Project Location	Rashtriya Chemicals & Fertilizers Ltd., Thal, Dist. Raigad, Maharashtra
2	Project Title	GTG-HRSG Project,
3	Customer	Rashtriya Chemicals & Fertilizers Ltd.
4	Consultant	Projects & Development India Ltd.

2. Environment Specifications

Sl. No.	Parameter	Specification
1	Maximum Ambient Temperature	45°C
2	Minimum Ambient Temperature	11°C
3	Equipment Design Ambient Temperature (IS-9676)	45°C
4	Relative Humidity	100%
5	Altitude	7.1m above mean sea level
6	Location of VFD Panels	Indoor, Ventilated Room with Air Conditioning
7	Atmospheric pollution	Ammonia Vapour, Sea Chlorides and Urea dust, etc.

REVISIONS 00

APPROVED BY
L SUBBALAKSHMI

PREPARED BY

GITESH DAS

ISSUED BY

VFD ENGG

DATE

17-07-2018

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3. Input and Transformer Data :

Sl. No.	Parameter	Specification
1	System Voltage / Frequency / Phase	11kV / 50Hz / 3
2	Voltage Variation	±10%
3	Frequency Variation	+3%, -5%
4	Combined Voltage and Frequency Variation	±10%
5	Fault Level	50kA for 3 sec
6	Transformer Type	Dry type integrated Transformer (In Vendor scope), Indoor
7	Rating	Transformer must be designed to carry 125% of calculated VFD rating. Transformer sizing calculation shall be provided along with offer.
8	Power Cables	Cable glands and termination suitable for 11kV, 1R x 3C x 400 sq.mm. Al, XLPE cable to be provided by the vendor for Transformer HV side cable termination. The exact cable sizes will be intimated during drawing approval stage. Cable is in Customer scope.

4. Motor Data :

Sl. No.	Parameter	Specification		
1	Type	Squirrel Cage Induction Motor		
2	Scope	Manufactured by BHEL-Bhopal		
3	Rated Output	4800kW, 11kV, 293A, 1496 rpm		
4	No load Current	During detailed engineering		
5	Pull Out Torque (% of FLT)	180%		
6	Fed from	Variable Frequency Drive (V/f Control) with DOL Bypass		
7	Duty Class	Continuous - S1		
8	Efficiency and Power Factor:	% of Load	Efficiency	Power Factor
		85	96.3%	0.89
		100	96.5%	0.89
9	Power Cables	Cable glands and termination suitable for 11kV, 1R x 3C x 400 sq.mm. Al, XLPE cable to be provided by the vendor for VFD Output side cable termination. The exact cable sizes will be intimated during drawing approval stage. Cables in BHEL scope.		



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5. Scope:

Sl. No.	Scope of Supply	Description
1	a) Fully Assembled Unit of 11kV VFD Panels (IGBT/SGCT/IGCT), Air/Water Cooled with integrated Dry type transformer b) All interconnecting cables between the VFD and integrated Transformer. c) One number of Flameproof Local Control Station (LCS) mounted near motor d) VFD Output Breaker / Motorised Isolator e) Power Cable glands (Flame proof), hardware and termination kits for VFD, Transformer & Breaker/Isolator Panel, Cable glands (Flameproof) and lugs for LCS. f) Any special cable other than power and control cables from VFD to other equipment. g) Any special tools and tackles. h) Mandatory Spares. i) Commissioning Spares	The vendor shall be responsible for engineering and functioning of the complete VFD system comprising of dry type transformer and VFD panel, meeting the intent and requirement of this specification, PDIL specification and datasheet. This shall include but not be limited to inverter sizing, transformer sizing, transformer impedance selection, vector group, input and output harmonic filter design and sizing, output dv/dt filter sizing, adequacy of motor cable size selected by BHEL, etc. VFD with output transformer/any other changeover circuit to meet the desired Motor voltage level of 11kV is not acceptable. All necessary interlocks as required for safe and reliable operation of VFD system along with Input Breaker, Output Breaker /Isolator shall be provided in VFD system. The machine shall normally run on VFD. However at the discretion of the operator, it shall be switched on to bypass manually after switching off the VFD feeder. All other control and protections not included in owner's scope but required for vendors supplied system shall be in vendor's scope.



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6. VFD Specifications

Sl.	Parameter	Specification
1	Drive	Ammonia Refrigeration Compressor-IV
2	Input Voltage	From Integrated Dry type Transformer
3	Power/Torque vs Speed	Torque $\propto$ Speed ² ; Power $\propto$ Speed ³
4	Single Line Diagram	See Attachment 3-661-00-00969
5	Output Voltage of VFD	0 to 11kV (V/f = Constant)
6	Output Current of VFD	293A at 45°C (Design Ambient)
7	Output Frequency	0 to 50Hz , Resolution: +/- 0.01% under transient conditions; +/- 0.5% under steady state conditions
8	Speed Regulation	+/- 0.5%
9	Speed Accuracy	+/- 1%
10	Over load Capacity	115% of rated current for one minute at rated voltage
11	Drive Control	Sensor less Vector Control
12	Braking Operation	Not Applicable
13	Output LC Sinusoidal Filter	Motor is designed for PWM operation. Distance between VFD and Motor is ~100 meters. Vendor to clarify and offer output Filter, if required. If O/P filter is required then the cables between VFD and filter will be in vendor scope. Cable glands, lugs and termination kit for the cables at both the end of the filter must be supplied by vendor.
14	VFD Panel Construction	a) Protection Class: IP43 b) Panel: Free standing, floor mounting type, comprising of rigid welded structural frames with Cold Rolled Sheet Steel enclosure of minimum thickness 2 mm for load bearing and 1.6 mm for other members. All doors and removable covers shall have neoprene gaskets. Ventilating louvers shall have easily removable and washable dust filters. c) Cooling: Forced Air Cooled VFD should be considered. Cooling system shall include well dimensioned panel, adequate cooling air flow path. Vendor shall ensure that the panel dimensions and flow paths have been designed for continuous running at the specified ambient without overheating. Vendor to provide low noise redundant cooling fan for the VFD panels (minimum n+1, where 'n' is the number of fans required for operation at specified rating) with a changeover arrangement. Changeover scheme shall be submitted along with the offer. Supply of loose redundant fan is not acceptable. Suitable thermal



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		switch for exit air temperature monitoring shall also be incorporated.
14	VFD Panel Construction	d) Earth Bus – minimum 50*6 mm Copper shall be provided with provision for connection to plant earth grid. e) Busbar Material – Electrolytic grade Copper, colour coded. Sleeving/shrouding for safety purposes shall be done. f) Door Interlock: The VFD shall have a door interlock for safety. This interlock system should ensure that none of the power cabinets can be opened until the main source of power is disconnected or will cause the main source of power to trip. Additionally the same interlock system should ensure that power cannot be initialized to the drive unless the doors are closed. Suitable shrouding mechanism shall be provided so that DC capacitors cannot be touched till their voltage is zero. g) Painting: 2 Coats of Primer and 2 Coats of Finish Paint to be given for all surfaces of enclosure. The panel shall be spray painted with two coats of Epoxy Based final paint with Powder Coated Finish - shade 631 of IS-5, Paint Thickness: 80 Microns (minimum). h) Power and Control Wiring shall be done with Fire retardant cables. i) Double compression type Nickel plated brass flame proof cable glands shall be supplied. Height of the terminal from cable gland plate shall be adequate to take care of the cable sizes and quantity mentioned. Minimum space for the power cable termination shall be 600mm clear from the cable gland plate. Cable entry will be from bottom only. Gland Plates shall be blank (undrilled) – to be drilled at site. Gland Plates shall be minimum 3 mm thick Aluminium (steel not allowed). Gland plate shall be of sufficient strength to handle all the cables. j) Termination kit for the VFD Transformer Input and VFD Output power cables shall be supplied. k) All electronic modules and components shall be accessible from front of panel only. Modular assemblies for both the system control electronic equipment and power electronic equipment shall be used.



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		l) All low voltage compartment and cabling shall be electrically and physically separated from the high voltage compartment. m) Lugs for all control cables shall be terminated in terminal block itself. This would avoid usage of different types of lugs at site during commissioning.
15	Noise Level	Shall be less than 75dB at a distance of 1 metre from the outline of VFD Panels at a height of 1.5 metres from the floor with all the fans running in the VFD Panels.
16	Storage Temperature	-40°C to +60 °C
17	Vibration	According to IEC68-2-6
18	Interference	According to IEC801 parts 2,3,4 Immunity: The panels shall be designed so as to have low Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI).
19	VFD Efficiency	<u>VFD System efficiency shall be $\geq 97\%$.</u> Efficiency figure shall be inclusive of Transformer, Output filter or choke (if provided), etc. Exact value to be specified by the Vendor in the technical offer.
20	Duty Cycle	Class I Duty Cycle as per IEC 146-1
21	VFD Requirements	a) Input Choke: Input chokes to be provided if necessary. b) Local/Remote: Selector switch shall be provided on VFD panel for operator to select type of operation: <u>Local</u> – Operation from VFD Panel for Speed Control from door mounted interface; <u>Remote</u> – Operation from DCS/LCS. If VFD is set for speed reference from Remote, it shall be possible to program the VFD to either shutdown, go to minimum speed or continue operation at its last known speed reference point whenever a loss of speed reference is detected. c) Local Start/Stop Push Button to be provided either on panel door or on panel mounted keypad. d) Door Mounted Lockable Push-Button to be provided with 4NO + 4 NC contact for Emergency Stop. One normally open contact to be wired to Terminal Block for external Interlocking / Annunciation. e) Every Panel shall be provided with LED illumination Lamp with limit switch and MCB. Space heater shall be provided in panel with switch fuse and variable setting thermostat. 240V power socket with MCB shall be provided.



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		f) 240V, 1phase, 50Hz, 1000W (approximate, exact value during drawing approval stage) Power Supply to the motor space heater shall be derived within VFD from 415V, 3 ϕ , 4 Wire supply. Necessary interlocking arrangement for this supply shall also be made available in the VFD panels.
21	VFD Requirements	g) PLC: PLC shall be provided for Interlocking and Protection (if required). h) The expected life time of the drive system shall be minimum 20 years. The system including all individual components forming part of the system shall have the highest reliability. i) VFD room dimension available at site : 10 m x 6 m. Vendor to accommodate the VFD and Isolator / Breaker Panel within the room size. Vendor to clearly mention the panel clearances in the technical offer. <u>j) Any special requirement regarding CT/ PT, Protection relay or any other device, in input breaker, which is required for functioning & protection of VFD system shall be considered by the VFD vendor in their scope.</u>
22	VFD Features	a) Soft Start and Auto Restart. b) Auto Speed Search Facility (Catch on Fly) shall be available for starting into rotating loads. c) Power loss ride through (Kinetic Buffering) and for voltage dips over 20% or Power interruption for less than 2 secs. d) Automatic VFD tuning during start-up. e) Flux optimisation function shall be provided to reduce the total energy consumption and noise level in case drive is operated below nominal load. f) Selectable reverse run prohibition g) Adjustable motor overload feature h) Settable minimum and maximum operating frequency i) VFD shall produce not greater than 1% torque pulsation to the shaft of driven equipment. j) Field adjustable Torque limits and acceleration and deceleration ramps k) Accelerate / Decelerate Times to be specified. l) Four (4) user programmable preset speeds.



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		m) The equipment may be stored outdoors for long periods before installation. The packing should also be suitable for outdoor storage areas with heavy rains / high ambient temperatures. n) Vendor shall certify readiness of system fit for commissioning. Vendor's scope shall also include supply of all specialized tools and tackles required. o) VFDs shall be installed in Air-conditioned area but it shall be suitable for operation in non-air-conditioned area also. p) Earthing scheme should be provided by the vendor. q) Any special cable other than power and control cables required to connect VFD to other equipment shall be in vendor scope. r) All electronic PCBs/Modules must have conformal coating to take care of site conditions.
23	Controls and monitoring	a) VFD shall be with an interactive and user-friendly door mounted digital operator interface with LCD display and sealed membrane type keypad. b) The operator interface shall be used for drive programming, drive monitoring and drive trouble shooting. The operator interface must also be able to start and stop the drive, reset VFD faults and manual adjust the speed reference. In case the above operation is not possible through operator interface, vendor has to supply one laptop loaded with driver software along with a suitable communication cable for interface with VFD. c) The operator interface shall have LED indicators for drive fault, drive run etc. d) The operator interface shall allow monitoring of inverter operating conditions including speed, current, voltage, torque, power etc. e) Messages shall be alphanumeric in nature. All the fault messages shall be in English. f) Provision shall be made available for remote operation. g) The operator interface shall be able to display all real time operating variables and all drive programming parameters. h) The operator interface shall be capable of displaying a specific user selected parameter on power-up. This power-up parameter would typically be a parameter



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		that is important to the operator such as motor speed or motor load. i) The following Control signals must be provided: ➤ Local/Remote selection ➤ Emergency stop ➤ Trip/Close Input breaker These are indicative. Vendor to suggest the interlocking scheme using these and other outputs as required for the system during detailed Engineering. These Outputs shall be provided with individual relay having 3 changeover potential free contacts wired to terminal blocks. j) All VFD operating parameter shall be stored in nonvolatile memory.
23	Controls and Monitoring	k) The drive shall have built in monitoring of following parameters as minimum on its digital operator interface and these parameter shall also be displayed at Plant DCS through Modbus link: i) Output Frequency ii) Output Current iii) Motor Speed iv) Output Voltage v) DC Bus Voltage vi) Output Power (It shall be possible to display power output of the drive in kW) vii) Digital Input Status viii) Digital output status ix) Analog Input Status x) Drive Thermal state xi) Motor energy meter xii) Hour run l) Necessary transducer shall be provided with 4-20 mA output for indicating Motor Speed and Motor Current in the DCS. Transducers shall be capable of driving 500 ohms load. m) The following indications shall be provided on the VFD Panel Door/keypad: i) Motor Running/ VFD ON ii) Motor Stopped/Tripped iii) AC Mains ON iv) Auxiliary Control Supply ON v) VFD Ready vi) VFD Fault vii) External Fault



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		viii) Emergency Stop Activated ix) Motor Over speed x) Input Breaker Trip xi) Motor zero speed xii) Rectifier output 'ON' n) The VFD shall store fault logs of minimum last 10 faults in memory. o) The interface details of VFD shall be incorporated as required for data communication with DCS system with serial interfaces with RS485 data links. Necessary hardware shall be included in the scope and the interface protocol (i.e. Modbus/Profibus) shall be provided.
23	Controls and Monitoring	p) The following Audio-visual annunciations must be provided. 1) Rectifier fuse failure / drive fault 2) Main AC failure 3) Inverter fuse failure / Drive fault 4) Inverter overload 5) Inverter high temperature / Drive fault 6) Cooling system failure 7) Motor failed to start / Drive fault 8) Transformer Fault & alarm 9) Communication and measurement system unhealthy 10) Motor Winding Temperature high
24	Protection	Following protections shall be built in within the inverter and any other protection as required: a) Motor Overload / Over Torque b) Instantaneous Over current (This device shall monitor the peak output current continuously and shall provide instantaneous shutdown without component failure whenever its trip point is surpassed. The trip point must be greater than or equal to 105% of the VFD's rated full load output current) c) Ground Fault Protection – 5-10A within 250ms maximum. d) Over Voltage/Under Voltage - VFD shall be able to withstand >20% dip in supply voltage for 2 secs without damage to semiconductors or fuses. e) Output Short Circuit f) Output Phase Loss/Fuse Failure g) Phase Sequence Protection h) Input Phase Loss/Single Phasing Preventer



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		i) Over Speed/Over frequency of motor j) Heat sink over temperature/VFD Panel Temperature High Stall prevention (During acceleration, deceleration and constant speed operation) k) Loss of Cooling Fans l) External faults like Transformer & Motor Fault and alarm m) Incoming Line surge protection n) Under/Over voltage protection o) Inverter fault p) System earth fault protection
24	Protection	q) The system shall be designed to deliver the motor input current and torque for the complete speed torque characteristics of the driven equipment, with input supply variation of +/-10% and frequency variation of +3%, -5% r) If the motor load exceeds the limit, the drive shall automatically reduce the frequency and voltage to the motor to guard against overload. If load demands exceed the current limit for more than 1 min, the drive shall shut down to prevent over heating of the motor and damage to the drive. s) The drive shall trip in case the speed exceeds 105% of the maximum operational speed or reduces to 95% of the minimum operational speed for more than 10 seconds. t) Fault diagnostic shall be built into the system to supervise the operation and failure of the system. The information regarding failure of any of the system including shut down of the system shall be available for a period of minimum 4 days after a shut down even though no supply available. u) <u>VFD shall monitor Motor Winding temperature and shall be able to trip in case temperatures are beyond permissible limits. Monitoring of temperatures can be done either through separate Temperature Scanner mounted in VFD or directly into the VFD.</u>



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25	Type of Control:	Completely programmable by the user as: - Flux vector control with speed feedback - Flux vector control without speed feedback - Scalar V/F. VFD shall be capable of maintaining motor speed within $\pm 0.5\%$ without the use of a motor mounted encoder or tachometer. The drive shall have programmable V/F patterns along with user definable custom V/F patterns.
26	Local Control Station (Flame proof) Features Gas Group IIC	- The enclosure shall be made of cast light metal Alloy. - Degree of protection is IP55. LCS shall be provided with integral canopy. The canopy shall be made of atleast 2mm galvanized sheet steel or FRP. The canopy shall be suitable for providing protection against rain from top and two sides. - The LCS shall be provided with gaskets made of non-inflammable and self-extinguishing material. - Paint shade is epoxy based 631 of IS5. Paint shade will be confirmed during drawing approval stage. - A warning inscription "Isolate power supply elsewhere before opening" shall be provided on the panel. The warning inscription shall be embossed on the enclosure or a separate warning plate fixed to the enclosure with screws. The warning plate shall be nickel plated brass or stainless steel. - The LCS shall be provided with two earthing studs with lugs on the external surface of the enclosures suitable for termination of 8 SWG GI wire. - The Emergency Stop push button shall be mushroom type with stay put feature and lockable in pressed position. - All control switches shall be provided with a pistol grip handle. - Meters shall be suitable for the appropriate input and shall be calibrated for the actual parameters. Further, for Bypass operation, the meters shall be capable of reading bypass full load and starting currents, as well as the drive current. 4-20mA Signals for Display from VFD: - Actual Current (0-400A) - Actual Speed (0-1500rpm) - Reference Speed (4-20mA) 4-20mA signal for display of Bypass Current with suppressed scale 0-400A/2000A



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

REV. NO: 00

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		j) The sub-vendor of LCS shall be as per attached PDIL approved sub-vendor list k) Nickel plated brass cable glands (Flame proof) and tinned Copper lugs for cable termination shall be provided by the vendor. l) Control supply to LCS shall be 230V AC non-UPS Supply. m) Push Buttons with 2NO + 2NC contacts 1. VFD Start & VFD Stop 2. Bypass Start & Bypass Stop 3. Emergency Stop 4. Speed Increase 5. Speed Decrease n) Switch: 1. Local/Remote Selection o) Indications: 1. VFD Fault 2. VFD Ready to Start 3. VFD Running 4. VFD Mode 5. Bypass Mode p) Customer approved Vendors : 1. Baliga Lighting Equipment Ltd. 2. FCG Flameproof Control Gear Pvt. Ltd 3. Flameproof Equipment Pvt. Ltd. 4. FCG Power Industries Ltd. 5. Sudhir Switchgears Pvt. Ltd. 6. Flexpro Electricals Pvt. Ltd. 7. Govan Industries (India) Pvt. Ltd.
27	Dry type Transformer	Dry type Transformer a) HV voltage: 11kV with Taps of $\pm 5\%$ in steps of 2.5% b) LV voltage: Multi secondary type. Number of secondaries and secondary voltage to be indicated by the vendor in technical offer. c) Class of insulation : H d) Winding Material : Electrolytic grade Copper Protection: RTDs (2 nos) to be provided in each limb for winding temperature measurement. Temperature scanner to be provided for winding temperature of all limbs. Alarm and trip contacts required for annunciation for fault and tripping action.



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

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		Construction: The dry type transformer shall be mounted in a panel which will be mounted along with the VFD panel. Connection: HV Incomer: Termination arrangement to be provided for 1R x 3C x 400 sq. mm, Al, XLPE cable. Termination kit and Cable glands to be provided by the vendor. The exact number and size will be intimated during drawing approval stage. Cables in Customer scope. LV Connection: Cable between LV secondaries and VFD shall be in Vendor scope. Necessary connection and routing arrangements to be made by Vendor.
28	Breaker / Isolator Panel	VFD Vendor to supply one number Breaker / Isolator Panel (Motorised) for connection at the VFD output and shall be suitable for variable frequency operation. The same is required for isolating the VFD during Bypass mode of operation. The selection of Breaker Panel (VCB) or Motorised Isolator Panel shall be governed by VFD manufacturer's operational requirements. Adequate provision shall be provided for closing and tripping (not required in case of Isolator) from remote through contacts and from local by switch provided on panel door. a) Rated Voltage = 12kV b) Rated Current = Shall be designed to carry 125% of VFD output Current. Isolator shall be suitable for overload requirements of the VFD. c) Rated short time current rating = 50kA for 3 Sec d) Termination shall be suitable for termination of 11kV, 03C x 400 Sq. mm, Al, Cable at the input and output of the Breaker/ Isolator Panel. Provision shall be kept in the panel for termination of cable from Bypass breaker output for connecting at a later date. e) Aux. supply = 110V AC UPS supply (To be derived from the VFD panel) f) Sheet Steel thickness = 2mm for doors and covers and 3mm for load bearing members and instrument panel (if any). g) Degree of Protection = IP42 h) Paint shade and thickness = Shade no. 631 of IS-5 and 80 Microns (min) i) Busbars = Electrolytic grade Tinned Copper j) Analog Meters shall be provided on Panel door for Motor Current, Motor Voltage and DC Supply Voltage. CTs and PTs shall be used in the panel for deriving the same.



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

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		k) All CTs/PTs shall be suitable for variable frequency operation. Terminals used for CT/PT and Control terminals shall be stud and nut type. l) Multifunction meter also has to be provided in the panel for monitoring of Current, Voltage, Power, etc. m) ON/OFF/Trip indications shall be provided on panel door. All indicators shall be LED type. n) All components shall be accessible from front side for easy maintenance. o) Panel space heater shall be provided with Thermostat. p) Cable termination kits and Cable glands for the power cable termination at the Input/Output of the Isolator/Breaker shall be in vendor scope. q) Facility for padlocking of panel doors shall be provided. r) Provision shall be provided for charging of spring charging motor manually. s) Suitable rating Surge Arrestors shall be used for Breaker/Isolator. t) Safety interlocks shall be provided in the panel so that, panel cannot be opened when current is flowing in this circuit.
29	Harmonic Limitations – Source	Shall be as per IEEE – 519 Voltage harmonics: Vendor to inform the values with calculations during detailed engineering stage. Current harmonics: Vendor to inform the source side 5th, 7th & 11th harmonics values with calculations during detailed engineering stage. Vendor should also perform measurements during FAT & also at Site to verify that the current and voltage harmonics are within limits as mentioned above. Harmonic measurements at site shall be done with and without VFD in service.
30	Harmonics at VFD Output / Motor Input	Shall be as per IEC 61800-4 Vendor to specify the maximum amount of voltage and current harmonics at the VFD Output / Motor Input terminals.
31	Switching frequency	To be specified by the vendor
32	Auxiliary Supply	a) 110V AC redundant UPS feeders will be provided by BHEL/Customer. Necessary changeover arrangement shall be incorporated in the VFD panel. Power supply for electronic modules and Power supply for the motorized Isolator has to be derived from the same. Feeder kVA Rating required is to be given by the Vendor considering total requirement.



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

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- b) 415V, 3Ph, 4Wire, 50Hz feeder shall be provided by Customer. Feeder Power rating (short time & continuous) to be specified by the Vendor.
- c) Other supplies required by the VFD system to be generated internally within the VFD system.
- d) 230V AC non-UPS feeder for LCS shall be provided by Customer. Feeder Power rating to be specified by the Vendor.

33. SPARES

Sl. No.	Parameter	Specification
A	i) Mandatory Spares & Commissioning Spares for VFD ii) Mandatory spares for LCS	Supplier should quote item wise price for the following spares. Unpriced List of Spares quoted for shall be provided in the Technical Offer.

Sl no	Items	Mandatory Spares for VFD
1	Electronic Circuit Board (Control Card / PCB)	1 no. of each type
2	Powercell OR Power Diodes, Transistors /IGBT /Thyristor /IGCT/Other Power Semiconductor devices, IGBT Stack / Complete Module, Filter Capacitors	2 nos. of each rating & type
3	Power fuses	5 Sets of each rating & type
4	Control fuses / MCB	5 Sets of each rating & type
5	Choke / Inductor (if applicable)	1 set of each rating & type
6	Control Transformer	1 set of each rating & type
7	Meters (Analog & Digital)	1 set of each rating & type
8	Power and Control Switches	1 set of each rating & type
9	Cooling Water System Pump + Motor Set (if applicable)	1 set of each rating & type
10	Drive Cooling fans	1 no. of each rating & type
11	HMI / Display unit for drive	1 no.
12	Temperature sensors	1 no. of each rating & type
13	Support Insulators	10% of installed quantity
14	RTDs for Dry Type Transformer	1 no. of each rating & type
15	Bushing for Dry Type Transformer	1 no. of each rating & type



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

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Sl no	Items	Commissioning Spares for VFD
1	Transistors /IGBT /Thyristor /IGCT/Other Power Semiconductor devices	1 no. of each rating & type
2	Electronic Cards	1 no. of each rating & type
3	Power Supply Card	1 no. of each rating & type
4	Power fuses	20% or one no. (min) of each rating & type, whichever is more
5	Control fuses / MCB	20% or one no. (min) of each rating & type, whichever is more

Sl no	Items	Mandatory Spares for LCS
1	Ammeters of different ranges	10% (Min 1 no. of each rating & type)
2	Push Buttons of different types	10% (Min 1 no. of each rating & type)
3	Terminal blocks	20%
4	Terminal bushings	20%
5	Signal lamp	20%
6	Selector switch of each type	10% (Min 1 no. of each rating & type)
7	Relay (if used)	10% (Min 1 no. of each rating & type)
8	Power Contactor (if applicable)	10% (Min 1 no. of each rating & type)
9	BMR (Bi-metallic relay, if applicable)	10% (Min 1 no. of each rating & type)



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

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Sl. No.	Parameter	Specification
34	Testing and Quality Plan	a) Routine Tests shall be carried out on VFD panel and transformer as per relevant standards. b) Temperature rise test has to be conducted on VFD along with Transformer c) Impulse test reports of similar transformer for same or higher rating to be submitted for review. If impulse test reports are not available, Vendor shall conduct the type tests without any cost implication to BHEL. d) Combined test of job VFD with job Motor is not applicable.
35	Inspection, training and Commissioning Support	a) Final Inspection: BHEL / Customer representative will be present at manufacturer's works for witnessing of final testing. This is to be incorporated in the Quality Plan. No charges shall be applicable for witnessing of final tests. b) Training : Training for 5 (Five) persons from BHEL/Customer for a period of 3 days at manufacturer's works and 2 nos. of days at Site for 5 Site Engineers. Boarding and Lodging on BHEL/Customer account. c) Commissioning: Commissioning of VFD System at RCF, Thal site shall be in the scope of Vendor. Final Acceptance shall be based on successful completion of the same. d) Any replacement of failed/damaged items during commissioning shall be exclusively at Vendor's cost. e) Vendor is advised to stock necessary spares and ensure easy availability to facilitate trouble free commissioning.
36	Software for Computer Interface	This software should be an easy to use commissioning tool for drives and shall be provided along with the system. The interface details of VFD shall be incorporated as required for data communication with DCS system with serial interfaces with RS485 data links. Necessary hardware shall be included in the scope and the interface protocol (Modbus only) shall be provided.
37	Maintenance	The procedure for maintenance of VFD panels and the schedule thereof shall be mentioned in the offer.
38	Confirmations/ Deviations to Specification	Point-wise confirmation to this specification to be given along with offer. Deviations, if any, shall be indicated separately. If there are no deviations to the specifications, supplier shall mention the same explicitly. A reply from vendor stating that "Equipment will generally meet the specifications" will not be accepted by BHEL. Clause-wise Confirmation / Clarifications of all Clauses in the Purchase Specifications 1 to 37 of Specification shall be furnished in the format below.



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

REV. NO: 00

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Point No.	Page No.	Confirmation / Clarification / Information / Deviation	Details	Remarks, if any

7. Scope of Supply:

Sl.No.	Parameter	Qty
1.	a) Fully assembled unit of 11KV VFD panel (IGBT/IGCT/SGCT) with integrated dry type transformer, O/P choke (if required) along with power cables between choke and VFD, glands, lugs and termination kit for output choke	1 no.
	b) Flame proof Local control station	1 no.
	c) Breaker / Isolator (Motorised) Panel	1 no.
	d) Cable glands, termination kits and hardware for power cable termination in VFD and transformer. Cable glands and lugs for all cable terminations in LCS.	1 set
2.	Mandatory spares for VFD	1 set
3.	Commissioning spares for VFD	1 set
4.	Mandatory spares for LCS	1 set
5.	Erection supervision and commissioning (Lumpsum charges)	1 lot

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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

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8. Documentation

Sl. No.	Parameter	Specification
1	Attached Documents	a) Single Line Diagram : 3-661-00-00969 b) Motor Data Sheet : EM-132-TS-0808 c) Compressor Torque Curve : 4CM40600934 d) PDIL VFD Specifications: EM132-TS-VFD-01 e) VFD Datasheet: EM132-DS-VFD-01 f) Transformer Datasheet g) PDIL Specification and Datasheet for LCS
2	Technical Information required along with Offer	a) Dimensional Drawing of Panels along with minimum clearance to be maintained for effective cooling, and Weight b) Technical Catalogue of VFD System being offered c) Reference list for similar rating VFDs giving the following: Model number, Application, Rating, Year of supply and commissioning. Confirmation / Clarification / Information / Deviation List as per Point 6.38 above. d) Confirmation / Clarification / Deviation List to PDIL Specifications and other documents in (1) above e) Design calculation for sizing of transformer and VFD
3	Information / Confirmations required along with offer	a) Supply of the VFD shall be by OEM only. The name of the country from which the drive is sourced and the location of the manufacturing plant should be mentioned in the offer. b) After Sales Service and Support shall be given by the Vendor for a minimum period of 15 (fifteen) years after commissioning. Address of the Sales and Service Representatives in India with complete contact details: Name/Telephone/Email are to be provided.
4	Information / Confirmations required along with offer	Vendor shall give a notice of at least 1 year to the end user of the equipment and BHEL before phasing out the product / spares to enable the end user for placement of order for spares and services.
5	Technical (unpriced) and Commercial (priced) Bids – For Evaluation	Refer sheet no 19 of 21 for Unpriced and Priced bid for Sl.no. 7.1 to 7.5



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

P.S NO. : PS/445/2606

REV. NO: 00

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Sl. No.	Parameter	Specification
6	Information required for Customer / Consultant Approval (within 3 weeks from the date of Purchase Order)	a) Dimensional Drawing of Panels along with minimum clearance to be maintained for effective cooling, and Weight b) Schematic Diagram c) Bill of Materials for equipment to be supplied d) Feeder Requirements – UPS and 415V supply e) Losses at Rated Load (including Fans) f) Heat Loss for Air Conditioning System sizing g) Technical Catalogue of VFD System being offered h) Test Protocol and Quality Plan i) Type test certificates of similar rating equipment as per respective ITP. j) Filled up Data sheet for VFD and Transformer
7	Information Required along with Supply. Maintenance Manuals and Documentation	a) Erection, Commissioning and Maintenance Manuals along with Final Drawings and Documentation – 2 Copies b) 1 no. CD ROM consisting of the above. c) Test and Guarantee Certificates. d) Complete Bill of Material (item wise) for the equipment supplied.

69600-00-199-Σ

2

3

4

5

6

7

8

11kV, 50Hz, 3ph
(CUSTOMER SCOPE)

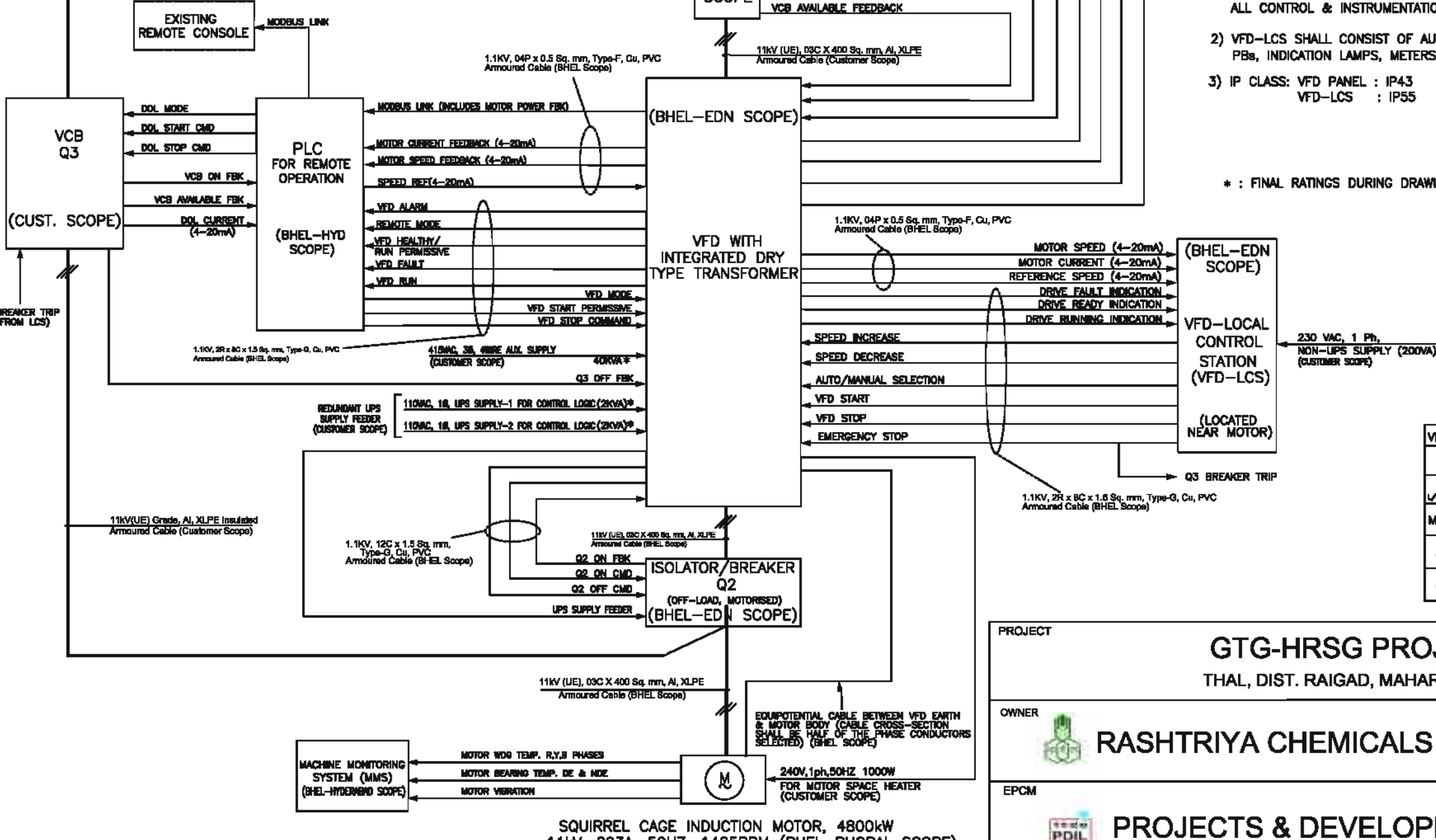
FAULT LEVEL(50KA/3 SEC)

VCB
Q1
CUST.
SCOPEVCB OPEN COMMAND
VCB CLOSE COMMAND
VCB TRIP COMMAND
VCB TRIP FB
VCB OPEN FEEDBACK
VCB CLOSE FEEDBACK
VCB AVAILABLE FEEDBACK
11kV (UE), 03C X 400 Sq. mm, Al, XLPE
Armoured Cable (Customer Scope)

NOTES:

- 1) CABLE GLANDS, LUGS & TERMINATION KITS FOR TERMINATION AT THE BHEL SUPPLIED EQUIPMENT END (VFD PANEL, VFD-LCS, O/P ISOLATOR/BREAKER & MOTOR) SHALL BE IN BHEL SCOPE. ALL HT POWER & LT POWER CABLES AS LISTED SHALL BE IN BHEL SCOPE, ALL OTHER CABLES SHALL BE IN CUSTOMER SCOPE. ALL CONTROL & INSTRUMENTATION CABLES SHALL BE IN BHEL SCOPE.
- 2) VFD-LCS SHALL CONSIST OF AUTO/MANUAL SELECTOR SWITCH, PBs, INDICATION LAMPS, METERS ETC.
- 3) IP CLASS: VFD PANEL : IP43
VFD-LCS : IP55

* : FINAL RATINGS DURING DRAWING APPROVAL STAGE.



PROJECT

GTG-HRSG PROJECT

THAL, DIST. RAIGAD, MAHARASHTRA

OWNER



RASHTRIYA CHEMICALS & FERTILIZERS LTD.

EPCM



PROJECTS & DEVELOPMENT INDIA LTD.

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

CARD CODE

TITLE:
SINGLE LINE DIAGRAM FOR VFD SYSTEM

No. OF SHEETS	02
SHEET No.	02
REV	01

M.O. No.

AS PER OPEN TOLERANCE
TO ED 0230499

DRG. No.

3-661-00-00969

A3 SIZE

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REF. DRG. No.

SIGN. & DATE

INVENTORY No.

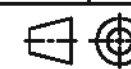
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		CHECKED	LSL
		APPROVED	LSL
REV.	DATE	ALTERED	GD
	25.06.18	CHECKED	LSL
		APPROVED	LSL

DRAWN	NAME	SIGN	DATE
CHECKED	LSL		09.05.18
APPROVED	LSL		09.05.18

DISTRIBUTION OF PRINTS			



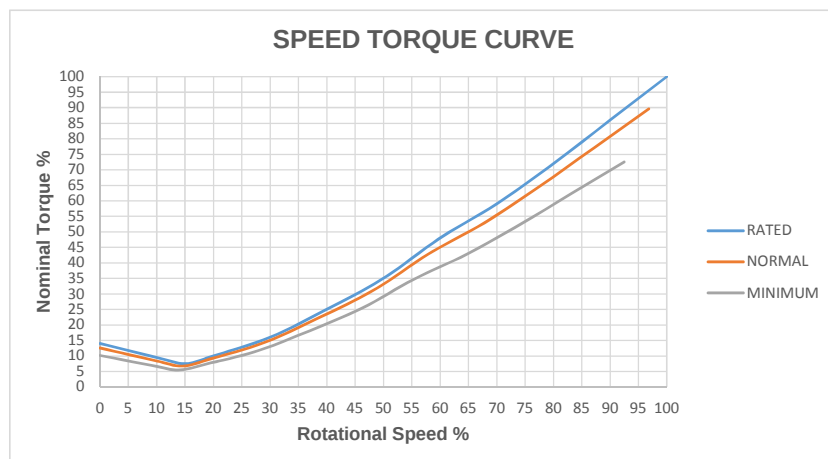
DEPT. CODE



STARTING TORQUE CURVE FOR CENTRIFUGAL COMPRESSOR

Sheet 1 of 3

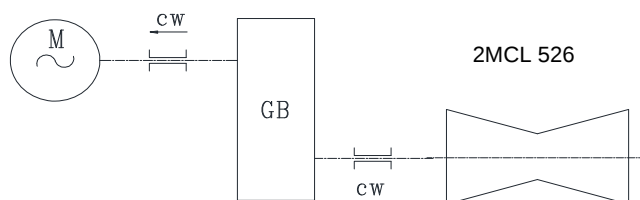
PROJECT : RCF GTG/HRSG PROJECT
SERVICE : AMMONIA REFRIGERATION
CUSTOMER : M/S RCF THAL
CONSULTANT : M/S PDIL
No. OF UNITS : 1



The motor is provided with VFD in order to realize different operating conditions as specified by the customer. These are indicated by the curves as shown above.

Motor Rating	4800 kW
Nominal Power	3995 kW
Motor Speed at Full Load	1485 rpm
Nominal Torque	2617 kgm
Static Torque	392.55 kgm
GD2 (Referred to Motor Speed)	5130 kgm ²
Direction of Rotation seen from Coupling end (for Motor)	CW
Shaft end cylindrical diameter	220 mm #
No. of Keys on Shaft end	1
Speed Range % :	80-105
Connection for Hub on Shaft Cylindrical fit of H6 / m5	
Compressor Power is referred to low speed shaft of step up Gear Box	

ARRANGEMENT OF MACHINES



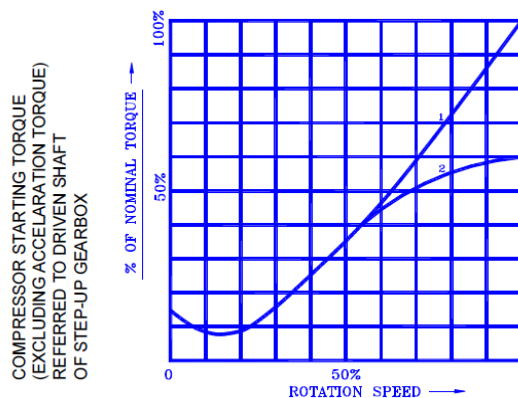
(#) Considered for coupling sizing. Motor group to check adequacy and confirm.
Please refer enquiry specification for all other technical details to finalize the motor design

STEAM TURBINES AND COMPRESSORS				Date	Dept. code
Format No.	Prepared	Checked	Approved	30.04.18	420
CA0-1-034-00	RAGHU	NEMA	YVRL	Drawing No. 4CM40600934	Rev 0

STARTING TORQUE CURVE FOR CENTRIFUGAL COMPRESSOR

Sheet 2 of 3

PROJECT : RCF GTG/HRSG PROJECT
SERVICE : AMMONIA REFRIGERATION
CUSTOMER : M/S RCF THAL
CONSULTANT : M/S PDIL
No. OF UNITS : 1

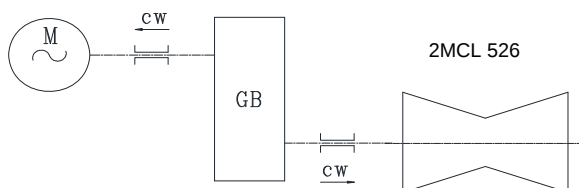


1. STARTING CURVE ON LOAD
2. STARTING CURVE WITH THROTTLING ON SUCTION.
(THIS CURVE IS VALID FOR MOTOR DESIGN)

For DOL Operation

Motor Rating	4800 kW
Nominal Power	3995 kW
Motor Speed at Full Load	1485 rpm
Nominal Torque	2617 kgm
Static Torque	392.55 kgm
GD2 (Referred to Motor Speed)	5130 kgm ²
Direction of Rotation seen from Coupling end (for Motor)	CW
Shaft end cylindrical diameter	220 mm #
No. of Keys on Shaft end	1
Speed Range % :	NA
Connection for Hub on Shaft Cylindrical fit of H6 / m5	
Compressor Power is referred to low speed shaft of step up Gear Box	

ARRANGEMENT OF MACHINES



(#) Considered for coupling sizing. Motor group to check adequacy and confirm.

STEAM TURBINES AND COMPRESSORS				Date	Dept. code
				30.04.18	420
Format No.	Prepared	Checked	Approved	Drawing No.	
CA0-1-034-00	RAGHU	NEMA	YVRL	4CM40600934	
					Rev
					0



STEAM TURBINES AND COMPRESSORS				Date	Dept. code
				30.04.18	420
Format No.	Prepared	Checked	Approved	Drawing No.	Rev
CA0-1-034-00	RAGHU	NEMA	YVRL	4CM40600934	0



SPECIFICATION SHEET INDUCTION MOTOR

EM-132-TS-0808

2

DOCUMENT NO

REV

SHEET 1 of 2

CLIENT: M/S RCF THAL		PROJECT: BOP GTG & HRSG Project		PLANT : AMMONIA Plant	
ISSUED FOR : PROPOSAL ☐		ENQUIRY ☐		ORDER ☒	
				FINAL ☐	
GENERAL					
Item No. :		Ref. Stds. : IS /IEC			
Quantity : 1 No.		Encl. Docs. : ES : 8102			
Description: Motor for Ammonia Refrigeration Compressor-IV		Make : BHEL			
Code No. :		Maker's Type:			
TESTS TO BE WITNESSED : Routine ☒ Type ☒ Others ☐					
SERVICE CONDITIONS					
SYSTEM DETAILS			AMBIENT CONDITION		
Rated Voltage with $\pm$ % : 11 KV $\pm$ 10%/VFD Output Voltage Level			Temp. Max./Min./Design Ref. 45/11 /45 °C		
No. of phases : 3			Relative Humidity 100% max Alt. above sea : 7.1 Mtr.		
Rated Frequency With $\pm$ % : 50Hz $\pm$ 5%			Atmospheric		
Combined V & F variation : $\pm$ 10%			Dusts : Urea Dust, Sand Dust		
Fault Level : 50 KA For 3 Sec			Pollution		
Space Heater Supply : 240V, 1-PH, AC			Vapour : Ammonia Vapour, Sea Chlorides		
Low Voltage Heating Supply :			Area		
Instrument			Safe ☐ Hazardous ☒		
Contact Rating			Haz. Area class : Zone : 2 Temp. class : T3 Encl. Gr. IIC		
Aux. Motor Supply : NA			Location : Indoor ☐ Outdoor ☒		
			COOLING WATER		
			Inlet Press : NA kg/sq.m Inlet Temp. NA C		
			Fauling Factor : NA Outlet Temp. NA C		
BASIC DATA					
RATING & DUTY			DRIVEN M/C DATA		
Rated Output : 4800 KW			Type :		
Syn. Speed : 1500 rpm			Make : BHEL		
Duty : Continuous			Absorbed Power : 3995		
Motor shall be suitable for 3 Cold and 2 Hot DOL start at rated Voltage.					
Rotor Type : Squirrel Cage			Coupling : Geared Box		
Starting Method : VFD Cum DOL			Torque-Starting / Max. :		
Max I Start/I Rated : 4.8 Times Incl. Tol. (DOL Start) / Depend On VFD			GD ² at Motor Speed : 5130 kg-m ²		
Min. V Start at Terms : 80% of rated voltage (Applicable For DOL start)			Thrust - Radial / Axial : Nil		
Min. M Start at VR : 60 % FLT at rated Voltage			Addl. Data : Nil		
EXECUTION			ACCESSORIES		
Degree of Protection : IP- 55			Foundation Bolt ☒ Space Heater ☒		
Addl. Degree of Protection : Exp (Pressurised)			Lifting Eye Bolt ☒ Drain Plug ☒		
Mounting Arrangement : Horizontal			Cable Glands ☒ Cable Lugs ☐		
Direction of Rotation : CW Looking From Motor DE			Diff. C.T.s ☒ C.W. Flow Indicator ☐		
Insulation Class : 'F' with temp. rise limited to 'B'			RTDs for Wdgs. ☒ Hot Air ☒ Bearings ☒		
Cooling Method : CACA (IC 611)			Thermometer For ☒ Hot Air ☒ Bearings ☒		
Stator Connection : Star			Earthing Terminals ☒ On Body ☒ In T.B. ☒		
CABLING DATA			Name Plate : ☒ Addl. name plate : ☒		
Power cable : Customer to Furnish Details			Rain Protecting Hood : ☐ Thermistor : ☐		
Heater cable : 1.1KV, 3 x 2.5 mm ² (Cu) XLPE-A- FRLS PVC			SPARE PARTS		
C.T. cable : Customer to Furnish Details			Required ☒ For Period of 2 Years		
R.T.D. cable : Customer to Furnish Details			Bearings ☒ Cooling Fan ☐		
Alarm cable : NA			1 / 3 Stator Coil : ☐ Space Heater ☒		
Cable Gland			Grease Nipple & Plug : ☐ Terminal Box ☐		
			Terminal stud with bushing & star link. ☒		
			Inner & Outer covers for DE & NDE bearing ☐		
PAINTING					

2	28.05.10	28.05.10	FOR D.P.O	LM	RKV	KK
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD



SPECIFICATION SHEET INDUCTION MOTOR

EM-132-TS-0808

2

DOCUMENT NO

REV

Type : Epoxy**Shade : 631 of IS : 5****Note :** All un filled data shall be filled by the vendor

2	28.05.10	28.05.10	FOR D.P.O	LM	RKV	KK
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD



TECHNICAL PARTICULARS INDUCTION MOTORS

EM-132-TS-0808

DOCUMENT NO

REV

SHEET 2 of 2

CLIENT: M/S RCF THAL		PROJECT: BOP GTG & HRSG Project		PLANT : AMMONIA Plant	
ISSUED FOR : PROPOSAL ☐		ENQUIRY ☐		ORDER ☒ FINAL ☐	
GENERAL					
Item No.		48004A275-11			
Quantity		1			
Description		SCIM Motor			
Code No.		-			
Ref. Standard		IS/IEC 60034-1, IEC 60079-2			
Make		BHEL			
Maker's Type		1SB1903-4			
ELECTRICAL DATA					
Rated Output		4800 KW			
Rated Voltage		11 KV			
No. of Starts - Hot / Cold		2/3 (Applicable For DOL Start at Rated Voltage at Motor Terminals)			
Torque - Starting / Pull Up / Pull Out		60/60 % FLT (Applicable for DOL Start)/180% FLT			
t Start at min. V Start (Hot/Cold)		48 Sec at Min. Permissible Voltage of 80% (Applicable For DOL start)			
Safe Stall Time at VR / I.IVR VR Hot / Cold		Hot 30/25 , Cold 35/29 Sec			
Stator Time Constant		7.168 (Stator Voltage)			
Temp. Rise at Full Load - Wdg. / Hot Air / Brg.		85 °C / Only For Reference Purpose / 47°C (Above Inlet Oil Temp. 43 °C)			
Temp. Rise of Stator / Rotor After	3 Starts From Cold	399 °C (at rated voltage at motor terminals in DOL Start)			
	2 Starts From Hot	356 °C (at rated voltage at motor terminals in DOL Start)			
Current at FL / 0.85 FL		293 / 250			
Efficiency at FL / 0.85 FL		96.5/96.3			
Speed at FL / 0.85 FL		1496/1496			
Power Factor at FL / 0.85 FL / Start		0.89/0.89/0.121			
Push Pull Voltage withstand Capacity		150% RV (at Bus transfer)			
Max. V dip for 1 sec. / 10 sec. / 60 sec.		85 / 22 / 0.02 (% Rated Voltage)			
Losses - Fixed / Copper / Total		102 / 47 / 174			
Space Heater Rating		1000 Watts, 1 Phase 240 V			
Suitable for Low Voltage Heating		Yes			
C.T. Ratio & Accuracy Class		Customer to furnish Details			
C.T. VK & I Mag. at VK / 2		Customer to furnish Details			
MECHANICAL DATA					
Frame Size / Ref. Dimensional Drg.		1SB1903-4/ OGA 14020041479			
Weight - Stator / Rotor / Total		14700 (Stator With Cooler) / 5300 / 20000 Kg			
Heaviest Weight to be Lifted		20000			
Rotor GD ² in Kgm ²		1576			
Reaction at Supports for	S/C Condition	Refer Foundation Load table of OGA 14020041479			
	Starting Condition	Refer Foundation Load table of OGA 14020041479			
	Running Condition	Refer Foundation Load table of OGA 14020041479			
	Push Pull Condition	Refer Foundation Load table of OGA 14020041479			
Max. Vibration Limit		2.3 mm/sec (RMS) & 37 micron (RMS)			
Max. Noise Level		85 dB(A) at 1 Meter			
Suitable for Outdoor Use		Yes			
Suitable for Bi-directional Rotation		No			
Material of Insulation		Micalastic			
Treatment of Insulation		Total VPI			
Winding Coils Replaceable at Site		No			
Type & Material of Fan		Shaft Mounted Internal Fan / Mild Steel			
Material & Thickness of Cooler Tube		Aluminium / 1 Thick			
Cooling Water Required in M ³ / hr		NA			
Lubrication Type		Sleeve with FOLS			
Lubricant Specn.		ISO VG 46 Or Eqv.			
Interval of Lubrication		NA			
Bearing Nos. & Type	DE	1 No. DIN Standard Bearing			
	NDE	1 No. DIN Standard Bearing			
	GUIDE	NA			
On Line Lubrication		Yes (FOLS in compressor vendor BHEL Hyderabad Scope of supply)			
Type & Rating of Main Cable Box		PSTB (Fault Level 50KA for 0.2 sec)			
No. of Cable Glands in Control Cable Box		NA			

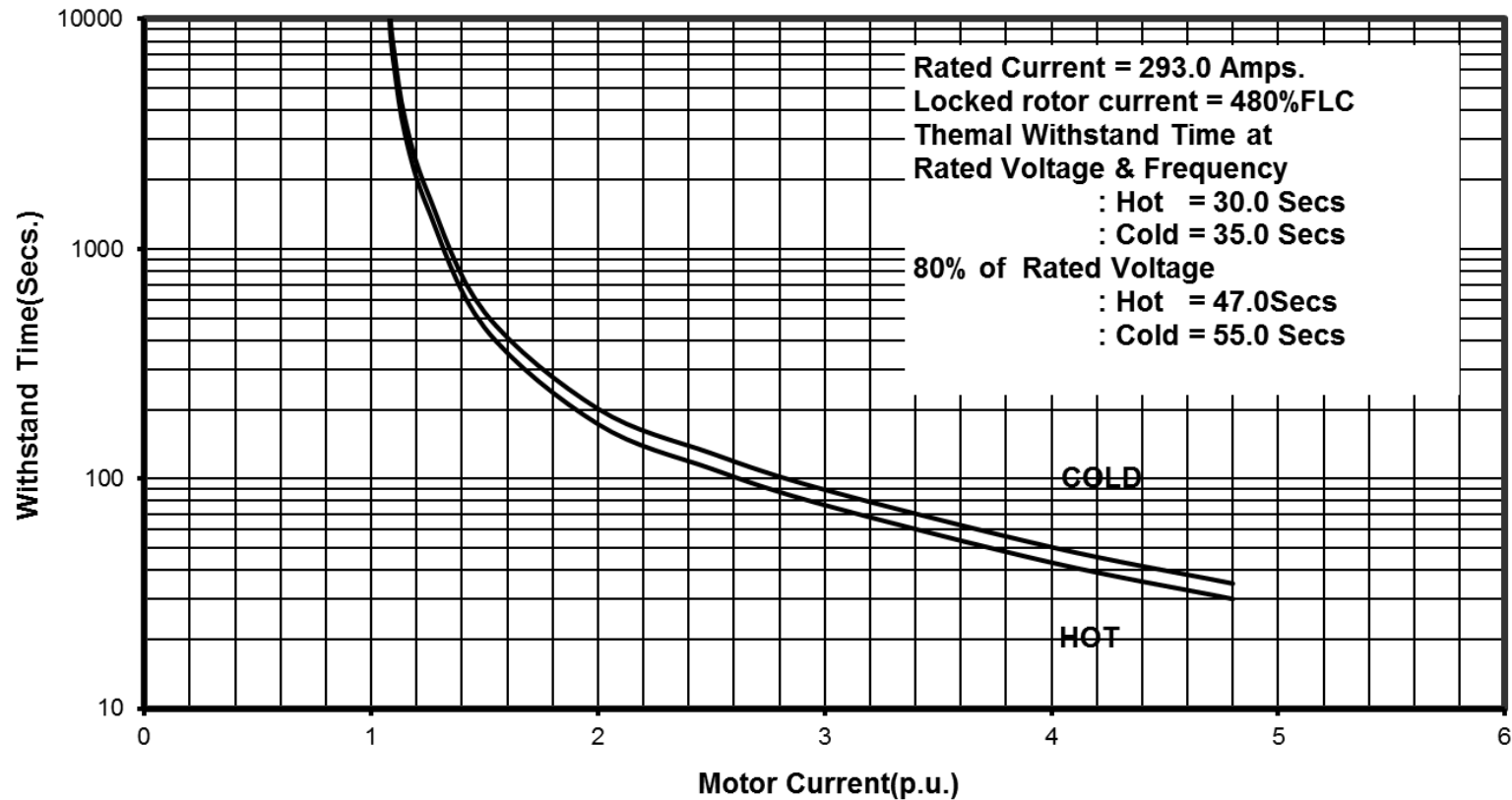
All unfilled data shall be filled in by the vendor

NOTE : All data to be filled by the bidder.

REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD
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Thermal Withstand Curves

Rating : 4800 KW 11 kV, 4 P SCIM (Compressor), VFD & DOL Bypass
Frame : 1SB1903-4 (Ex'p')
W.O.No. : 48004A275-11
Customer : M/s PDIL For RCF Thal



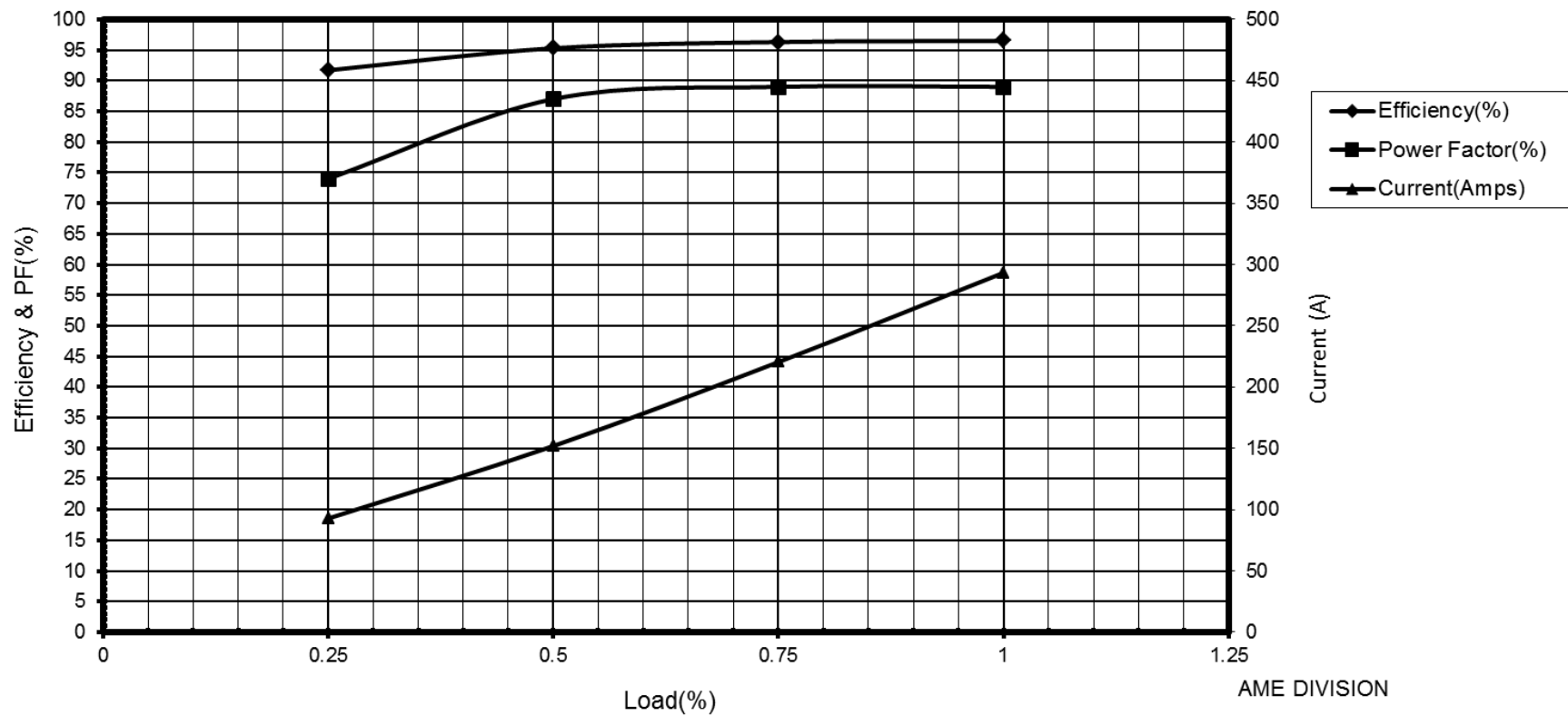
LOAD Vs. CURRENT, EFFICIENCY & PF CURVES

Rating : 4800 KW 11 kV, 4 P SCIM (Compressor), VFD & DOL Bypass

Frame : 1SB1903-4 (Ex'p')

W.O.No. : 48004A275-11

Customer : M/s PDIL For RCF Thal

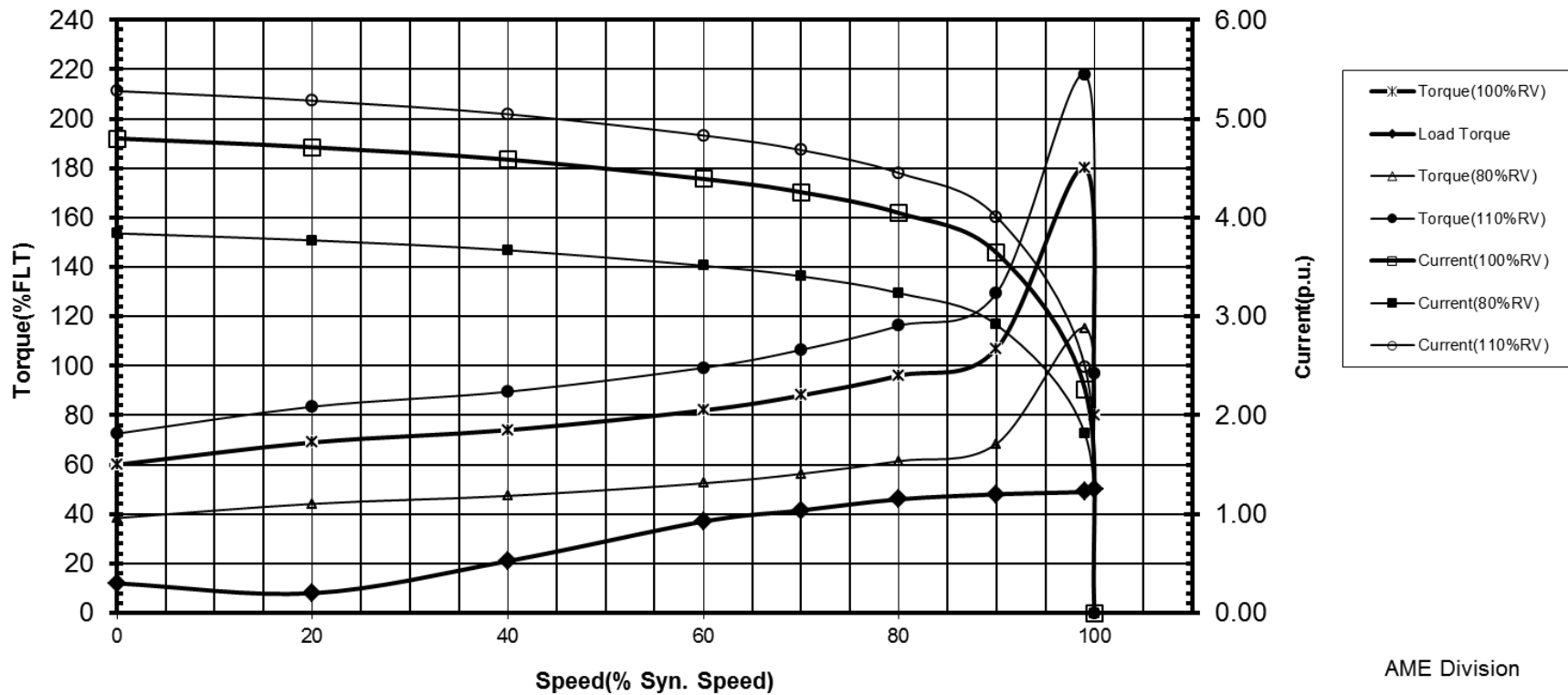


Torque & Current Vs. Speed Curves

Rating : 4800 KW 11 kV, 4 P SCIM (Compressor), VFD & DOL Bypass
Frame : 1SB1903-4 (Ex'p'l)
W.O.No. : 48004A275-11
Customer : M/s PDIL For RCF Thal

Rated Torque = 30.65 kN-m
Rated Current = 293.0 Amps

Applicable For DOL Start

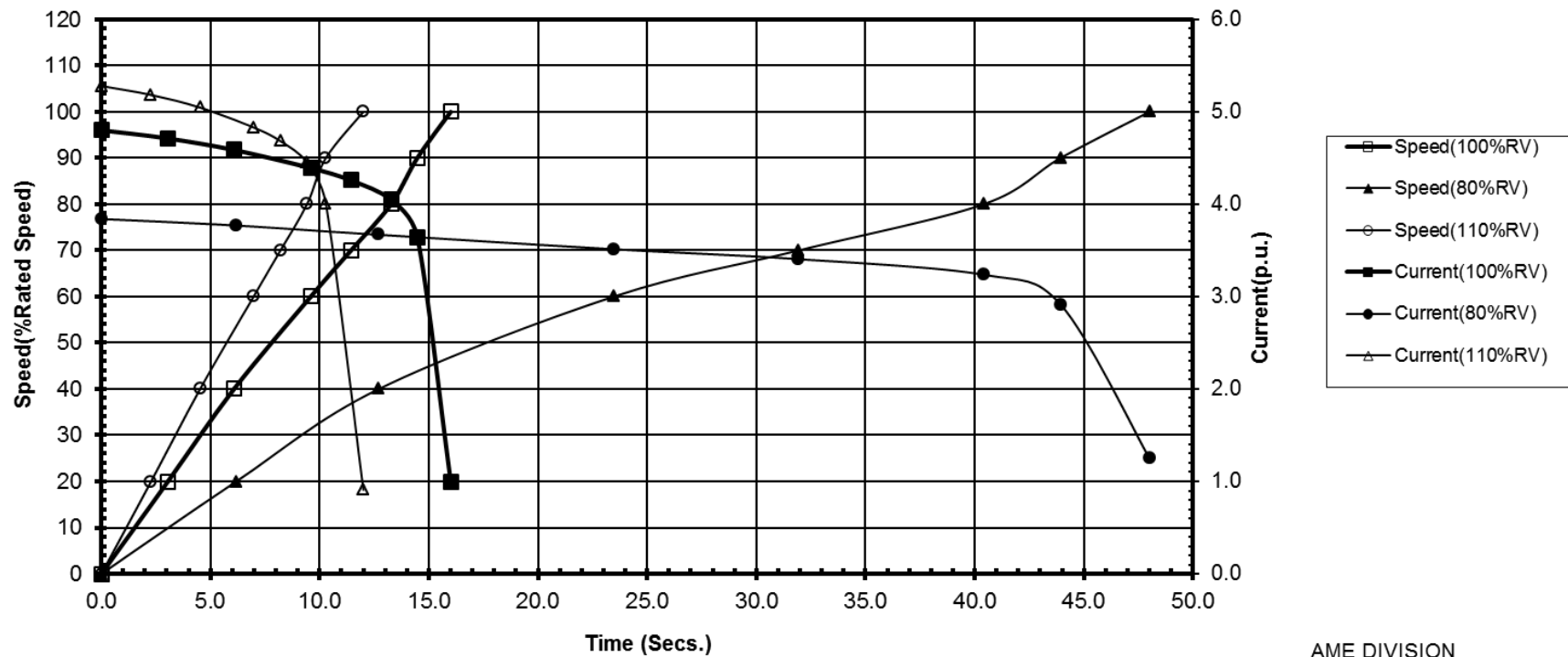


Speed & Current Vs. Time Curves

Rating : 4800 KW 11 kV, 4 P SCIM (Compressor), VFD & DOL Bypass
Frame : 1SB1903-4 (Ex'p'l)
W.O.No. : 48004A275-11
Customer : M/s PDIL For RCF Thal

Rated Speed = 1496 RPM
Rated Current = 293.0Amps

Applicable For DOL Start



AME DIVISION

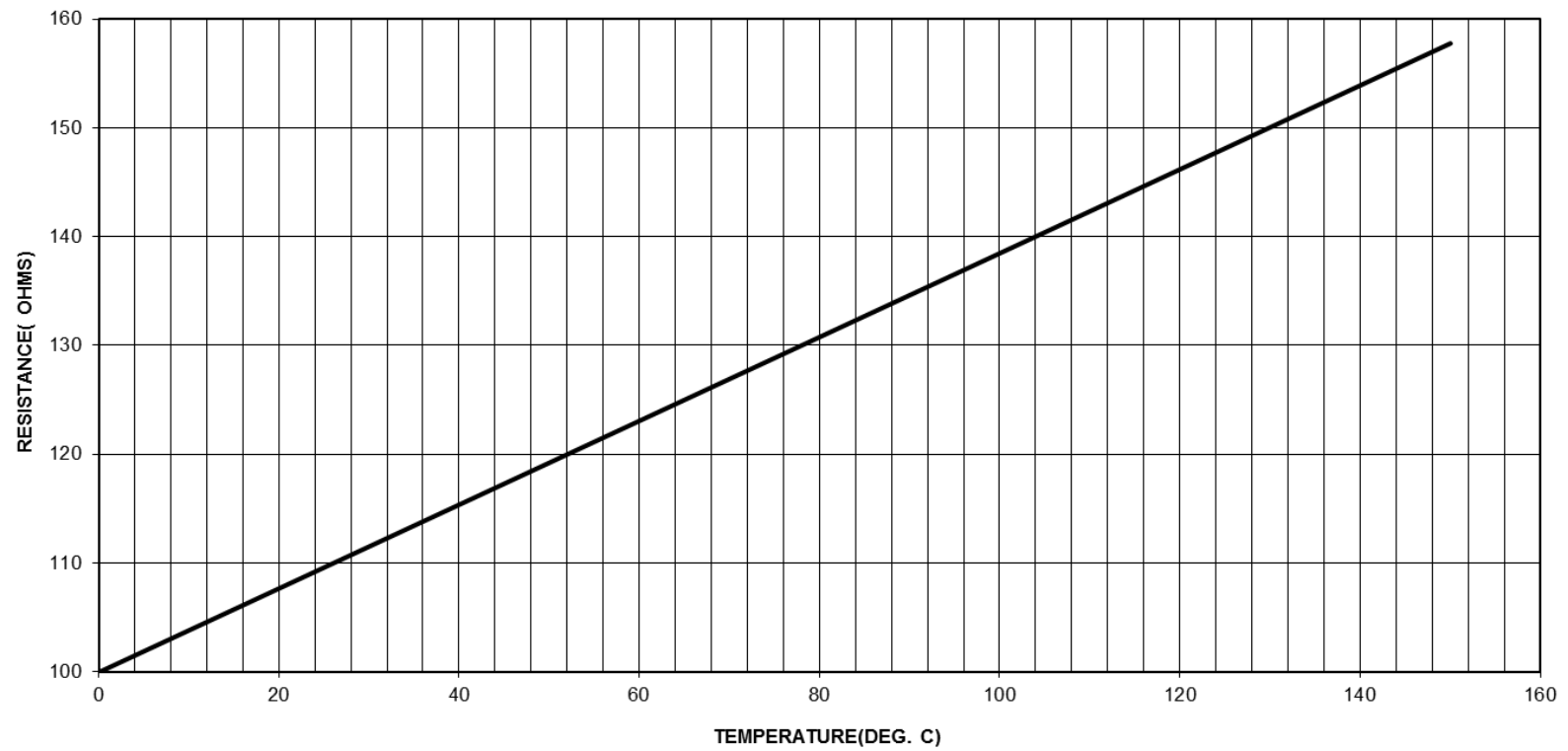
CALIBRATION CURVE FOR RTD/BTD - PT100

Rating : 4800 KW 11 kV, 4 P SCIM (Compressor), VFD & DOL Bypass

Frame : 1SB1903-4 (Ex'p')

W.O.No. : 48004A275-11

Customer : M/s PDIL For RCF Thal



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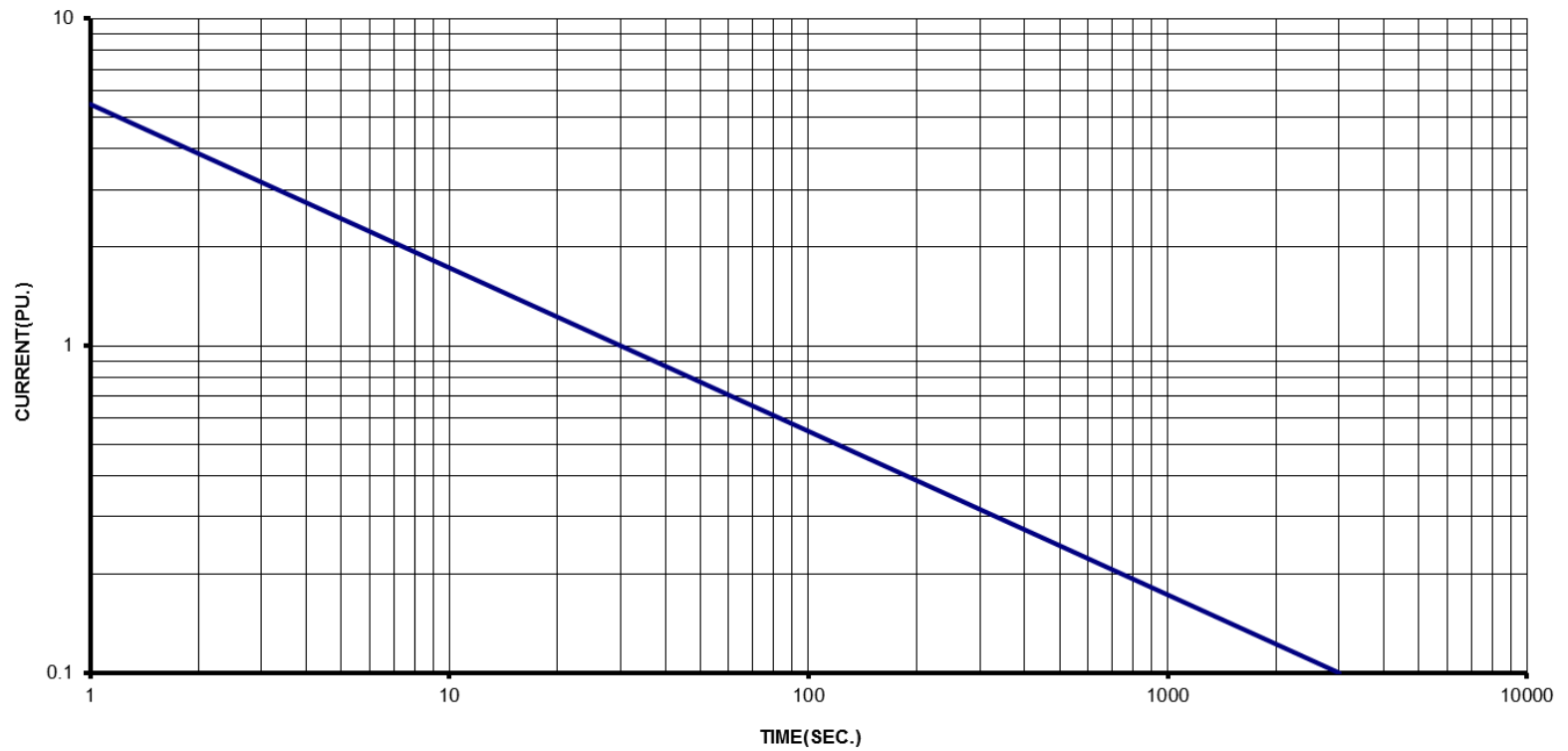
NEGATIVE SEQUENCE CURVE

Rating : 4800 KW 11 kV, 4 P SCIM (Compressor), VFD & DOL Bypass

Frame : 1SB1903-4 (Ex'p')

W.O.No. : 48004A275-11

Customer : M/s PDIL For RCF Thal



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EM132-TS-VFD-01

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TECHNICAL SPECIFICATION

FOR

VARIABLE FREQUENCY DRIVE

FOR

NEW AMMONIA REFRIGERATION COMPRESSOR - IV

AT

RCF, THAL AMMONIA PLANT

0	22.02.2017	22.02.2017	ISSUE FOR ENQUIRY	DG	RKV	RKV
P	30.08.2016	30.08.2016	FOR CLIENT'S COMMENTS	SK	RKV	RKV
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD

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2.0	Codes & Standard	3
3.0	Service condition	3
4.0	System Details	3
5.0	General Design & Constructional requirements	3
6.0	Equipment specification	4
7.0	Drawings & Documents	12
8.0	Spares	12
9.0	Make	14

LIST OF ATTACHMENTS

SERIAL NUMBER	DESCRIPTION	No. of sheets
1.0	Technical Specification – Induction Motor	4
2.0	Engineering Standard –Induction Motors (ES:8102)	13
3.0	Specification Sheet - Induction Motor	1
4.0	Technical Particulars – Induction Motors (Blank)	1
5.0	Data Sheet – Variable Frequency Drive	4

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1.0 SCOPE

- 1.1 The scope shall include design, engineering, manufacture, testing at works, delivery to site in well packed condition of Drive Motor and Variable Speed Drive for New Ammonia refrigeration Compressor- IV.
- 1.2 This specification shall be read in conjunction with all drawing, documents, data sheets and other relevant reference as specified herein.
- 1.3 The scope of supply shall include the following electrical equipment::
 - Drive Motor
 - Variable Speed Drive complete with HT transformer etc.
 - Local Control Panel

2.0 CODES & STANDARDS

- 2.1 The design, manufacture of the equipment shall comply with the latest issue of relevant Indian Standard Specification and codes of practices. In the absence of IS for any particular equipment or in case of imported equipment, relevant IEC shall be complied with.
- 2.2 The equipment shall also comply with the provisions of latest issue of Indian Electricity Rules and other Statutory Acts and Regulations.

3.0 SERVICE CONDITIONS

The equipment shall be designed for the following site conditions:

Max temp./Min./Design Ref	45 ⁰ C/11 ⁰ C/45 ⁰ C
Relative humidity	100%
Altitude above sea level	7.1 Mtrs.
Atmospheric pollution	Ammonia Vapour, Sea Chlorides, Urea dust

4.0 SYSTEM DETAILS

These shall be as specified in the specification sheet of the motor.

5.0 GENERAL DESIGN AND CONSTRUCTIONAL REQUIREMENTS

- 5.1 The electrical equipment shall be designed as per latest practice to provide maximum reliability, flexibility, safety to personnel and equipment and ease of operation and maintenance.
- 5.2 All equipment shall have adequate and standard ratings.
- 5.3 VFD Transformer shall be suitable for pulse specified for Variable frequency drive.
- 5.4 VFD transformer shall have Class-H insulation.
- 5.5 Motor should be able to generate starting torque sufficient to accelerate ARC-IV compressor within its thermal withstand capacity.
- 5.6 Motor starting current through VFD should not be more than full load current.
- 5.7 All live parts shall be adequately protected to prevent inadvertent or accidental contact.
- 5.8 All external hardware of diameter less than 8mm shall be of stainless steel and those of diameter 8mm and above shall be of mild steel cadmium plated or zinc passivated.

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5.9 All detailed drawings, equipment sizing, make & type of equipment shall be subject to approval of owner/owner's authorized representative.

6.0 EQUIPMENT SPECIFICATION:

6.1 Induction Motors

6.1.1 Motor shall conform to Engineering Standard ES: 8102 and Technical specification, Specification Sheets enclosed.

6.1.2 Type test certificate of similar motor for use in specified Hazardous area shall be furnished.

6.1.3 Filled in Specification Sheet and Technical Particulars shall be furnished.

6.1.4 The duty cycle of the motor shall meet the process and driven machine requirement.

6.1.5 Motor shall be suitable to run at 30% to 100% of the rated speed (As per the requirement of the driven compressor) through variable frequency drive (VFD).

6.1.6 Motor shall be suitable for DOL starting as well as suitable for variable speed drive operation.

6.1.7 The motor shall be suitable for the current waveforms produced by the power supply including the harmonics generated by the drive.

6.1.8 The permitted voltage variation should take into account the steady state voltage drop across the AC drive and all other system components upstream of the motor.

6.1.9 The motor shall be constructed to withstand torque pulsations resulting from harmonics generated by the solid-state power supply.

6.1.10 The motor insulation shall be designed to accept the applied voltage waveform, within the Vpeak and dv/dt limits as per IEC-61800-4.

6.1.11 The bidder shall be solely responsible for proper selection of the motor & drive for the given load application.

6.2 Variable Speed Drive

6.2.1 It shall be a variable frequency drive (VFD) based on Voltage Fed Inverter technology and suitable for start-up and operation of compressor with VFD & the selected motor rating. Drive rating shall be 11 KV.

6.2.2 Input supply to the VFD shall be 3 phase, 11 KV $\pm$ 10%, 50 Hz+3%,-5%.

6.2.3 The variable frequency drive system shall consist of all system components required to meet the performance, protection, safety, testing and certification criteria of this specification. These components shall include multi pulse, phase-shifting input rectifier-grade isolation transformer, VFD converter /DC-link/inverter, and all other components deemed necessary for the proper functioning of the VFD system.

6.2.4 The VFD system shall be air-cooled / Water cooled. The VFD system as defined shall be completely factory pre-wired, assembled and then tested as a complete package (along with inverter & transformer) by the VFD manufacturer, to assure a properly coordinated fully integrated drive system.

For fan cooled drives, redundant cooling fans (N+1) shall be provided.

6.2.5 The VFD shall meet the following speed and torque requirements:

- i) The VFD shall be capable of producing a variable AC voltage/frequency output to provide continuous operation over the normal speed range of 10% -100% (As per the

requirement of the driven compressor) with speed set accuracy of $\pm 1\%$ of rated maximum speed and steady state regulation of $\pm 0.5\%$. The VFD must be capable of sustained operation at 1/10 speed to facilitate checkout and maintenance of the driven equipment. As a commissioning feature, the VFD power circuit shall be capable of operating without a motor connected to the VFD output.

- ii) The VFD shall be capable of operating any standard AC motor of equivalent rating (horsepower and speed) over the specified speed range.
- iii) The VFD shall be able to produce full rated torque at any speed in the operating range and also in the event of power loss of 5 cycles or less. It shall be suitable for operating constant torque loads. The overload capacity shall be 150% of the rated output current for a period of 60 seconds for constant torque/ compressor application and 115% of rated current for 60 seconds for variable torque applications at rated voltage.

During operation, the system shall be capable of developing sufficient torque under all load conditions to respond to a 20% alteration in speed set point within a time limit up to 60 seconds.

6.2.6 Harmonics at supply side of the drive system at primary of the main input transformer shall be restricted within maximum allowable levels of current and voltage distortion as per recommendation in the latest edition of IEEE 519. The vendor shall perform design calculation and measurement and meet the following distortion limits without need of any harmonic filters. The input stage of VFD shall be minimum of 24 pulse to minimise harmonics.

- i) Voltage Harmonics: Individual or simultaneous operation of the VFD shall not add more than 3% total harmonic voltage distortion while operating from the power supply.
- ii) Current Harmonics: Maximum allowable total harmonic current distortion limits for VFD shall not exceed 3% as calculated and measured at the point of common coupling.

Vendor shall provide harmonic distortion before running and after running the drive.

The total harmonic distortion of the voltage and current at inverter output shall be as per IEC 61800-4 and it shall be considered in the design of motor.

6.2.7 The VFD system shall provide an output waveform that will allow utilization of standard motors, without need of any special insulation or de-rating. Motor life expectancy should not be compromised in any way by operation with the VFD system. The VFD must provide motor overload protection in any operating condition.

6.2.8 The VFD output shall employ multi level technology (minimum 3 level or better) to ensure sinusoidal output waveform. The VFD output waveform shall be suitable for operating the specified squirrel cage induction motor without de-rating or requiring additional service factor. To ensure that there is no problem of motor overheating, VFD output current waveform shall be inherently sinusoidal at all speeds without need for any special output filter.

6.2.9 The VFD shall inherently protect motor from high voltage dv/dt stress, independent of cable length to motor. VFD shall not require non-standard insulation systems or insulation ratings above the VFD output voltage rating. Unless specified otherwise, the VFD system shall be designed to produce no standing waves or over voltage conditions based on a cable length of 300m (typical) which will cover most application requirements and allow for potential future cable run changes from VFD to motor.

6.2.10 The guaranteed minimum total VFD system efficiency shall be a minimum 97% at 100% speed & 100% load. Efficiency evaluation shall include all components of VFD including input transformer, VFD convertor, output filter or choke if provided.

6.2.11 The VFD system shall maintain a 0.95 minimum true factor from 50% to 100% speed without any power factor correction unit.

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- 6.2.12 Unless otherwise specified, the VFD speed regulation shall be $\pm 0.5\%$ without encoder or tachometer feedback.
- 6.2.13 The maximum allowable audible noise from the VFD system will be less than 75 dB (A) at a distance of 1 metre at any speed or load condition with all normal cooling fans operating. VFD systems with audible noise in excess of this limit must be provided with sufficient noise abatement treatment to reduce the sound pressure level below 75 dB (A).
- 6.2.14 The VFD system shall be capable of automatically restarting in the events of a momentary loss of power, or a clearing of a drive trip.
- 6.2.15 The VFD system shall be capable of continuous operation with 20% voltage sag on the input power line.
- 6.2.16 In the event of a ground fault, the VFD shall be capable of annunciating ground fault condition; either continues operating safely or trip as per severity of the fault. In the event of a ground fault trip, the VFD shall be capable of being reset and operate normally. There shall be no risk of fire or electric shock as a result of the ground fault.
- 6.2.17 VFD system should be designed for front access only. The contractor shall state in his proposal if rear or side access is required.
- 6.2.18 All power components in the converter sections shall be designed for rack-out accessibility. This provides the maximum safety during component repair or maintenance as well as providing the required ease of access to minimize repair downtime.
- 6.2.19 Offered system shall be designed suitably for the distance between drive panel and motor as specified in the data sheet.
- 6.2.20 The offered VFD shall be of the highest reliability. The MTBF of the VFD shall be 80,000 Hrs. minimum.
- 6.2.21 The VFD system shall have redundancy w.r.to following,
- Redundant Cooling water pumps (N+1) shall be provided.
 - Redundant / Standby Drive cooling fans (N+1) shall be provided.
- 6.2.22 All low voltage components, circuits and wiring shall be separated with physical barriers from any sources of high voltage. The signal wiring between low voltage components and high voltage components shall be fibre optic cable for isolation.
- 6.2.23 Protective features and Circuits
- i) The controller shall include the following alarms and protective features:
 - Static instantaneous overcurrent and over voltage trip
 - Under voltage and power loss protection.
 - Over temperature protection.
 - Electric motor inverse time overload protection
 - Short circuit
 - When power is restored after a complete power outage, the VFD shall be capable of catching the motor while it is still spinning and restoring it to proper operating speed.
 - ii) The VFD system shall be protected from the damage due to the following:
 - Single-phase fault or three-phase short circuit on VFD system output terminals.
 - Loss of input power due to opening of VFD input disconnects device or utility power failure during VFD operation.
 - Loss of one (1) phase of input power.
 - Motor regeneration due to backspin or loss of VFD input power.

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- VFD output open circuit that may occur during operation.

Safety interlock shall be provided so that power cabinet can't be opened unless the upstream breaker is disconnected, safety-grounding switch is closed and DC link capacitor is discharged.

6.2.24 Data Displays

A door-mounted LCD display shall be furnished, capable of displaying the VFD operational status and drive parameters. The digital display must present all diagnostic message and parameter values in English engineering units when accessed, without the use of codes.

As a minimum, the following door mounted digital indications shall be available.

- Speed in RPM
- Output current in amperes
- Output Frequency in Hertz
- Output voltage
- Total 3-phase kW output
- Energy consumption in KWH (monitoring as well as integrating).

Drive shall be equipped with a front mounted operator control panel consisting of a backlit alphanumeric display and a keypad with keys for parameterization and adjusting parameter which shall not be limited to start / stop, local / remote, auto / manual, increase / decrease, menu navigation and protection and measurement parameter selection etc. Display shall consist of minimum 2 lines of 16 characters- LCD type.

Keypad shall be operable with password for changing the protection setting, safety interlock etc. However the parameters such as measurements, setting, mode of drive etc. shall be allowed to be viewed without any password.

Operator console shall have facility / port to connect external hardware such as Note book / PC etc.

Following minimum indications shall be made available on drive panel :

- Motor running
- Motor stopped
- VFD System Fault
- System ready to start
- AC mains „ON“
- VFD “ON“
- Remote breaker trip

Note:- Potential free contacts of above indications shall be wired separately for remote indications in Owners SCADA / PLC system.

6.2.25 Diagnostics & Fault Recording

The control logic section shall be fully digital and not require analog adjustment pots or fixed selector resistors. The design shall be microprocessor based.

Fault log data storage memory shall be stored in non-volatile memory to be supported by a UPS sized to provide a minimum of 48 hour data retention.

A “FAULT LOG” shall record, store and display upon demand, the following for the most recent events:

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- Date and time of day
- Type of fault

All protection, metering, indication, alarm, annunciation and fault diagnostic as required, shall be available at PLC over communication network (RS-485). Necessary communication module shall be provided in VFD accordingly.

6.2.26 Programming & Communications

Manual speed device, a mode selector marked “Manual/Automatic”, a “ POWER ON” light, a VFD “FAULT” light, a VFD “RUNNING” light, start pushbutton, stop pushbutton and reset pushbutton shall also be provided on the front door.

A door-mounted membrane keypad with integral digital LCD display shall be furnished, capable of controlling the VFD and settling drive parameters. The display must present all diagnostic message and parameter values in English engineering units when accessed, without the use of codes. The keypad shall allow the operator to enter exact numerical settings in English engineering units. A plain English user menu (rather than codes) shall be provided in software as a guide to parameter setting.

Drive parameters shall be factory set in non-volatile memory and re-settable in the field through the keypad. Password security shall be available to protect drive parameters from unauthorized personnel. The stored drive variables shall be able to be transferred for programming of new or spare boards.

The VFD system shall have selectable option of programming up to three speed avoidable bands. This gives the user the ability to block out and prevent operation at any undesirable speed, such as one that may be coincident with a mechanical resonance condition.

6.2.27 Digital Communication & Protocols

VFD shall be capable of direct communication to an IBM / PLC /DCS or compatible computer for serial link setup of parameters, fault diagnostics and diagnostic log downloading. The communication protocol shall be Modbus or Ethernet.

The drive motor shall be speed controlled corresponding to 4-20 mA or 0-10V reference input signal, the drive shall automatically run at constant speed as at 80-110% of the last speed reference available prior to the loss of signal.

It shall be possible to vary the speed of the drive in either Local or Remote mode. Local / Remote selection shall be from VFD panel unless otherwise specified.

a. With the selector switch in “Local” mode, the operator shall be able to set the speed through keypad, mounted on front of the drive panel.

b. With the selector switch in “Remote” mode, speed of the motor shall be controlled from a 4-20 mA signal, from owner's PLC/SCADA system. The relationship between the speed, torque and the reference signal (4-20mA) within the operational speed shall be linear. Necessary equipment required for interfacing with DCS/PLC/SCADA shall also be provided in the drive panel.

The required provision for the interface with remote DCS/PLC/SCADA located at control room shall be through hardwiring of interface signals (DI/DO/AI/AO) with potential free contacts and transducers. Also, provision for MODBUS communication (RS 485) from VFD to Owners control panel shall be made available. Vendor shall provide protocol details, mapping and addresses to be taken by Owner's panel.

6.2.28 Printed Circuit Boards

All printed circuit boards shall be conformably coated for moisture and chemical resistance, in addition to any dielectric coating properties. All boards must be tested

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individually prior to assembly to minimize any impact faulty boards may have on delivery schedules and system reliability.

6.2.29 Power Bus and Wiring

The main power bus shall be tin-plated, high-conductivity copper for chemical and corrosion resistance and low losses. Bus shall be appropriately sized for the VFD continuous current rating and braced to withstand the mechanical forces caused by a momentary short circuit current of 26.2 kA expected at the bus. All connections shall be bolted or continuously welded.

All live portions of the busbar shall be sleeved with Raychem make heat shrinkable sleeves. All busbar joints and cable end terminations shall have suitable shrouds for protection.

All wiring shall be tagged with permanent labels at each termination, junction box, and device. Labels shall correspond to the schematic and wiring diagrams.

6.2.30 The VFD shall be suitable for satisfactory operation in the specified ambient condition.

6.2.31 Suitable arrangement for location in specified hazardous area for control, monitoring and indication from field shall be provided by the vendor. Provision for control from remote DCS panel shall also be incorporated. Starting and controlling of speed shall generally be from field, however, further speed control shall be from DCS. Vendor shall ensure bump less transition from field to DCS control. Speed monitoring arrangement shall be provided on the local control panel.

6.2.32 The VFD shall be housed in a metal clad cubicle. The cubicle shall be dust, damp and vermin proof type equivalent to IP-43 as per IS: 12063/ 13947. In case it is necessary to provide openings for ventilation, these shall be closed from inside by fine wire mesh.

6.2.33 The frame work of cubicles shall be of bolted / welded construction, fabricated out of cold rolled sheet steel of not less than 2 mm thickness. The thickness of base channel shall not be less than 3 mm, suitable reinforcement, wherever necessary, shall be provided.

6.2.34 Hinged doors shall be provided on both the front and back side for easy access. The door hinges shall be concealed type.

6.2.35 The doors and the removable covers shall be provided with non-deteriorating neoprene gaskets. Gaskets without any discontinuity shall be preferred. Gaskets shall be held in position in groove in shaped steel work or these shall be 'U' type. Only one joint per gasket shall be permitted. Adhesive cement, if used, shall be of good quality so that the gaskets do not come off during service.

6.2.36 The mounting of the components shall be such that these are accessible for checking and replacement without the necessity of removing the adjacent ones, at the same time ensuring necessary degree of safety.

6.2.37 The components to be mounted on door like meters, switches and lamps shall be flush mounted type. All components of one unit shall be mounted on the same unit.

6.2.38 All the live parts shall be insulated. Parts, which cannot be insulated, shall be provided with insulating barriers. These barriers shall provide shielding of all live parts to prevent accidental contact when the door is open. However, for the parts requiring handling normally, such as fuses/ lamps etc. separate barriers shall be provided. The barriers in all cases shall cover the cable lug portions and shall be firmly secured, stable and durable. It shall, however, be possible to remove such barriers, if required.

6.2.39 At the equipment termination points, insulated phase barriers, PVC bolt caps, PVC hoses or insulating ribs shall be provided.

6.2.40 The outgoing terminal blocks shall be shrouded type or provided with insulating barriers.

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- 6.2.41 Adequate arrangement for earthing shall be provided to safeguard the operator or other personnel from electric hazards under all conditions of operation.
- 6.2.42 Minimum clearances and creepage distances shall be maintained as per relevant IS/IEC.
- 6.2.43 The insulation used shall be non-hygroscopic and may be of porcelain, epoxy resin or glass fibre moulded with plastic. It shall be of adequate electrical and mechanical strength to give trouble free service during normal operation and short circuit conditions.
- 6.2.44 The insulation shall be treated suitably to withstand the tropical conditions and atmospheric pollution as specified.
- 6.2.45 The panel shall be completely factory wired and ready for external connections.
- 6.2.46 The panel shall be designed for bottom entry for power and control cables. Sufficient space shall be provided for ease of connection and termination of cables.
- 6.2.47 The termination of cables shall be done through heavy duty double compression type rolled aluminium cable glands of suitable size. The cable gland shall be mounted on a removable gland plate, provided at a minimum height of 75mm from the bottom of the panel. Two spare knock outs of size 20mm shall also be provided on the gland plate for future addition of control cables.
- 6.2.48 For all power cables, crimping type cable lugs of same material as of conductor shall be provided.
- 6.2.49 A continuous earth bus of aluminium of suitable size (min. 32x6mm) shall be run all over the length in the lower part of the panel with two ends connected to the external earth terminals of the panel.
- 6.2.50 The cubicle shall be provided with a thermostatically controlled space heater rated for 240V, single phase, 50Hz supply and controlled through double pole MCB.
- 6.2.51 The panel shall have a large nameplate on the top to indicate its name and designation. All control switches, pushbuttons, lamps etc. shall have function identification labels. Name plate shall be of black Perspex with white engraving of minimum 3 mm thickness.
- 6.2.52 The enclosure after suitable pre-treatment shall be painted with two coats of anti rust paint followed by two coats of epoxy based anticorrosive paints. The finishing shade shall be 631 of IS : 5.

6.2.53 Tests

The panel shall be subjected to routine test as per relevant IS/IEC in presence of owner's representative.

The following minimum Type tests shall be performed on the drive system:

- Efficiency Test at 100%, 75% and 50% load.
- Temperature rise
- Line side voltage and current distortion content
- Power factor at 100%, 75% and 50% load.
- Audible noise
- High voltage test on transformers
- Speed loop test capability to ride through voltage less than 80%.
- Total Harmonic Distortion at input side

Additional tests on transformers/other auxiliaries etc. shall be carried out as per the applicable codes/standards.

- 6.2.54 Bypass breaker/ contactor-HRC fuse complete with protection, annunciation and metering shall be provided.

	TECHNICAL SPECIFICATION VARIABLE FREQUENCY DRIVE	EM132-TS-VFD-01	0
		DOCUMENT NO.	REV.
		SHEET 11 of 14	

- 6.2.55 All variable frequency drives (VFD) having bypass feature shall have motor protection relay along with necessary control and metering etc. Switching scheme shall be such that in case of drive mal-operation, the motor could be taken on bypass control manually, while the drive could be attended by opening its isolation devices.
- 6.2.56 Safety interlock between inverter and bypass breaker/ contactor shall be provided such that closing of healthy device is inhibited in case of external fault.
- 6.3 **Local Control Station**
- 6.3.1 For control of main motor, LCP shall be provided near the Motor.
- 6.3.2 The enclosure for LCP shall be of fibre glass/thermo plastic (heat resistant) and shall be of flameproof & weatherproof construction. A rain-hood shall be provided as an additional protection. Rain hood shall be of the same material as of the main enclosure. The enclosure shall be suitable for mounting on wall or on steel structure. 4Nos. holes suitable for 12 mm bolts shall be provided outside the enclosure for fixing the control station.
- 6.3.3 The LCS shall have the following provisions:
- Start & Stop push buttons
 - Emergency Stop push button (mushroom headed) with locking arrangement in 'OFF' position
 - Auto/Manual selector switch
 - Increase/Decrease speed push buttons
 - Drive RPM indicator (Digital)
 - Reference RPM indicator (Digital)
 - Indication Lamps (LED Type)
 - Ammeter
- 6.3.4 The push buttons shall be spring loaded with a set of normally closed & open contacts. The push button for 'Start' shall be shrouded type and coloured green while 'Stop' push button shall be un-shrouded type and coloured red. The contact shall be rated to make, break & carry inductive current of 5 Amp. at 415V AC and 1 Amp. at 220 V DC.
- 6.3.5 Auto/Manual selector switch shall be single pole stay put type having three positions, namely 'AUTO-OFF-MANUAL'. Provision shall be made to pad lock the switch in 'OFF' position.
- 6.3.6 The ammeter shall be flush mounting, moving iron spring controlled type, of accuracy class 1.5 as per IS:1248, with square face of minimum size 72 mm x 72 mm having scale range 0-240°. The ammeter for motor shall be provided with uniform scale upto CT primary current and compressed end scale up to the 6 times the C.T. primary current. Adjustable red pointer shall be provided to indicate the full load current of the motor. Zero adjusters shall be provided for operation from the front of the meter. The ammeter shall be operated through 1 Amp. CT only. The CT ratio and full load current shall be indicated in specification sheet.
- 6.3.7 Indication lamp shall be LED type having good illumination in all direction with lumen output of minimum 200milli candela.
- 6.3.8 All the components shall be mounted on a base plate inside the enclosure. Necessary actuating system for control switches, non-yellowing acrylic/glass cover for ammeter and indication lamps shall be provided on the front cover. No wiring shall be carried out on the front cover.
- 6.3.9 Each control station/panel shall be provided with minimum 2 mm thick stainless steel nameplates indicating the code number and description of the equipment controlled by switches. The nameplate and labels shall be fixed with screws only.

	DATA SHEET VARIABLE FREQUENCY DRIVE WITH CONVERTER TRANSFORMER	EM132-DS-VFD-01	4
		DOCUMENT NO.	REV.
		SHEET 1 of 4	

DATA SHEET

FOR

VARIABLE FREQUENCY DRIVE

VARIABLE FREQUENCY DRIVE WITH CONVERTER

TRANSFORMER

4	20.02.2017	20.02.2017	FOR ISSUE OF ENQUIRY	DG	RKV	RKV
3	17.06.2015	17.06.2015	For Client's Comments	SS	RKV	RKV
2	09.03.2015	09.03.2015	For Issue of Enquiry	SS	RKV	RKV
1	13.01.2015	13.01.2015	Issued for Client's Review/ Comments	SS	RKV	RKV
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD

	DATA SHEET VARIABLE FREQUENCY DRIVE WITH CONVERTER TRANSFORMER	EM132-DS-VFD-01	4
		DOCUMENT NO.	REV.
		SHEET 2 of 4	

CLIENT : RCF, THAL	PROJECT :GTG & HRSG PROJECT	PLANT : AMMONIA
ISSUED FOR : PROPOSAL ☐	ENQUIRY ☒	ORDER ☐ FINAL ☐

GENERAL	
Item No.	VFD for New Ammonia Ref. Compressor - IV
Rated Output / Voltage	
Make	
Maker's Type	
Codes and Standards applicable	IEC60076. IEC61378, IS-2026
Enclosed Documents	ES8102(Engineering Standard of Motor)ES-8043 (Engineering Standard-Power Transformer)
TECHNICAL DATA	
Type of the drive, make & model	
Whether facility to hook up with DCS through auto	Yes
Capacity in KW (Heavy Duty)	
Basic Load current	
IP Class	IP - 43
Starting current of motor through VFD	1X Full load current of motor
Standard Protection	To be provided as per specifications.
Reactor (Input & Output)	
Sine filter	Output sine filter to be provided
DC reactor	
Carrier frequency	
Output frequency stability	0.01 Hz
Provision to vary speed from control room through DCS	To be Provided
Whether VSDU is suitable for longer cable lengths	
Whether programming can be done for jumping over critical speeds	
Noise level during operation with all normal cooling Fans operating.	To be provided as per specifications.
Whether speed setting provision for low & high is provided.	Required
Speed control range	
Acceleration & deceleration time	Programmable at site (Party to provide range)
Output frequency range	
Input voltage of the drive	11000 KV +/- 10%
Output voltage of the drive	Party to specify
Nominal drive output power	Party to specify
Nominal drive output current	Party to specify
Continuous overload ability	Party to specify
Short term overload ability	150% for 60 Seconds
Maximum heat loss	Party to specify
Accuracy of speed control	0.1%
Cooling method (if air then redundant air fan)	To be Provided
Ambient operating temperature range.	0 to 45 °C
Air conditioner requirement	Party to specify
Air flow requirement	Party to specify
Air filter requirement	Party to specify
Input Bridge (Pulse Configuration)	24 pulse
Dimensions	Party to specify
Weight	Party to specify
Total Harmonic distortion	As per IEEE 519 Standards / IEC 61800-4
Output waveform	Sine wave
Humidity limits	95% R.H.
Low harmonics	As per IEEE 519 standards
Higher harmonics	As per IEEE 519 standards
Drive de-rating factor per degree after design temperature of 40°C	Party to specify
Two year recommended spare details	

4	20.02.2017	20.02.2017	FOR ISSUE OF ENQUIRY	DG	RKV	RKV
3	17.06.2015	17.06.2015	For Client's Comments	SS	RKV	RKV
2	09.03.2015	09.03.2015	For Issue of Enquiry	SS	RKV	RKV
1	13.01.2015	13.01.2015	Issued for Client's Review/ Comments	SS	RKV	RKV
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD

	DATA SHEET VARIABLE FREQUENCY DRIVE WITH CONVERTER TRANSFORMER	EM132-DS-VFD-01	4
		DOCUMENT NO.	REV.
		SHEET 3 of 4	

Compatibility of variable speed drive with DCS	To be Provided
Efficiency of the drive	>97% as per specifications
Whether built in auto controller is provided?	Party to specify
Cabling Data	Power
	Control
	Instrument

TECHNICAL DATA FOR TRANSFORMER

GENERAL	
Quantity	1
Type	Oil immersed filled tank
Cooling method	ONAN
Installation	Outdoor
Rated Apparent Power	
Rated Voltage MV Side	
Highest Voltage MV Side	
Rated Current MV Side	Later
Rated Frequency	50 Hz + 5%
Combined Voltage & Frequency variation	+ 10%
Fault MVA	950 MVA at 11 KV side
Number of secondary windings	
Rated Voltage LV Side	
Impedance Voltage HV-LV (U_{cc})	
Degree of Protection	IP 55
Sound Pressure Level	
Winding material	Copper
Efficiency	Later
INSULATION SYSTEMS	
Insulation level – HV side (Highest/ Power freq./ Impulse)	
Insulation level – LV side (Highest/ Power freq./ Impulse)	
Temperature Rise Oil	50 Degree Celsius
Temperature Rise Windings	55 Degree Celsius
Insulation Class	A
TAP CHANGERS	
Type	Off-Load
Tapping Range/ Number	-5% to +5% / 5 nos. @ 2.5%
Rating / Voltage Ratio	
Rated Current - Primary / Secondary	
Rated No Load Current	
Temp. Rise over Ambient - Oil / Winding	
Load Loss at Rated Current at 75° C	
No Load Loss at Rated Voltage / Copper Loss	
Full Load Efficiency at $\cos\phi$ - Unity / 0.8 Lag	
Maxm. Efficiency & Load at which it occurs	
Full Load Regulation at $\cos\phi$ - Unity / 0.8 Lag	
Short Circuit Withstand Capacity	
B max. at Rated V & F (Tesla)	
Excitation Loss per Kg. at B max.	
INSULATION	Primary
GRADED / UNIFORM	Secondary
Induced Over Voltage Withstand Capacity : Pri / Sec.	
OLTC : Rated Voltage / Rated Current	
Total Auxiliary Power Requirement : AC / DC	
CONTROL PANELS	Sheet Metal Thickness
	Enclosure Type
	Control Scheme Ref. No.
Cooling Fans : Qty. / Rating	
MECHANICAL DATA OF TRANSFORMER	
Core : Material & Grade	

4	20.02.2017	20.02.2017	FOR ISSUE OF ENQUIRY	DG	RKV	RKV
3	17.06.2015	17.06.2015	For Client's Comments	SS	RKV	RKV
2	09.03.2015	09.03.2015	For Issue of Enquiry	SS	RKV	RKV
1	13.01.2015	13.01.2015	Issued for Client's Review/ Comments	SS	RKV	RKV
REV	REV DATE	EFF DATE	PURPOSE	PREPD	REVWD	APPD



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PURCHASE SPECIFICATION

GROUP: VFD ENGINEERING

TRF DATASHEET RCF-THAL

REV. NO: 00

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VFD TRANSFORMER DATA SHEET

Sl no.	<u>Transformer Data</u>	
1	Manufacturer	
2	Manufacturing Location	
3	Type	Dry type Integrated Transformer
4	Duty	Continuous (Converter Duty)
5	Rating (Transformer must be designed to carry 125% current of calculated VFD rating)	
6	Class of insulation	H
7	Insulation level:	
	P. f withstand	
	i) HV Winding	
	ii) LV Winding	
	Impulse withstand	
	i) HV Winding	
	ii) LV Winding	
8	Fault Level on HV Side	50kA for 3 Sec
9	HV Voltage and Phase	11kV and 3Ph.
10	LV Voltage/ Current	
11	No. of LV Windings	
12	Rated Frequency	50Hz
13	Impedance	
14	Cooling Type	AN
15	Winding Material	Electrolytic grade Copper
16	Location of Off-Circuit Tap Changer	HV Winding
17	No. of Taps and Type	±5%, in steps of 2.5%
18	Vector Group	
19	Winding Connection - Primary	Star
20	Winding Connection – Secondary	
21	Cable Size/Type	
	i) HV Winding	11kV (UE), 03C x 400 Sq. mm, Al, XLPE
	ii) LV Winding	(Interpanel Wiring – In VFD vendor's scope)
22	No Load Loss	
	i) At 100% Voltage	
	ii) At 110% Voltage	
23	Full Load Copper loss at 75°C	
24	No Load Current	
	i) At 100% Voltage	
	ii) At 110% Voltage	

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BASE SPECIFICATION

GROUP: VFD ENGINEERING

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TRF DATASHEET RCF-THAL

REV. NO: 00

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25	Efficiency at full load at 75°C	
	i) At 0.8 p.f.	
	ii) At 1.0 p.f.	
26	Efficiency at half load at 75°C	
	i) At 0.8 p.f.	
	ii) At 1.0 p.f.	
27	Regulation at 75°C at full load	
	i) At 0.8 p.f.	
	ii) At 1.0 p.f.	
28	Dimensions	
	i) Length (mm)	
	ii) Height (mm)	
	iii) Depth (mm)	
	iv) Weight (kg)	
29	Degree of protection for enclosure	
30	Paint Shade	
31	Heat Load (kW)	
32	Type Test	Temperature Rise Test shall be conducted along with VFD during FAT of VFD. Impulse test reports shall be submitted.

padlock. The switches shall have sliding contact between 'AUTO' and 'ON' position. In 'OFF' position the contact shall be completely broken from 'AUTO' position.

- 6.3.6 All selector switches shall be stay put rotary type and provided with oval shape handles.
- 6.3.7 All signal lamps shall be LED type having good illumination in all directions with lumen output of minimum 200 milli candella and lamp colours shall be as follows:
- | | | |
|-------------------|---|-------|
| ON | - | Red |
| OFF | - | Green |
| Ready for service | - | White |
| Fault | - | Amber |
- 6.3.8 The ammeter shall be flush mounting, moving iron spring controlled type, of accuracy class 1.5 as per IS: 1248, with square face of minimum size 72 mm x 72 mm having scale range 0-240°. The ammeter shall be provided with uniform scale upto CT primary current and compressed end scale up to the 6 times the C.T. primary current. Adjustable red pointer shall be provided to indicate the full load current of the motors. Zero adjusters shall be provided for operation from the front of the meter. All ammeters shall be operated through 1 A remote CTs only. The CT ratio and full load current shall be corresponding to the motor full load current.
- 6.3.9 The terminal blocks shall be bolted lug type having minimum current rating of 16 Amps. The lugs shall be of tinned copper and suitable for crimping. All the terminals of particular motor shall be located at the same place side by side for connection of the external cables.
- 6.3.10 All the cable glands shall be of rolled aluminium heavy duty double compression type and suitable for the hazardous area and panel location.
- 6.3.11 All the earthing terminals shall be complete with spring and flat washers and bolts.
- 6.3.12 LCP shall be designed for bottom cable entry for all incoming and outgoing cables.

6.4 Local Control Station (LCS)

- 6.4.1 In addition to the control and monitoring components on the LCP as specified above, local control station shall be provided near each auxiliary motor. Local control station shall be mounted on suitable structure fabricated out of standard section of mild steel near the motor. The structure, after suitable pre-treatment, shall be painted with two coats of anti rust paint followed by two coats of epoxy-based paint.
- 6.4.2 Local Control Stations shall also conform to the Specification Sheet attached with this specification.
- 6.4.3 The enclosure for LCS shall be of cast aluminium alloy (LM6) and shall be of flameproof & weatherproof construction. A rain-hood shall be offered as an additional protection. Rain hood shall be made of 14-gauge aluminium sheet bent to shape. The enclosure shall be suitable for mounting on wall or on steel structure. 4 Nos. holes suitable for 12 mm bolts shall be provided outside the enclosure for fixing the LCS.
- 6.4.4 Each LCS shall have provisions as indicated in specification sheet of LCS attached with this specification.
- 6.4.5 LCS shall be of either of the makes specified at Cl. No. 11.0 of this specification.
- 6.4.6 The components shall comply with the requirements specified above.

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			DOCUMENT NO	REV
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6.4.7 All the components shall be mounted on a base plate inside the enclosure. Necessary actuating system for control switches, non-yellowing acrylic/glass cover for ammeter and indication lamps shall be provided on the front cover. No wiring shall be carried out on the front cover.

6.4.8 Each control station shall be provided with minimum 2 mm thick stainless steel nameplates indicating the code number and description of the equipment controlled by it. Similar labels shall be provided for all indication lamps and push buttons. The nameplate and label shall be fixed with screws only.

6.4.9 All LCS shall be have bottom cable entry.

6.5 Cables and Cable Racks

6.5.1 The main incoming 11KV power cable from substation to VFD transformer is in RCF scope.

6.5.2 The power cable suitable for VFD input and output i.e from VFD transformer to VFD and from VFD to main motor shall be in bidder scope.

6.5.3 The interconnecting cables between LCP and field mounted auxiliary electrical items shall be 1.1 KV grade XLPE-A-FRLS PVC copper conductor cables as per IS: 1554 (Part 1).

6.5.4 The cable racks shall be of aluminium and prefabricated ladder type of minimum 4 mm thickness having rung spacing of 300 mm.

6.5.5 The control cable size shall be 2.5 sq. mm (Cu). For lighting purpose, minimum cable size shall be 16 sq. mm (Al) and 2.5 sq. mm (Cu).

6.5.6 Cable shall be of either of the makes specified at Cl. No. 11.0 of this specification.

7.0 EARTHING SYSTEM

7.1 Tapping from existing nearest earth pit/electrode shall be taken through 2 Nos. 75 mm X 8 mm G.I. strip directly buried in ground and brought within battery limit to form local earth grid.

7.2 Earthing of electrical equipment shall be done to the local earth grid through earthing conductors of following sizes:

- | | |
|---|--|
| i) MV Motors upto 5.5 KW | : 2 Nos. 1Cx16 mm ² (Al), 1.1KV grade XLPE FRLS PVC cable |
| ii) MV Motors above 5.5 KW
and upto 30 KW | : 2 Nos. 1C x 35 mm ² (Al), 1.1KV grade XLPE FRLS PVC cable |
| iii) MV Motors above 30 KW
and less than 75 KW | : 2Nos. 1Cx95mm ² (Al), 1.1KV grade XLPE FRLS PVC cable |
| iv) MV Motors 75 KW & above | : 2 Nos. 1Cx185mm ² (Al), 1.1KV grade PVC cable |
| v) Local Control Station | : 1No. 1Cx16 mm ² (Al), 1.1KV grade PVC cable |
| vi) Non-electrical equipment,
such as vessels, structures etc. | : 1 No. 32mm x 6 mm G.I. strip. |

 पी डी आई एल PDIL	TECHNICAL SPECIFICATION (ELECTRICAL) FOR AMMONIA REFRIGERATION COMPRESSOR - IV	EM-132-TS- 0808	1
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R.T.D. cable : LATER		Bearings ☒	Bearing Accessory ☒
Alarm cable :		Thermometer ☒	Cooling Fan ☒
CABLE GLAND	Type : Ex'd' Double Compression	Grease Nipple & Plug ☒	Space Heater ☒
	Material : Rolled Aluminium	Inner & Outer covers for DE & NDE bearings	☒
		Terminal Stud with bushing & star link	☒
PAINTING			
Type : Epoxy			
Shade : 631 of IS : 5			

Notes: i) Separate sheets shall be used for different services and ratings of motors.
ii) All unfilled data shall be filled by the bidder and submitted with bid.

SPECIFICATION SHEET LOCAL CONTROL STATIONS

CLIENT : M/s RCF, THAL		PROJECT : GTG & HRSG PROJECT		PLANT: AMMONIA PLANT	
ISSUED FOR : PROPOSAL ☐		ENQUIRY ☒		ORDER ☐ FINAL ☐	
GENERAL			AMBIENT CONDITION		
Ref. Stds. : IS/IEC			Temp. Max./Min./Design Ref: 45 / 11 / 45 °C		
Encl. Docs. :			Relative Humidity 100% Alt. above sea : 7.1M		
Vendor :			Atmospheric Pollution		
Vendor Ref. No. :			Dusts : Urea Dust, Sand Dust		
			Vapour : Ammonia Vapour, Sea		
Sample : Regd. : ☒ Not Regd. : ☐			Safe : ☐ Hazardous : ☒		
Tests : Routine : ☒ Type : ☐			Zone : 2 Encl. Gr. : IIC		
Others: Type Test Certificate Required			Temp. Cl. T3		
			Location : Indoor ☐ Outdoor ☒		
BASIC DATA					
Item No.		Type 1		Type 2	
Quantity				Equal to the numbers of Auxiliary motors	
Rated Control Voltage with $\pm$ %				240V $\pm$ 10% AC	
Rated Frequency with $\pm$ %				50 Hz $\pm$ 5%	
Enclosure for Hazardous Area				Ex'd'	
Provisions required in LCS					
PUSH BUTTON	Start			--	
	Stop			--	
	Reverse			--	
	Forward			--	
CONTROL SWITCH	TNC			--	
	Lock / Service			--	
	OFF / AUTO / ON			Reqd.	
	Auto / Manual			--	
INDICATION LAMP	ON			Reqd.	
	OFF			Reqd.	
	Ready To start			Reqd.	
	Space Heater ON			---	
	Electrical Fault			Reqd.	
METERS	Ammeter			Reqd.	
	Range			NOTE-1	
	C.T. Sec. Current			1Amp	
RAIN HOOD	Reqd.			Reqd.	
	Not Reqd.				
Control Cable Size PVCAPVC (Cu)				19C X 2.5 sq.MM	
Painting Type & Shade				Epoxy shade 631	
Period For which Spares Reqd.				2 Years	
Note-1 It shall be of dual rating (ex. 0-100A-600A) and the rating shall be indicated at the Bidder.					
MAKE OF COMPONENTS					



TECHNICAL SPECIFICATION (ELECTRICAL)
FOR
AMMONIA REFRIGERATION COMPRESSOR - IV

EM-132-TS- 0808

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Push Buttons	L & T / Siemens / Alstom / Tecknic
TNC Switches	Kaycee / GE / Alstom
Other Control Switch	L & T / Siemens / Alstom / Tecknic / Kaycee
Ammeter	AEP / IMP / Meco / Universal
Indication Lamp	L&T / Siemens / Teknic / Binay / GE Power
Cable Gland	Baliga / FCG Flameproof Control Gears Pvt. Ltd. / R. Stahl / CEAG
Terminal Box	Elemex / Siemens/ L& T

TECHNICAL PARTICULARS
INDUCTION MOTOR

CLIENT : M/s RCF, THAL		PROJECT : BOP GTG & HRSG PROJECT		PLANT: AMMONIA PLANT	
ISSUED FOR : PROPOSAL ☐		ENQUIRY ☒		ORDER ☐ FINAL ☐	
GENERAL					
Item No.					
Quantity					
Description					
Code No.					
Ref. Standard					
Make					
Maker's Type					
ELECTRICAL DATA					
Rated Output					
Rated Voltage					
No. of Starts - Hot / Cold					
Torque - Starting / Pull Up / Pull Out					
Starting Time at min. V Start (Hot / Cold)					
Safe Stall Time at $V_R / 1.1V_R$					
Stator Time Constant					
Temp. Rise at Full Load - Wdg. / Hot Air / Brg.					
TEMP. RISE OF STATOR		3 Starts From Cold			
/ ROTOR AFTER		2 Starts From Hot			
Current at FL / 0.85 FL					
Efficiency at FL / 0.85 FL					
Speed at FL / 0.85 FL					
Power Factor at FL / 0.85 FL / Start					
Push Pull Voltage withstand Capacity					
Max. V dip for 1 sec. / 10 sec. / 60 sec.					
Losses - Fixed / Copper / Total					
Space Heater Rating					
Suitable for Low Voltage Heating					
C.T. Ratio & Accuracy Class					
C.T. V_K & Imag. at $V_K / 2$					
Heating Time Constant					
Cooling Time Constant					
MECHANICAL DATA					
Frame Size / Ref. Dimensional Drg.					
Weight - Stator / Rotor / Total					
Heaviest Weight to be Lifted					
Rotor GD ² in Kgm ²					
REACTION AT SUPPORTS FOR		S/C Condition			
		Starting Condition			
		Running Condition			
		Push Pull Condition			
Max. Vibration Limit					
Max. Noise Level					
Suitable for Outdoor Use		Yes ☐		No ☐	
Suitable for Bi-directional Rotation		Yes ☐		No ☐	
Material of Insulation					
Treatment of Insulation					
Winding Coils Replaceable at Site					
Type & Material of Fan					
Material & Thickness of Cooler Tube					



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 002- Rev 01

GENERAL COMMERCIAL CONDITIONS FOR CONTRACT

These 'General Commercial Conditions for Contract for Purchase' herein after referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Bharat Heavy Electricals Limited and any of its units, regions or divisions (hereinafter referred to as "BHEL" or the Purchaser) or its projects/ customers.

Any deviations from or additions to these GCC require BHEL's express written consent. The general terms of business or sale of the vendor shall not apply to BHEL. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the vendor have been accepted.

Orders, agreements and amendments thereto shall be binding if made or confirmed by BHEL in writing. Only the Purchasing department of BHEL is authorized to issue the Purchase Order or any amendment thereof.

Definitions: Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

- a) 'The Purchaser' means Bharat Heavy Electricals Limited, Electronics division, Mysore road, Bangalore 560 026, a Unit of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act having its registered office at BHEL House, Siri Fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
- b) 'The vendor' means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the vendor's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.
- c) 'Contract' shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent/acceptance/ award, the General Conditions of Contract and Special Conditions of Contract for Purchase, Specifications, Inspection/ Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by BHEL or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.
- d) 'Parties to the Contract' shall mean the 'The Vendor' and the Purchaser as named in the main body of the Purchase Order.

Order of Precedence:

In case of any inconsistency or contradiction between any of the documents, the order of precedence shall be Purchase Order, LOI / LOA, Special Conditions of Contract and General Conditions of Contract for commercial conditions; and specific agreement on technical conditions, RFQ/offer and specification for Technical Conditions.

Interpretation:

In the contract, except where the context requires otherwise:

- a) words indicating one gender include all genders;
- b) words indicating the singular also include the plural and words indicating the plural also include the singular;

- c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
- d) "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

Applicable Conditions:

1. **Price Basis:** All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted.
2. **Ordering and confirmation of Order:** Vendor shall send the order acceptance on their company letter head/ through e-mail within a week from the date of receipt of Purchase Order or such other period as specified/ agreed by BHEL. BHEL reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by BHEL as well as payments made in this regard shall not imply acceptance of any deviations.
The purchase order will be deemed to have been accepted if no communication to the contrary is received within one week (or the time limit as specified/agreed by BHEL) from the date of receipt of the purchase order.
3. **Documentation:** After receipt of Purchase Order, vendor should submit necessary documents (if & as applicable) like drawings specified, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/ Customer.
At any stage within the contract period, the vendor shall notify of any error, fault or other defect found in BHEL's documents / specifications or any other items for reference. If and to the extent that (taking account of cost and time) any vendor exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the vendor's documents, they shall be corrected at his cost, notwithstanding any consent or approval.
4. **Penalty:**
 - a. **For delay in documentation:** In the event of delay in submission of complete set of specified documents ((like drawings, bill of materials, datasheets, catalogues, quality plan etc. as called in tender specifications including soft copies wherever applicable) in required sets beyond two(02) weeks (or as agreed/indicated in the SCC/Purchase Order) from the date of receipt of Purchase Order (by email), penalty at 0.5% (half percent) per week or part thereof, limited to a maximum of 5% (five percent) of the basic material value of the Purchase Order will be applicable.

Penalty for delayed documentation if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted. GST as applicable will be recovered along with penalty amount.
 - b. **For delay in delivery:** In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of issue of Manufacturing clearance along with approved document. The date for which Inspection call is issued by vendor along with test certificates / test reports / Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and BHEL will not be responsible for delay in actual date of inspection.

Penalty for delayed delivery if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted. GST as applicable will be recovered along with penalty amount.

5. Contract variations (Increase or decrease in the scope of supply): BHEL may vary the contracted scope as per requirements at site. If vendor is of the opinion that the variation has an effect on the agreed price or delivery period, BHEL shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be the basis for such additional work. Vendor shall not perform additional work before BHEL has issued written instructions/ amendment to the Purchase Order to that effect. The work which the vendor should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the vendor's part, shall not be considered additional work.
6. Inspection: Prior written notice of at least 10 days shall be given along with internal test certificates/COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification/acceptance for issue of dispatch clearance.
All costs related to inspections & re-inspections shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.
7. Transit Insurance: Transit insurance coverage between vendor's works and project site shall be to the account of BHEL, unless specifically agreed otherwise. However, vendor shall send intimation directly to insurance agency (as mentioned in dispatch instructions issued by BHEL) through fax/courier/e-mail, immediately on dispatch of goods for covering insurance. A copy of such intimation sent by vendor to insurance agency shall be given to BHEL along with dispatch documents. Dispatch documents will be treated as incomplete without such intimation copy. BHEL shall not be responsible for sending intimations to insurance agency on behalf of the vendor.
8. Mode of dispatch:
Indigenous Scope: By road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Dispatch Instructions), only on receipt of Despatch Clearance from BHEL.
Imported Scope: By Air/Sea through BHEL approved Freight Forwarder/supplier approved Consolidator respectively as per agreed contractual terms, only on receipt of Dispatch Clearance from BHEL.
9. Changes in Statutory levies:
If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the execution of Contract, which was or will be assessed on the bidder in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to fully take into account any such change by addition to the Contract Price or deduction there from, as the case may be. However, these adjustments would be restricted to direct transactions between BHEL and the bidder /agent of foreign bidder (if applicable). These adjustments shall not be applicable on procurement of raw materials, intermediary components etc. by the bidder /agent.
10. Availing duty/tax exemption benefits by bidder, wherever applicable: BHEL shall issue the required Certificate/s, as per relevant policies of the Govt. of India, to facilitate the bidders to avail any such benefits under the Contract. In case of failure of the bidders to receive the benefits partly or fully from the Govt. of India and/or in case of any delay in receipt of such benefits, BHEL shall neither be liable nor responsible in any manner whatsoever.

11. Taxes against sub-vendor dispatches: All taxes/levies, as applicable in respect of all components, equipments and material to be despatched directly from the sub-vendor's works to Site irrespective of the fact whether such taxes and levies are assessable and chargeable on Vendor or the BHEL, shall be to the vendor's account and no separate claim in this regard will be entertained by BHEL.
12. High Sea Sales (HSS): Customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors.
Any delay in submission of complete/correct HSS documents to BHEL may incur demurrage charges. All demurrage charges on account of incomplete /incorrect HSS documents submission by vendor will be to vendor's account and all such charges will be recovered from any of the available vendor bills with BHEL.
13. Packaging and dispatch: The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea/ Air / Rail/ Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures/ hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.
The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw/ solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitary/ Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, vendor must provide this information without fail along with the consignment.
Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (LxBxH) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated in the packing list.
Separate packing & identification of items should be as follows.
 1. Main Scope - All items must be tagged with part no. & item description.
 2. Commissioning accessories/spares - All items must be tagged with part no. & item description.
 3. Mandatory spares - All items must be tagged with part no. & item description.
 Nevertheless, vendor shall adhere to dispatch & packing instructions issued by BHEL at the time of dispatch.
14. Assignment of Rights & Obligations; Subcontracting: Vendor is not permitted to subcontract the delivery or any part thereof to third party or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from BHEL. Any permission or approval given by the BHEL shall, however, not absolve the vendor of the responsibility of his obligations under the Contract.
15. Progress report: Vendor shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of BHEL in any manner.
16. Non-disclosure and Information Obligations: Vendor shall provide with all necessary information pertaining to the goods as it could be of importance to BHEL. Vendor shall not reveal any specified confidential information that may be divulged by BHEL to Vendor's employees not involved with the tender/ contract & its execution and delivery or to third parties, unless BHEL has agreed to this in writing beforehand. Vendor shall not be entitled to use the BHEL name in advertisements and other commercial publications without prior written permission from BHEL.
17. Cancellation /Termination of contract: BHEL shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.
BHEL shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so on account of any decline, diminution, curtailment or stoppage of the business.

18. Risk Purchase Clause: In case of failure of supplier, BHEL at its discretion may make purchase of the materials / services not supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.

In case of items demanding services at site like erection and commissioning, vendor should send his servicemen/representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase/service including additional handling charges due to the change.

19. Shortages: In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages, caused by supplier's act or omission, shall be made good at free of cost within a reasonable time that BHEL may allow from such intimation.

Transit Damages: In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, supplier shall make good of all such damages within a reasonable time from such intimation by BHEL. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will be reimbursed to supplier.

20. Remedial work: Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.

21. Indemnity Clause: Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved. Vendor is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment.

22. Product Information, Drawings and Documents: All specified drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.

Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.

All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.

23. Intellectual Property Rights, Licenses: If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods/related service) or accompanying documentation shall be the exclusive property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged)

claims by third parties. The Vendor shall indemnify BHEL against any (alleged) claims by third parties in this regard and shall reimburse BHEL for any damages suffered as a result thereof.

24. **Force Majeure:** Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the "Act of God" and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and vendor doing everything reasonably possible to resume its performance.

A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

Notwithstanding above provisions, in an event of Force Majeure, BHEL reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

25. **Warranty:**

Wherever required, and so provided in the specifications/ Purchaser Order, the Seller shall ensure that the goods supplied shall comply with the specifications laid down, for materials, workmanship and performance.

Unless otherwise specified in SCC, warranty period shall be applicable for a period of 24 months from the date of delivery of goods or 18 months from the date of commissioning of goods, whichever is earlier.

The warranty period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Unless otherwise specifically provided in the Purchase Order, Vendor's liability shall be co terminus with the expiration of the applicable warranty period.

26. **Limitation of Liability:** Vendor's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.

The total liability of Vendor for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

27. **Liability during warranty:** Vendor shall arrange replacement / repair of all the defective materials / services under its obligation during the warranty period. The rejected goods shall be taken away by vendor and replaced / repaired. In the event of the vendor's failure to comply, BHEL may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the vendor. In case, defects attributable to vendor are detected during Warranty period or where the commissioning call is issued within the warranty period, vendor shall be responsible for replacement/ repair of the goods as required by BHEL at vendor's cost even after expiry of warranty period.

Further if the equipment or any part thereof cannot be used by reason of such defect and/or making good of such defect, the warranty period of the equipment or such part, as the case may be, shall be extended by a period equal to the period during which the equipment or such part cannot be used by BHEL because of any of the aforesaid reasons. Upon correction of the defects in the facilities or any part thereof by repair/replacement, such repair/replacement shall have the warranty period for a period of twelve (12) months from the time such replacement/repair of the equipment or any part thereof has been completed.

28. **Liability after warranty period:** At the end of the warranty, the Vendor's liability ceases except for latent defects. For the purpose of this clause, latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the warranty Period, but later. The Contractor's liability for latent defects warranty for the equipment including spares shall be limited to a period of six months from the end of the warranty period of the respective equipment including spares or first time commissioning, whichever is later but not later than one (01) year from the date of expiry of warranty period.

29. Compliance with Laws: Vendor shall, in performing the contract, comply with all applicable laws. The vendor shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold BHEL harmless against and from the consequences of any failure to do so.
30. Settlement of Disputes: Except as otherwise specifically provided in the Purchase Order, decision of BHEL shall be binding on the vendor with respect to all questions relating to the interpretation or meaning of the terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof. Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Vendor shall continue to perform the contract, pending settlement of dispute(s).
31. Arbitration Clause in case of Contract with vendors other than Public Sector Enterprise (PSE) or a Government Department:

ARBITRATION & CONCILIATION

The parties shall attempt to settle any disputes or difference arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, or in connection with this contract through friendly discussions. In case no amicable settlement can be reached between the parties through such discussions, in respect of any dispute; then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the sole arbitration of an arbitrator appointed by Head of the BHEL–EDN. Such Sole Arbitrator appointed, shall conduct the arbitration in English language.

The Arbitrator shall pass a reasoned award and the award of the Arbitration shall be final and binding upon the Parties.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be Bangalore.

The cost of arbitration shall be borne as decided by the Arbitrator upon him entering the reference.

Subject to the Arbitration Clause as above, the Courts at Bangalore alone shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.

Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the parties shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and efficiency in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

Arbitration Clause in case of Contract with a Public Sector Enterprise (PSE) or a Government Department:

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred by either party for Arbitration to the Sole Arbitrator in the Department of Public Enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any Party aggrieved by such Award may make further reference for setting aside or revision of the Award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the Parties hereto finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator.'

32. Applicable Laws and Jurisdiction of Courts: Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract. Subject to the conditions as aforesaid, the competent courts in Bangalore alone shall have jurisdiction to consider over any matters touching upon this contract.
33. General Terms: That any non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.

That the headings used in this agreement are for convenience of reference only.

That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE:PR:001- Rev 01

INSTRUCTIONS TO BIDDERS

Bidder is requested to read the instructions carefully and submit their quotation taking into consideration of all the points:

A. GENERAL INSTRUCTIONS:

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: CE: PR: 001 – Rev 01), General Conditions of Contract (document reference: CE: PR: 002 - Rev 01) and Special Conditions of Contract, if any, of the enquiry.
2. Any deviations from or additions to the “General Conditions of Contract” or “Special Conditions of Contract” require BHEL’s express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Regret letter (either through post or by mail or by EPS) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender. Supplier shall be liable for removal as a registered vendor of BHEL when the supplier fails to quote against four consecutive tender enquiries for the same item or all enquiries in last two years for the same item, whichever is earlier.
4. Procurement directly from the manufacturers is preferred. However, if the OEM/ Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. Agent/Representative authorized by the OEM/Principal in turn cannot further sub authorize any other firm for submitting the offer or for placement of order.

In case bids are received from the manufacturer/ supplier and his agent, bid received from the agent shall be ignored.

5. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
6. If an Indian representative/associate/liaison office quotes on behalf of a foreign based bidder, such representative shall furnish the following documents:
 - a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
 - b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.
 - c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages/damages/replacement/repair of imported scope till the equipment is commissioned and handed over to customer will be the sole responsibility of the Indian representative/associates/agent/liaison office.
 - d. Refer **Annexure I** on “Guidelines for Indian Agents”.
7. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport /Seaport. Bidders must provide all original documents required

for completing the customs clearance along with the shipment. Warehousing charges due to incomplete or missing documentation will be to supplier's account. All offers for imported scope of supply by air, must be made from any of the gateway ports (within the country) indicated (**Refer Annexure II**).

8. The offers of the bidders who are on the banned list and also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of the banned firms is available on BHEL website: http://www.bhel.com/vender_registration/vender.php
9. Business dealings with bidders will be suspended if they are found to have indulged in any malpractices/misconduct which are contrary to business ethics like bribery, corruption, fraud, pilferage, cartel formation, submission of fake/false/forged documents, certificates, information to BHEL or if they tamper with tendering procedure affecting the ordering process or fail to execute a contract, or rejection of 3 consecutive supplies or if their firms / works are under strike/lockout for a long period. Bidder may refer "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" available on www.bhel.com for more details.
10. The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to your notice.

B. GUIDELINES FOR PREPARATION OF OFFER:

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
 - **SINGLE PART BID:** Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
 - **TWO PART BID:** Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid" without the prices** should be enclosed in one cover and the cover must be super scribed "**Techno-commercial offer**) and Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed "**Price Bid**". Both these envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.
 - **THREE PART BID:** Pre-qualification Bid (Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

If any of the offers (Part I, Part II or Part III) are not submitted before the due date and time of submission (or) if any part of the offer is incomplete, the entire offer of the bidder is liable for rejection.

2. Supplier shall ensure to superscribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is "Techno Commercial Bid" or "Price Bid" or "Pre-Qualification Bid". Please ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.
3. BHEL standard Commercial Terms and Conditions (duly filled, signed & stamped) must accompany Technical-Commercial offer without fail and should be submitted in original only.

The above indicated submission of Offers in "sealed envelope/hard copy" as mentioned in points B.1-B.3 is applicable for tenders that are not floated through E-Procurement System (EPS).

4. Validity: Unless otherwise specified in SCC (special commercial conditions of contract), the offer will be valid for a period of 90 days from the date of part-I bid opening and in case of Negotiation/Counter-offer/Reverse

Auction, price validity will apply afresh for a period of _60_ days from the date of according final price by bidder (or) upto original validity period, whichever is later.

5. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without deviation.
6. Deviation to this specification/item description, if any, shall be brought out clearly indicating "DEVIATION TO BHEL SPECIFICATION" without fail, as a part of Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.
7. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and/or any other relevant documents called in purchase specification as part of Technical Bid.
8. "Price Bid" shall be complete in all respects containing price break-up of all components along with all applicable taxes and duties, freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the "Price Bid." Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.
9. In addition, bidder shall also quote for erection & commissioning charges/erection supervision & commissioning charges (E&C service charges) if applicable, documentation charges, testing Charges (type & routine), training charges etc. as applicable along with corresponding tax. The price summary must indicate all the elements clearly.
10. For Physical Export projects or wherever services are rendered by foreign suppliers in India, bidders should indicate "lumpsum" Erection and Commissioning (or) Erection Supervision and Commissioning charges, as applicable (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for carrying out E&C activity and further handing over to customer. The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist (if any).
11. Wherever bidders require PAC (Project Authority Certificate)/applicable certificates for import of raw materials, components required for DECC,EPCG Power Projects, Export Projects or other similar projects wherein supplies are eligible for customs duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.
12. Prices should be indicated in both figures & words. Bid should be free from correction/overwriting, using corrective fluid, etc. Any interlineation, cutting, erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for rejection. Any typographical error, totalling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure III** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid" and BHEL decision will be final.
13. Documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder. However, this requirement is not mandatory for offers uploaded through E-Procurement System (EPS).

C. GUIDELINES FOR OFFER SUBMISSION:

The under-mentioned clauses 1, 2&3 will not be applicable for EPS tenders.

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ. The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption "CE, SC&PV, DEFENCE". Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer.

2. E-Mail/ Internet/EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email ID specified in the SCC document of the tender.
3. Offers of Vendors who already have a valid Technical/Commercial MOU with BHEL-EDN for the items of the RFQ shall mention the relevant MOU reference no. and give only such other details not covered in the MOU.
4. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over either of the two purchase officers whose names are mentioned in the SCC document of tender RFQ.
5. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. For EPS tenders, e-mail notifications will be automatically generated and forwarded to registered e-mail ID/s of bidders during opening of tenders.
6. Bidder will be solely responsible:
 - a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
 - b. For submission of offers in the correct compartment of the tender box based on the day of due date (Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
 - c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box (or) if the tender document is handed over to the wrong person, BHEL will not be responsible for any such delays.
 - d. For offers received through email etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time (This clause will not be applicable for EPS tenders).

The above indicated submission of Offers as mentioned in points 6.a-6.d is applicable for tenders that are not floated through EPS.

- e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, system/software requirements etc. will be the sole responsibility of the bidder. Wherever assistance is needed for submission of e-tenders, help-line numbers as available in the web-site of service provider of BHEL may be contacted.

Purchase Executive/ BHEL shall not be responsible for any of the activities relating to submission of offer.

D. PROCESSING OF OFFERS RECEIVED:

1. Any discount/ revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid). The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes/revisions are requested by BHEL. In case of withdrawal of any Technical/Commercial deviation(s) by the bidder before opening of price bids/conducting the Reverse Auction, revision of price/impact bid will not be accepted.
3. In case there is no change in the technical scope and/ or specifications and/ or commercial terms & conditions, the supplier will not be allowed to change any of their bids after Technical bids are opened (after the due date and time of tender opening).
4. In case of changes in scope and/ or technical specifications and/ or commercial terms & conditions by BHEL and it accounts for price implications from bidders, all techno-commercially acceptable bidders shall be asked

by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid. Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.

5. BHEL reserves the right to adopt Reverse Auction or standard Price Bid Opening procedure for price evaluation, at its discretion. This shall be decided after completion of techno-commercial evaluation of tender (Refer BHEL website http://www.bhel.com/vender_registration/vender.php for Guidelines of Reverse Auction). In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) already submitted and available with BHEL shall be opened as per BHEL's standard practice.
6. Un-opened bids (including price bids) will be returned to the respective bidders after release of Purchase order. Regarding Offers for EPS tenders that get rejected on PQC/ techno-commercial grounds, the bids for the subsequent parts will not be opened i.e., both technical bid and price bid (Parts-II & III) will not be opened in case of rejection on PQC ground and price bid (Part-II/Part-III, as applicable) will not be opened in case of rejection on techno-commercial ground.
7. After receipt of Purchase Order, supplier should submit required documents viz., specified drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
8. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL and agreed upon in the Purchase Order.
9. Evaluation shall be on the basis of delivered cost (i.e. "Total Cost to BHEL").

"Total Cost to BHEL" shall include total basic cost, packing & forwarding charges, taxes and/or duties (as applicable), freight charges, taxes on Services, customs clearance charges for imported items, any other cost indicated by bidder for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions). Benefits arising out of Nil Import Duty on DEEC, EPCG, DFIA Projects, Physical Exports or such 100% exemptions (statutory benefits), project imports, customer reimbursements of statutory duties (like Basic Customs Duty and cess on customs duty), Input tax credits as applicable will also be taken into account for arriving at the Total cost to BHEL (wherever applicable and as indicated in SCC document of tender).

For EPS tenders, it shall be noted that the prices (including discounts) vis-a-vis currency quoted in EPS portal only will be considered as Final for the purpose of evaluation of the lowest bidder. Bidder shall ensure to indicate the applicable taxes against each line item in online portal, failing to which the same will be considered as inclusive/NIL.

10. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:

Single part bids:	Date of tender opening
Two/three part bids:	Date of Part-I bid opening
Reverse Auction:	Date of Part-I bid opening

In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.

If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.

11. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.

E. INFORMATION ON PAYMENT TERMS:

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format (**Refer Annexure IV**) for receiving all payments through NEFT.(Applicable for Indian vendors only)
2. In case of High Sea Sales transaction, customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors. All warehousing charges due to delay in submission of complete and or correct HSS documents to BHEL will be to supplier's account only. Such recovery will be made out of any of the available bills (**Refer Annexure V**).
3. Statutory deductions, if any, will be made and the deduction certificate shall be issued. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.

In addition to the above, Foreign vendors shall also submit relevant details of their bankers like Swift Code, Banker's Name &Address etc.

4. Incomplete documentation will not be accepted. Delayed submission of invoice / documents may result in corresponding delay in payment. In this connection, request to also refer clause: G about invoicing & payment formalities under GST regime. Applicable documents shall be submitted to the purchaser at the time of execution of supplies/services for availing GST input credits.

F. STANDARD PAYMENT TERMS OF BHEL-EDN:

<u>PURCHASE ORDERS FOR:</u>	<u>SUPPLY WITH ERECTION & COMMISSIONING</u>	<u>SUPPLY WITH ERECTION SUPERVISION & COMMISSIONING</u>	<u>SUPPLY ONLY</u>
<u>INDIGENOUS PROCUREMENT</u>	a. 90% of basic value + 100% of taxes and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 10% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C. <u>Note:</u> In case PBG is not furnished, only 80% payment will be released against 90% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	b. 95% of the basic value + 100% of taxes and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 5% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of commissioning. <u>Note:</u> In case PBG is not furnished, only 85% payment will be released against 95% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	c. 100% of PO value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.

<u>PURCHASE ORDERS FOR:</u>	<u>SUPPLY WITH ERECTION & COMMISSIONING</u>	<u>SUPPLY WITH ERECTION SUPERVISION & COMMISSIONING</u>	<u>SUPPLY ONLY</u>
<u>IMPORT PROCUREMENT</u>	d. 90% of the basic value will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents. Balance 10% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C. <u>Note:</u> In case PBG is not furnished, only 80% payment will be released against 90% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	e. 95% of the basic value will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents. Balance 5% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of commissioning. <u>Note:</u> In case PBG is not furnished, only 85% payment will be released against 95% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	f. 100% of PO value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents.
<u>HIGH-SEA SALES PROCUREMENT</u>	g. 90% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 10% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C. <u>Note:</u> In case PBG is not furnished, only 80% payment will be released against 90% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	h. 95% of the basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later. Balance 5% of basic value (Retention money) will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of commissioning. <u>Note:</u> In case PBG is not furnished, only 85% payment will be released against 95% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	i. 100% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.

j. Comprehensive Annual Maintenance Contract:

Evaluation methodology: Unless and otherwise specified in SCC, CAMC will be applicable for a period of 04 years from the date of expiry of warranty period (or) from the date of completion of commissioning of equipment, whichever is later and the total AMC value should not be less than 20% of the main supply value. In case the quoted total AMC value is less than 20% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price and apportioning towards AMC charges.

Payment terms: 100% AMC charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of AMC on yearly basis.

k. Terms of Payment for Training: 100% payment will be made in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of invoice along with documentary evidence, whichever is later.

LOADING FACTORS FOR DEVIATION IN PAYMENT TERMS (APPLICABLE FOR IMPORT PROCUREMENT ONLY):

- 1) For offers received with Sight draft payment term in place of Usance draft, loading applicable will be 1.0% of basic value.
 - 2) For offers received with Letter of Credit payment term with Usance of 45 days, loading applicable will be 2.5% of basic value.
Additional loading of 2% will be applicable for payment term as Letter of Credit at Sight.
- l.** Any payment term with credit period of less than 45 days for indigenous supply/HSS and any other variation of payment terms are liable for rejection.
- m.** Standard payment terms indicated in Clauses: F (a), (b), (c), (d), (e), (f), (g), (h), (i), (j) & (k) will not attract any loading.

Note 1: Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable). Wherever the Purchase Order is split into import portion and indigenous portion of supply, the retention money will be 10% (where scope includes E&C) or 05% (where scope includes Erection supervision & Commissioning) of both purchase order values put together.

Note 2: If the E&C could not be completed till the end of the Warranty period due to reasons not attributable to the supplier, BHEL will release the retention money to the supplier against Bank Guarantee for equivalent value valid for an initial period of one year.

Note 3: In case of Physical Export projects or wherever services are rendered by foreign suppliers in India, E&C charges (if quoted separately/extra by bidder) will be paid in 15 days from the date of submission of supplementary invoice/ documents against proof of completion of E&C.

Note 4: In case of multiple packages/units in a power plant, payment of retention money/E&C charges will be processed on pro-rata basis.

Note 5: No deviation will be permitted from the duration of Guarantee/Warranty and/or Comprehensive Annual Maintenance Contract period specified in SCC.

G. Terms & Conditions to be complied under GST regime:

1. All invoices to contain BHEL-EDN (buyer) GSTIN number: 29AAACB4146P1ZB. However for CGST +SGST/UGST billing outside the state of Karnataka, invoice has to be generated with BHEL's Nodal Agency GSTIN number. Address of Nodal Agency along with GSTIN number will be provided by BHEL at the time of issuing dispatch clearance.
2. The Bidder shall mention Bidder's GSTIN number in all quotations and Invoices submitted.
3. The Bidder shall also mention HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) mandatorily in all quotations and invoices submitted.
4. Invoice submitted should be in the format as specified under GST Laws viz., all details as mentioned in Invoice Rules like GST registration number(GSTIN), invoice number with date of issue, quantity, rate, value, taxes with nomenclature – CGST, SGST, UGST,IGST mentioned separately, HSN Code / SAC Code etc. Invoice should be submitted in original for buyer plus duplicate for credit availment.
5. Payment of GST to Vendor will be made only if it is matching with data uploaded by the Vendor in GST portal.
6. For invoices paid on Reverse charge basis – “Tax payable on reverse charge basis” to be mentioned on the invoice.
7. In case GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount will be recoverable from vendor along with interest levied/ leviable on BHEL.
8. In case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law will be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.
9. Vendor should intimate BHEL immediately on the same date of invoicing without any delay.
10. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the supplies, within the calendar month notified by BHEL.
11. Bidders to note that Rules & Regulations pertaining to E-way bill system are to be strictly adhered to, as and when notified by Govt. authorities.

H. Performance bank guarantee (PBG):

Performance bank guarantee (PBG) will be applicable as called in the tender documents. Unless otherwise specified in the SCC, the PBG against performance of the contract shall be valid for a period of 24 months from the date of dispatch of goods + claim period of 03 months, for a value equal to 10 % of the basic value of the purchase order which will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable).

1. The BG issued in Indian Rupees by Banks in India is to be executed on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is

higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Bank issuing the guarantee.

2. No deviation for the duration and value of PBG will be permitted.
3. PBG shall be from any of the BHEL consortium of bankers (**refer Annexure VI**).
4. PBGs from nationalized banks are also acceptable.
5. PBG should be sent directly by the bank to the dealing executive mentioned in the purchase order located at the address mentioned in the purchase order.
6. PBG should be in the format specified (**refer Annexure VII**). No deviation to this format will be allowed. However in case BHEL changes the PBG format, bidder shall honor the same.
7. Bank Guarantee should be enforceable in Bangalore.
8. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in Bangalore.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)
 - b.1 Please note that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter-Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It shall be noted that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 is required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).
9. Expired BGs / PBGs will be returned only after expiry of the claim period or on completion of the contractual obligation with respect to Purchase Order.
10. PBG shall not be applicable for spares.

I. PROVISIONS APPLICABLE FOR MSE VENDORS (MICRO AND SMALL ENTERPRISES) :

Benefits/facilities as applicable for Micro and Small Enterprises (MSEs) shall be available to MSEs registered with Government designated authorities as per the Purchase & Price Preference Policy of the Government subject to them becoming eligible otherwise.

Vendors who qualify as MSE vendors are requested to submit applicable certificates (as specified by the Ministry of Micro, Small and Medium Enterprises) at the time of vendor registration. Vendors have to submit any of the following documents along with the tender documents in the Part I / Technical bid to avail the applicable benefits:

- a. Attested copy of valid NSIC certificate or
- b. Attested copy of either Entrepreneur's Memorandum part II (EM II) certificate/Udyog Aadhar certificate having deemed validity (five years from the date of issue of acknowledgement in EM II/Udyog Aadhar) or
- c. EM II/ Udyog Aadhaar certificate along with attested copy of a CA certificate (Format enclosed at Annexure VIII where deemed validity of EM II certificate/ Udyog Aadhar certificate of five years have expired) applicable for the relevant financial year (latest audited).

Date to be reckoned for determining the deemed validity will be the date of bid opening (Part-I in case of two-part bid and three-part bid).

Documents have to be notarized/attested by a Gazetted officer and must be valid as on the date of part I bid opening for the vendors to be eligible for the benefits applicable for MSE vendors. Please note that no benefit shall be applicable if any deficiency in the above required documents are not submitted before the price bid opening/Reverse Auction. If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded on the portal.

Bidders to however note the documents that shall be furnished in order to establish credentials as MSE vendor should be as per the extant statutory requirements specified by the Ministry of Micro, Small and Medium Enterprises.

PURCHASE PREFERENCE FOR MSE VENDORS:

- d. MSE vendors quoting within a price band of L1 + 15% shall be allowed to supply up to 20% of the requirement against this tender provided
 1. The MSE vendor matches the L1 price.
 2. L1 price is from a non MSE vendor.
 3. L1 price will be offered to the vendor nearest to L1 in terms of price ranking (L2 - nearest to L1). In case of non-acceptance by the MSE vendor (L2), next ranking MSE vendor will be offered who is within the L1 + 15% band (if L3 is also within 15% band).
 4. 20% of the 20% (i.e. 4% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) and (2) are fulfilled.
 5. In case no vendor under SC / ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, in such cases the 4% quantity will be distributed among the other eligible MSE vendors who have participated in the tender.
 6. Serial no. 1 to 5 will not be applicable wherever it is not possible to split the tendered quantity/items on account of customer contract requirement, or the items tendered are systems. Such information that tendered quantity will not be split shall be indicated in the SCC.

J. INTEGRITY COMMITMENT IN THE TENDER PROCESS, AND EXECUTION OF CONTRACTS:

1. Commitment by BHEL: BHEL commits to take all measures necessary to prevent corruption in connection with the Tender process and execution of the Contract. BHEL will, during the tender process, treat all bidder / suppliers in a transparent and fair manner, and with equity.
2. Commitment by Bidder(s)/ Contractor(s):
 - a. The Bidder(s)/ Contractor(s) commit(s) to take all measures to prevent corruption and will not directly or indirectly try to influence any decision or benefit which he is not legally entitled to.
 - b. The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding or any actions to restrict competition.
 - c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant Acts. The Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain or pass on to others, any information or document provided by BHEL as part of business relationship.
 - d. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.

If the Bidder(s) / Contractor(s), before award or during execution of the Contract commit(s) a transgression of the above or in any other manner such as to put his reliability or credibility in question, BHEL is entitled to disqualify the Bidder(s) / Contractor (s) from the tender process or terminate the contract and/ or take suitable action as deemed fit.

K. Integrity Pact (IP):

- a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner.
A panel of independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those Bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

- b) Please refer Section-8 of the IP for Role and Responsibilities of IEMs (Annexure IX). In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department.”

Annexure

Annexure I
Guidelines for Indian Agents

- **Definition of Indian Agent:** An Indian Agent of foreign principal is an individual, a partnership, an association of persons, a private or public company, that carries out specific obligation(s) towards processing of BHEL tender or finalization or execution of BHEL's contract on behalf of the foreign supplier.

In case of yes, vendor to note the following and reply accordingly:

- i. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agency Agreement.
- ii. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.
- iii. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.
- iv. Any agency commission to be paid by BHEL to the Indian agent shall be in Indian currency only.
- v. Tax deduction at source is applicable to the agency commission paid to the Indian agent as per the prevailing rules.
- vi. In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.
- vii. The "Guidelines for Indian Agents of Foreign Suppliers" enclosed at annexure - 'A' shall apply in all such cases.

- viii. The supply and execution of the Purchase Order (including indigenous supplies/ service) shall be in the scope of the OEM/ foreign principal. The OEM/ foreign principal should submit their offer inclusive of all indigenous supplies/ services and evaluation will be based on 'total cost to BHEL'. In case OEM/ foreign principal recommends placement of order(s) towards indigenous portion of supplies/ services on Indian supplier(s)/ agent on their behalf, the credentials/ capacity/ capability of the Indian supplier(s)/ agent to make the supplies/ services shall be checked by BHEL as per the extant guidelines of Supplier Evaluation, Approval & Review Procedure (SEARP), before opening of price bids. In this regard, details may be checked as per Annexure-B (copy enclosed). It will be the responsibility of the OEM/ foreign principal to get acquainted with the evaluation requirements of Indian supplier/ agent as per SEARP available on www.bhel.com.

The responsibility for successful execution of the contract (including indigenous supplies/ services) lies with the OEM/ foreign principal. All bank guarantees to this effect shall be in the scope of the OEM/ foreign principal.

—X—

Vendor's Signature with Seal

Guidelines for Indian Agents of Foreign Suppliers

- 1.0 There shall be compulsory registration of agents for all Global (Open) Tender and Limited Tender. An agent who is not registered with BHEL shall apply for registration in the registration form in line with SEARP.
- 1.1 Registered agents will file an authenticated Photostat copy duly attested by a Notary Public/Original certificate of the Principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/ remuneration/ salary/ retainerhip being paid by the principal to the agent before the placement of order by BHEL.
- 1.2 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.
- 2.0 **Disclosure of particulars of agents/ representatives in India, if any.**
- 2.1 **Tenderers of Foreign nationality shall furnish the following details in their offers:**
 - 2.1.1 The Bidder(s)/ Contractor(s) of foreign origin shall disclose the name and address of the agents/ representatives in India if any and the extent of authorization and authority given to commit the Principals. In case the agent/ representative be a foreign Company, it shall be confirmed whether it is existing Company and details of the same shall be furnished.
 - 2.1.2 The amount of commission/ remuneration included in the quoted price(s) for such agents/ representatives in India.
 - 2.1.3 Confirmation of the Tenderer that the commission/ remuneration, if any, payable to his agents/ representatives in India, may be paid by BHEL in Indian Rupees only.
- 2.2 **Tenderers of Indian Nationality shall furnish the following details in their offers:**
 - 2.2.1 The Bidder(s)/ Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any, indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents/ representatives.
 - 2.2.2 The amount of commission/ remuneration included in the price (s) quoted by the Tenderer for himself.
 - 2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/ remuneration, if any, reserved for the Tenderer in the quoted price(s), may be paid by BHEL in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.
- 2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission/ remuneration, if any payable to the agents/ representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
- 2.4 Failure to furnish correct and detailed information as called for in paragraph 2.0 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BHEL. Besides this there would be a penalty of banning business dealings with BHEL or damage or payment of a named sum.

ANNEXURE - II
LIST OF INTERNATIONAL GATEWAY AIRPORTS

For air based consignment, terms of delivery will be on FCA basis from following listed airports only. Vendors are requested to verify this list for use before submission of offer.

SCHEDULE NO	COUNTRY	CURRENCY CODE	AIRPORT
001	UK	GBP	LONDON (HEATHROW)
002	UK	GBP	NEW CASTLE
003	UK	GBP	OXFORD, CHETNAM
004	UK	GBP	BRISTOL, WELLINGBOROUGH
005	UK	GBP	BIRMINGHAM
006	UK	GBP	EAST MIDLANDS
007	UK	GBP	MANCHESTER
008	UK	GBP	LEEDS
009	UK	GBP	GLASGOW
010	FRANCE	EURO	PARIS (BOISSY) & LYON
011	SWEDEN	EURO	STOCKHOLM
012	SWEDEN	EURO	GOTHENBERG & MALMO
013	ITALY	EURO	ROMA, MILAN
014	ITALY	EURO	TURIN, BOLOGNA, FLORENCE
015	NETHERLANDS	EURO	AMSTERDAM, ROTTERDAM
016	AUSTRIA	EURO	VIENNA, LINZ, GRAZ
017	BELGIUM	EURO	ANTWERP, BRUSSELS
018	DENMARK	DKK	COPENHAGEN
019	JAPAN	JPY	TOKYO, OSAKA
020	SINGAPORE	SGD	SINGAPORE
021	CANADA	CAD	TORONTO
022	CANADA	CAD	MONTREAL
023	USA	USD	NEW YORK, BOSTON
024	USA	USD	CHICAGO
025	USA	USD	SAN FRANCISCO, LOS ANGELES
026	USA	USD	ALANTA, HOUSTON
027	GERMANY	EURO	MUNICH, KOLN, DUSSELDORF, HANNOVER, HAMBURG, STUTTGART, DAMSTADT, MANIHEM, NURUMBERG
028	GERMANY	EURO	FRANKFURT
029	GERMANY	EURO	BERLIN
030	SWITZERLAND	SFR	BASLE, ZURICH, GENEVA
031	SPAIN	EURO	BARCELONA
032	AUSTRALIA	AUD	SYDNEY
033	AUSTRALIA	AUD	MELBOURNE
034	AUSTRALIA	AUD	PERTH
035	CZECH	EURO	PRAGUE
036	HONG KONG	HKD	HONG KONG
037	NEW ZELAND	NZD	AUCKLAND
038	RUSSIA	USD	MOSCOW
039	SOUTH KOREA	USD	KIMPO INTERNATIONAL, INCHEON
040	FINLAND	EURO	HELSINKI
041	ROMANIA	EURO	BUCHAREST
042	NORWAY	EURO	OSLO
043	IRELAND	EURO	DUBLIN
044	ISRAEL	USD	TEL AVIV
045	UAE	USD	DUBAI
046	OMAN	USD	MUSCAT
047	EGYPT	USD	CAIRO
048	TAIWAN	USD	TAIPEI
049	UKRAINE	USD	KIEV
050	CHINA	USD	SHANGHAI, SHENZHEN
051	PHILIPPINES	USD	MANILA
052	MALAYSIA	USD	KUALALUMPUR, PE NANG
053	CYPRUS	USD	LARNACA
054	SOUTH AFRICA	USD	JOHANNESBURG, DURBAN
055	SLOVAKIA	EURO	BARTISLOVA
056	SAUDI ARABIA	SAR	RIYADH
057	TURKEY	EURO	ISTANBUL
058	THAILAND	USD	BANGKOK
059	BRAZIL	USD	SAO PAULO, RIO DE JANEIRO

ANNEXURE – III
DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID

Following guidelines will be followed in case of discrepancy in words & figures-quoted in price bid:

(a) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.

(b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

(d) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.

ANNEXURE - IV
Electronic Funds Transfer (EFT) OR
Paylink Direct Credit Form

Please Fill up the form in CAPITAL LETTERS only.

TYPE OF REQUEST(Tick one): ☐ CREATE ☐ CHANGE

BHEL Vendor / Supplier Code:
Company Name:
Permanent Account Number(PAN):
Address:

City: PINCODE STATE

Contact Person(s):
Telephone No.:
Fax No.:
e-mail Id:

1 Bank Name:

2 Bank Address:

3 Bank Telephone No:

4 Bank Account No:

5 Account Type: Savings/Cash Credit

6 9 Digit Code Number of Bank and branch
appearing on MICR cheque issued by Bank

7 Bank IFSC Code(applicable for NEFT)

8 Bank IFSC code(applicable for RTGS)

(Indian Financial System Code)

- A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.
- B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transferring Bank responsible.
- C This authority remains in full force until BHEL, EDN, Bangalore receives written notification requesting a change or cancellation.
- D I have read the contents of the covering letter and agree to discharge the responsibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:

Designation:

Telephone No. with STD Code

Company Seal

Bank Certificate

We certify that _____ has an Account No _____ with us and we confirm that the bank details given above are correct as per our records.

Date:

(.....)

Place:

Signature

Please return completed form along with a blank cancelled cheque or photocopy thereof to:

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

In case of any Query, please call concerned purchase executive.

ANNEXURE - V
PRESENT PROCEDURE FOR SALE IN TRANSIT (HIGH SEA SALES)

In case of High Sea Sales, vendor should submit following documents:

1. ORIGINAL HIGH SEA SALES AGREEMENT

- Sale agreement (on Rs. 200/- non-judicial stamp paper & notarised with 2 witnesses with identity) has to be signed between BHEL and the Party importing material. The date of the sale documents should be in between the date of House Air Way Bill / Bill of Lading and before landing of the goods in Indian origin.
- Following shall be included in the High Sea Sales Agreement:
"THE BUYER ALSO UNDERTAKE DISCHARGES, THE OBLIGATION AND FULFILLMENT OF CONDITIONS, IF ANY, ATTACHED TO THE IMPORTATION, ASSESSMENT AND CLEARANCE OF THE GOODS IN TERMS CUSTOMS TARIFF ACT 1975, THE CUSTOMS ACT 1962 & RULES & REGULATIONS MADE THERE UNDER AND OTHER RELEVANT ACTS, ORDERS, NOTIFICATIONS".

2. ORIGINAL INVOICES: INDIGENOUS RUPEE INVOICE & FOREIGN CURRENCY INVOICE

- Prices should be C.I.F., designated airport/seaport basis.
- I.E.C., C.S.T., K.S.T. Nos. to be mentioned.
- Description of item (Nomenclature), Unit & Quantity in both the Foreign Currency & the Indigenous Invoice in Rupee shall be exactly as per Purchase Order Description of item, Quantity and Unit. The Indigenous Invoice value shall be exactly as per Purchase Order value.
- Seller should give Foreign Currency Invoice from the original consignor. The Foreign Currency Invoice value should be at least 2% (two per cent) less than the Indigenous Rupee Invoice value in equivalent foreign currency.

4. ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING

- The sale agents should duly endorse House Air Way Bill (HAWB) for air shipments or original Bill of Lading (O.B.L.) for sea shipments and Foreign Currency Invoice in favour of BHEL-EDN.

5. ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER.

6. ORIGINAL DELIVERY ORDER ISSUED IN NAME OF BHEL-EDN.

7. ORIGINAL PACKING LIST.

8. A LETTER TO THE COMMISSIONER OF CUSTOMS FOR EFFECTING ABOVE SALE.

9. A LETTER TO THE DEPUTY ASSESSOR (OCTROI) FOR EFFECTING ABOVE SALE IN FAVOUR OF BHEL.

REMARKS: In case vendor needs any clarifications on the above, the same may be sought in writing.

Annexure-VI
BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

BANK GUARANTEE (BG) SHALL BE ISSUED FROM THE FOLLOWING BANKS ONLY:

	Nationalised Banks		Nationalised Banks
1	Allahabad Bank	19	Vijaya Bank
2	Andhra Bank		Public Sector Banks
3	Bank of Baroda	20	IDBI
4	Canara Bank		Foreign Banks
5	Corporation Bank	21	CITI Bank N.A
6	Central Bank	22	Deutsche Bank AG
7	Indian Bank	23	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
8	Indian Overseas Bank	24	Standard Chartered Bank
9	Oriental Bank of Commerce	25	J P Morgan
10	Punjab National Bank		
11	Punjab & Sindh Bank		Private Banks
12	State Bank of India	26	Axis Bank
13	State Bank of Hyderabad	27	The Federal Bank Limited
14	Syndicate Bank	28	HDFC Bank
15	State Bank of Travancore	29	Kotak Mahindra Bank Ltd
16	UCO Bank	30	ICICI Bank
17	Union Bank of India	31	IndusInd Bank
18	United Bank of India	32	Yes Bank

Note:

- All BGs must be issued from BHEL consortium banks listed above.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.
- Bank Guarantees issued by Co-Operative Banks/Financial Institutions cannot to be accepted under any circumstance.

Annexure-VII

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____¹ through its Unit at _____ (name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) with its registered office at _____² hereinafter referred to as the 'Vendor / Contractor / Supplier', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No. _____ dated _____³ valued at Rs. _____⁴ (Rupees _____) / FC. _____ (in words _____) for _____⁵ (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to _____ % (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract.

we, _____, (hereinafter referred to as the Bank), having registered/Head office at _____ and inter alia a branch at _____ being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs -- _____⁶ (Rupees _____) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Vendor / Contractor / Supplier shall have no claim against us for making such payment.

We the _____ bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance guarantee period as per the terms of the Contract and that it shall continue to be enforceable till

all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

WeBANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Vendor / Contractor / Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Vendor / Contractor / Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor / Contractor / Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor / Contractor / Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier's liabilities.

This Guarantee shall remain in force upto and including⁷ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor / Contractor / Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the⁸ we shall be discharged from all liabilities under this guarantee thereafter.

We, BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁶
- b) This Guarantee shall be valid up to⁷
- c) Unless the Bank is served a written claim or demand on or before⁸ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

¹ NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

Annexure – VIII
(Applicable only for MSE suppliers)
Certificate by Chartered Accountant on Letter Head

This is to certify that M/s
.....(hereinafter referred to as 'Company')
having its registered office at is registered under MSMED Act 2006,
(Entrepreneur Memorandum No (Part-11 dtd
Category: (Micro/Small) (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as
per the latest audited financial year..... as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original
cost excluding land and building and the items specified by the Ministry of Small
Scale Industries vide its notification No.S.O.1722 (E) dated October 5, 2006:
Rs.....Lacs.
2. **For Service Enterprises:** Investment in equipment (original cost excluding land and
building and furniture, fittings and other items not directly related to the service
rendered or as may be notified under the MSMED Act, 2006:
Rs.Lacs.

The above investment of Rs.Lacs in within permissible limit of
Rs.....Lacs for.....Micro / Small (Strike off which is not
applicable) Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) (**Strike off which is
not applicable**) and the date of graduation of such enterprise from its original category is
..... (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of
such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013
published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name:

Membership Number:

Seal of Chartered Accountant

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved

in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

- 2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.
- 2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.
- 2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.
- 2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s). before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 4 – Compensation for Damages

- 4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/Bid Security,
- 4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

- 6.1 The Bidder(s)/ Contractor(s) undertake(s) to obtain from all subcontractors a commitment consistent with this Integrity Pact and report Compliance to the Principal. This commitment shall be taken only from those sub-contractors whose contract value is more than 20 % of Bidder's/ Contractor's contract value with the Principal. The Bidder(s)/ Contractor(s) shall continue to remain responsible for any default by his Sub-contractor(s).
- 6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.
- 6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders/ Contractors /Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 –Independent External Monitor(s)

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.
- 8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.
- 8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.
- 8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the

Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins and shall be binding on and from the submission of bid(s) by bidder(s). It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

For & On behalf of the Principal

(Office Seal)

For & On behalf of the Bidder/ Contractor

(Office Seal)

Place:_____

Date:_____

Witness: _____

(Name & Address) _____

Witness: _____

(Name & Address) _____



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भारत हेवी इलेक्ट्रिकल्स लिमिटेड

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Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

CE: PR: 003- Rev 01

PB 2606 , Mysore Road Bangalore , 560026 INDIA

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 01) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 01). These documents along with required annexures are available in our website: [www.bhel.in](#). These two documents along with Special Conditions of Contract annexed to this RFQ will form an integral part of the contract as and when the RFQ culminates into a Purchase Order / Contract.

RFQ No: NKR0000247

RFQ Date: As per E-Procurement System

Due Date: As per E-Procurement System

Customer/Project: RCF THAL

Item Description: VFD System

E-tendering – **Applicable**

TYPE OF BID: ~~SINGLE PART BID / TWO PART BID~~ **THREE PART BID**

Purchase Executives: Clarifications with regard to the tender shall be addressed to purchase officers whose e-mail IDs are given below: nilmanikumar@bhel.in or isaac@bhel.in or savitha@bhel.in

Submission of documents post PO viz., drawings /data sheet etc. as indicated in Cl: 04 of GCC: Within **3** weeks from the date of receipt of Purchase Order. Delay in submission of complete set of specified documents in NIT, will attract Penalty as per GCC Clause no.:04.a.

Splitting of tendered quantity to MSE vendors: The tendered quantity will /will not be split to MSE vendor/s subject to submission of relevant documents by vendors. Refer clause I of Instructions to Bidders for conditions applicable and for information on documents to be submitted.

Destination: a) For Indigenous scope of supply, items are to be directly despatched to respective project BHEL's Site Office or Stores located at/near Mumbai, Maharashtra State, India Consignee other details required for dispatch will be issued by BHEL along with Despatch Clearance.

b) For Imported scope of supply, destination is **Bangalore**. In case of shipment by sea, port of discharge will be any port in India seaport and port of delivery shall be ICD-Bangalore.

Project Benefits:

Imported scope of supply:

- ~~DEEC / SEZ/EPCG/DFIA/ Physical Export contract: Eligible for "NIL" Basic Customs Duty.~~
- ~~Project Imports: Eligible for Concessional Basic Custom Duty.~~
- ~~Basic Custom duty and Cess on Basic Custom duty are reimbursable by customer.~~
- Merit Duty is applicable

Terms of Delivery:

• **Indigenous scope of supply:**

Ex-works < _____ (station of dispatch)> (including Packing & Forwarding charges but excluding Taxes & Duties).

• **Imported scope of supply:**

F.C.A. (for air consignments) < _____ (indicate international port of dispatch) > / C.I.F. (for sea consignments) < ICD, Bangalore > (including Packing, Forwarding, Handling, Ancillary charges like processing of Sight Draft/ Letter of Credit, negotiation of bank documents, Export declaration, Country of Origin etc.).

Kindly indicate the approximate weight of the total imported consignment, which is required for calculating air-freight charges:

Under-mentioned details shall be provided against indigenous supplies and services:

a. GSTIN (no.) of place of supply: _____

b. HSN (Harmonized System of Nomenclature) code: _____

Applicable tax and Rate: _____ & _____

c. SAC (Service Accounting Code) no.: _____

Applicable tax and Rate: _____ & _____

d. If service is also involved, GSTIN (no.) of place of supply of service: _____

I. Bidders to mandatorily provide confirmation/compliance for the under-mentioned terms:

SL NO.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	REMARKS,if any
01	Reverse Auction	Will be intimated separately to qualified bidders after finalization of techno-commercial evaluation. Non-acceptance to participate in RA may result in non-consideration of the bid, in case BHEL decides to go for RA. In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) shall be opened as per BHEL's standard practice.	AGREE	
02	Delivery Period	Within 16 weeks from the date of issue of Manufacturing clearance along with approved document. Delay in contractual delivery will attract Penalty as per GCC Clause no.:04.b.	AGREE weeks	
03	Terms of Payment at the time of material supply	Refer Clause "F" of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms: Indigenous Scope: a) Supply with Erection & Commissioning b) Supply with Erection Supervision & Commissioning (For Main supply) c) Supply only (For spares) Imported Scope: d) Supply with Erection & Commissioning e) Supply with Erection Supervision & Commissioning (For Main supply) f) Supply only (For spares) High-Sea sales: g) Supply with Erection & Commissioning h) Supply with Erection Supervision & Commissioning (For Main supply) i) Supply only (For spares) Spares: c) and/or f)/i) depending upon the scope	AGREE	

II. Bidder to note that Deviations shall not be permitted for the below mentioned terms and are deemed to be complied. In case of non-compliance/deviation, offer shall be liable for rejection:

- Validity:** The offer will be valid for a period of **90** days from the date of part-I bid opening and in case of Negotiation/ Counter-offer/Reverse Auction, price validity will apply afresh for a period of **60** days from the date of according final price by bidder (or) upto original validity period, whichever is later.
- Guarantee/ Warranty:** **24** months from the date of dispatch of goods or **12** months from the date of commissioning of goods, whichever is earlier.
- Performance Bank Guarantee (PBG):** PBG will be applicable for a period of **24** months from the date of dispatch of goods + claim period of **03** months, for a value equal to 10% of the basic value of the purchase order. Refer Clause "H" of Instructions to

Bidders. Also note that PBG should be in the format specified in Annexure VII of ITB and no deviation to this format will be allowed.

Note: In case PBG is not furnished, the 10% basic amount will be withheld from the supply invoice. This withheld amount will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.

- (4) **Despatch Documents:** Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to Purchase Executive/BHEL directly. Depending upon the project/customer demands, despatch documents may include one or more documents from the following: Invoice (02 sets of original), Lorry Receipt (L/R), Packing List, Air Way Bill (AWB)/Bill Of Lading (BOL), Copy of High Sea Sales (HSS) agreement, Country of origin certificate, NIL Short Shipment Certificate, Original Performance Bank Guarantee (directly from issuing bank to BHEL), insurance intimation letter, POD (Proof of Delivery) on L/R.

The precise list of despatch documents needed for the project will be specified in the Purchase Order.

One set of Invoice, Packing List and L/R or AWB shall be e-mailed/faxed immediately to BHEL-EDN after despatch.

- (5) **Freight Charges (for indigenous scope of supply):** Freight charges shall be to vendor's account. Vendor to quote reasonable lump sum Freight charges separately, with applicable tax in priced offer.
- (6) Any additional commercial term or deviation in commercial term, if sought by any vendor, should be clearly brought out in this document (special commercial conditions of contract). Any additional commercial term or deviation in commercial term mentioned anywhere else shall be ignored and not be considered for evaluation.
- (7) **Evaluation criteria for tendered item/s:**

- (a) Items will not be split on item-wise lowest offer. Items shall be evaluated and procured as a combined package. (or)

~~(b) Items will not be split on item-wise lowest offer. Items shall be evaluated and procured as a combined package.~~

- ~~(8) **Integrity Pact:** Execution of Integrity Pact is applicable for this tender (Refer clause "K" of Instructions to Bidders)~~

~~Details of IEM for this tender are mentioned below:~~

Name: _____ Address: _____ Email: _____

With this, we hereby confirm that all the terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 01) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 01) are accepted without any deviation.

Vendor's Signature with Seal

Note B:

1. Any technical or commercial clarification for this tender can be raised on or before 07.08.2018. No clarification will be entertained by BHEL after given cutoff date.
2. **Wherever Indigenous suppliers are rendering E&C services at project site, NO separate/extra Erection supervision and commissioning charges shall be quoted.**
3. **In case Foreign suppliers are rendering E&C services at project site, separate E&C charge may be quoted . In such case request may be made to BHEL 1 week prior to due date of tender submission. BHEL will provide line item for quoting E&C charge in E-procurement portal to these vendors.**
4. Vendor has to mandatorily give break-up price of each item as per BOM of specification for each item spares
5. Third party inspection (TPI) outside India - Vendor's scope (arrangement including travel, lodging, boarding and applicable inspection charges). Vendor has to organize TPI from TUV / BVIS only
6. Packing standard -
 - A. For non-hazardous items, wooden packing shall be strong and efficient enough to ensure safe preservance upto the final point of destination
 - B. For hazardous/dangerous items, packing as specified in the applicable international regulations/standards
 - C. Mandatory Spares' boxes should be marked with
 - i) "BHEL EDN- Mandatory Spares for RCF THAL GTG HRSG(CE/1433)"
 - ii) "S" with red colour on all sides proportionate to the size of the box.

- iii) Spares shall be packed separately and identification marks tagged to each of the item ,containing the following information
- a. Details of equipment and Purchase Order
 - b. Nomenclature of part/component
 - c. Part No. and Drawing No
 - d. Serial No. of part in Purchase Order
 - e. Serial No. of part in catalogue