

TANGEDCO PROJECTS
1X800MW NORTH CHENNAI TPS
&
2X800MW UPPUR STPP

TECHNICAL SPECIFICATION
FOR
SOOT BLOWER MCC

BHEL DOCUMENT NO.: EP-4-TS-18001-001 REV 00



BHARAT HEAVY ELECTRICALS LIMITED
ELECTROPORCELAINS DIVISION
BANGALORE – 560012



DOCUMENT TITLE:

**TECHNICAL SPECIFICATION FOR
SOOT BLOWER MCC**

DOCUMENT NO.: EP-4-TS-18001-001

REV NO. :00; DATE:11/1/2018

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IT IS CONFIRMED THAT OUR TECHNICAL OFFER COMPLIES WITH THE SPECIFICATION IN TOTAL & THAT THERE ARE NO TECHNICAL DEVIATIONS.

BIDDER'S STAMP & SIGNATURE
(REFER INSTRUCTION NO. 1 OF INSTRUCTIONS TO BIDDERS)



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INSTRUCTIONS TO BIDDERS FOR PREPARING TECHNICAL OFFERS

1. One signed and stamped copies of the following shall be furnished by all bidders as technical offer:
 - a) Un-priced copy of all Price Schedule, duly stamped and signed by the bidder.
 - b) Complete dimension of all the boards including no. of panels, dimensions of each type of panels, module size of each type of feeders and minimum clearances required on all sides for each type of panels. No. Of Breaker panels, No. Of MCC panels, Weight & Dimensions of all boards
 - c) A copy of the sheet "Instructions to Bidders for Preparing Technical Offer" duly stamped and signed by the bidder.
 - d) A copy of sheet "List Of Contents" duly stamped and signed by the bidder.
 - e) Technical deviation/ clarification, if any
2. No technical submittal such as copies of type test certificates, data Sheets, write-up, drawing, technical literature, etc. is required during tender stage. Any such submission, even if made, shall not be considered as part of offer.
3. Confirmations/ comments (if any) regarding delivery schedules shall be furnished as part of the commercial offer. Any reference elsewhere/ covering letter of technical offer shall not be considered by BHEL.
4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.
5. Any changes made by the bidder in the price schedule with respect to the Item description/ quantities, notes etc. from those given in specification shall not be considered (i.e., technical description, quantities, notes etc. as per specification shall prevail).
6. Bidders to quote for all items/ sub items even if those are not in their manufacturing range.
7. Wherever ambiguity in specification is found same shall be clearly got clarified, if not BHEL decision is final regarding same.
8. Bidders to provide filled deviation sheet as per Annexure -J-DEVIATION SHEET only along with Techno-Commercial bid/ offers.

BIDDER'S STAMP & SIGNATURE



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SOOT BLOWER MCC**INFORMATION FOR FILLING PRICE BID FORMAT**

1. Items to be manufactured as per technical specification.
2. Prices of each line item shall be furnished in separate sealed price bid.
3. Following information shall also be furnished along with bid:
 - a) Catalogue of item offered. Dimension details to be provided.
 - b) Deviation sheet
 - c) Packing shall be as per vendor standard.
 - d) Unpriced bid.



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DEVIATION SHEET

Sl No.	Document Title	Clause No.	NIT requirement	Bidders Deviation

Total Number of Deviation(s):

(Both in figures & Words)

BIDDER'S STAMP & SIGNATURE

BHARAT HEAVY ELECTRICALS LIMITED,



**TECHNICAL SPECIFICATION FOR
SOOT BLOWER MOTOR CONTROL CENTRE (SBMCC)**

SPECIFICATION REF. CI:1818:SBMCC:SPEC / REV. 00

1 SCOPE

These specifications cover design, manufacture, testing and supply of 415 V AC Soot Blower Motor Control Centre (SBMCC).

2 STANDARDS

- 2.1 All materials, equipment's and accessories used in the manufacture shall conform to the latest editions of relevant Indian Standards including amendments and addenda
- 2.2 IS-694 PVC insulated unsheathed and sheathed cables/cords with rigid and flexible conductor for rated voltages up to and including 450/750V.
- 2.3 IS 13010 / IS 13779 part 3: A.C Electric Meters.
- 2.4 IS 1248: Direct acting Indicating analogue Electrical measuring instruments & their accessories.
- 2.5 IS 2705: Current Transformers.
- 2.6 IS 3043 : Code of practice for earthing
- 2.7 IS 3156: Voltage Transformers.
- 2.8 IS 3231: Electrical Relays for power System protection.
- 2.9 IS 5578: Guide for marking of insulated conductors.
- 2.10 IS 6005: Code of practice for phosphating of iron and steel.
- 2.11 IS 8623: Low voltage switchgear and control gear assemblies.
- 2.12 IS 10118: Code of practice for selection, Installation and Maintenance of switchgear and Control Gear.
- 2.13 IS 11353: Guide for uniform system marking and identification of conductors and apparatus terminals.
- 2.14 IS 12021: Specification for Control Transformers for Switchgear and Control gear for Voltages not Exceeding 1000 V AC.
- 2.15 IS 2551: Danger notice plates
- 2.16 IS 2629: Hot dip galvanising
- 2.17 IS 5082: Wrought aluminium and aluminium alloys for electrical purposes.
- 2.18 IS/IEC 60947-5-1: LV switchgear and control gear control current devices and switching element.
- 2.19 IS 8686: Static relays

- 2.20 IS 13703 / IEC 60269: HRC cartridge fuses
- 2.21 IS 11171: Specification for dry type transformers
- 2.22 IEC 60947-7-1: Terminal blocks for copper conductors
- 2.23 IS 513(2008): Cold rolled low carbon steel sheets and strips
- 2.24 IS 13703: Low voltage fuses for voltages not exceeding 1000V AC and 1500V DC.
- 2.25 IS 60947 (part-1): Low voltage switchgear and control gear- General rules.
- 2.26 IS 60947 (part-2): Low voltage switchgear and control gear- Circuit breakers.
- 2.27 IS 60947 (part-3): Low voltage switchgear and control gear- Switches, Disconnectors, Switch disconnectors and fuse combinations unit.
- 2.28 IS 60947 (part-4): Low voltage switchgear and control gear Contactors and motor starters.
- 2.29 BS 60947 (part1-4): Specification for low voltage switchgear and control gear.
- 2.30 In absence of specific Indian Standard Specifications, International Electro-technical Committee (IEC) Specification shall be followed.

3 CLIMATIC CONDITIONS

- 3.1 It should be noted in general that the switchgear shall be suitable for use in tropical climate with high humidity, heavy rainfall and climate conducive to fungus growth and corrosion. Design ambient temperature shall be assumed as 50 °C.
- 3.2 Site Conditions
 - a) Ambient temp. & RH for SG Auxiliaries design : 30 deg C & 75% RH
 - b) Ambient temp. & RH for performance & Efficiency guarantees : 30 deg C & 75% RH
 - c) Ambient temperature (max) : 45 deg C
 - d) Ambient temperature (min) : 15 deg C
 - e) Elevation above MSL (m) : 10
 - f) Seismic Zone : Zone-III as defined in IS 1893-2002
 - Zone factor : 0.16
 - Importance factor : 1.75
 - g) Wind load : IS 875 (Part 3)
 - Basic wind speed : 50m/sec (max)

4 SYSTEM

- 4.1 The electrical system voltage, frequency, fault level and circuit current ratings shall be 415V, 3Phase, 3Wire, 50Hz, 50KA for 1sec.
- 4.2 MCC shall be capable of operating continuously without adverse effects or overheating under all specified conditions of operation.
- 4.3 MCC shall be capable of withstanding fault currents equal to the system fault level without damage or danger to operating personnel.

5 CONSTRUCTION

- 5.1 MCC shall be fabricated using suitable mild steel structural sections or pressed and shaped Cold Rolled Cold Annealed (CRCA) sheet steel.
- 5.2 MCC shall be floor mounted, free standing, totally metal enclosed, compartmentalized, dust, damp and vermin proof and self-ventilated. Non-deteriorating gaskets to be used between all adjacent units and beneath all covers and doors for dust proofing. Stiffeners shall be provided wherever necessary.
- 5.3 The MCC shall be of bolted design. The complete structures shall be rigid, self-supporting and free from flaws, twists and bends. All cut-outs shall be true in shape and devoid of sharp edges.
- 5.4 MCC enclosure shall have minimum degree of protection - IP 54 (as per IS 60947). All cut-outs shall be provided with EPDM / Neoprene gaskets.
- 5.5 All switch operating handles and meters shall be between (As per project Drawings) from the bottom of base frame of MCC.
- 5.6 MCC shall be suitable for extension at both ends by the addition of vertical sections after removing the end covers. Ends of busbars shall be drilled for extension.
- 5.7 MCC shall be supplied with base frames made of structural steel sections, along with all necessary mounting hardware required for welding down the base frame to the foundation / steel insert plates. The minimum base frame channel height shall be 75mm
- 5.8 MCC shall be double front, fully drawout type. However fixed type can be accepted for control supply transformers feeders, incomers and jamming relay modules.
- 5.9 Minimum thickness of various members fabricated using CRCA sheet steel shall be as follows:
 - Base frame/ Gland Plate : As per concerned
 - Load bearing members : project drawings to
 - Internal partition / doors / covers : be taken care.
- 5.10 Hinges provided for doors shall be of concealed type.
- 5.11 Instruments / relays, indicating lamps, etc. of MCC incomer shall be mounted in a separate compartment adjacent to the incomer compartment.

- 5.12 MCC construction, mounting of various equipment viz. instruments, relays, busbars & secondary wiring and number of feeders per vertical panel shall be done with due consideration to the following:
- Facility for ease of operation, inspection, maintenance and repairs.
 - Minimum vibration and noise.
 - Minimum risk of accidental short circuits and open circuits
 - Inter changeability of modules.
 - Risk of Shock due to accidental contact with live parts and danger to personnel due to live parts.
 - Rating of vertical bus bars.
 - Conformity to the latest Indian Electricity Rules and other statutory regulation (in the state in which the installation is located) as regards safety, earthing and other essential provisions specified therein for installation and operation of electrical plants:
 - Subject to the above, the number of feeders per side of vertical section shall be limited to five for DOL / RDOL starters.
- 5.13 Four (4) nos. lifting hooks shall be provided for each section, two (2) nos. on either end of the section. Hooks shall not leave any openings in the MCC, when they are removed.
- 5.14 After isolation of power and control circuit connections, it shall be possible safely carry out maintenance in a compartment with the bus bar and adjacent circuit live. Necessary shrouding arrangement shall be provided for this purpose over the cable terminations located in cable alley.
- 5.15 MCC panel doors shall open by 90 deg or more.
- 5.16 A horizontal wire way extending the entire length of the assembly shall be provided at the top for inter-panel wiring. Incomers shall be provided at the ends of an assembly and bus section.
- 5.17 Dummy panels shall be provided wherever necessary to avoid column interference while running cables. The exact number, size and location of dummy panels will be informed during detailed engineering.
- 5.18 All equipment and materials used in construction of MCC shall be new and of approved make as per BHEL Standard Quality plan QA:CI:STD:QP:34/04. However, for components which are not appearing in the list, vendor can use their own make if available. For all other makes BHEL approval shall be obtained. However, the make of components shall be subject to BHEL /Customer's approval at the time of drawing approval.
- 5.19 TYPE OF COMPARTMENT
- Each feeders has to be housed in separate compartments. All compartments to be fully segregated from one another, as well as from bus bar chambers, with sheet steel barriers. Terminal chambers for incoming feeders to be segregated from those for outgoing feeders. Each feeder compartment shall have a separate door.
- 5.20 Bus-bar Compartment
- A completely enclosed bus bar compartment shall be provided for the horizontal and vertical bus bars. Bolted covers shall be provided for access to horizontal and vertical

busbars and all joints for repair and maintenance, which shall be feasible without disturbing any feeder compartment. Auxiliary and power busbars shall be in separate compartments.

5.21 MCC compartment :

All equipment associated with an incomer or outgoing feeder shall be housed in a separate compartment of the vertical section. The compartment shall be sheet steel enclosed on all sides with the withdrawable units in position or removed. Each vertical section shall have a removable back cover. The front of the compartment shall be provided with single leaf door with concealed hinges and captive screws for positive closure.

5.22 Cable compartment or cable alley

A full-height cable alley of minimum 250mm width shall be provided for power and control cables. Cable alley shall have no exposed live parts and shall have no communication with bus bar compartment. The termination for each module shall have its own integral glanding facility. The vendor shall furnish suitable plugs to cover the cable openings in the partition between feeder compartment and cable alley. Cable alley door shall be hinged.

5.23 All disconnecting contacts for power and control circuits of draw out modules shall be of robust and proven design, fully self-aligning and spring- loaded. Both fixed and moving contacts shall be silver-plated and replaceable. The spring-loaded power and control draw out contacts shall be on withdrawable chassis and the same on fixed portion shall not be accepted. The design shall be such as to permit easy/withdrawal/re-insertion of the unit with guide rails to ensure correct alignment.

5.24 Individual opening in the vertical bus enclosure shall permit the entry of moving contacts from the drawout modules into vertical droppers.

5.25 All equipment and components shall be neatly arranged and shall be easily accessible for operation and maintenance. The internal layout of all modules shall be subject to approval.

5.26 MCC shall be provided with undrilled, removable type gland plate, which shall cover the entire cable alley.

5.27 The minimum clearance in air between phases and between phases and earth for the entire run of horizontal and vertical busbars and bus-link connections shall be 25 mm. For all other components, the clearance between "two live parts", "a live part and an earthed part", shall be at least ten (10) mm throughout. Wherever it is not possible to maintain these clearances, insulation shall be provided by sleeving or barriers. However, for horizontal and vertical busbars the clearances specified above should be maintained even when the busbars are sleeved or insulated. All connections from the bus bars up to switch / fuses shall be fully shrouded / insulated and securely bolted to minimize the risk of phase to phase and phase to earth short circuits. Interpanel barriers shall be provided in bus bar compartment to prevent arc flashover travel along the switchboard.

5.28 Separate compartments shall be provided specifically for horizontal and vertical bus bar cable chambers, which will be fully and effectively segregated from one another.

5.29 All stationery structures shall be directly connected to the ground bus for effective grounding. All hinged doors shall be earthed through flexible copper braid wire.

5.30 TYPE OF FEEDERS

5.30.1 Fully draw out type

5.30.2 The draw out design shall have three positions - 'SERVICE', 'TEST' and 'ISOLATE' for motor starter feeders. Isolated condition is achieved when module is drawn out of test position. Service position is with door closed.

5.30.3 Position indicator shall be provided on the module to indicate the position of the feeder trolley viz. 'ISOLATE', 'TEST' and 'SERVICE'

5.30.4 There shall be provision for pad locking the trolley in all the three positions for complete safety.

5.30.5 Feeder compartments shall be totally closed from all sides, with a door on the front side.

5.30.6 The draw out portion of the modules shall be effectively connected to the earth bus through scraping contacts. It must be ensured that the drawout portion gets earthed both in service and test positions.

5.30.7 All Modules for feeders of same rating and type shall be interchangeable.

5.31 BUS BARS & INSULATION MATERIALS

5.31.1 The MCC shall have main horizontal and vertical busbars, housed in a separate compartment segregated from all other compartments, with sheet steel barriers. Busbars shall be of heat shrunk PVC sleeved Aluminium alloy, suitable for carrying the continuous rated and intermittent short time current without overheating. Busbars shall be adequately supported on insulators to withstand dynamic stresses due to short circuits. Bus bar support design should ensure free thermal expansion. The temperature rise of the horizontal and vertical bus bars and main bus link including all the power draw out contracts when carrying 90% of the rated current along the full run shall in no case exceed 55 deg C with silver plated joints and 40 deg C with all other types of joints over an ambient of 50 deg C. Location of Bus bar section shall be on the top of MCC. Bus bar support shall be 'SMC' or better compounds. For double front MCC, separate set of vertical busbars shall be provided for front and rear section of MCC.

5.31.2 All bus bar connections and bus taps to individual feeders shall be through links insulated with shrunk PVC sleeves. Bus bars shall be painted with Red, Yellow, Blue colours for easy identification of three phases.

5.31.3 Bus bar insulators shall be of track-resistant, high strength, non-hygroscopic, non-combustible type and suitable to withstand stresses due to over voltages and short circuit current. Insulators and barrier of inflammable material such as Hylam shall not be provided.

5.31.4 Vertical bus bars shall be designed for minimum current rating of 200A. These also shall be able to withstand full fault current as per the SLD.

- 5.31.5 Busbars for horizontal and vertical risers shall be of uniform cross section throughout the panel.
- 5.31.6 The bus bar joints shall be suitably treated to avoid oxidation / corrosion.
- 5.31.7 Wherever the busbars are painted with black Matt paint, the same should be suitable for temperature encountered in the switchboard under normal operating conditions.
- 5.31.8 All the bus bar sizes shall be selected based on the feeder ratings/fault level as given in SLD and also meeting above requirements.
- 5.31.9 The entire system and accessories should not contain any asbestos material.

6 EQUIPMENT / COMPONENTS

6.1 GENERAL

- 6.1.1 All feeders are to be provided with appropriate components and protective devices as called for in SLD and control schematics.
- 6.1.2 Indicating meters and instruments and protective relays of the incoming feeder shall be mounted in a separate compartment adjacent to the incoming feeder compartment. For outgoing feeders these may be mounted in the same compartment.
- 6.1.3 Starting current of motors will be 700% of the designated values shown in the SLD with $\pm 20\%$ variation. All the components selected for MCC shall be suitable to withstand worst case variations based on the tolerances indicated above for voltage and current. Selection of components shall be based on tested Type-II co-ordination chart.

6.2 MANUAL TRANSFER FOR INCOMER

Normally both the incomers & bus coupler shall be so interlocked using castle key that at any given point of time, any two out of three can be closed at a time. This is to avoid paralleling of two incomers.

6.3 MOULDED CASE CIRCUIT BREAKER (MCCB)

- 6.3.1 MCCB's shall be 3 pole, single throw, air break type having trip free mechanism with quick make quick break contacts conforming to as IS-60947 part 2) as specified in SLD.
- 6.3.2 Incomer MCCB's shall have thermo magnetic based thermal over current and short-circuit adjustable releases.
- 6.3.3 MCCB's shall have current limiting design & identical rating shall be physically and electrically interchangeable.
- 6.3.4 MCCB's shall be provided with minimum 1 NO and 1 NC electrically separate auxiliary contacts.

6.4 MOTOR PROTECTION CIRCUIT BREAKER (MPCB)

- 6.4.1 For Outgoing motor feeders MPCB shall be used. MPCB's shall conform to IS-60947 (part 1, 2 & 4) and shall have the short circuit breaking capacity as called for.
- 6.4.2 MPCB's shall have short circuit & single phasing protection only.
- 6.4.3 MPCB's shall have 1 NO + 1 NC integral auxiliary contacts and 1 NO + 1 NC fault signalling contacts.
- 6.4.4 In case of motor loads characteristics shall be selected so as to avoid tripping during starting.

6.5 FUSES

- 6.5.1 All fuses shall be non-deteriorating high rupturing capacity, link type mounted in suitable fuse carriers or fuse bases, conforming to IS 13703.
- 6.5.2 Fuses for motor feeders shall be properly co-ordinated with overload relay so that they do not operate during starting of the respective motors and shall provide adequate protection for all feeder components.
- 6.5.3 For switch fuse feeders, the rating of the fuse, if not specified, shall be same as that of the switch rating.
- 6.5.4 Fuses shall be provided with operation indicators and it shall be possible to change fuses with the circuit live. Visible indication shall be provided on blowing of fuse.
- 6.5.5 All fuses in control, indication and metering circuit shall be HRC cartridge type rated for 80 KA RMS (prospective breaking capacity at 415V)

6.6 CONTACTORS

- 6.6.1 Contactors shall be electromagnetic, air break type generally as per IS 60947 Part-4 suitable for Type 2 co-ordination.
- 6.6.2 All power contactors shall be rated for minimum 125% of feeder full load current. Minimum rating shall be not less than 16 Amps.
- 6.6.3 Coil voltage shall be as per scheme. Contactor coils shall operate satisfactorily and drop OFF at voltages as given in IS 60947 Part-4.
- 6.6.4 Power contactor shall have utilization category of AC3 for DOL starters and AC4 category for RDOL starters (as per IS 60947, Part- 4). For AC3 duty making capacity shall be minimum 10 times rated current and breaking capacity shall be minimum 8 times rated current. For AC4 duty making capacity shall be minimum 12 times rated current and breaking capacity shall be minimum 10 times rated current.

- 6.6.5 All power contactors shall be provided with minimum 2 Normally Open (NO) and 2 Normally Closed (NC) auxiliary contacts preferably convertible from NO to NC and vice versa.
- 6.6.6 All contactor coils shall be suitable for tropical climatic conditions specified elsewhere in this specification. Insulation Class for Coils - Class 'H'.
- 6.6.7 Reversible contactors shall be electrically and mechanically interlocked
- 6.6.8 All the terminals shall be shrouded such that they offer protection against finger contact.
- 6.7 BIMETAL RELAYS (BMR)
 - 6.7.1 All bimetal overload relays shall be of hand reset type with at least one NO and one NC contact with reset push buttons, mounted on door such that it shall be possible to reset the OIL relay with door closed.
 - 6.7.2 All bimetal relays shall have built-in single phasing prevention feature and ambient temperature compensation.
 - 6.7.3 Range of bimetal relays shall be generally 70% to 110% of circuit full load current.
- 6.8 INDICATING LAMPS
 - 6.8.1 Indicating lamps shall be cluster LED type. It should be noted that lenses should not get discoloured in course of time, due to the heat generated by the lamps. Lamp holder provided shall be suitable for easy removal I insertion of lamps.
 - 6.8.2 The colour of indicating lamps shall normally be the following unless otherwise specified in the control scheme :
 - Red - Feeder 'ON'
 - Green - Feeder 'OFF'
 - Amber - Feeder 'TRIP'
 - RYB – Phase indication for 3Ph A.C. supply.
- 6.9 CURRENT & POTENTIAL TRANSFORMERS
 - 6.9.1 The design and construction shall be sufficiently robust to withstand thermal and dynamic stresses due to maximum short circuit current available at the point of installation of current and potential transformer. The class of insulation shall be 'E' or better.
 - 6.9.2 Secondary terminals of the C.T. shall be brought out suitably to a disconnecting shorting link type terminal block which will easily be accessible for testing and external connections
 - 6.9.3 The CT & PT terminal marking shall be in accordance with IS. Name rating plate as per IS shall be provided on each CT and PT which shall be easily readable after opening the door.
 - 6.9.4 CT & PT shall be of encapsulated cast - resin type.

- 6.9.5 The accuracy class for Protection and metering CT shall be 5P20 and 1.0 respectively.
- 6.9.6 The accuracy class for Protection and metering PT shall be 3P and 1.0 respectively.
- 6.9.7 Current transformers shall preferably be capable of being left open on the secondary side with the primary circuit carrying rated full load current without overheating or damage.
- 6.9.8 Current transformers may be multi or single-core type. All voltage transformers shall be single phase type.
- 6.9.9 The bus VTs shall be housed in a separate compartment. All VTs shall have readily accessible HRC current limiting fuses on both primary and secondary sides.
- 6.9.10 All CTs shall be provided with supports independent of busbar / busbar supports.
- 6.9.11 The CTs shall be located in such a way that they can be easily approached for maintenance without necessitating shut down of adjacent feeders.

6.10 TRANSDUCERS

- 6.10.1 Transducer for conversion of AC electrical quantities such as voltage, current and Kilo watt shall be supplied as required for remote connection to Plant DCS. All transducer shall be dual output type class 0.5, 4-20mA linear output & 750 ohm load.
- 6.10.2 The transducer for indicating type instruments shall be of very low burden type having 4-20 mA DC linear, galvanically isolated output compatible with secondary instruments and Plant DCS.

6.11 CONTROL TRANSFORMER

- 6.11.1 For Control supply two nos. adequately rated 415/110V control transformer with necessary taps shall be provided. Insulation class 'B' or better. Auxiliary bus bars shall be used to distribute 110V AC control supply. 100% standby shall be ensured.
- 6.11.2 Control transformer shall be double wound, air cooled type with one leg of secondary earthed.
- 6.11.3 Control transformers to be capable of withstanding secondary short circuit for not less than 15 seconds.
- 6.11.4 VA rating of the Control transformer to be adequate to supply about 150% of the control loads of the MCC. Voltage regulation of the Control transformer shall be limited to 4%.
- 6.11.5 The control transformer shall be provided with easy changeover arrangement for feeding the complete bus from either transformer or independently.
- 6.11.6 The control transformers shall have $\pm 2.5\%$ or $\pm 5\%$ tapping on primary.

6.12 CONTROL AND SELECTOR SWITCHES

- 6.12.1 Control and selector switches shall be of heavy duty, rotary type with escutcheon plates clearly marked to show the positions. The control & selector switches should be as per IS/IEC 60947 Part V section 1. The switches shall be of sturdy construction suitable for mounting on panel front. Switches with shrouding of live parts and sealing of contacts against dust ingress shall be preferred. Name plates shall be provided for identification of switch operating positions.
- 6.12.2 Multi-Function Meter (MFM) shall be provided in the Incomer as per SLD. Multifunction meter shall cover Current, Voltage, kW, kVAR, kWH, power factor and frequency.
- 6.12.3 Contacts of the switches shall be spring assisted and shall be of suitable material to give a long trouble free service.

6.13 INSTRUMENTS AND RELAYS

- 6.13.1 All relays and instruments shall be flush mounting type. All indicating instruments shall be of industrial grade 'A' accuracy. Instruments shall be mounted in a dust-tight, damp-proof cases. Instruments and relays shall be able to withstand a high voltage test of 2000 volts (rms) for one minute. All meters/ instruments shall be flush mounted on front panel at least 96 sq.mm square size with 90° linear scale and accuracy class of 1.0. C.T. secondary rating and current setting range of relays shall be as per SLD.

6.14 EARTHING

- 6.14.1 The MCC shall be provided with a continuous earth bus of Galvanized steel having cross section 50X6 Sq. mm sufficient to carry the specified fault current for specified duration without exceeding the safe temperature throughout its entire length. Earth bus link shall be provided if shipping section is more than one.
- 6.14.2 All non-current carrying metal work of the MCC shall be effectively bonded to this earth bus. Bonding washers (star washers) shall be used when sections of MCC are bolted together to ensure earth continuity.

6.15 INTERNAL WIRING

- 6.15.1 MCC shall be complete with all internal wiring and ready for Purchaser's external cable connections at the outgoing terminals. All inter-modular wiring within the MCC for control and interlock looping shall be carried out by the MCC-manufacturer.
- 6.15.2 All control wiring inside the MCC shall be carried out with 1100 V grade HRPVC insulated multi strand copper wires of grey colour.
- 6.15.3 Minimum size of conductor for power and CT circuits shall be 2.5 sq. mm stranded copper. R / Y / B coloured wire shall be used for respective phases.
- 6.15.4 All control wiring shall be carried out with minimum 1.5 sq. mm stranded copper conductor.

- 6.15.5 All wiring shall be securely fixed and neatly arranged to enable easy tracing of wires. Suitable ferrules shall be provided on all terminals of the wiring.
- 6.15.6 All terminal blocks and wires shall be tagged for identification in accordance with IS 5578 and IS 11353.
- 6.15.7 All wiring for external connections shall be brought out to the individual terminals on a readily accessible terminal block. All terminal blocks shall be shrouded or provided with transparent covers. Minimum 1 NO + 1 NC unused contacts shall be wired up to terminal block. All the terminals shall be numbered.
- 6.15.8 Cage Clamp type control terminal blocks shall be provided for outgoing control cables. Minimum 20% or 4 nos. (Whichever is less) spare terminals shall be provided for future use. Control terminal block of different voltages shall be separated by means of an insulating barrier.
- 6.15.9 Power terminals of busbars, shall have terminal holes and fitted with cable lugs and bolts suitable for the cables specified.
- 6.15.10 All wiring terminations shall be carried out with ATC lugs of suitable size.
- 6.15.11 Terminal blocks shall be 1100V grade, 10Amps rated, stud-type made up of unbreakable polyamide 6.6 grade. The terminals shall be either screw type or screw-less (spring loaded) (for power cables) / cage clamp type (for control cables) with lugs. Marking on terminal strips shall correspond to the terminal numbering in wiring diagrams. All metal parts shall be of non-ferrous material. In case of screw type terminals the screw shall be captive, preferably with screw locking design.
- 6.15.12 Terminal blocks shall be provided with links to facilitate testing, isolation star / delta formation and earthing. Terminal blocks for CT secondary shall have the short circuiting facility. The terminals for remote ammeter connection etc. shall also be disconnecting type only.
- 6.15.13 Terminal blocks shall be arranged with at least 100mm clearance between two sets of terminal blocks. The minimum clearance between the first row of terminal blocks and the associated cable gland plate shall be 250 mm.

6.16 SPACE HEATERS - MCC

- 6.16.1 Adequately rated anti-condensation space heaters shall be provided in cable alleys of each vertical sections of the MCC to maintain MCC inside temperature, 5°C above outside ambient temperature.
- 6.16.2 Space heater shall be strip type, rated for operation on 240V, Single Phase, 50 Hz. AC. supply.
- 6.16.3 Each space heater shall be complete with a toggle switch (min of 6 Amps), HRC fuse/MCB in the phase, neutral link in neutral and a control thermostat. In addition, the space heater circuit of each panel shall also have a thermostat of suitable rating.
- 6.16.4 5A / 3 pin plug power socket with MCB shall be provided in each vertical section.

6.17 CABLE TERMINATIONS

- 6.17.1 Cable entry to MCC shall be from bottom of the MCC.
- 6.17.2 Ample space shall be provided in the cable compartment for external cabling.
- 6.17.3 Access for cabling shall be from the front.
- 6.17.4 Power / control termination shall be properly shrouded so that there is no accidental touch to other live terminals while working on any terminal block. For this, power terminations shall be properly shrouded and segregated from terminal blocks of other feeders.
- 6.17.5 All power and control terminals from fixed portion of the panel shall be wired up to power and control terminals in respective cable alley for external cable termination.
- 6.17.6 For all external Incoming cables (power and control cable) to MCC, two sets of double compression weather proof brass cable glands for the cable sizes indicated in the SLD shall be provided.
- 6.17.7 Cable lugs suitable for the power and control TB's supplied by vendor inside MCC to be supplied by vendor as loose item.
- 6.17.8 For outgoing feeders:
Two sets of cable lugs shall be provided for all outgoing feeders. Lugs suitable for connection of power, control and instrumentation cable shall be provided. Cable sizes shall be indicated in the SLD.
- 6.17.9 For incomer feeders: As applicable for the cable sizes indicated in the SLD.

6.18 PAINTING AND FINISHING

- 6.18.1 All metal surfaces shall be thoroughly cleaned and degreased to remove scale, rust, grease and dirt. Fabricated structures shall be pickled and then rinsed to remove any trace of acid. The surface shall be made free from all Imperfections before undertaking the finishing coat.
- 6.18.2 After preparation of the surface, the switchboard shall be powder coated with two coats of epoxy based electrostatic power painting of minimum 80-100 microns of final painting. The finished panels shall be dried in stowing ovens in dust free atmosphere. Panel finish shall be free from imperfections like pinholes, orange peels, run off paint etc.
- 6.18.3 Paint colour shall be as follows :
 - External : As per project related
 - Internal : drawings.
 - Base :
 - Mounting Plate :
- 6.18.4 All unpainted steel parts shall be cadmium plated or suitably treated to prevent rust formation. If these parts are moving elements then they shall be greased.

6.19 NAME PLATES AND LABELS

- 6.19.1 One nameplate (minimum size 40X150X3 mm) of anodized aluminium/lamicaid giving designation of the MCC shall be affixed prominently on top of the MCC. Details of designation will be specified.
- 6.19.2 Labels giving following details shall be affixed on each feeder compartment.
- | |
|--|
| Feeder No. |
| Equipment Reference Number and Description |
| Rating (KW / KVA / AMP) |
- 6.19.3 All components whether mounted inside the MCC or on the door shall be permanently and clearly labelled with reference number and/or letter of their function.
- 6.19.4 Label size shall be minimum 20X75mm for instruments / devices. All labels shall be non-corrodible laminated plastic with minimum 3mm thickness with white letters on black background. Alternatively, anodised aluminium label with white letters on black background is also acceptable.
- 6.19.5 Labels for feeder designation shall be fixed on the front side of respective feeder with chrome plated, self-tapping and countersunk head screws. These labels shall be identical size to permit interchange. Spare feeders shall have blank labels to enable engraving in later stage, if necessary.
- 6.19.6 Caution notice on suitable metal plate shall be affixed both at the front and back of each vertical panel.

7 DOCUMENTS TO BE SUBMITTED

7.1 Along with Offer

Only confirmation to enquiry specification shall be indicated in the offer. If any deviation is there from the enquiry specification the same shall be brought out clearly in the sub-delivery enquiry deviation format available along with the enquiry.

7.2 After Placement of Order

The following Drawings / Details shall be furnished within 15 days from the date of Purchase order.

- 7.2.1 GA Drawing with all details like front, foundation plan, floor cut-outs, transport sections with weight etc.
- 7.2.2 Single line diagram showing all the feeders.
- 7.2.3 Detailed BOM with make, model no., quantity etc.
- 7.2.4 Power & control schemes for each feeders, incomers based on the SLD and schemes furnished by BHEL. Marshalling compartment interconnection with terminal details.

- 7.2.5 Terminal Plan showing terminal numbers, ferrule numbers, device terminal numbers, etc.
- 7.2.6 Sizes of Main busbars (phase and neutral), Vertical busbars and earth busbar and calculations for justifying the selection shall be furnished.
- 7.2.7 3 copies of Erection, Commissioning, Operation and Maintenance Manual, complete with all relevant information, drawings, literatures, BOM, Relay Characteristics, etc.
- 7.2.8 2 sets of CD for the above Manual.

8 TESTING, INSPECTION AND PACKING

- 8.1 After completion of all work at the manufacturer's facility, MCC shall be inspected and tests witnessed by the Purchaser's Representative.
- 8.2 Vendor to ensure type-II co-ordination for all DOL starter feeders.
- 8.3 Customer approved quality plan as per enquiry shall be followed for meeting the quality requirements.
- 8.4 All routine tests and checks as specified in the above Quality Plan shall be carried out by vendor.
- 8.5 Type test requirements:-

The following type test certificates on each type and rating of SBMCC panel shall be carried out by the vendor in the name of BHEL as manufacturer event of order and shall be offered for witness by BHEL.

- a) Degree of protection tests
- b) Temperature rise test
- c) Short circuit test bus bar fault level
- d) Type-II short circuit co-ordination test for any three rating of SBMCC modules.

- 8.6 Vendor shall provide all facilities such as power supply, testing instruments and apparatus required for carrying out the tests. Required copies of test certificates for all the tests carried out along with copies of type test certificates and certificates from sub vendor for the components procured from them are to be submitted before despatch of the MCC.

8.7 The product will be installed in the Name of BHEL and vendor shall perform type test in the name of BHEL as Manufacturer at CPRI/ ERDA laboratory.

PROJECT: 1X800MW NORTH CHENNAI TPS



1X800 MW COAL BASED NORTH CHENNAI THERMAL POWER PROJECT STAGE III

CHAPTER 2 PROJECT INFORMATION

1.1 GENERAL

TANGEDCO has planned to establish 1X800MW Coal Based Super Critical North Chennai Thermal Power Project Stage III in the premises of existing NCTPS at Ennore & Puzhuthivakkam Village, Ponneri Taluk, Thiruvallur District, Tamil Nadu, India. This project will be executed in two package mode i.e, BTG with related Civil Works and BOP with related Civil Works.

1.2 LOCATION

The proposed site for main power plant is located near Ennore port (approx 5 km) and also 35 km from Chennai City.

The nearest Railway station is at Athipattu Pudunagar (approx 5 km)

All weather road from Pattamandri on the Thiruvotriyur-Ponneri highway is the nearest road access.

The nearest airport is at Chennai at a distance of 60 km.

1.3 PROJECT INFORMATION

1.1	Project Title	:	1 x 800 MW North Chennai Coal Based Super Critical Thermal Power Project Stage III.
1.2	Plant capacity	:	800 MW
1.3	Type of project	:	Brown field
1.4	Owner	:	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)
1.5	Plant site location	:	In the premises of North Chennai Thermal Power Station (NCTPS)
1.6	Location co-ordinates	:	80° 19' E to 80° 20' E Longitude 13° 13' N to 13° 18' N Latitude
1.7	Nearest Village	:	Ennore & Puzhuthivakkam Village
1.8	Nearest Town & City	:	Chennai (35 Km)
1.9	State Capital	:	Chennai (35 Km)



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1.10	Nearest Railway Station	:	Athipattu Pudunagar (5 Km) on Chennai Vi ayawada Line
1.11	Nearest Airport	:	Chennai (60 Km)
1.12	Nearest Seaport	:	Ennore (3 Km)
1.13	Nearest Road access	:	All weather road from Pattamandri on the Thiruvottiyur Ponneri highway
2.0	Meteorological Condition		
2.1	Climate	:	Tropical, very dry and hot summer, dry and cold winter and good rain-fall in monsoon accompanied with strong wind
2.2	Site Elevation	:	(+) 10.0 Meter above Mean Sea Level
2.3	Ambient Temperature		
a.	Annual Maximum Mean Temperature	:	45 C
b.	Annual Minimum Mean Temperature	:	15 C
c.	Design ambient temperature	:	30 C
2.4	Relative Humidity		
a.	Maximum	:	90
b.	Minimum	:	36
c.	Design	:	75
2.5	Annual Rainfall		
	Maximum	:	2540 mm
	Average	:	1600 mm
	Minimum	:	1175 mm
2.6	Basic Design Wind Pressure	:	As per IS: 875 (Latest Edition)



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2.7	Wind Speed	:	11.8 kmph (Avg), 50 m/s (max)
2.7	Seismic zone	:	Zone: III as defined in IS:1893-2002
2.8	Design ambient temperature for Electrical equipment	:	50 C

1.4 ACCESS TO SITE

Site is well connected to all weather road from Pattamandri on the Thiruvotriyur Ponneri highway. Site is located adjacent to the Chennai Howrah broad gauge line and thus well connected by rail also.

1.5 PLANT RATING CAPACITY AVAILABILITY PLF

Plant continuous rating will be 800MW at Generator terminals based on the following site conditions.

- Ambient Air temperature
- Condenser cooling water inlet temperature of 33 Deg. C and 9 Deg. C temperature rise across the condenser.
- Generator Power factor of 0.85
- Fuel Specification as given elsewhere
- Design temperature of electrical equipment is 50 Deg. C

The VVO capacity of the steam turbine shall not be less than 105 TMCR flow at rated parameters. Boiler maximum Continuous Rating (MCR) is at least 1.02 times the steam flow at turbine VVO condition plus continuous auxiliary steam requirement of unit at TMCR, rounded to next integer divisible by 5.

The capacity of the unit is selected so as to deliver the rated output even after ageing that will occur between overhauls, as a result of deposition of salts in turbine blades, wear and tear etc. The plant load factor (PLF) being considered is 85 %.

1.6 SOURCES OF FUEL

TANGEDCO has long term linkage of Coal from the coal sources of Talcher or Mahanadi in Orissa. Domestic coal requirement for the power plant will be sourced from kalinga block of the Talcher, Mahanadhi and IB valley coal field.

The Imported coal has been sourced from foreign countries through sea to Ennore port. The coal will be conveyed from port through conveying system.

The steam generator shall be designed for the following conditions:

Best Coal	100	Imported Coal	
Design Coal	70	Imported & 30	Domestic Coal
Worst Coal	50	Imported & 50	Domestic Coal

LT Switchgear



1X800 MW COAL BASED NORTH CHENNAI THERMAL POWER PROJECT STAGE III

2.2.11 LT SWITCHGEAR

2.2.11.1 CODES AND STANDARDS

All equipment and materials shall be designed, manufactured and tested in accordance with the latest editions including all applicable official amendments of relevant Indian Standards (IS) and IEC except where modified and/or supplemented by this specification.

Equipment and material conforming to any other standards, which ensure equal or better quality, may be accepted. In such case, copies of the English version of the standard adopted shall be submitted along with the bid.

The electrical installation shall meet the requirements of Indian Electricity Rules as amended up to date and relevant IS Code of Practice. In addition, other rules and regulations applicable to the work shall be followed.

All works shall be carried out as per the following codes and standards.

Sl.No	Code	Description
1	IEC-60947 IEC-60439 IS-13947	Low voltage switchgear and control gear assemblies.
2	IS-8623	Specification for Low-Voltage Switchgear and Control gear Assemblies
3	IEC-60664 IS-15382	Insulation coordination for equipment with low voltage systems
4	IEC-60044	Instrument transformers
5	IEC-60529	Degrees of protection provided by enclosures
6	IS-13118	High Voltage alternating circuit breakers
7	IS-2675	Enclosed distribution fuse boards and cut outs for voltages not exceeding 1000 V AC and 1200 V DC
8	IS-8828	Electrical Accessories – Circuit breaker for over current Protection
9	IS -12021	Specification for Control transformer for switchgear and control gear for voltages not exceeding 1000V AC
10	IS-5082	Wrought aluminium & aluminium alloy for electrical Purposes
11	IS-13703	Specification for low voltage fuses for voltages not exceeding 1000 V AC and 1500 V



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		DC
12	IS-8187	Specification for D Type fuses
13	IS- 6005	Code of practice for phosphating iron and steel
14	IS-694	694 PVC insulated cables for working voltages up to and including 1100
15	IS-722	AC Electricity Meters
16	IS-1248	Electrical Indicating instruments
17	IS-2551	Danger Notice Plates
18	IS-2629	Hot dip galvanizing
19	IS-2705	Current Transformers
20	IS-3043	Code of practice for earthing
21	IS-3072	Code of practice for installation and maintenance of Switchgear
22	IS-3156	Voltage Transformers
23	IS-3202	Code of practice for climate proofing of electrical equipment
24	IS-3231	Electrical relays for power system protection
25	IS-8686	Static Relays
26	IS-10118 (4 parts)	Code of practice for selection, installation and maintenance of switchgear and control gear
27	IS-11171	Specification for dry type transformers
28	IS-11353	Guide for uniform system of marking and identification of conductors and apparatus terminals

2.2.11.3.1 TYPE

Circuit Breakers	Shall be air break, three pole, spring charged, and horizontal
Switchgear	Fully draw out type single front



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MCC	Fully draw out type single front/Double front.
ACDB/DCDB	Fixed type single front

2.2.11.3.2 SYSTEM PARAMETERS

1)	Nominal system voltage	415 V AC	220 V DC
2)	Highest system Voltage	433 V	240 V DC
3)	Voltage variation	±10%	190 - 240
4)	Rated frequency	50 HZ	-
5)	Frequency variation	+3% to (-5%)	-
6)	One minute Power	2.5 kV	2.5 kV
	frequency withstand voltage Main circuit Auxiliary Circuit	2.0 KV	2.0 KV
7)	System Earthing	Solidly Grounded	Unearthed
8)	Maximum system fault level	50KA for 1sec	25KA for 1 sec

2.2.11.3.3 General Technical Requirements

Power from LV service transformers shall be supplied to 415 V switchgears. Power from 415 switchgears to the various MCCs, PDBs, ACDBs etc. shall be supplied from redundant incomers. These switchgears shall distribute power to LV auxiliary motors and also to other auxiliary loads viz. MCCs / ACDBs, etc. LV switchgears shall be of metal enclosed indoor type. Incomers / bus-couplers, outgoing tie feeders rated 630A & above and motor feeders rated 90 kW & above shall be equipped with air circuit breakers of fault interrupting capacity of 50 KA rms.

All PCC/PMCC/MCC shall be of intelligent type compatible with IEC-61850 communication protocol. Utility MCCs like service building MCC, Welding DBs, AC & Ventilation MCCs, etc., shall be non-intelligent type.



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All the boards shall be sectionalized, except for turbine valve DB.

Not more than 2 out of 3 ACBs can be closed at a time unless at the time of planned short time paralleling through synchro check.

Under normal mode of operation each incoming source shall be connected to the respective bus sections with bus coupler open.

During the normal mode of operation if there is a loss of normal source to any bus-section, slow bus auto changeover shall be initiated to first trip the normal incomer connected to this section and further close the bus coupler to extend power from healthy bus section.

Restoration of normal operating condition (described in 1.14.6 above) shall be through planned manual changeover through synchro check paralleling or manual dead bus closing.

In case parallel running between two sources prolong over a set time, an alarm shall be generated and the last ACB to close shall be opened.

The AC control supply voltage for motors rated below 90 kW shall be 110V AC. For this purpose each motor feeder of PMCC/MCC shall be provided with suitable rated 415/110V Control Transformer. Separate control transformer for test bus supply shall be provided for each bus section.

All circuit breakers shall have 220V DC control.



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2.2.11.2 TEMPERATURE RISE

The temperature rise of the horizontal and vertical busbars and main bus link including all the power drawout contracts when carrying 90% of the rated current along the full run shall in no case exceed 55 deg c with silver plated joints and 40 deg c with all other types of joints over an ambient of 50 deg c.

2.2.11.3 OPERATIONAL REQUIREMENTS

2.2.11.3.1 Breakers

- I. Breakers shall have anti-pumping feature and it shall be electrically drawout type. The incomer and bus coupler breakers for switchgear shall be electrically operated with over current releases or relays.
- II. Breakers shall have inherent fault making and breaking capacities. They shall have shunt trip coils. In case releases are offered, the same shall have contact for energisation of lockout relay. All breakers Shall have built in interlocks for equipment and personnel safety
- III. Paralleling of two supplies shall be avoided by except for switchgear where auto-changeover is provided. Breaker contact multiplication, if required, shall be through latch relay.
- IV. Mechanical tripping shall be through red 'Trip' push button outside the panels for breakers, and through control switches for other circuits.
- V. Provision of mechanical closing of breaker only in 'Test' and 'Withdrawn' position shall be made. Alternatively, mechanical closing facility should be normally inaccessible, accessibility rendered only after deliberate removal of shrouds. It shall be possible to close the door with breaker in test position.
- VI. Clear status indication for each circuit shall be provided through lamps, switch positions or other mechanical means.
- VII. Supervision relay shall be provided for trip coil monitoring

2.2.11.3.2 Switches, Contactors and Fuses

- a. Incomers for MCCs and DBs rated up to 630A could be MCCB's & for above ratings ACB are preferred.
 - b. Motor starter contactors shall be of air break, electromagnetic type suitable for DOL starting of motor, and shall be of utilisation category AC-3 for ordinary and AC-4 for reversing starters. DC contactor shall be of DC-3 utilisation category.
-



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- c. Fuses shall be HRC, preferably link type, with a minimum interrupting capacity equal to the short circuit current of the LT system. Fuses shall be furnished complete with fuse bases and fittings of such design as to permit easy and safe replacement of fuse element. Visible indication shall be provided on blowing of the fuse.
- d. Motor fuse characteristics and ratings shall be chosen to ride over starting period without blowing. The fuse on incoming feeder wherever provided, shall be chosen to provide discrimination with motor/feeder fuses.
- e. Isolating switches and MCCBs shall have door interlocks and padlocking facility.
- f. Wherever two incoming switches and one bus-section switch/breaker are provided for an assembly, these shall be electrically interlocked to ensure that only two out of the three can be closed at time.
- g. Wherever two incoming switches are provided for an assembly, these shall be electrically interlocked to ensure that one of the two can be closed at time.

2.2.11.3.3 Panels

- a. All switchgears, MCCs, DBs, panels, modules, local starters and push buttons shall have prominent engraved identification plates.
 - b. Local push button stations shall have metal enclosure of die cast aluminium or rolled sheet steel of 1.6mm thickness & shall be of DOP IP55. Push buttons shall be of latch type with mushroom knobs.
 - c. Where breaker/starter module front serves as compartment cover, suitable blanking covers, one for each size of modules per switchboard shall be supplied for use when carriage is withdrawn.
 - d. All non-current carrying metal work of boards/panels shall be effectively bonded to earth bus of galvanised steel, extending throughout the switchboard/MCC/DB. Positive earthing shall be maintained for all positions of chassis and breaker frame.
 - e. Suitable trolley arrangement shall be provided for breaker/starter modules. Two trolleys per switchgear room shall be provided so that top most breaker module of all types, sizes and rating can be withdrawn on trolley and lowered for maintenance purpose.
-



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- f. The incoming connection to transformer of more than 1000KVA and inter-connecting Sections between switchboards shall preferably be of bus ducts. The bus duct enclosure shall be made of minimum 3mm thick aluminium alloy. The section of the bus duct should have adequate strength to withstand internal and external forces resulting from the various operating conditions. Aluminium sheet hood shall be provided for outdoor bus duct enclosure joints to provide additional protection against water ingress. The bus duct top shall be sloped to prevent retention of water. The bus duct shall have DOP of IP55.
- g. It should be possible to carryout maintenance on a feeder with adjacent feeders alive

2.2.11.3.4 Control, Protection & Metering Requirements

- i) Control circuits shall operate at suitable voltage of 110V AC or 220V DC. Necessary control supply transformers having primary and secondary fuses shall be provided for each MCC, 2 x 100% per section. However the breakers shall operate on 220V DC. The auxiliary bus bars for control supply shall be segregated from main bus bars. The control supplies shall be monitored.
 - ii) Contractor shall fully co-ordinate overload and short circuit tripping of breaker with upstream and downstream breakers/fuses/MCCBs motor starters. Various equipment's shall meet requirement of Type-II class of coordination as per IEC.
 - iii) All relays and timers shall operate on available DC supply and not have any inbuilt batteries. They shall be provided with hand-reset operation indicator (flags) or LEDs with pushbuttons for resetting.
 - iv) All equipment's shall have necessary protections. However, following minimum protections shall be provided:

MPCB with Contactor controlled LV motor feeders (Motors rated 18.5kW & below) having intelligent controller
 - a. Instantaneous short circuit protection
 - b. Overload protection
 - v) MCCB with Contactor controlled LV motor feeders (Motors rated above 18.5kW but below 90 kW) having intelligent controller
 - a. Instantaneous short circuit protection
-



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- b. Overload protection
 - vi) Single phasing protection for motors rated 30 kW and above rating
 - vii) In Instantaneous short circuit protection on all phases through HRC cartridge type fuses / MCCB rated for 80 kA rms (prospective breaking capacity at 415V).
 - viii) Thermal overload protection
 - ix) Single phasing protection for motors protected by fuses.
 - x) Breaker controlled motors feeders (motors rated above 90kW) Numerical, comprehensive motor protection relay with following minimum facility as indicated below :
 - a. Instantaneous short circuit protection
 - b. Overload protection
 - c. Under voltage protection
 - d. Locked Rotor protection
 - e. Earth fault protection
 - f. Current unbalance.
 - g. Temperature monitoring (stator, bearing etc.).
 - h. Phase reversal.
 - i. Thermal model based with RTD feedback and negative sequence current.
 - j. Voltage compensated acceleration.
 - xi) Incomers (ACB):
 - a. 3 ph IDMT Overcurrent & earth fault protection (51,51N)
 - b. 3 ph Instantaneous Overcurrent protection (50)
-



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- c. Standby earth fault protection for service transformer protection (connected on transformer neutral CT side)
 - d. Under voltage protection (27) with Timer & Fuse failure protection
 - e. Neutral dEviation relay
 - xii) Buscoupler (ACB):
 - a. 3ph IDMT Overcurrent & earth fault protection (51 & 51N)
 - b. Sync check relay (25)
 - xiii) Bus PT:
 - a. Under voltage protection (27)
 - b. No voltage protection (27)
 - c. Fuse failure protection (97)
 - xiv) ACB outgoing feeders:
 - 3 ph IDMT Overcurrent protection (51, 51N)
 - xv) Incomer from DG Set.
 - a) Differential Protection (87) - Three Pole
 - b) Reverse Power Protection.
 - c) Overload Alarm on one phase
 - d) Earth Fault Detection Relay (64)
 - e) Voltage controlled Overcurrent relay
 - f) Generator under/over voltage Protection
 - g) Hand Reset/Lockout Relay with a blue lamp.
 - h) 3 Phase Energy Meter having accuracy of 1.0 class
-



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Apart from protection relays, each electrically operated breaker shall also be provided with Anti pumping (94), trip annunciation(30), lockout (86). Lockout supervision (95) and trip supervision (74) relays. Lockout relay shall be hand reset type.

2.2.11.3.5 Meters / instruments

- I. All meters/ instrument shall be flush mounted on front panel, at least 96 sq.mm. Size with 90 degree linear scales and accuracy class of 2.0. All motors above 7.5 kW shall have directly connected ammeter and Motors above 30kW shall have CT connected Ammeter with ASS. Necessary Current transducers shall be provided for the same. Bus-section shall have bus VT, voltmeter with selector switch, and other relay and timers required for protection. Adequate control and selector switches, push buttons and indicating lamps shall be provided. Thermostatically controlled space heaters with switches shall be provided to prevent condensation.
- II. All Incomer feeders shall be provided with MFM, Ammeter with selector switches & with necessary kW transducer, Current transducers etc., Bus PT feeder shall be provided with Voltmeter + VSS & necessary Transducers. All Outgoing supply feeders shall be provided with Ammeters + ASS & necessary transducers.
 - a. In case of remote controlled breaker panels, following shall be ensured. Each feeder shall have local/remote selector switch. Closing from local shall be possible only in test position whereas closing from remote shall be possible in either service or test position. Tripping from local shall be possible only when local/remote selector switch is in local position. Tripping from remote shall be either breaker in service position or selector switch being in remote position.
 - b. Control from Remote Necessary hardware shall be provided in the switchgear panel like coupling relays (24V DC, with max. burden of 2.5VA), auxiliary relays, current/voltage transducers (4-20 mA, dual output) etc. to effect interlocks, exchange information / status and exercise control from remote.

2.2.11.3.6 DESIGN AND CONSTRUCTIONAL FEATURES

- 1) All 415V switch gear motor control centres (MCCs), AC & DC distribution boards (DB s), etc. shall have following features
 - 2) Shall be of metal enclosed, indoor, floor mounted and free standing type.
-



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- 3) All frames and load bearing members shall be fabricated using mild steel structural sections or pressed and shaped cold rolled sheet steel of thickness not less than 2mm.
 - 4) Frame shall be enclosed in cold rolled sheet steel of thickness not less than 1.6mm. Doors and covers shall also be of cold rolled sheet steel of thickness not less than 1.6 mm. Stiffeners shall be provided wherever necessary. Removable gland plates of thickness 3mm (hot/cold rolled sheet steel) or 4 mm (non-magnetic material) shall be provided for all panels.
 - 5) All switchboards/panels shall be of dust and vermin proof. All cut-outs shall have synthetic rubber gaskets.
 - 6) All switchboards, MCCs and DB s shall have following distinct vertical sections.
 - i) Completely enclosed bus bar compartment for horizontal and vertical busbars.
 - ii) Completely enclosed switchgear compartments (one for each circuit housing circuit breakers, motor starter or switch-fuse feeder).
 - iii) Compartment for cable alley or cable box for power and control cables. In case of cable box, they shall be segregated with complete shrouding for individual feeders at the rear for direct termination of cables.
 - iv) For cable connection to circuit breaker a separately enclosed cable compartment shall also be acceptable.
 - v) Compartment for relays and other control devices associated with a circuit breaker, wherever necessary.
 - vi) The switchboards/MCC/DBs of 1600A & above rating shall be of DOP IP42 & of IP52 for less than 1600A rating.
 - vii) All 415V switchgears, MCC's, AC & DC distribution boards etc. shall be painted by powder coating process. Paint shade for complete panels excluding end covers shall be RAL7032 for extreme end covers of all boards.
 - 7) Busbars shall be of high conductivity aluminium alloy or copper.
 - 8) Minimum air clearance in air between phases and phase-earth shall be 25 mm for busbars and cable terminations. For all other components, the Clearances
-



1X800 MW COAL BASED NORTH CHENNAI THERMAL POWER PROJECT STAGE III

shall be at least 10mm. wherever above is not possible except for horizontal and vertical busbars, insulation shall be provided by anti-tracking sleeving or barriers. However for horizontal and vertical busbars, clearances specified above shall be maintained even when busbars are insulated/sleeved. In case of DC DBs/ fuse boards, the busbar system shall be insulated or physically segregated with barriers to prevent interpole short circuit.

- 9) Minimum air clearance in air between phases and phase-earth shall be 25 mm for busbars and cable terminations. For all other components, the Clearances shall be at least 10mm. Wherever above is not possible except for horizontal and vertical busbars, insulation shall be provided by anti-tracking sleeving or barriers. However for horizontal and vertical busbars, clearances specified above shall be maintained even when busbars are insulated/sleeved. In case of DC DBs/ fuse boards, the busbar system shall be insulated or physically segregated with barriers to prevent interpole short circuit.
 - 10) Busbar insulators shall be of track-resistant high strength non-hygro- scopic, non- combustible type and suitable to withstand stresses due to over-voltages and short circuit current. Insulators and barrier of inflammable material such as Hylam shall not be accepted.
 - 11) All types of relays and timer shall be subject to Purchaser's approval. They shall be flush mounted with connections from inside, and shall have transparent & dust tight cover, removable from front, drawout construction for easy replacement and testing facility. The auxiliary relays and timer may be provided in fixed cases.
 - 12) Maxi terminal /cage clamp type terminal blocks shall be provided for signals to be interfaced with DDCMIS/PLC.
 - 13) The switchgears/MCC shall be designed to offer adequate level of safety to operating/ maintenance personnel. Means shall be provided to prevent access to the live part to avoid accidents during service as well as maintenance period. Bidder shall bring out the safety means provided to achieve above. A detailed instruction plate suitable for wall mounting shall be provided for each switchgear/MCC room discribing various safe operating procedure/safety precautions for safe operation and maintenance of switchgear/MCC.
 - 14) All current and voltage transformers as required for metering & protection specified shall be completely encapsulated, cast resin insulated type. Incomers from transformers shall have CTs for transformer REF protection. All current and voltage transformers as required for metering and protection specified shall be completely encapsulated, cast resin insulated type. Incomers from
-



1X800 MW COAL BASED NORTH CHENNAI THERMAL POWER PROJECT STAGE III

transformers shall have CTs for transformer restricted earth fault protection. The accuracy shall be as follows:

- 15) Other CT particulars like ratio, burden knee-point voltage, excitation current and secondary resistance shall be decided by the Tenderers
- 16) CT secondary shall be rated for 1 A for metering and either 5 A or 1 A for protection.
- 17) indicating lamps shall be cluster LED type
- 18) 20% spare feeders of each type & rating used in the MCC with a minimum one (1) number on each bus section shall be provided.

2.2.11.3.7 ESSENTIAL SERVICE MODULE

During auto changeover of the supply the contactors in the affected bus would have dropped off. Services, which, shall be restarted immediately without time lapse to keep the unit running, are considered essential services. Such auxiliaries shall restart automatically without any action by the operator after an auto changeover. These modules shall have additional hardware like timer (or time delayed closing from DCS), aux. contactors and associated circuitry in the module. Such essential services shall be identified during the detailed engineering stage and suitable module/scheme shall be provided.

The modules of some of the critical application motors like barring gear motor, air heater motor, lube oil pump, jacking oil pump etc. irrespective of their kW rating shall be provided with a CT, ammeter and a current transducer with remote metering in DCS.

2.2.11.3.8 Type Tests

GENERAL

All equipment's to be supplied shall be of type tested quality. The Contractor shall submit for Purchaser's approval the reports of all the type tests as listed in this specification and carried out within last five years from the zero date of the project. These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.

In case the Contractor is not able to submit report of the type test(s) conducted within last five years from the zero date of the project, or in case the type test report(s) are not found to be meeting the specification requirements, the Contractor shall conduct all such tests under this contract free of cost to the Purchaser and submit the reports for approval.



1X800 MW COAL BASED NORTH CHENNAI THERMAL POWER PROJECT STAGE III

All acceptance and routine tests as per the specification and relevant standards shall be carried out. Charges for these shall be deemed to be included in the equipment price.

The following type test certificates on each type & rating of L.T. Switchgear, MCC panel and distribution boards shall be submitted.

- a. Short time withstand test with circuit breaker mounted inside the switchgear panel.
- b. Temperature rise test.
- c. Type II - Short circuit co-ordination test for any three ratings of MCC module as selected by the Purchaser.
- d. Test sequence –1 & combined test sequence shall be carried out on each rating of circuit breaker mounted inside the panel.
- e. Degree of protection tests

2.2.11.3.9 ROUTINE TEST

LT SWITCHGEAR

Switchgear shall be subjected to all routine tests as per relevant standards along with following tests:

Temperature rise test on power circuits

- a. Short time current tests on power circuits.
- b. Mechanical operation test
- c. Insulation resistance and 500V DC Megger before/ after 1 minute HV xvi) test
- d. Electrical control, interlock and sequential operation tests
- e. Verification of wiring as per approved schematic.

NOTE

1. MCC SHALL BE SUITABLE FOR IP 54 DEGREE OF PROTECTION. AS PER IS 60947.
2. ALL SB MCC SHALL BE OF COMPARTMENTAL FULLY DRAWOUT TYPE AND DOUBLE FRONT EXECUTION SUITABLE FOR BOTTOM CABLE ENTRY. HOWEVER IN COMER CONTROL SUPPLY TRANSFORMER AND JAMMING RELAY MODULES WILL BE NON DRAWOUT TYPE. MCC SHALL BE DUST & VERMIN PROOF. ALL CUT-OUTS SHALL HAVE NEOPRENE / EPDM GASKETS.
3. MCC SHALL BE FABRICATED BY CRCA (COLD ROLLED CLOSE ANNEALED) SHEET STEEL OF FOLLOWING THICKNESS

a) LOAD BEARING MEMBER - 2.0 mm

b) GLAND PLATE - 3.0 mm C) OTHERS - 1.6 mm
4. THE BUSBARS SHALL BE SUITABLE FOR 50 KA FAULT LEVEL FOR 1 SEC. & SHALL BE OF HIGH CONDUCTIVITY ALUMINIUM.
5. POWER CONTACTORS SHALL HAVE 2NO + 2NC AUX. CONTACTS. MOTOR STARTER CONTACTOR SHALL BE OF AIR BREAK ELECTROMAGNETIC TYPE UTILASATION CATEGORY AC-3.
6. OVER LOAD RELAYS SHALL BE ELECTRONIC WITH CURRENT DISPLAY IN SBMCC. OLR SHALL BE WITH BUILT-IN SINGLE PHASE PREVENTOR.
7. MCC SHALL BE PAINTED WITH SHADE DIN RAL 7032 FOR EXTERIOR (SEMI GLOSSY FINISH) INTERIOR PAINT SHADE AS PER VENDOR STANDARD. POWDER COATING PROCESS SHALL BE FOLLOWED FOR PAINTING.
8. THE WIRING SHALL BE CARRIED OUT WITH 1100 V GRADE HR PVC INSULATED STRANDED COPPER CONDUCTOR OF SIZE 2.5 SQ. MM FOR POWER AND C.T CIRCUIT AND 1.5 SQ.MM FOR CONTROL WITH T.C. LUGS IN ALL TERMINATIONS.
9. CONTROL AND SELECTOR SWITCHES SHALL BE OF ROTARY TYPE.
10. UNDRILLED CABLE GLAND PLATES SHALL BE SUPPLIED ALONG WITH THE PANEL.
11. SPARES INDICATED ARE ONLY FOR ELECTRICAL FEEDERS.
12. AN EARTH BUS OF GALVANISED STEEL SIZE NOT LESS THAN 50 X 6 SQ.MM SHALL BE PROVIDED AT THE BOTTOM THROUGHOUT THE LENGTH OF THE MCC. PROVIDED IN ALL VERTICAL SECTIONS. BUSBAR SHALL BE SUITABLE FOR SPECIFIED, FAULT LEVEL.
13. SEPARATE VERTICAL BUSBARS FOR FRONT AND REAR OF SUITABLE SIZE AND RATING SHALL BE PROVIDED.
14. MCCB'S AT TWO INCOMERS AND ONE BUS COUPLER SHALL BE MECHANICALLY INTERLOCKED USING KEYS SO THAT ONLY TWO CAN BE SWITCHED ON AT A TIME.
15. ALL CABLE LUGS FOR EXTERNAL CONNECTION ARE TO BE SUPPLIED ALONG WITH THE PANEL
16. MULTIFUNCTION METER SHALL COVER CURRENT, VOLTAGE, KW, KVAR, POWER FACTOR, KWH AND FREQUENCY.
17. INDICATING LAMPS WILL BE OF CLUSTER LED TYPE.
18. MINIMUM AIR CLEARANCE BETWEEN PHASES AND PHASE TO EARTH SHALL BE 25MM FOR BUSBARS AND CABLE TERMINATIONS. FOR ALL OTHER COMPONENTS, THE CLEARANCES SHALL BE ATLEAST 10MM.
19. CABLE GLANDS & LUGS SUITABLE FOR INCOMER CABLE SIZE 3Cx10 SQ.MM AL. PVC ARMOURED TO BE PROVIDED.
20. CAGE - CLAMP TYPE TERMINALS ARE PROVIDED. 20% SPARE TERMINALS SHALL BE PROVIDED.
21. WORKING HEIGHT OF OPERATING HANDLE SHALL BE LIMITED BETWEEN 300MM AND 1800MM FROM FLOOR LEVEL.
22. FOUNDATION BOLTS & NUTS, IF REQUIRED SHALL BE SUPPLIED ALONG WITH SBMCC.
23. TRANSUDCER SUITABLE FOR 4-20MA SHALL BE PROVIDED FOR REMOTE MONITORING FOR INCOMER VOLTAGE, CURRENT AND WATT - HOURS.
24. TRANSUDCERS SHALL BE OF DUAL OUTPUT TYPE, CLASS 0.5, 4-20MA DC LINEAR OUTPUT & 750 OHM LOAD.
25. CONTROL SUPPLY TRANSFORMER SHALL BE PROVIDED 2x100% IN EACH BUS SECTION.

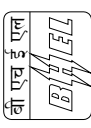
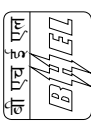
LEGEND

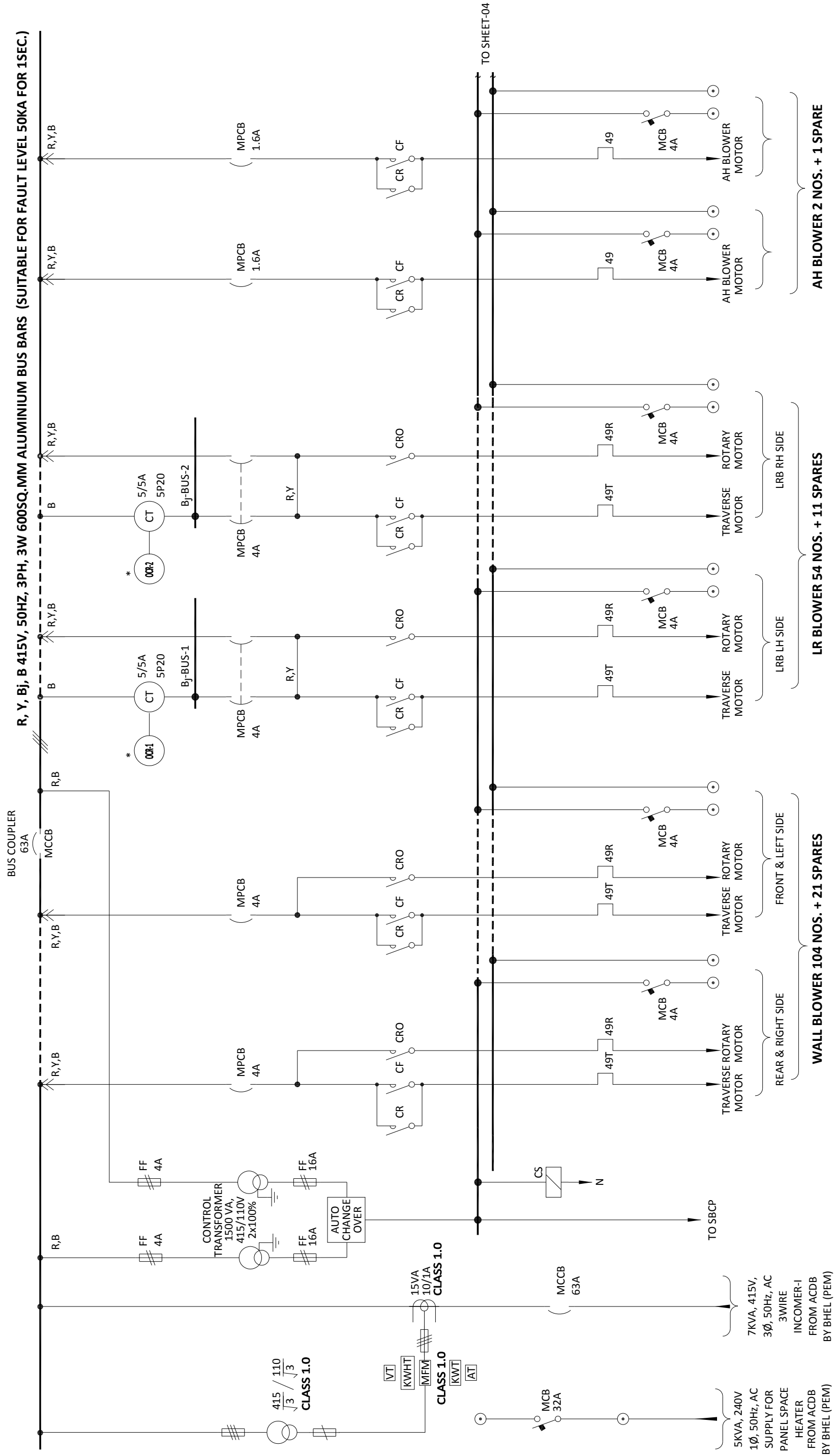
42	CONTACTOR FOR AH BLOWER
49	ELECTRONIC OVERLOAD RELAY
49R	ELECTRONIC OVER LOAD RELAY ROTARY
49T	ELECTRONIC OVER LOAD RELAY TRAVERSE
74, CT, CX	AUX. CONTACTORS
AT	CURRENT TRANSDUCER
CC	CONTACTOR FOR CLOSE
CF	CONTACTOR FOR FORWARD
CO	CONTACTOR FOR OPEN
CR	CONTACTOR FOR REVERSE
CRO	CONTACTOR FOR ROTARY
CT	CURRENT TRANSFORMER
FF	FUSE
LSTE	WALL BLOWER HOME POSITION LIMIT SWITCH
LSTR	WALL BLOWER ROTARY LIMIT SWITCH
LSTS	WALL BLOWER FORWARD END POSITION LIMIT SWITCH
LS1	LRB/AHB FORWARD END POSITION LIMIT SWITCH
LS2	LRB/AHB HOME POSITION LIMIT SWITCH
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MFM	MULTIFUNCTION METER
MPCB	MOTOR PROTECTION CIRCUIT BREAKER
SBC	SOOTBLOWER CONTROLS SYSTEM
VT	VOLTAGE TRANSDUCER

LEGEND

	SB CP TERMINALS
	SB MCC TERMINALS
	LOCAL TERMINALS
	POWER / AUX. CONTACTOR
	"NO" CONTACT OF CONTACTOR
	"NC" CONTACT OF CONTACTOR
	OFF DELAY TIMER
	"NO" CONTACT OF TIMER
	INDICATING LAMP (A-AMBER) (B-BLUE)
	MCCB / MPCB
	MCB
	SWITCH
	DRAWOUT TYPE TERMINALS

REV	DATE	ALTERED :	230317
01	230317	CHD./APPD. :	
REVISED AS PER CUSTOMER COMMENTS LETTER REF. SE/E/THP/E5/AEE/F.NCTPP, ST-III(BIG) D.105/17 DATED 03-03-2017 & RECEIVED ON 15-03-2017.			

		TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED		NAME	SIGNATURE	DATE	SCALE
		NORTH CHENNAI THERMAL POWER PROJECT		A. ThambuRaj		31-01-17	
TIRUCHIRAPPALLI		1x800 MW, STAGE-III-BTG, Cust. No. 1818		SR / KB	Sd. / SR-KB	31-01-17	NTS
DEPT. : C & I		TITLE		A.K.Panda	Sd. / AKP	31-01-17	
CODE : 392		SOOT BLOWER MCC NOTES		DRAWING NO :		REV	
						02/14	
						3-96-186-15475	



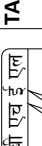
WALL BLOWER 104 NOS. + 21 SPARES

LR BLOWER 54 NOS. + 11 SPARES

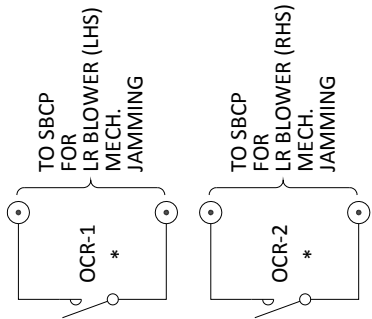
AH BLOWER 2 NOS. + 1 SPARE

REV	DATE	ALTERED :
01	230317	CHD./APPD. : 230317

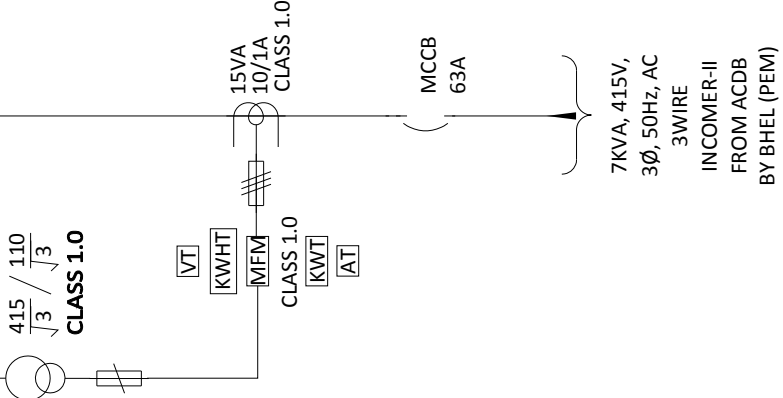
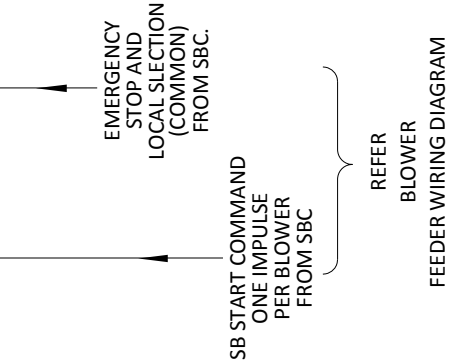

 REVISED AS PER CUSTOMER COMMENTS
 LETTER REF. SE/E/THP/E5/AEE/F.NCTPP,
 ST-III(BIG) D.105/17 DATED
 03-03-2017 & RECEIVED ON 15-03-2017.

	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED NORTH CHENNAI THERMAL POWER PROJECT 1x800 MW, STAGE-III-BTG, Cust. No. 1818				D.R.N.	NAME A. ThambuRaj	SIGNATURE 	DATE 31-01-17	SCALE
					C.H.D.	SR / KB	Sd. / SR-KB	31-01-17	NTS
					A.P.P.D.	A.K.Panda	Sd. / AKP	31-01-17	
	TITLE SOOT BLOWER SINGLE LINE DIAGRAM				SHEET NO.	DRAWING NO.:		REV	
DEPT. : C & I				03/14				3-96-186-15476 01	
CODE : 392									

R,Y,B 415V, 50HZ, 3PH, 3W 600SQ.MM ALUMINIUM BUS BARS (SUITABLE FOR FAULT LEVEL 50KA FOR 1SEC.)



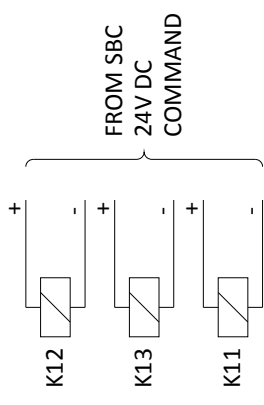
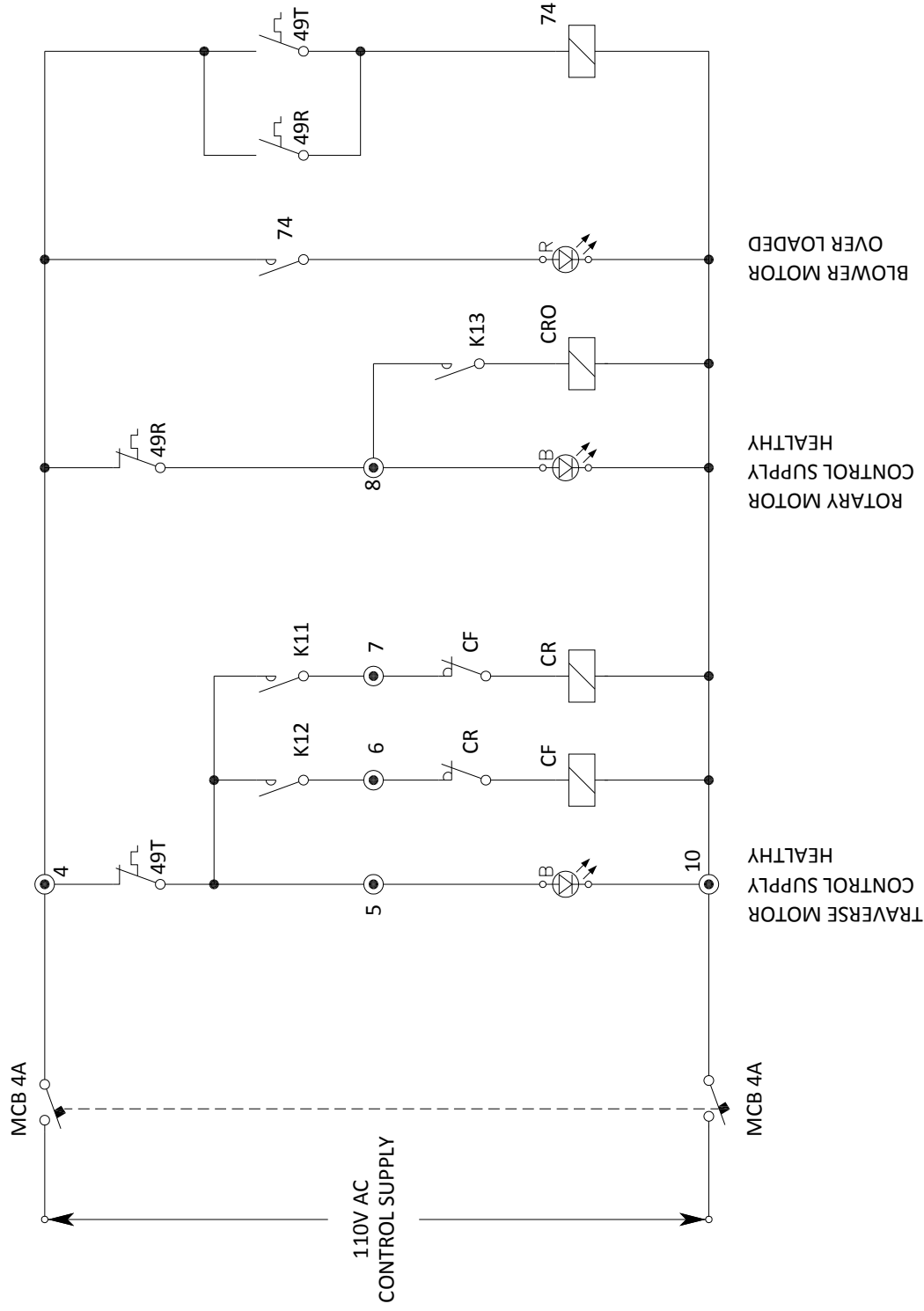
FROM SHEET-03



7KVA, 415V,
3Ø, 50Hz, AC
3WIRE
INCOMER-II
FROM ACDB
BY BHEL (PEM)

DESCRIPTION	INCOMER FOR SPACE HEATER	INCOMER-I	INCOMER-II	WALL BLOWERS		LR BLOWERS		AH BLOWER
FEEDER NO. DETAILS	1	1	1	104 + 21 SPARES		54 + 11 SPARES		2 NOS. + 1 SPARE
DRIVE DETAILS	-	-	-	TRAVERSE	ROTARY	TRAVERSE	ROTARY	
MOTOR CAPACITY IN KW	5.0 KVA	7.0 KVA	7.0 KVA	0.56	0.09	0.56	0.736	0.18
FULL LOAD CURRENT IN AMPS	-	-	-	1.36	0.64	1.4	1.65	0.56
O/L RELAY RANGE IN AMPS	-	-	-	0.9-1.5	0.45-0.75	0.9-1.5	1.0-2.0	0.45-0.75
MCCB/MPCB RATING IN AMPS	32A	100A	100A	4	4	4	4	1.6
POWER CONTACTOR	-	-	-	16	16	16	16	16
FUSE RATING IN AMPS PF/FF	-	-	-	-	-	-	-	-
CABLE SIZE	3CX6SQ.MM(AL) PC	3CX10SQ.MM(AL) PC	3CX10SQ.MM(AL) PC	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)

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LIMIT SWITCH CONTACT DEVELOPMENT				
CONTACT	POSITION	HOME	INTER MEDIATE	FORWARD END
LSTS	1-2	-	-	X
	1-3	X	X	-
LSTE	4-5	-	X	X
	4-8	X	-	-
LSTR	6-7	-	-	MAKES AFTER 1 Rev.
X CONTACT CLOSED, - CONTACT OPEN				

ALL LIMIT SWITCHES ARE WIRED TO DCS.

WRITE UP ON OPERATION OF WALL BLOWERS

There are 3 limit switches and two motors, one for traverse motion and the other for rotary motion. At a time only one motion will take place. When an impulse is given for the blower start, the forward Motion starts. When the blower reaches its full forward position , it actuates the limit switch LSTS. This gives an impulse to trip traverse motor and to start the rotary motor through SBC. When the blower completes its rotary motion, it actuates limit switch LSTR. This gives an impulse for the Blower to retract from SBC by energising the reverse contactor in the starter. Limit switch LSTR and LSTS resets. As soon as the blower leaves the forward end position resetting of LSTS, SBC trips the rotary motor. When it reaches its initial position, it actuates limit switch LSTE and the blower is stopped.

NOTE

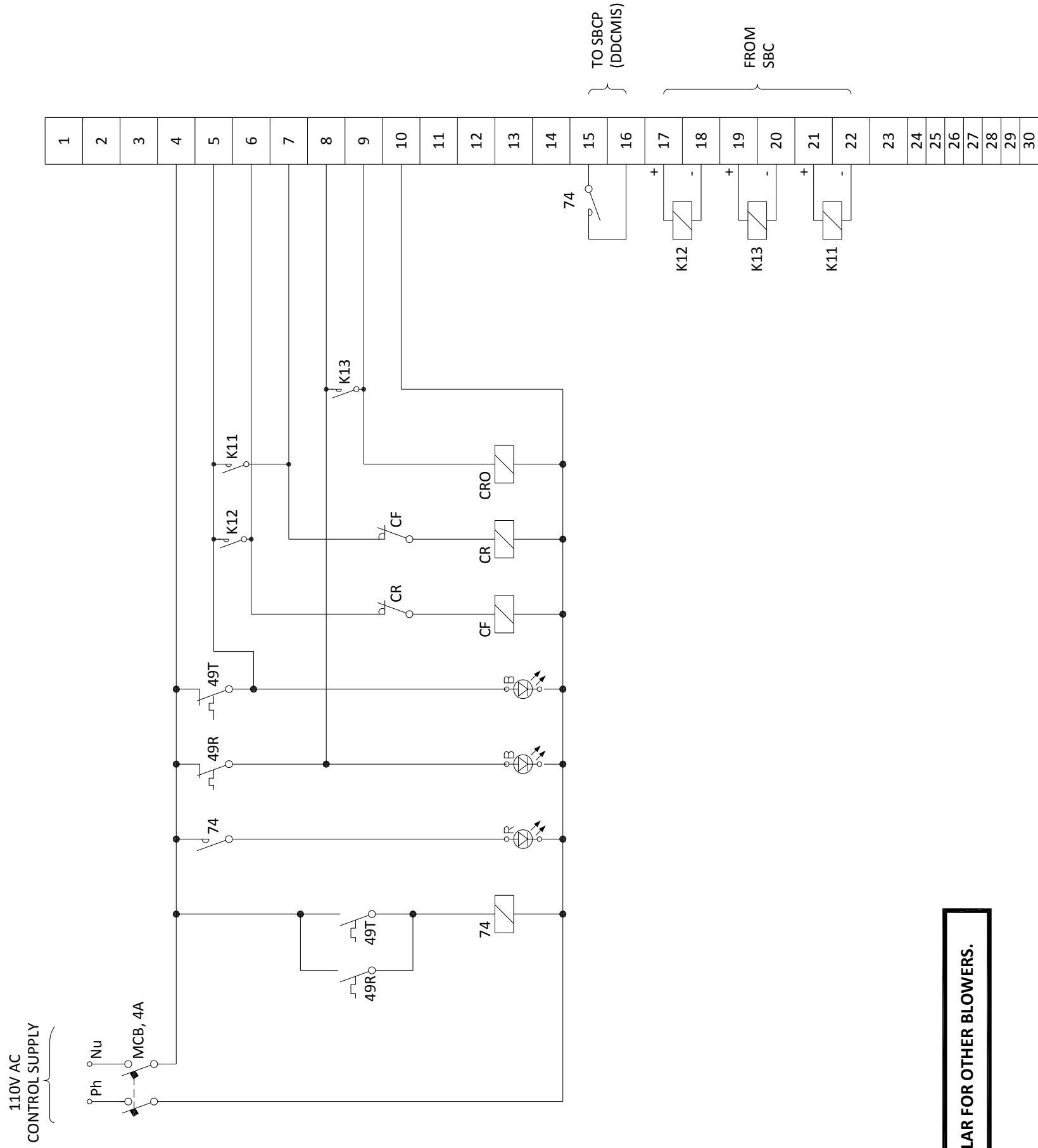
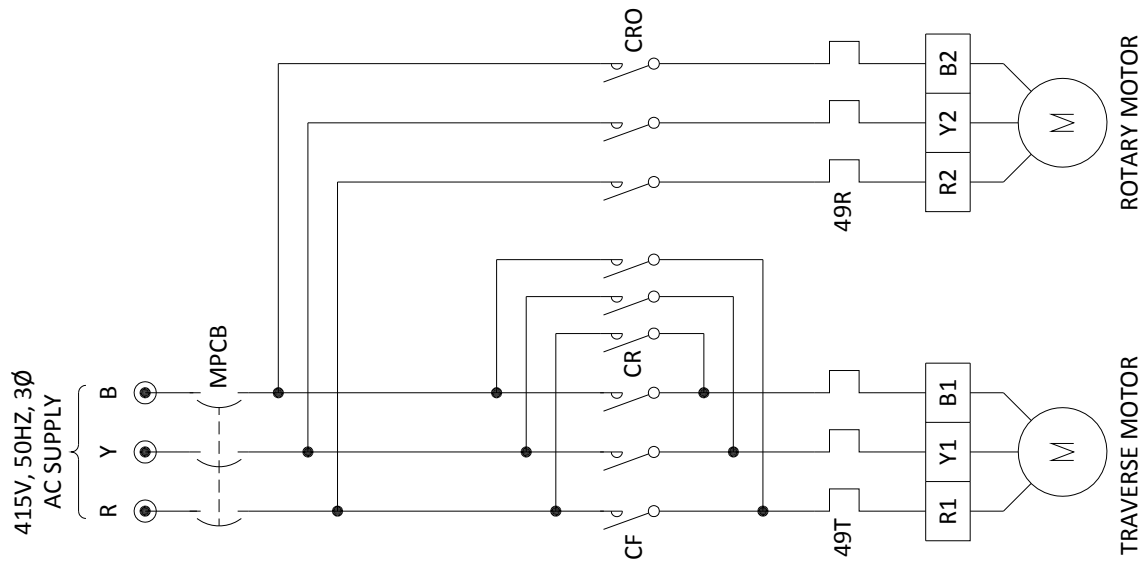
K11, K12, & K13 ARE ENERGISED BY 24V DC COMMANDS FROM SBC.

K12 - ADVANCE COMMAND

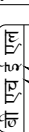
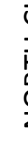
K13 - ROTATE COMMAND

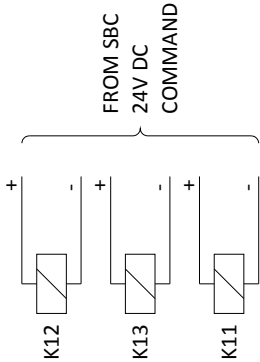
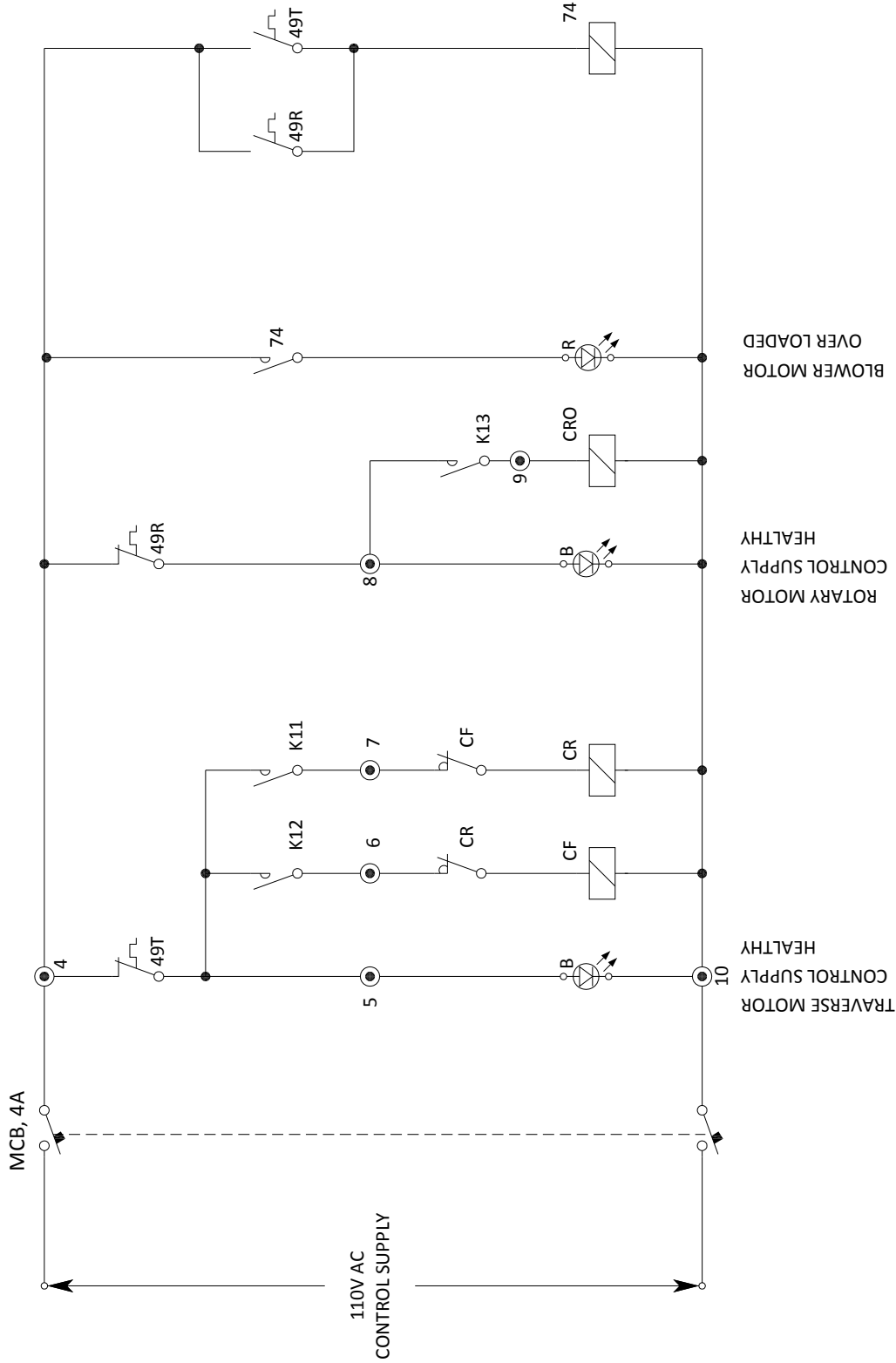
K11 - RETRACT COMMAND

REV		DATE	ALTERED :		230317
01		230317	CHD./APPD. :		
LIMIT SWITCH DETAILS SHOWN.					
<					



WIRING SHOWN FOR BLOWER-1 & SIMILAR FOR OTHER BLOWERS.

वी एच ई एल  TIRUCHIRAPPALLI	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED				D.R.N.	NAME	SIGNATURE	DATE	SCALE
	NORTH CHENNAI THERMAL POWER PROJECT					A. ThambuRaj		31-01-17	
	1x800 MW, STAGE-III-BTG, Cust. No. 1818					SR / KB		31-01-17	
						A.P.P.D.		31-01-17	
DEPT. : C & I		TITLE			SHEET NO.	DRAWING NO.:		REV	
CODE : 392		WALL BLOWER FEEDER WIRING DIAGRAM			06/14			3-96-186-15479 00	



LIMIT SWITCH CONTACT DEVELOPMENT				
CONTACT	POSITION	HOME	INTER MEDIATE	FORWARD END
LS-1	1-2	X	X	-
LS-2	4-5	-	X	X
	4-6	X	-	-
X CONTACT CLOSED, - CONTACT OPEN				

ALL LIMIT SWITCHES ARE DIRECTLY WIRED TO DCS.

WRITE UP ON OPERATION OF LONG RETRACTABLE BLOWER.

The long retractable blower has dual electric motor drives. One motor moves the lance into and out of the boiler. The other rotates it always in the same direction. Rotation is continuous from the moment the lance starts to extend until retraction is completed. At the end of travel into boiler the two jets always return over a different path than that taken while the lance was extending. To start the LR blower, First the rotary motor is given command forward and starts rotating. Then the traverse motor starts is given start command. The limit switch LS-2 (contact 4,5) closes as soon as the blower starts moving. At the end of the forward Motion limit switch LS-1 opens (contacts 1,2). This will be used for resetting forward command and to issue retract command. When the blower reaches the home position. The limit switch LS-2 (contact 4,5) opens and 4,6 closes and the blower stops.

NOTE

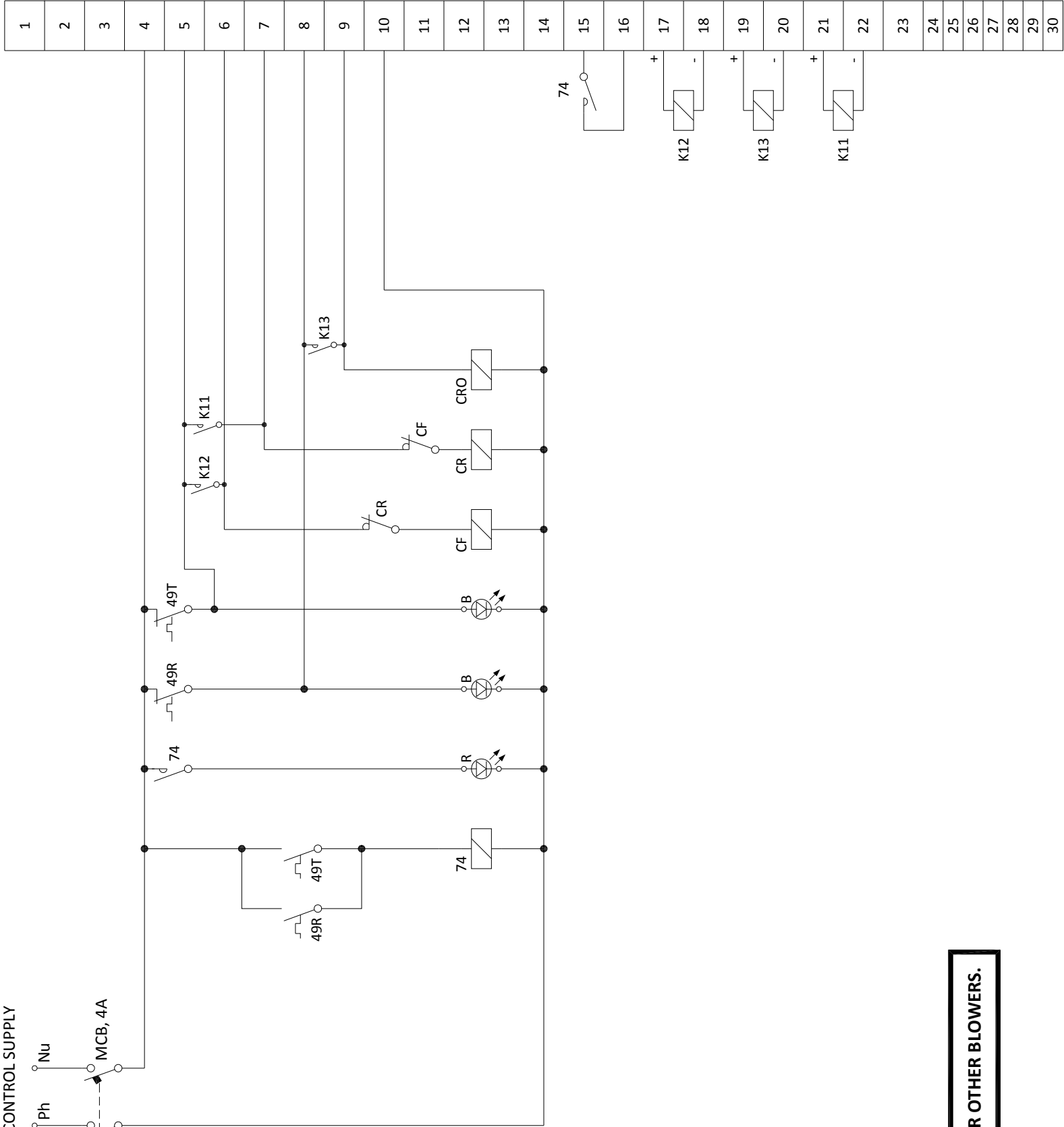
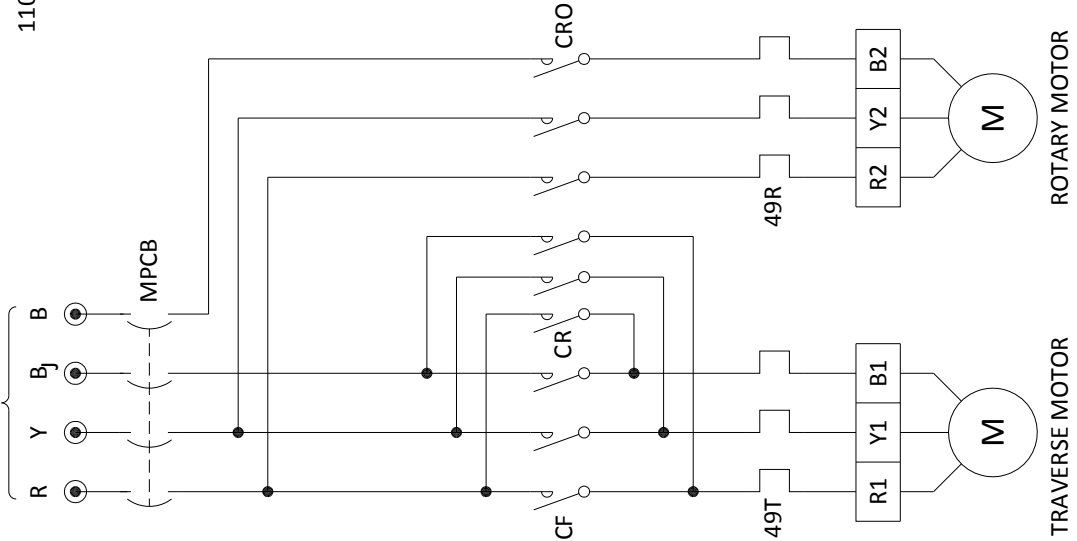
- K11, K12, & K13 ARE ENERGISED BY 24V DC COMMANDS FROM SBC.
- K12 - ADVANCE COMMAND
- K13 - ROTATE COMMAND
- K11 - RETRACT COMMAND

	REV	DATE	ALTERED :  230317
	01	230317	CHD./APPD. :
REVISED TO UPDATE CONTROL SCHEME OF LONG RETRACTABLE BLOWER.			

TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED				NAME	SIGNATURE	DATE	SCALE
NORTH CHENNAI THERMAL POWER PROJECT				A. ThambuRaj	 310117	31-01-17	
1x800 MW, STAGE-III-BTG, Cust. No. 1818				SR / KB	Sd. / SR-KB	31-01-17	NTS
				A.P.P.D.	A.K.Panda	31-01-17	
TITLE				DRAWING NO:		REV	
LONG RETRACTABLE BLOWER CONTROL SCHEME DIAGRAM				SHEET NO.			
				07/14			
				3-96-186-15480			

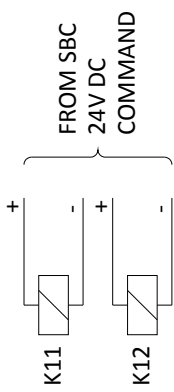
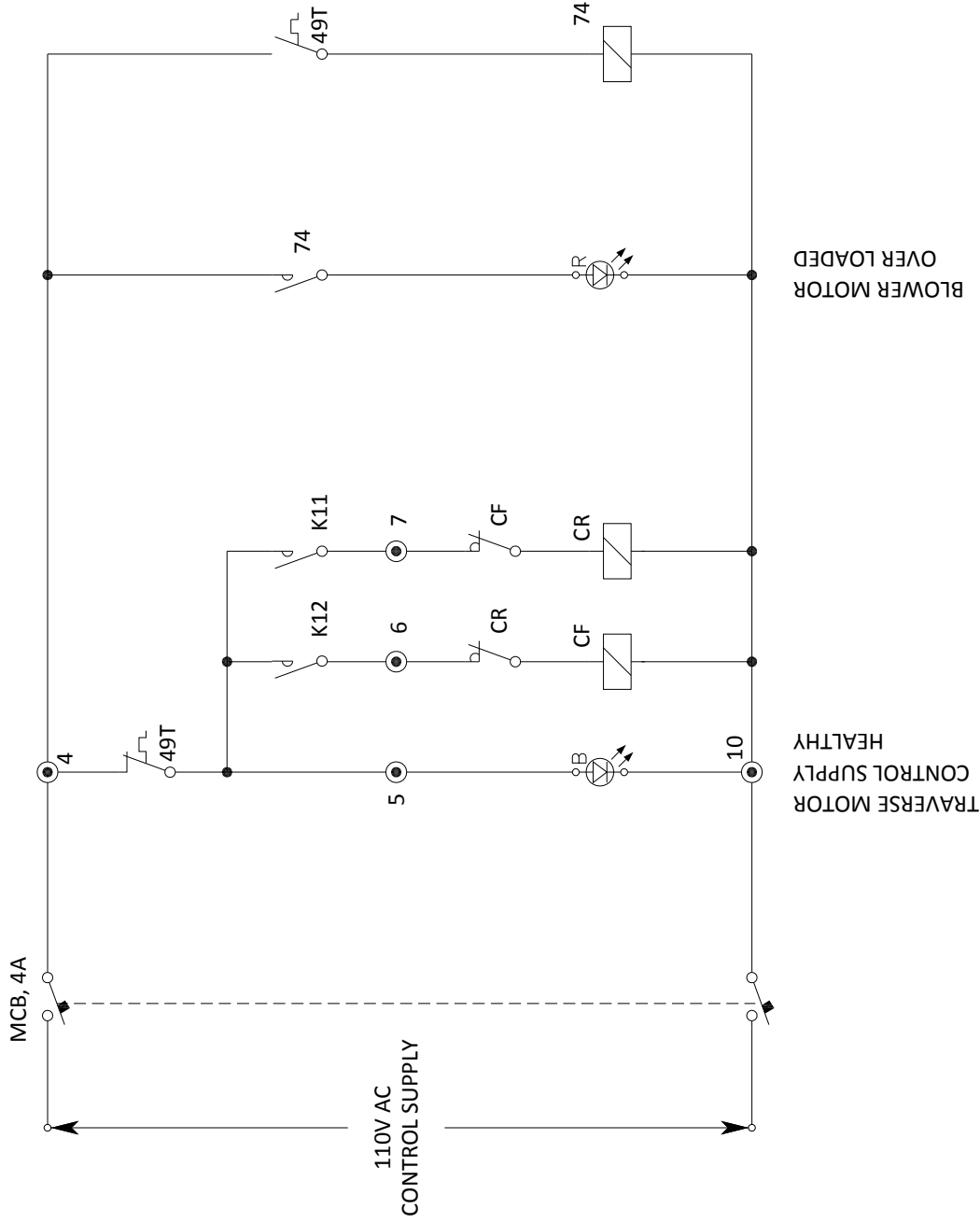
DRAWING NO : 3-96-186-15481

415V, 50HZ, 3Ø
AC SUPPLY



WIRING SHOWN FOR BLOWER-1 & SIMILAR FOR OTHER BLOWERS.

REV		DATE	ALTERED : 	230317		TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED NORTH CHENNAI THERMAL POWER PROJECT 1x800 MW, STAGE-III-BTG, Cust. No. 1818	DRN.	NAME A. Thamburaj	SIGNATURE 	DATE 31-01-17	SCALE
01	230317	CHD./APPD. :		CHD.			SR / KB	Sd. / SR-KB	31-01-17	NTS	
REVISED TO UPDATE LONG RETRACTABLE BLOWER INTERCONNECTION DIAGRAM.							APPD.	A.K.Panda	Sd. / AKP	31-01-17	
TIRUCHIRAPPALLI						TITLE LONG RETRACTABLE BLOWER INTERCONNECTION DIAGRAM	SHEET NO.	DRAWING NO :		REV	
DEPT. : C & I										01	
CODE : 392							08/14	3-96-186-15481			



LIMIT SWITCH CONTACT DEVELOPMENT				
CONTACT	POSITION	HOME	INTER MEDIATE	FORWARD END
LS-1	1-2	X	X	-
LS-2	4-5	-	X	X
	4-6	X	-	-
X CONTACT CLOSED, - CONTACT OPEN				

ALL LIMIT SWITCHES ARE WIRED TO DCS.

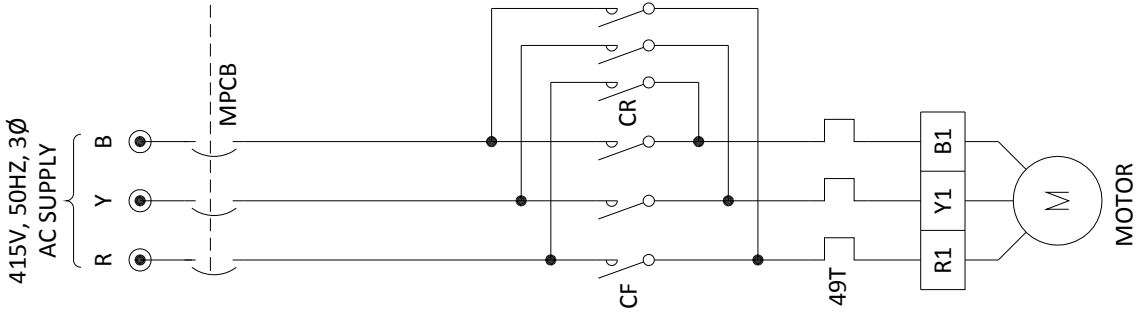
WRITE UP ON OPERATION OF AIR HEATER BLOWERS

There are 2 limit switches (LS-F & LS-R) and one motor. When an impulse is given for the blower start, the forward Motion starts. When the blower moves from home position limit switch LS-R contact makes and associated solenoid valve shall be given open command from DDCMIS. Opening the solenoid valve will admit the steam through AH blower. When the blower reaches forward end position limit switch LS-F makes. This issues retract command to the blower. During retract cycle there will be no steam blowing. When the blower completes its retract command motion, it actuates limit switch LS-R. This opens LS-R limit switch.

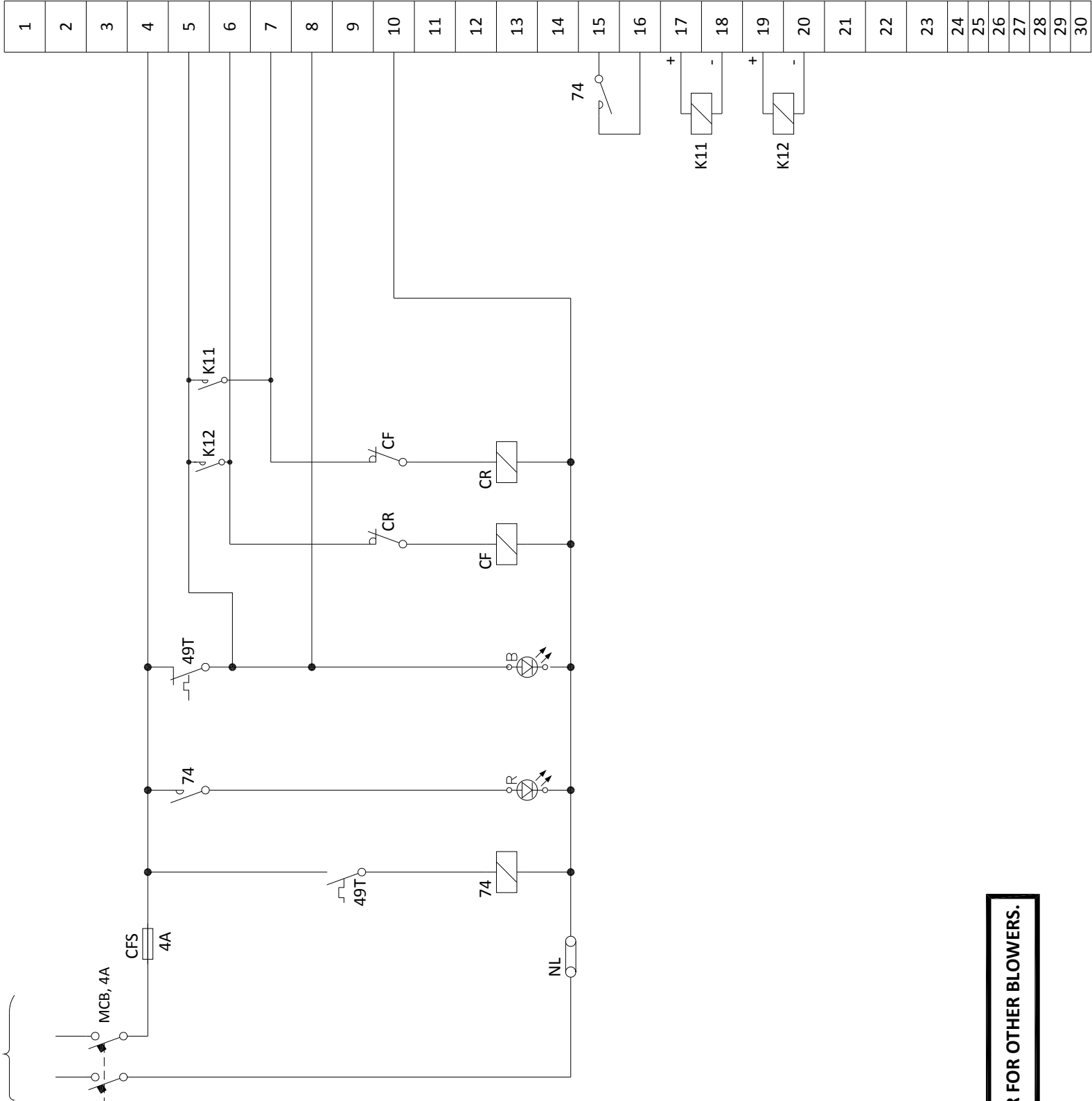
NOTE

K11, K12, & K13 ARE ENERGISED BY 24V DC COMMANDS FROM SBC.

TRUHIRAPPALLI TRUHIRAPPALLI			TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED NORTH CHENNAI THERMAL POWER PROJECT 1x800 MW, STAGE-III-BTG, Cust. No. 1818				D R N.		NAME A. Thambu Raj	SIGNATURE  1310117	DATE 31-01-17	SCALE
REV 01	DATE 230317	ALTERED :  230317	CHD./APPD. : 230317	CH D.	SR / KB	Sd. / SR-KB	APP D.	A.K.Panda	Sd. / AKP	31-01-17	NTS	
REVISED TO UPDATE CONTROL SCHEME OF AH BLOWER.				TITLE AIR HEATER BLOWER CONTROL SCHEME DIAGRAM	SHEET NO.	DRAWING NO :		09/14	3-96-186-15482	01		



110V AC
CONTROL SUPPLY



WIRING SHOWN FOR BLOWER-1 & SIMILAR FOR OTHER BLOWERS.

REV		DATE	ALTERED :	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED		D R N.		NAME	SIGNATURE	DATE	SCALE
01		230317		NORTH CHENNAI THERMAL POWER PROJECT		CH D.		A. Th a m b u R a j		31-01-17	
			CHD./APPD. :	1x800 MW, STAGE-III-BTG, Cust. No. 1818		A P P D.		SR / KB	Sd. / SR-KB	31-01-17	NTS
								A.K.Panda	Sd. / AKP		
REVISED TO UPDATE AIR HEATER BLOWER INTERCONNECTION DIAGRAM.				TITLE		SHEET NO.		DRAWING NO:		REV	
				DEPT. : C & I		10/14				01	
				CODE : 392				3-96-186-15483			

PROJECT: 2X800MW UPPUR STPP

SPECIFICATION FOR BTG EPC CONTRACT

VOLUME II – GENERAL & SCHEDULES

CHAPTER 1

PROJECT SYNOPSIS

1.0 GENERAL BACKGROUND AND SALIENT FEATURES

1.1 Introduction

Tamilnadu Generation and Distribution Corporation owns the proposed green-field 1600 MW (2 units of 800 MW each) Coal Based Thermal Power Station. The Project Site is located in Uppur, Valamavoor and Thiruppalaikudi villages of Thiruvadanai Taluk, Ramanathapuram District.

1.2 Location

The proposed site for main power plant is located at Uppur in Ramnathpuram District of Tamil Nadu.

The nearest Railway station is Thiruppalaikudi Railway Station, 3Kms from site

ECR Connecting Ramanathapuram and Pattukottai is the nearest road access.

The nearest airport is at Madurai at a distance of 140 km.

The nearest port is Tuticorin located at a distance of 130 km.

1.3 Type of Plant

The proposed 2 x 800 MW Super-Critical Power Project consists of coal fired steam generator connected to a reheat type steam turbine generator along with all the required auxiliaries. Circulating cooling water system is envisaged for condenser cooling.

The description and salient technical data of the Steam Generator, Steam Turbine Generator, Auxiliary systems, Electrical, Control & Instrumentation, Civil etc. are explained elsewhere in the specification:

1.4 PROJECT INFORMATION



2 x 800 MW Supercritical Coal Based Uppur
Thermal Power Project
Spec. No. SE/E/T&H(P)/OT No.01 /2015-16

Vol. II: 1



1.1	Owner	:	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)	
1.2	Project Title	:	2 x 800 MW Uppur Thermal Power Project	
1.3	Owner's Engineer	:	Desein Private Limited; New Delhi	
1.4	Project Site Location	:	Place	Uppur
			State	Tamil Nadu
			Country	India
1.5	Nearest Railway Station	:	Ramanathapuram at 28 KM away	
1.6	Nearest City	:	Ramanathapuram	
1.7	Nearest Highway	:	ECR Connecting Ramanathapuram and Pattukottai	
1.8	Nearest Airport	:	Domestic air port at Madurai (140 KM)	
1.9	Nearest Sea Port	:	Tuticorin Port (130 KM)	
1.10	Site Elevation	:	+ 4.5 m	
1.11	CLIMATOLOGICAL DATA	:		
i.)	HIGHEST TEMPERATURE RECORDED	:	37.8°C	
ii.)	MINIMUM TEMPERATURE RECORDED	:	22.3°C	
iii.)	DRY BULB TEMPERATURE (DBT) FOR DESIGN PURPOSE	:	30 ± 10°C 50°C (for electrical equipment)	
iv.)	RELATIVE HUMIDITY FOR DESIGN PURPOSE	:	75 ± 15%	
v.)	ANNUAL RAINFALL	:	827 mm (avg.)	
1.12	Source of Water (Distance from site)	:	Sea	
1.13	Primary Fuel & Source	:	Imported Coal (Indonesia and S. Africa)	
1.14	Startup Fuel & Source	:	HFO/ L.D.O. (Domestic)	
1.15	Earthquake Data	:	Zone III as defined in IS: 1893-2002	

1.5 Access to Site

Site is well connected and located along ECR Connecting Ramanathapuram and Pattukottai. Site is well connected by rail also.

1.6 Plant Rating, Capacity, Availability, PLF



2 x 800 MW Supercritical Coal Based Uppur
Thermal Power Project
Spec. No. SE/E/T&H(P)/OT No.01 /2015-16



SECTION – 11 : 415V SWITCHGEARS AND DC BOARDS

11.01.00 SCOPE

11.01.01 This specification is intended to cover design, engineering, manufacture, assembly, shop testing, inspection, packing, delivery to site, erection, testing and commissioning of following with all fittings and accessories for efficient & trouble free operation:-

- i) 415 V Power control Centre (PCC)
- ii) 415 V Motor Control Centers (MCC)
- iii) 415 V Motor cum Power control Centre (PMCC)
- iv) 415 V Distribution Boards (DB) and Fuse boards
- v) DC starters
- vi) DC Distribution Board
- vii) AC Fuse Board

11.01.02 Base channel frame of all boards and fuse boards along with necessary mounting hardware.

11.01.03 Set of accessories as listed below:

- i) Hydraulic operated Breaker lifting & handling trolley- 1No. per board
- ii) Racking in/out handle for breakers- 5 Nos. in each type per board
- iii) Racking in/out handle for draw out MCC modules- 5 Nos. in each type per board

11.01.04 Bidder to ensure that at least 10% spare feeders (minimum 1 No.) of each type & rating in each 415V switchgear/MCC shall be provided at the time of handing over the plant (irrespective of the spares finalised during detailed engineering) subject to the contract provision.

11.01.05 Mandatory Spares as given in elsewhere

11.01.06 All provisions and accessories shall be furnished for termination and connection of cables, including removable gland plates cable supports, crimp type tinned copper/aluminum lugs, double compression type brass glands with tapered washer (power cables only) and terminal blocks.

11.01.07 Foundation bolts for all the floor mounted equipment, and fixing bolts and accessories for wall mounted equipment.

11.01.08 All interconnecting wiring between various panels/compartments of a switchgear or MCC shall be carried out internally by the Bidder at his works/site.

11.01.09 Certain switchgears with very long lengths shall be sectionalized and physically separated for ease of operation and maintenance. Interconnection of such sections by bus trunking shall be in Bidder's scope.

11.01.10 Bidder shall supply dummy panels, if required for floor beam crossing without any price implication.



11.01.11	All 415V PCC, PMCC & MCC shall generally be of intelligent type compatible with IEC 61850 Communication protocol. However utility MCCs as mentioned in the single line diagram shall be non-intelligent type. . A marshalling module shall be provided on each bus of LV Switchgear (PCC, PMCC, MCC) for interfacing with DCS. Control of incomers and bus-coupler breakers of LV switchgear shall be possible from the DCS. The check synchronizing relay shall be housed in the respective switchboards. Dummy panels shall be integral part of the LV Switchgear and of same size.
11.01.12	MCCs shall be used to supply power to contactor controlled motors rated below 90 kW, local panels, local starter panels etc.
11.01.13	PCCs / PMCCs shall be used to supply power to motor of ratings 90 to 200 KW through ACBs.
11.01.14	Incomers of MCCs of rating 630A and above shall be through Air Circuit Breakers while incomers of lower rating can be through motorized MCCBs.
11.01.15	All Outgoing feeders (non motor feeders) of PCC/PMCC rated 630A & above shall be Air Circuit Breakers while rated below 630A shall be MCCB.
11.01.16	Motors less than 90 KW shall be provided with MCCB/ MPCB, contactors and intelligent controllers.
11.01.17	Motors rated 90 KW and above shall have comprehensive motor protection relays. They shall be numerical type and shall communicate with DCS through Open protocol (IEC 61850).
11.01.18	All MCCs/PMCCs except PCC portion of PMCC shall be of double front construction. PCCs and PCC portion of PMCCs shall be single front. All Switchgears/MCCs shall be sectionalized unless specifically mentioned in the single line diagram.
11.01.19	All Switchgears shall be easily extendable on either side. The Bidder shall supply Switchgear in various shipping sections consisting of Incomer, Ties and Motor modules. Bidder may be required to change module types, sizes and the components in respect of certain feeders even during erection, testing and commissioning.
11.01.20	The Bidder shall furnish calculations and/or type-test certificates to prove adequacy of the bus bar sizes offered, for specified current and short time current ratings. Bus bars in particular and droppers (HBB/VBB) shall be supported on flame-retardant, track resistant type bus insulators with high creepage distance and covered with heat-shrunk PVC sleeves which shall be shrunk fit and not capable of being removed without destruction. While continuous current ratings of the droppers in each Switchgear Cubicle shall be at least equal to the corresponding Breaker rating, short time current rating shall be same as that for Horizontal Main Bus bars. Only those dropper ratings shall be allowed as have passed a type test.
11.01.21	All MCCB, MPCB and contactors shall conform to Type-II class of Co-ordination as per IS-13947. Bidder shall furnish Type-II Co-ordination, p & q type test report as per IS: 13947 for all modules.



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- 11.01.22 The Bidder shall furnish relay application checks/ calculations to check adequacy of the CTs/VTs as well as suitability of relay settings/setting ranges proposed by the Bidder. These checks/ calculations shall be furnished during detailed engineering stage for each and every feeder.
- 11.02.00 AUTO CHANGEOVER
- 11.02.01 Auto-changeover facility shall be provided in PCC/ PMCC and MCCs. These Switchgears/MCC shall normally operate with Bus coupler open. If sustained under voltage is detected on any one of the bus section, the respective Incoming Breaker shall trip and bus - coupler shall close if voltage is available on the other bus section. Auto changeover shall be blocked if the Incoming Breaker has tripped due to bus fault. Manual change over from one source of supply to the other or vice versa shall be possible by momentary paralleling of the two supplies after checking synchronism with the help of a synchro check relay. On closing the Incoming breaker, the selected running Breaker should trip within a preset time. An annunciation shall be provided if the two bus sections remains paralleled for more than a preset time. If the selected running breaker fails to trip within the preset time the incoming breaker shall trip.
- 11.02.02 During auto changeover of the supply the contactors in the affected bus would have dropped off. The services which shall be restarted immediately without time lapse to keep the process running are considered essential services. Such services shall restart automatically without any action by the operator after an auto changeover.
- 11.03.00 GENERAL
- 11.03.01 Power Control Center (PCC)
- POWER CONTROL CENTER (PCC), shall mean a continuous line-up of breaker panels in single front construction, used to feed Motor Control Centres/PDBs etc, ACB controlled LV motors. All PCCs shall have duplicate incomers and a bus-section. Incomers, bus section, and all outgoing feeder of a PCC shall be breaker controlled. Distribution of outgoing feeders shall be arranged such as to ensure uniform loading on each section of the PCC. The 240 V supply for panel & Motors Space Heater, wherever required shall be derived through 415V/240V isolation transformer.
- 11.03.02 Power-Cum-Motor Control Center
- POWER-CUM-MOTOR CONTROL CENTER (PMCC), shall mean a continuous line-up of vertical sections housing breaker panels, MCCBs, and contactor-operated modules in double front construction. However PCC part of PMCC shall be single front only. All PMCCs shall have duplicate incomers and a bus-coupler. Incomers and bus-coupler shall be breaker controlled. All outgoing (non motor) feeders shall be ACB/MCCB/MPCB controlled. Motor feeders rated below 90 kW shall be MPCB, MCCB, contactor controlled with intelligent controllers depending upon the rating Distribution of outgoing feeders shall be such as to ensure uniform loading on each section of the PMCC. The 240 V
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supply for panel & Motors Space Heater, wherever required shall be derived through 415V/240V isolation transformer.

11.03.03 Motor Control Center

MOTOR CONTROL CENTRE (MCC), shall mean a continuous line-up of vertical sections in double front construction, housing breaker panels and MPCB / MCCB, contactor operated outgoing modules. All incomers and Bus-sections rated 630A & above shall be breaker controlled which are electrically inter-locked. MCCBs shall be provided for incomers and bus couplers rating below 600A with castle key interlocks. All outgoing (non motor) feeders shall be MCCB/MPCB controlled. Motor feeders shall be MPCB, MCCB, contactor controlled with intelligent controllers depending upon the rating. Distribution of outgoing feeders shall be such as to ensure uniform loading on each section of the MCC. The 240 V supply for panel & Motors Space Heater, wherever required shall be derived through 415V/240V isolation transformer.

11.03.04 Distribution Board

Distribution Board (DB) shall mean a continuous line-up of vertical sections housing MCCB/MPCB modules only. PDBs/ACDBs shall have duplicate incomers and a bus-section. DCDBs shall have two incomers from its associated battery charger with bus sectionalized. Wherever bus-sections are provided, distribution of outgoing feeders shall be such as to ensure uniform loading on each section of DB.

11.04.00 CODES AND STANDARDS

11.04.01 All equipment and materials shall be designed, manufactured and tested in accordance with the latest applicable Indian Standard (IS) except where modified and / or supplemented by this specification. Indian Standards for the equipment covered under this specification are as follows:

IS:375	Marking and arrangements of bus bars.
IS:722	AC Electricity Meters.
IS:1248	Electrical Indicating instruments.
IS:2147	Degree of protection provided by enclosures for low voltage switchgear and control gear.
IS:2208 & IS:9224 (Part-II)}	HRC Cartridge Fuses.
IS:2516	A.C. Circuit Breakers.
IS:2629	Hot dip galvanising.
IS:2705	Current transformers
IS:2959	Contactors



IS:3072	Code of practice for installation and maintenance of Switchgear.
IS:3156	Voltage transformers
IS:3202	Code of practice for climate proofing of electrical equipment.
IS:3231	Electrical relays for power system protection.
IS:4064	Air-breaker switches, air break disconnectors, air break disconnector and fuse combination units for voltage not exceeding 1000V AC or 1200V DC.
IS:4237	General requirements for switchgear and control gear for voltages not exceeding 1000V.
IS:5082	Wrought Aluminum and aluminum alloys for electrical purposes.
IS:6005	Code of practice of phosphating iron and steel.
IS:6875	Switches and push buttons.
IS:8544	A.C. Motor starters of voltage not exceeding 1000 V.
IS:8623	Specification for factory built assemblies of switchgear & control gear for voltages up to and including 1000V AC/1200 V DC.
IS:13947	Low voltage switchgear and Control Gear.

- 11.04.02 Equipment and materials conforming to any other standard which ensures equal or better quality may be accepted. In such cases copies of the English version of the standard adopted shall be submitted along with the bid.
- 11.04.03 The electrical installation shall meet the requirements of Indian Electricity Rules as amended up to date and relevant IS codes of practice. In addition, other rules or regulations as applicable to the work shall be followed. In case of any discrepancy, the more restrictive rule shall be binding.
- 11.05.00 DESIGN CRITERIA
- 11.05.01 The PCC/PMCC/MCC and DBs shall be used to supply auxiliary power for normal and start-up operation, control and protection for 415/240V AC and 220V DC auxiliary services of generating units.
- 11.05.02 Duty involves direct-on-line starting of large induction motors up to 200 KW and also under certain emergency conditions automatic transfer of loads from one source of supply to other. Motor starting current varies from 6 to 8 times full load current with maximum of 3 starts per hour.
- 11.05.03 The equipment shall be located in a clean but hot, humid and tropical atmosphere, highly polluted at places with coal dust and/ or fly ash.



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- 11.05.04 Circuit breaker/ switchgear shall not produce any harmful over voltage during switching off induction motors/ supply. If required, surge protective devices shall be included in the scope of supply to limit over voltage.
- 11.05.05 For continuous operation at specified ratings, the temperature rise of the various equipment shall be limited to the site permissible values stipulated in this specification.
- 11.05.06 Loads of outgoing feeders wherever applicable shall also be considered while sizing the bus bars, equipments and components. All equipment and components shall be capable of withstanding the mechanical forces and thermal stresses of the short-circuit currents without any damage or deterioration of materials.
- 11.05.07 Busbars for PCC/PMCCs being fed from service transformers shall be sized based on the rated LV winding current of the transformer rounded off to the next higher standard rating
- 11.05.08 Busbars of MCCs/DBs shall be sized to carry continuously the running load connected to it with a 10% margin.
- 11.05.09 In cubicle ratings of incomer and bus section breakers/MCCBs shall be identical to the associated busbar rating.
- 11.05.10 The control circuitry of all modules in respective PCC/PMCC/MCC shall be suitable for interfacing with plant DCS for remote monitoring switching and control.
- 11.06.00 SPECIFIC REQUIREMENTS
- 11.06.01 Construction of PCC/PMCC / MCC/ DBs
- i) The PCC/PMCC/MCC shall be of Form 3B Type 2 construction.
 - ii) PCC/PMCC/MCC/DBs shall be indoor, air insulated, metal-clad, floor mounting type. All PCCs/PMCCs/MCCs except for the utility MCCs shall be fully draw out type having self-aligning type secondary plug in contacts. All DBs and utility MCCs (as mentioned in single line diagram) shall be fixed type. The design and construction shall be such as to allow extension at either end.
 - iii) The enclosure of the equipment shall be dust and weather proof, conforming to a degree of protection IP-52 for ratings up to 1600A and IP-42 for ratings above 1600A. The switchboard frames shall be fabricated using suitable mild steel structural section or braced and shall be cold rolled sheet steel of thickness of not less than 2 mm. The frames shall be enclosed in cold rolled sheet steel of not less than 1.6 mm. The doors and covers shall also be of cold rolled steel of thickness not less than 1.6mm. Adequate stiffness shall be provided wherever necessary. Gland plates shall be 3 mm. The design shall be such that specified degree of protection shall be achieved even after a breaker control module has been taken out of the panel.
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- iv) SWGR/PCC/MCC/ DB assembly shall comprise a continuous line up of dead front, free-standing vertical sections, housing the control modules in multitier formation. The installations of circuit breakers, however, shall be limited to the single tier formation.
 - v) The design shall be fully compartmentalized with metal/ insulating partitions between compartments. The working height shall be limited within 300mm to 1900 mm. Switch boards shall be mounted on base frame of 75 mm height from the finished floor.
 - vi) Each breaker/ control module/ MCCB unit shall be housed in a separate compartment, complete with an individual front access door having sufficient opening with concealed type hinges. Each vertical section of single front board shall have a removable back cover.
 - vii) All doors and covers shall be provided with life long rubber and life long pasting neoprene gaskets. MCC module shall also be dust and vermin proof when the module is taken out from the chassis. Suitable arrangement to achieve this feature shall be provided.
 - viii) All switches push buttons, lamps, indicating instruments shall be flush mounted on respective module compartment whereas relays and other auxiliary devices may be mounted on a separate cubicle. All meters indicating lamps and protective relays shall be visible on the door.
 - ix) A full height vertical cable alley with cable supports shall be provided in each section to facilitate dressing of unit wiring. The chamber shall be liberally sized to accommodate all cables and shall have hinged doors opening on opposite sides with respect to the module doors and removable cover at back side for access. The width of the cable chamber when viewed from front of the switchboard shall not be less than 250 mm.
 - x) Breaker cubicle shall be so sized as to permit easy closing of the front access door when the breaker is pulled out to 'ISOLATED' position. The breaker can be operated both in SERVICE and TEST position with the door closed.
 - xi) A horizontal wire way, extending the entire length, shall be provided at the top of each SWGR/PCC/MCC/ DB for inter panel wiring. The chamber shall be liberally sized to accommodate all cables and shall have removable cover at the front for access.
 - xii) Incomers shall be provided at the ends of an assembly and bus section, wherever required, shall be provided at the middle of the assembly.
 - xiii) Four (4) nos. lifting lugs shall be provided for each section, two (2) nos. on either end of the section.
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11.06.02 Bus and Bus Taps for SWGR/PCC/MCC/DB

- i) The main, tap off buses and connections shall be of high conductivity aluminum / aluminum alloy . The size for specified current ratings shall be such that maximum temp. rise at bus bar joints shall be limited to 90 Deg. C (i.e. 40 Deg. C rise over 50 Deg. C ambient).The maximum allowable temperature rise at silver plated joints shall be 105 deg C (ie 55 deg C rise over 50 deg C ambient)
- ii) Vertical bus bars shall be designed as per system requirement.
- iii) All bus connections shall be provided with anti-oxide grease. For all bus connections adequate contact pressure shall be ensured by means of two bolt connection with plain and spring washers and locknuts. The protruding bolts of different phases/ poles shall be staggered and shall not see each other directly. All the joints surfaces shall be silver plated.
- iv) Busbars and connections shall be fully insulated for working voltage with adequate phases/ ground clearance. Insulating sleeves for bus bars and shrouds for joints shall be provided. Shrouds for bus bar joints and tapping points shall be two part click-fit type epoxy resin cast/ fiber glass moulded.
- v) Minimum clearance of 25.4mm is required between phases/ poles for entire run of horizontal and vertical bus bars and 19 mm between phase and earth irrespective of sleeve/ shroud provided for bus bars.
- vi) For all other components, the clearance between two live parts, a live part and earthed part, and isolating distance shall be at least 10 mm throughout.
- vii) Wherever it is not possible to maintain the above mentioned clearances, insulation shall be provided by means of barriers. All connections from busbars upto the fuses shall be fully shrouded to minimize risk of phase to phase and phase to earth faults.
- viii) Insulating shrouds for busbar joints shall be moulded type. SWGR/PCC/MCC/ DB with higher clearances shall be preferred considering dust laden environmental condition in which SWGR/PMCC/ MCC/ DB has to operate. Bus bars shall be supported on flame-retardant, track resistant type bus insulators with high creepage distance and covered with heat-shrunk PVC sleeves which shall be shrunk fit and not capable of being removed without destruction. Separate supports shall be provided for each phase and neutral busbar.
- ix) Cross section of busbar shall be uniform throughout the length of assembly. All buses and connections shall be supported and braced to withstand, the stresses due to maximum short-circuit current and also to take care of any thermal expansion.



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- x) Busbars shall be colour coded for easy identification and so located that the sequence R-Y-B shall be from left to right, top to bottom or front to rear, when viewed from the front of the SWGR/PMCC/ MCC/ DB assembly.
 - xi) Bolted disconnect links shall be provided for DBS for all incoming and outgoing feeders for isolation of neutral, if necessary.

11.06.03 Module Details

- i) Draw out type control module shall have self- aligning, plug in power / control disconnects. All disconnects shall be silver-plated to ensure good contacts.
 - ii) The design shall be such as to permit easy withdrawal / reinsertion of the unit guide rails to ensure correct alignment & all the power contacts meet accurately every time the module is inserted. Two feeders shall not be accommodated in the same module of MCC.
 - iii) Various module sizes should be multiples of one basic unit to facilitate modifications at site. Suitable provision for this purpose should also be incorporated in the vertical busbars.
 - iv) Control module shall house the control components for a circuit such as MPCB / MCCB, contactors, relays, push buttons, lamps etc. as per requirement only the push button actuators, lens of indicating lamps, and transparent windows for meters shall be mounted on module door such that when the module is withdrawn the cubicle door shall be provided the specified degree of protection when the module door is closed. These modules shall be designed to withstand internal arc faults i.e. in the event of fault occurring in one module the arc should not spread to neighboring module and should not affect their functioning.
 - v) The equipment layout shall provide sufficient working space in between the components and subject to Owner's approval.
 - vi) It shall be possible to carry out routine, maintenance checks or small changes in a module without physically taking the module away from switchboard.
 - vii) Automatic safety shutters shall be provided to fully cover the female primary disconnects when the module is withdrawn. Under any circumstances it shall not be possible to access the vertical dropper accidentally and also suitable means shall be provided to avoid any phase short circuit in vertical droppers.
 - viii) The module shall be dust & vermin proof even when module is completely withdrawn. Suitable means shall be provided to achieve this feature.
 - ix) Draw out type control modules of same size and type shall be electrically and physically interchangeable.
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- x) Draw out control modules of PCC/PMCC/MCC shall have the SERVICE, TEST & ISOLATED positions with positive indications and interlocking for each position. The doors of individual modules and the cable alley should open in opposite directions to facilitate clear view of the module when the operator is working on the cable terminals.
- xi) In service position, both power and control circuits shall be engaged. It shall not be possible to open the module door when the module is in service position.
- xii) In TEST position, the power circuits shall be disengaged but the control circuits shall be engaged. It shall be possible to close the module door when the module is in TEST position. Keeping the front access door of module in closed condition, the breaker can be placed in ISOLATED, TEST or SERVICE position from outside.
- xiii) In ISOLATED position, both power and control circuits shall be disengaged.
- xiv) For motors 90 KW and above, ACBs with numerical protection relays are envisaged. All motor feeder modules shall also be provided with local/ remote selector switches on the module itself.

11.06.04 Circuit Breakers

- i) Breakers shall have anti-pumping feature.
- ii) Circuit breakers shall have minimum interrupting capacity equal to the listed fault level.
- iii) Circuit breaker shall be three poles air break type with stored energy, trip free mechanism and shunt trip.
- iv) Circuit breakers shall be draw out type, having SERVICE, TEST & ISOLATED positions with positive indication for each position.
- v) Circuit breakers of identical rating shall be physically and electrically interchangeable.
- vi) All circuit breakers shall be of motor wound spring charged mechanism and also shall have hand operated spring charged mechanism facility.
- vii) For motor wound mechanism, spring charging shall take place automatically after each breaker closing operation. One open-close/open operation of the circuit breaker shall be possible after failure of power supply to the motor.
- viii) Mechanical safety interlock shall be provided to prevent the circuit breaker from being racked in or out of the service position when the breaker is closed.



	ix) Automatic safety shutters shall be provided to fully cover the female primary disconnects when the breaker is withdrawn. x) Each breaker shall be provided with closing and emergency manual trip, mechanical ON-OFF indicator, an operation counter and mechanism charge/ discharge indicator. xi) In addition to the auxiliary contacts required for normal breaker operation and indication, each breaker shall be provided with following for interlocking purpose:- a) Position/ cell switch with 4 NO + 4 NC contacts. b) Auxiliary switch, with 6 NO + 6 NC contacts, mounted on the moving portion of the switchgear/ PMCC/ MCC and operated mechanically by a sliding lever from the breaker c) Alternatively. Electrically reset latching relay may be used for the purpose. The exact requirement of contacts of position/cells switch, limit switch, auxiliary switch and latching relay shall be decided by the Bidder taking into account the scheme requirement spares. d) Spring charge limit switch shall be provided for breakers with motor wound spring charging mechanism. These limit switches for motor duty shall be provided with minimum 2 NO + 2 NC aux. contacts. e) Limit / auxiliary switches shall be convertible type that is suitable for changing N.O contact to N.C. and vice-versa. xii) Provision of mechanical closing of breaker only in 'Test' and 'Withdrawn' position shall be made. Alternatively, mechanical closing facility should be normally inaccessible, accessibility rendered only after deliberate removal of shrouds. It shall be possible to close the door with breaker in test position. xiii) Mechanical tripping shall be through red 'Trip' push button outside the panels for breakers, and through control switches for other circuits.
11.06.05	Moulded Case Circuit Breakers (MCCB), Motor Protection Circuit Breaker (MPCB) and Miniature Circuit Breakers (MCB) i) MCCBs shall be provided with spring assisted quick make/break manually operated trip free mechanism. ii) MCCBs / MPCBs shall be provided with adjustable tripping device with inverse time characteristics for overload protection and instantaneous characteristics for short circuit protection. As per requirement, MCCBs shall also be provided with ground fault protection and 1NO contacts for tripping indication / alarm for Owner use.



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- iii) MCCBs / MPCBs for motor feeder shall be equipped with instantaneous magnetic adjustable tripping element only.
 - iv) MCCBs operating handle 'ON' and 'OFF' positions shall be displayed and the operating handle shall be mounted on the door of compartment/module housing MCCBs.
 - v) MCCBs/MPCBs shall be provided with minimum 2 NO + 2 NC spare auxiliary contacts
 - vi) MCBs shall be used in all the AC control circuits and DC control & lighting feeders, as specified. However, control fuses may be used in the ACB feeders for DC circuit.
 - vii) The MCBs shall be suitable for manual closing and opening and automatic tripping under overload and short circuit conditions. They shall be provided with trip-free mechanism.
 - viii) The MCBs shall be suitable for housing in the lighting panels and for connection of standard copper / aluminium wires at both the incoming and outgoing ends by copper lugs or bus bars connection on the incoming end.
 - ix) The terminals of MCB and ON and OFF positions shall be clearly and indelibly marked.
 - x) The interrupting current and continuous current rating of the MCCBs shall be as per the requirement.

11.06.06 Contactors

- i) The contactors shall be three pole, air break type designed for duty class III category A.C. -3 for non-reversing and AC4 for reversing starters with non-bouncing silver / silver alloy contacts.
- ii) Each contactor shall be provided with two (2) normally open and two (2) normally closed auxiliary contacts. Reversing contacts shall be electrically and mechanically interlocked.
- iii) Contactors with delayed dropout feature shall be provided for some essential auxiliaries. These contactors shall not dropout on power failure if the voltage is restored within 3 seconds.
- iv) Contactors shall break without damage 10 times rated current up to 100 amp rating and 8 times rated current for above 100 amp rating.
- v) Coil continuous current shall not exceed 2 amp and initial pick up shall be limited to 9 amp. Class of insulation shall be E or better.
- vi) Drop out voltage shall be 45 to 65% of rated voltage and pick up shall be 85 to 110%. Contactor duty shall be as per requirement.



	vii)	Coil shall be designed for the control voltage without economy resistors.
11.06.07	A.C. Starter	
		A.C starters shall be of TYPE II coordination.
11.06.08	DC Starter	
	i)	DC starters shall be complete with switch fuse units, contactors, resistors, relays, meters, push buttons, lamps, etc.
	ii)	Starters shall be furnished in totally enclosed floor mounting, sheet steel cubicles complete with a hinged front access door. Minimum thickness of sheet steel shall be 2 mm.
	iii)	The cubicle enclosure shall provide dust and humidity protection, the degree of protection being not less than IP 54.
	iv)	The resistor enclosure shall be provided with ventilating louvers and wire mesh guard and shall have a degree of protection IP 23.
	v)	Cubicle space heater shall be provided to maintain internal temperature above dew point. Heater shall be furnished with SFU and thermostat control.
11.06.09	Power Distribution board (PDB)	
	i)	PDB shall house MCCB modules only with have duplicate incomers and a bus-coupler. Distribution of outgoing feeders shall be such as to ensure uniform loading on each section of DB. Board shall be single/double front, metal clad, front matched, dust and vermin proof, fixed type compartmentalized and extensible on both sides with IP51 type enclosure.
	ii)	Shall have base channel of size ISMC 75.
	iii)	Shall have isolated busbar chamber for main bus bar at the top, running throughout the length of the board. Chamber shall have removable cover.
	iv)	Cable alley shall have sufficient space for aluminium power cables and bottom cable chamber shall be left free completely isolated from the vertical bus bar.
	v)	Bus bars shall have same cross section throughout the length. Rating of the neutral bus bar shall be 50% of the main bus bar. Earth bus bar shall run in bottom chamber throughout the length of the panel.
	vi)	Isolation transformer shall be provided in the PDB for driving 3 Ph, 4 Wire supply.



11.06.10 DC Distribution Boards

DCDBs shall have two incomers and a bus coupler. Incomers and outgoing feeders of DCDBs shall be switch fuse modules/MCCB modules. They shall be fixed type and floor mounted. Other constructional features shall be similar to PDB.

The feeder rating and quantity shall be as per requirement.

11.06.11 AC Fuse Boards

AC Fuse Boards, shall have switch fuse units as incomer. Fuse boards may be fed from DBs and shall have two incomer. AC fuse boards shall be of two types - one with 415V, 4-wire, triple pole- and-neutral (TPN) outgoing feeders and the other with 240V, 2- wire, single-pole-and-neutral outgoing feeders. The boards shall be wall mounted type and other constructional features as given in above specification for PDB except that fixed type module are accepted for such DBs.

For small loads, MCB boards with TPN MCB as incomer and TPN/SP MCBs for outgoing may be considered. However, to bring down the short circuit level to safe limits, isolation transformer shall be provided wherever necessary.

The feeder rating and quantity shall be as per requirement.

11.06.12 Control & Indication

- i) The circuit breaker shall be wired up for local and remote operation. Each breaker cubicle shall be equipped with following:-
 - a) One (1) "TESTREMOTE" selector switch stay put type with black pistol grip handle and key interlock for motor feeder breaker and as well as for incoming and outgoing tie feeders.
 - b) Two (2) heavy duty, oil tight, push buttons for TRIP & CLOSE.
 - c) One (1) heavy duty, oil-tight, CLOSE-NEUTRAL-TRIP Switch
 - d) Indicating light on front of compartment:

GREEN	-	Breaker open
RED	-	Breaker closed
AMBER	-	Trip/Trip circuit trouble
BLUE	-	Breaker Spring charged
AMBER	-	Breaker, Auto trip
WHITE	-	Trip coil healthy
WHITE	-	Breaker in test position
YELLOW	-	Breaker in service position
 - e) Lamps shall be LED type with coloured dome. Lamps and lens shall be replaceable from the front. LED lamp shall be made in accordance with InP technology (Aluminum Indium Gallium



Phosphide technology). The body shall be made of poly carbonate unbreakable lens. LED shall be protected by inbuilt fuse with surge suppressor or leakage voltage glow protection. LED circuit shall be PCB mounted. Intensity shall be greater than 200 mcd. All push button lamp shall be as per LED indicating lamp.

- f) Two(2) incomers and bus coupler shall be so interlocked that no two incomers shall operate in parallel except during momentarily paralleling.
- ii) The control module shall be connected for local remote operation. Each control module shall be equipped with the following:
- iii) Required nos. of push buttons as per scheme drawing.
- iv) Each push button shall have two (2) normally open and two (2) normally closed contact rated 10A at 240V.
- v) Push button shall be heavy duty, oil tight, push to actuate type with integral escutcheon plate marked with its function.
- vi) One (1) MCC-REMOTE selector switch having make before break feature shall be provided for unidirectional motor feeders.
- vii) For Test control supply, the Bidder shall provide separate 415/110 control transformer.
- viii) DCDBs shall be provided with indication to monitor healthiness of the incoming DC supplies.

11.06.13 Current Transformer

- i) Current Transformers shall be epoxy cast-resin type rated minimum of 10 VA. All secondary connections shall be brought out to terminal blocks where wye or delta connection shall be made. Insulation class shall be "E or better."
- ii) Accuracy class of the current transformers shall be:-
 - a) Class PS for differential
 - b) Class 5P20 for other relaying
 - c) Class 1.0, ISF < 5 for metering other than MEAA
 - d) CTs for MEAA metering shall be as per Chapter-1
- iii) Separate wire shall be used for metering and protection as far as possible. Secondary wire terminals shall be made available accordingly.
- iv) Terminals with CT secondary shorting links for metering leads and TEST terminals block for C.T. secondary relay and KWH leads shall be provided.



- v) VA Burden of CT's shall be adequate (15 VA minimum) for connection to remote metering system. Also additional terminal blocks etc. as may be required shall be provided in panels.
- vi) CT secondary shall be rated 1 A for metering and protection.

11.06.14 Voltage Transformer

- i) Three nos. single phase voltage transformer shall be provided in each incoming power supply circuit with voltmeter and selector switch. Additional three nos. voltage transformers shall be provided for each bus section voltmeter and its selector switch. These voltage transformers shall be mounted in separate compartments of the switchgears.
- ii) Voltage transformers shall be epoxy cast resin and shall have an accuracy class of 1.0. Voltage Transformers mounted on breaker carriage is not acceptable. Voltage rating for the Transformer shall be 1.2 continuous and 1.5 for 30 second.
- iii) Voltage transformer shall capable to withstand 200% of rated voltage continuously without change in its characteristics.
- iv) High voltage windings of voltage transformer shall be protected by current limiting fuses.
- v) Suitably rated three phase MCBs to prevent overload shall be installed in all ungrounded secondary leads. MCBs shall be suitably located to permit easy access while the MCC is energised.
- vi) VTs for MEAA metering shall be as per Chapter-1

11.06.15 TEST Control Transformers

- i) For TEST control supply control transformers of adequate rating (min. 2 KVA rating) shall be provided.
- ii) For motor space heating supply, the transformers of adequate rating (min. 2 KVA rating) with 100% standby shall be provided.
- iii) All the control transformers shall be placed in spacious compartments to have proper air circulation and keep lower temperature of transformer and its module.
- iv) All the control transformers shall be provided with selector switch, fuses, indicating lamps. Each control transformer shall feed to its control buses of respective bus section during normal operation. In case of failure of one of the control transformer, provision shall be made to tap the control supplies from other bus section control transformer by auto changeover using aux. relays contacts/switch. Bidder has to develop scheme accordingly. This logic shall be made applicable for space heating and winding heating control transformer also.



- v) All control transformer shall conform to IS: 12021.
- vi) Control transformer shall have OCTC tap range of $\pm 5\%$ in steps of 2.5% per tap.

11.06.16 Control supply for MCC modules

- i) Each motor feeder of MCC shall be provided with suitably rated 415/110V control transformer, for arranging control supply for the module. All the necessary auxiliary and main contactors shall be provided suitable for this control supply.
- ii) In test position module control supply shall be disconnected and provision shall be available to test the control circuit through test bus, obtained from separate control transformer provided for this purpose.

11.06.17 Control supply for ACBs of PCC and PMCC modules

- i) Two 220 V DC feeders shall be provided in each board for power supply of control, shunt tripping and annunciation purpose.
- ii) Control supply shall have supervision facility, alarm shall be provided for non-availability of any one of the control supply.
- iii) MCCBs/MCBs shall be provided on incoming sides of supplies. Control buses of two sections shall be connected through auto changeover scheme.
- iv) LEDs shall be provided for the indication purpose.
- v) Isolation arrangement shall be provided on each panel to facilitate fault location and testing. Separate fuses shall be provided for spring charging motors, for indication lamps and for closing / Tripping circuits of each cubicle

11.06.18 Relays

- i) Relays shall be of draw out design with built-in testing facilities. Small auxiliary relays may be in non-draw-out execution and mounted within the cubicle.
- ii) Numerical type protective relays shall be provided to isolate the faulty equipment and system as early and as expeditiously possible.
- iii) The Bidder shall furnish, install & co-ordinate all relays to suit the requirements of protection, interlock and bus transfer scheme as broadly indicated in the drawings.
- iv) All relays shall be mounted on the front of the panel and shall be specified as per requirement.
- v) Protection relay shall be lockout type with hand reset feature.



- vi) Rated continuous making and breaking currents for contacts shall be suitable for service involved.
- vii) All Relays shall be suitable for 220 V DC operation.
- viii) All numerical relays shall have keypad / keys to allow relay settings from relay front. In addition, relay shall have front port for downloading / uploading of relay settings from the PC / Laptop. All hand-reset relays shall have reset button on the relay front. Relay to be self or hand reset shall be software selectable.
- ix) All relays shall have LED / LCD display for settings, status, faults and events. LCD display shall be backlit and temperature compensated up to 65°C for contrast and legibility.
- x) As a minimum, the relay shall have LED indicating lamps for fault trip, relay healthy / unhealthy and control supply on.
- xi) The relay shall have at least 6 programmable LEDs on relay front.
- xii) Software Security
- xiii) Relay shall be provided with password protection against unauthorized write access. However, viewing of metering data, setting and status and event data as read only parameters should be without password protection.
- xiv) Disturbance, Event Recording & data Storage Status, disturbance data and events shall be stored in non-volatile memory or memory backed up by battery. It should be possible to store minimum 50 events with date and time stamp, last 5 fault records and last disturbance record. When auxiliary power fails, it should be possible to see the latest state of display when power is restored. Also, in case of power supply failure lock out status of the relay should be stored and kept in memory to allow the working of interlock logic properly on restoration of the supply.
- xv) Trip Circuit Supervision & Lock out function
- xvi) Relay shall have built in lockout function. Lock out feature shall be self reset or hand reset and shall be software selectable.
- xvii) For trip circuit supervision separate relay shall be provided.
- xviii) Input / Output Interface, Filters and galvanic Isolation.
- xix) Relay shall have at least 4 NO contacts each shall separately be programmable for either hand reset or self-reset. The contact rating shall be minimum 5A at 250V AC / DC.
- xx) Relay shall be made immune to capacitance effect due to long length cables.



- xxi) All IOs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.
- xxii) IEC 61850 protocol shall be used and shall be directly linked to DCS without converters. The numerical relays shall be provided with dual redundant ports for IEC 61850 communication and the numerical relays shall be connected in ring topology for linking to redundant controllers of DCS.

11.06.19 Intelligent Controllers

- i) Each intelligent PCC, PMCC and MCC shall be provided with multi-function microprocessor based Numerical protective relay/ relay with intelligent controller.
This numerical relay shall have the following functions:-
 - a) Metering
 - b) Protection
 - c) Control
 - d) Monitoring
 - e) Communication through IEC 61850 protocol shall be used and shall be directly linked to DCS without converters. The Intelligent controllers shall be connected in daisy chain (in groups) or in star connection for linking to redundant controllers of DCS through Profibus using suitable device such as Y-link.
- ii) Each panel shall be supplemented with required additional control element for features not covered by intelligent controllers.
- iii) Numerical Relays of all modules in PCC / PMCC/ MCC shall be interlinked to DCS through open protocol IEC61850. Suitable hardware, software, cabling and any other interface requirement shall be taken care by this Bidder.
- iv) Software for Numerical relays shall be supplied and shall be configurable from DCS based control system. Using this software, the following functions shall be carried out:-
 - a) Control of breakers (Close / Open / Trip)
 - b) Program or modify set points
 - c) Load or save set point from or to a disk
 - d) Read actual values
 - e) Monitor status
 - f) Read pre-trip data and trip record
 - g) Display dynamic trending of actual values
 - h) Get help on topic
 - i) Print
- v) The device should have a control voltage of wide band from 110 to 240 V AC/DC, as applicable.



- vi) Intelligent controller in a 415V / PMCC / MCC shall be directly interfaced to DCS control system through IEC 61850 Communication protocol for monitoring and through Hard wired interface for critical feedbacks and for commands with suitable interposing relay via remote I/O panel in MCC Room. The protection system should be independent / autonomous of the system i.e. motor protection & control should continue to be available even in the event of a communication or automation system failure.

11.06.20 Communication with DCS

- i) Co-ordination between the switchgear manufacturer and DCS Supplier for protocol / mapping, procedures, interface and testing is included in the scope of services.
- ii) Software for intelligent controller shall be supplied and suitably interfaced with DCS. It shall be possible to configure a device either individually or over a communication network. For this purpose, provision for connecting a laptop should be available at Numerical Relays/ Intelligent controller.
- iii) Minimum of 2 Nos. laptop shall be provided along with PCCs / PMCCs / MCCs with all accessories, fully loaded software for Uploading / Downloading the switchgear data. In order to achieve minimum response time, the device shall be capable of transmitting data at a speed, suitable for operation with high speed bus systems.

11.06.21 Operations and Indications

- i) Close/ open operations of all Incomer, Bus coupler & outgoing feeder breakers in "test" position, for all 0.415 kV feeders shall be through Push Buttons and test / service selector switches provided at the respective modules.
- ii) Modules shall have ON, OFF & TRIP (LED indications provided.)

11.06.22 Interface with DCS

SL. NO.	DESCRIPTION	TYPE OF I / O
A.	Incomer (ACB Controlled)	
	Breaker Close	DO
	Breaker Trip	DO
	Line PT under voltage	DI
	Line PT Fuse Fail	DI
	Breaker ON	DI
	Breaker OFF	DI
	Incomer Disturbance (Control Supply Fail)	DI
	Numerical relay Unhealthy	DI
	Trip Coil Healthy	DI
	Incomer Available (Breaker in service/spring charged/ switchgear in remote)	DI



SL. NO.	DESCRIPTION	TYPE OF I/O
	Electrical Trip (Lockout relay optd)	DI
	Numerical relay	Interface through IEC 61850 protocol.
B.	Incomer (MCCB Controlled)	
	MCCB Close	DO
	MCCB Trip	DO
	Current feedback	AI
	MCCB ON	DI
	MCCB OFF	DI
	Incomer Disturbance (Contol supply fail)	DI
	Electrical Trip	DI
C.	Bus Coupler (ACB Controlled)	
	Breaker Close	DO
	Breaker Trip	DO
	Incomer-1 check Syn	DO
	Incomer-2 check Syn	DO
	Bus coupler check Syn	DO
	Breaker ON	DI
	Breaker OFF	DI
	Buscoupler Disturbance (Control Supply Fail)	DI
	Numerical relay unhealthy	DI
	Trip Coil Healthy	DI
	Bus-A Under Voltage	DI
	Bus-A PT Fuse Fail	DI
	Bus-B under voltage	DI
	Bus-B PT Fuse fail	DI
	DC Supply-1 fail	DI
	DC Supply-2 fail	DI
	Buscoupler Available (Bkr. In service/spring charged/swgr in remote)	DI
	Electric Trip (Lockout relay optd)	DI
	Numerical relay	Interface through IEC 61850 protocol
D.	Bus Coupler (MCCB Controlled)	
	MCCB Close	DO
	MCCB Trip	DO
	Current feedback	AI
	MCCB ON	DI
	MCCB OFF	DI
	Bus coupler Disturbance (Control Supply Fail)	DI
	DC Supply-1 Fail	DI
	DC Supply-2 Fail	DI
	Electrical Trip	DI



SL. NO.	DESCRIPTION	TYPE OF I/O
E.	Outgoing ACB Feeder	
	Breaker Close	DO
	Breaker Trip	DO
	Breaker ON	DI
	Breaker OFF	DI
	O/G Feeder Disturbance (Control Supply Fail)	DI
	Numerical relay unhealthy	DI
	Trip Coil healthy	DI
	O/G Feeder Available (Breaker in service/spring charged/swgr. In remote)	DI
	Electrical Trip (Lockout relay optd)	DI
	Numerical relay	Interface through IEC 61850 protocol
F.	ACB Controlled Motor Feeder	
	Start Command	DO
	Stop Command	DO
	ON Feedback	DI
	OFF Feedback	DI
	Electrical trip (Lockout relay)	DI
	Emergency LPBS Stop	DI
	Module Disturbance (Control supply fail)	DI
	Module available (Breaker in service position, Switchgear in remote & breaker spring charged)	DI
	Numerical relay unhealthy	DI
	Trip coil healthy	DI
	Numerical relays	Interface through IEC 61850 protocol
G.	Unidirectional LT Drive (MCCB/MPCB Controlled)	
	Start Command	DO
	Stop Command	DO
	ON Feedback	DI
	OFF Feedback	DI
	Module disturbance (Control supply fail)	DI
	Emergency LPBS Stop	DI
	Intelligent Controllers	Interface through IEC 61850 protocol or Profibus.



SL. NO.	DESCRIPTION	TYPE OF I/O
H.	Bidirectional LV Drive with Non-Integral starters (Soot blower)	
	Forward Command	DO
	Reverse Command	DO
	Forward Feedback	DI
	Revers Feedback	DI
	Module disturbance (Control supply fail)	DI

NOTE: The above I/O shall be hard wired to DCS.

11.06.23 Metering and Protection

The feeders shall have the following protections / metering required for the switchgear panels. The minimum protections / metering required for various typical feeders including ACB operated feeders are given below. For non ACB controlled feeders having intelligent controller, the metering indicated shall be in-built.

i) ACB Controlled feeders with numerical relays

A)	Incomers		
	Protections	Metering (for remote)	Local Indication
	Instantaneous over current protection 50	Current in all the three phases	Current in all the three phases
	IDMT over current protection 51	Voltage – Phase to phase, phase to neutral	Voltmeter with voltage selector switch
	Instantaneous earth protection 50N	kW	
	IDMT Earth fault protection 51N	kWH	
	Circuit breaker failure protection 50BF		
	Under voltage protection 27		
	Restricted earth fault protection 64R		
	Backup (Standby) earth fault protection 64S		
	Apart from above protection relays, each electrically operated breaker shall be provided with anti pumping (94), lockout (86) and trip circuit supervision (95) relays. Lockout relay shall be a hand reset type and		



	shall not be clubbed with numerical relay.		
	Check synchronizing 25 through relay mounted in bus coupler.		
B)	Bus Couplers		
	Protections	Metering (for remote)	Local Indication
	Instantaneous over current protection 50	Current in all the three phases	Current in all the three phases
	IDMT over current protection 51	Voltage - Phase to phase, phase to neutral	Voltmeter with voltage selector switch for Bus A
	Instantaneous earth protection 50N	kW	Voltmeter with voltage selector switch for Bus B
	IDMT Earth fault protection 51N	kWH	
	Circuit breaker failure protection 50BF		
	Under voltage protection 27		
	Check synchronizing 25		
	Apart from above protection relays, each electrically operated breaker shall be provided with anti pumping (94), lockout (86) and trip circuit supervision (95) relays. Lockout relay shall be a hand reset type and shall not be clubbed with numerical relay.		
C)	Motor Feeders (90KW and above only)		
	Protections	Metering (for remote)	Local Indication
	Numerical Composite motor protection to cover a minimum of protections such as negative phase current (46), thermal over load (49), phase over current (50/51), earth fault (50N/51N), locked rotor (51LR), No. of starts per hour (66), breaker failure (50BF), under voltage (27 from PT)	Current in all the three phases	Current (Y phase)



	Apart from above protection relays, each electrically operated breaker shall be provided with anti pumping (94), lockout (86) and trip circuit supervision (95) relays. Lockout relay shall be a hand reset type and shall not be clubbed with numerical relay.	kW, kWh	
D)	Outgoing Feeder (630A and above)		
	Protections	Metering (for remote)	Local Indication
	Instantaneous over current protection 50	Current in all the three phases	Current (Y phase)
	IDMT over current protection 51	Voltage – Phase to phase, phase to neutral	
	Instantaneous earth protection 50N	kW	
	IDMT Earth fault protection 51N	kWh	
	Circuit breaker failure protection 50BF		
	Apart from above protection relays, each electrically operated breaker shall be provided with anti pumping (94), lockout (86) and trip circuit supervision (95) relays. Lockout relay shall be a hand reset type and shall not be clubbed with numerical relay.		

ii) MCCB Controlled feeders rated below 630A.

A)	Incomers (with motorized MCCB)		
	Protections	Metering (for remote)	Local Indication
	Over current protection	Current transducer (Y phase)	Current (Y phase)
	Short circuit protection		Voltmeter with voltage selector switch



B)	Bus Couplers (with motorized MCCB)		
	Protections	Metering (for remote)	Local Indication
	Over current protection	Current transducer (Y phase)	Current (Y phase)
	Short circuit protection		
C)	Outgoing Feeder (Below 630A) with MCCB (non motorized)		
	Protections	Metering (for remote)	Local Indication
	Over current protection		Current (Y phase)
	Short circuit protection		
D)	Incomers for ACDB/MLDB/PDB MCCB (non motorized)		
	Protections	Metering (for remote)	Local Indication
	Over current protection		Voltmeter with voltage selector switch
	Short circuit protection		Electronic energymeter with communication port suitable for IEC 61850 protocol

iii) Other feeders

A)	Bus PT / Line PT Modules		
	Protections	Metering (for remote)	Local Indication
	Under voltage protection 27	Voltage – phase to phase, phase to neutral	
	Fuse failure protection		
B)	Motor feeders upto 15.0kW (MPCB with Contactors)		
	Protections	Metering (for remote)	Local Indication
	Intelligent controllers with current measuring module and overload & short circuit protection.		
C)	Motor feeders above 15.0kW but below 90kW (MCCB with Contactors)		
	Protections	Metering (for remote)	Local Indication
	Intelligent controllers with current measuring module and Overload, single phase preventor & short circuit protection.	Phase current (for motors of rating 30KW and above)	



iv) DC System

A)	Incomer Breaker / MCCB		
	Protections	Metering (for remote)	Local Indication
	With indication only no protection with O/L alarm to DCS	Bus voltage	Load Voltage
			Bus Voltage
			Shunt with ammeter
B)	Outgoing Feeder		
	With indication only no protection with O/L alarm to DCS		Shunt with ammeter

Note:

Fuse failure relay shall be provided on the secondary side of voltage transformer to monitor HV and LV fuses.

11.06.24 Secondary wiring

- i) The Switchgear/MCC/DB shall be fully wired at the factory to ensure proper functioning of control, protection, transfer and interlocking schemes.
- ii) Fuse and links shall be provided to permit individual circuit isolation from bus wires without disturbing other circuits. All spare contacts of relays, switches and other devices shall be wired up to terminal blocks.
- iii) Wiring shall be done with flexible, 1100V grade, PVC insulated switchboard wires with stranded copper conductors of 2.5 sq.mm for current circuits and 1.5 sq.mm for voltage circuits and control circuits. Colour code shall be maintained for voltage and current circuits.
- iv) Each wire shall be identified, at both ends with permanent tubular type printed markers bearing wire numbers as per Bidder's wiring diagrams. Each wire shall be ferruled by plastic tube with indelible ink print at both ends having terminal block no., terminal nos., destination no, as per approved drawing.
- v) Wire terminations shall be made with crimping type connectors with insulating sleeves. Wire shall not be spliced between terminals. Fork type lugs shall be provided for all control terminals. The lugs shall be suitable for 2.5 sq.mm stranded copper conductor. However, C.T. wiring shall be done by using circular type lugs.
- vi) For power wiring inside module copper cables are to be used.
- vii) Terminal blocks with loose wires shall be provided in each shipping section for inter panel wiring.
- viii) All control terminals shall be of 10 sq.mm size and shall be sliding type for draw out module and clip on type for fixed type module.



11.06.25 Terminal Blocks

- i) Terminal blocks shall be 1100V grade box-clamp type with marking strips, similar to ELMEX 10 sq.mm or equal. Terminals for C.T. secondary leads shall have provision for shorting or any other equivalent new technology terminal blocks after approval of Owner.
- ii) Not more than two wires shall be connected to any terminal. Spare terminals equal in number to 20% active terminals shall be furnished.
- iii) Terminal block shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.
- iv) Coloured terminal blocks for connection of power cables (R,Y,B phases) shall be provided.
- v) Twisted pair 0.5sq.mm copper cable shall be used for DCS/BMS surface

11.06.26 Cable Termination

- i) SWGR/PMCC / PCC/MCC/DB shall be designed for cable entry from the bottom. Sufficient space shall be provided for ease of termination and connection.
- ii) All provisions and accessories shall be furnished for termination and connection of cables, including removable gland plates cable supports, crimp type tinned copper/aluminium lugs, double compression type brass glands with tapered washer (power cables only) and terminal blocks. Terminating of power cables shall be shrouded to avoid accidental touch. Suitable supporting clamps shall be provided for cables to eliminate stresses on terminals.
- iii) Twisted pair 0.5 sq. mm copper cable shall be used for DCS interface.
- iv) Gland plates shall be minimum 3 mm thick. The gland plate and supporting arrangement for I/C Power cables shall be such as to prevent flow of eddy current.
- v) Gland plates shall be easily removable type. The gland plate shall be mounted at 40/50 mm above the bottom of base frame of switch board.
- vi) Cabling area above gland plate shall be free of any earth bus, neutral bus etc. so that the total gland plate area is usable for cabling and also do not obstruct removal of gland plate.

11.06.27 Busduct Connection

- i) Busduct connections, wherever provided, shall be furnished along with transition panel if required.



- ii) All connecting bus work shall have the same continuous rating as associated SWGR/PMCC / PCC/MCC bus and shall be fully braced for the specified short circuit current.
- iii) All provisions such as matching flange and other accessories shall be furnished for connection to busduct.
- iv) All the incomers from transformer shall be connected by Bus

11.06.28 Ground Bus

- i) A ground bus made of copper/GI rated to maximum fault current shall be extended to full length of the Switchgear/MCC/DB.
- ii) The ground bus shall be provided with two-bolt drilling with G.S. bolts and nuts at each end to receive 50x6 mm G.S. flat.
- iii) Each stationary unit shall be connected directly to the ground bus. The frame of each circuit breaker and V.T. unit shall be grounded through heavy multiple contacts at all times except when the primary disconnecting devices are separated by a safe distance.
- iv) The frames of all other drawout modules shall be grounded through heavy multiple contacts at all times except when the power disconnects are separated by a safe distance.
- v) Wherever the schematic diagrams indicate a definite ground at the SWGR/PCC/ MCC a single wire for each circuit thus grounded shall be run independently to the ground bus and connected thereto.
- vi) C.T. and V.T. secondary neutral shall be earthed through removable links so that earth of one circuit maybe removed without disturbing others.
- vii) Door earthing shall be done by using 2.5 sq.mm stranded flexible copper conductor PVC insulated (Green colour).

11.06.29 Name Plates

- i) Name Plates of approved design shall be furnished at each cubicle/control compartment, at the top of each Switchgear/MCC/DB and at each instrument and device mounted on or inside the cubicle.
- ii) The material shall be lamicoid or approved equal 3 mm thick with white engraved letters on black background.
- iii) The name plate shall be held by self-tapping screws. Name plate size shall be minimum 40 X 150 mm of 0.5mm thick for instrument/devices & 75 x 450 mm of 1mm thick for panels. The size of lettering shall be minimum 5 mm for module/feeder designation; however, component designation letter size shall be 6 mm.



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- iv) Caution notice on suitable metal plate shall be affixed at the back of each vertical panel for single front construction.
 - v) Board labels and panel Nos. shall be provided both on front and rear at two locations each if board is more than 10 meters in length.
- 11.06.30 Space Heaters and Plug Sockets
- i) Each vertical section shall be provided with thermostat controlled space heater and 5A, 3 pin plug socket.
 - ii) In addition, motor feeders 30 KW and above shall be wired up for feeding the motor space heater through suitably rated starter auxiliary NC contact.
 - iii) Cubicle heater, Motor heater, plug socket circuit shall have individual switch fuse units.
 - iv) For valve / actuator provision of space heater supply shall be provided.
- 11.06.31 Tropical Protection
- i) All equipment, accessories and wiring shall have fungus protection, involving special treatment of insulation and metal against fungus, insects and corrosion.
 - ii) Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects.
- 11.07.00 PAINTING FOR SWGR/PCC/MCC/DB
- 11.07.01 All surfaces shall be subject to tank pretreatment process to produce a smooth, clean surface free of scale, grease and rust.
- 11.07.02 The SWGR/PCC/ MCC/DB and all other components shall be powdered coated as mentioned in Chapter 1.
- 11.07.03 Sufficient quantity of touch-up paint shall be furnished for application at site.
- 11.08.00 TESTS
- 11.08.01 During the fabrication switchgears shall be subject to inspection by Owner or its authorized representatives. Manufacturer shall furnish necessary information concerning the supply to Owner.
- 11.08.02 All routine tests shall be carried out at manufacturer's work under his care and expense, in the presence of Owner or his representative.
- 11.08.03 Stage inspection after the pre treatment and preparation of under surface and before final painting shall be carried out by Owner.
-



11.09.00	ROUTINE TEST
11.09.01	A general visual check shall be carried out. This shall cover measurement of overall dimension, location, number and type of devices, terminal boxes, location and connection of terminal etc.
11.09.02	Manual and electrical operation of circuit breakers / relay shall be checked under the worst condition of the auxiliary voltage.
11.09.03	Dry insulation test with power frequency voltage shall be conducted for the main and auxiliary circuit.
11.09.04	Insulation resistance of the main and auxiliary circuits shall be checked before and after high voltage withstand test.
11.09.05	Operation checks shall be carried out for every control function / interlocks as per the schematic diagrams by manually simulating fault condition and operation of the control switches / relay etc.
11.09.06	Relay shall be tested with secondary injection test equipment.
11.09.07	Primary injection test to check winding of current transformers, ammeter, ammeter selector switch and correction of wiring connection between them.
11.09.08	For equipment bought from other sub suppliers, certified test report of tests carried out at the manufacturer's works shall be submitted. Normally all the routine test specified in the relevant standards shall be conducted by the sub-supplier at his works.
11.09.09	Interchangeability of similar modules shall be checked on random basis. This may be done on one module of each size.
11.10.00	TYPE TEST
11.10.01	The type test certificate of similar rating of switchgear performed shall be submitted.
11.10.02	In case the Bidder is not able to submit report of the type test(s) conducted or in the case of type test report(s) are not found to be meeting the specification requirements, the Bidder shall conduct all such tests in the presence of the Owner without cost implication and submit the reports for approval.
11.11.00	TEST WITNESS
	Test shall be performed in presence of Owner's if so desired by the Owner. The Bidder shall give at least fifteen (15) days advance notice of the date when tests are to be carried out.
11.12.00	DRAWINGS, DATA AND MANUALS
11.12.01	Following drawings/ data and Manuals to be submitted for approval.



	i)	Outline dimensional drawing showing general arrangement, space requirements and bus duct / cable entry points.
	ii)	Cross-section with parts list
	iii)	Foundation plan with loading
	iv)	Board-wise single line diagrams
	v)	Control schematics
	vi)	Wiring diagrams
	vii)	Consolidated Bill of Material
	viii)	Relay setting calculation
	ix)	Test Certificates and QAP
	x)	Bus bar sizing
	xi)	CT/VT sizing
	xii)	Technical leaflets
11.12.02		The Bidder shall also submit all instruction manuals clearly indicating the installation method, check-up and tests that are to be carried out before commissioning the equipment.
11.12.03		Bidders shall note that the drawings, data and manuals listed herein are minimum requirements only. The Bidders shall ensure that other necessary write-ups, curves and information required to fully describe the equipment are submitted during detail engineering.



DATASHEET FOR 415V PCC/PMCC/MCC/DBs

SL NO.	DESCRIPTION	SPECIFICATION	REQUIREMENTS
(a)	Rated voltage, phases and frequency	415V, 3 phase, 4 wire, 50 Hz.	
(b)	System neutral earthing	Solidly earthed	
(c)	Reference Ambient air temperature	50°C	
(d)	Material of bus bars	Al. or Al. Alloy	
(e)	Maximum temp. of bus bars joints, droppers and along the run at site reference ambient of 50°C With Plain or Tin joints With silver plated joints Bus enclosure and structure	40°C 55°C 30°C	
(f)	Short time rating for 1.0 Sec. (kA rms)	50	
(g)	Momentary rating (kA peak)	105	
(h)	Degree of protection for as per IS:2147	IP-54 for outdoor IP52 for indoor panels with current rating less than and including 1600A and IP 42 for panels with current rating more than 1600A	
(i)	Thickness of sheet steel in mm		
	(i) Load bearing members	2	
	(ii) Non-load bearing members	1.6	
(j)	Colour finish shade	Interior Exterior	Glossy white As mentioned in Chapter 1.



SL NO.	DESCRIPTION	SPECIFICATION	REQUIREMENTS
Air Circuit Breaker			
1	Service	:	Indoor
2	Type	:	Air – break
3	Rated service voltage	:	415 V +/- 10%
4	Rated Current	:	As per requirement or 630A/1000A/1250A/2000A/2500A/3000A
5	Rated frequency	:	50 Hz +/- 5%
6	System earthing	:	Solidly grounded
7	Rated short time withstand current for 1 sec.	:	50 KA (r.m.s.)
8	Rated Symmetrical breaking current at rated voltage	:	50 KA (r.m.s.)
9	Rated making capacity (min)	:	105 KA
10	Rated operating duty	:	The duty of circuit breaker for motor feeder involves direct-on- line starting of motors. The motor starting current varies from 6 to 8 times the full load current at a very low power factor Frequency of starts of motors: Three (3) Starts per hour & Two (2) Consecutive Cold starts and one (1) hot restart.
11	Duty cycle	:	O-3 min-CO-3 min-CO
12	Operating mechanism	:	Stored energy type
	a) Closing	:	motor wound spring operated
	b) Opening	:	shunt trip coil
	c) Latching arrangement	:	Mechanically & Electrically trip free
13)	Auxiliary Voltage	:	
	Closing	:	220V D.C. (85% - 110%)
	Tripping	:	220V D.C. (70% - 110%)
	Spring charging motor	:	220 V +/- 10% D.C.
	Space heater & lamp	:	240 V +/- 10% AC 50 Hz
14	Anti-pumping feature	:	Electrical anti-pumping feature shall be provided.
15	No. of poles	:	3/4
16	Aux. Switch contact	:	Min (6 NO + 6 NC)
17	Mounting	:	Draw-out type transfer truck within switchgear cubicle
18	Limits of temp. rise	:	As per IS:2516 part I & II / Sec I
19	Termination	:	



SL NO.	DESCRIPTION	SPECIFICATION REQUIREMENTS	
	Incomer	:	Bus duct (top)
	Outgoing	:	Armoured aluminum cable
20	Static built in release	:	To be provided
21	Finish paint shade	:	As mentioned in Chapter 1.
	HRC FUSES	:	
	Type	:	Link type
	Reference standard	:	IS : 9224
	Rated current	:	As specified
	Operation indicator	:	Required
	Fuse characteristics	:	Bidder to furnish
	CONTACTOR	:	AC DC
1	Service	:	Indoor within steel cubicle for maximum system voltage, starting of motors and miscellaneous loads. Indoor within steel cubicle for maximum system voltage, starting of motors and miscellaneous loads.
2	No. of Poles	:	3 2
3	Rated service voltage	:	415 V +/- 10% 220 V(190-240V)
4	Rated frequency	:	50 Hz +/- 5%
5	System earthing	:	Solidly grounded Ungrounded
6	Short time rating	:	To be coordinated with MCCB/MPCB Preceding it. To be coordinated with MCCB/MPCB Preceding it.
7	Continuous current	:	To suit motor continuous current rating Conditions specified. To suit motor continuous current rating Conditions specified.
8	Short circuit level	:	50 KA (rms) at 415 V
9	Location of control	:	One point control Logic adopted



SL NO	DESCRIPTION	SPECIFICATION REQUIREMENTS	
10	Control circuit	:	110V $\pm 10\%$ 1-ph 50 Hz $\pm 5\%$ derived from 415/110V control transformer provided in each control module.
11	Utilization category	:	AC 3 for uni- directional motors AC 4 for Bi-directional Motors.
	CONTACTOR	:	AC DC
12	Duty Class: Intermittent class for Uni-directional motors (IS:2959)	:	0.1
	Intermittent class for Bi-directional motors (IS:2959)	:	0.3
13	Aux. Contact requirement	:	Min. 2 NO & 2 NC contacts
14	Limits of operation	:	
	Closing (pick-up)	:	85% to 110%
	Dropout	:	45 – 65% of rated
15	High voltage test values (one Min. value)	:	
	a. Main power circuit	:	2.5 KV
	b. Control & auxiliary circuit volts	:	2.0 KV
16	Limits of temperature	:	As per IS:2959
CURRENT TRANSFORMERS			
1	Service	:	Indoor
2	System	:	415V, 3 phase, 4 wire, 50Hz, Solidly earthed neutral
	Insulation class	:	E or better.
3	Type	:	Resin cast
4	Rated voltage	:	415 V + 10%



SL NO.	DESCRIPTION	SPECIFICATION	REQUIREMENTS
5	Quantity required	:	As per requirements of individual feeders and as mentioned in the specification drawings.
6	Ratio and burden	:	As required, C.T. secondary rating shall be 1 AMP.
7	Accuracy	:	5P10 or better for protection and class-1 for metering.
8	Power frequency withstand voltage	:	2.5 KV (r.m.s) for one minute
9	Rated short time current	:	
10.	Short time withstand current for 1 sec	:	50 KA (r.m.s)
11.	Dynamic current	:	105 KA (peak)
12	Mounting	:	Inside switchgear cubicle in stationary portion.
Potential Transformer			
1	Service	:	Indoor
2	System	:	451V, 3 phase, 4 wire, 50 Hz, Solidly earthed neutral
3	Type	:	Cast resin
4	Rating- Voltage ratio	:	$415/\sqrt{3} / 110/\sqrt{3}$
5	Rated burden	:	As specified
6	Accuracy class	:	As per requirement, to be furnish during detail engineering
7	Power frequency withstand voltage	:	Primary: 11.0 KV for one minute
			Secondary : 2.0 KV for one minute
8	Mounting	:	Fixed type
9	Quantity	:	As per requirement

Microprocessor based numerical relays with communication facility

The numerical relays for 0.415KV Switchgears shall comply with but not limited to the following technical requirements.



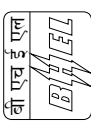
S. NO.	DESCRIPTION	:	SPECIFICATION
1	Purpose	:	Control & Protection, Metering and Monitoring of all switchgears and MCCs with synchro-check facility for Incomers, Bus couplers.
2	Auxiliary Supply	:	220V DC for ACBs and 110V AC for MCC only.
3	CT Secondary Current	:	1Amp.
4	PT Secondary Voltage	:	110V AC, 3 Phase
5	Ambient Temperature	:	50°C
6	Degree of protection	:	IP 54
7	Communication	:	Compatible with DCS system through suitable connectivity (IEC61850) & suitable software.
8	Input & Output	:	Required number of analog and digital inputs/outputs as per scheme requirement with spare.
9	Control	:	Close / open control of breakers through lap top from the front fort/through key pad (Built in)/ through rear port connection from DCS.
10	Metering	:	Instantaneous and Integrated values as indicated.
11	Protection	:	Complete protection for Incomer, Tie, Bus coupler, feeders as indicated.
12	Monitoring	:	Self-diagnostic facility.
	Facilities to be made available in the relay		Programming keys for complete access without computer (built in). Provision for external programming unit through suitable software and communication ports. Display unit. Read/Write set points. Current & Voltage actual values and any other analog measurement. Event recording with Pre-trip data with starting characteristics. Statistical data. Output relays. Tamper proof security system

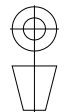


NOTE	
1.	MCC SHALL BE SUITABLE FOR IP 54 DEGREE OF PROTECTION. AS PER IS 60947.
2.	ALL SB MCC SHALL BE OF COMPARTMENTAL FULLY DRAWOUT TYPE AND DOUBLE FRONT EXECUTION SUITABLE FOR BOTTOM CABLE ENTRY. HOWEVER CONTROL SUPPLY TRANSFORMER AND JAMMING RELAY MODULES WILL BE NON DRAWOUT TYPE. MCC SHALL BE DUST & VERMIN PROOF. ALL CUT-OUTS SHALL HAVE NEOPRENE / EPDM GASKETS.
3.	MCC SHALL BE FABRICATED BY CRCA (COLD ROLLED CLOSE ANNEALED) SHEET STEEL OF FOLLOWING THICKNESS a) LOAD BEARING MEMBER - 2.0 mm b) GLAND PLATE - 3.0 mm C) OTHERS - 1.6 mm
4.	THE BUSBARS SHALL BE SUITABLE FOR 50 KA FAULT LEVEL FOR 1 SEC. & SHALL BE OF HIGH CONDUCTIVITY ALUMINIUM.
5.	POWER CONTACTORS SHALL HAVE 2NO + 2NC AUX. CONTACTS. MOTOR STARTER CONTACTOR SHALL BE OF AIR BREAK ELECTROMAGNETIC TYPE UTILASATION CATEGORY AC-3.
6.	OVER LOAD RELAYS SHALL BE ELECTRONIC WITH CURRENT DISPLAY IN SBMCC. OLR SHALL BE WITH BUILT-IN SINGLE PHASE PREVENTOR.
7.	MCC SHALL BE PAINTED WITH SHADE DIN RAL 7032 FOR EXTERIOR (SEMI GLOSSY FINISH) INTERIOR PAINT SHADE AS PER VENDOR STANDARD. POWDER COATING PROCESS SHALL BE FOLLOWED FOR PAINTING.
8.	THE WIRING SHALL BE CARRIED OUT WITH 1100 V GRADE HR PVC INSULATED STRANDED COPPER CONDUCTOR OF SIZE 2.5 SQ. MM FOR POWER AND C.T CIRCUIT AND 1.5 SQ.MM FOR CONTROL WITH T.C. LUGS IN ALL TERMINATIONS.
9.	CONTROL AND SELECTOR SWITCHES SHALL BE OF ROTARY TYPE.
10.	UNDRILLED CABLE GLAND PLATES SHALL BE SUPPLIED ALONG WITH THE PANEL.
11.	SPARES INDICATED ARE ONLY FOR ELECTRICAL FEEDERS.
12.	AN EARTH BUS OF GALVANISED STEEL SIZE NOT LESS THAN 50 X 6 SQ.MM SHALL BE PROVIDED AT THE BOTTOM THROUGHOUT THE LENGTH OF THE MCC. PROVIDED IN ALL VERTICAL SECTIONS. BUSBAR SHALL BE SUITABLE FOR SPECIFIED, FAULT LEVEL.
13.	SEPARATE VERTICAL BUSBARS FOR FRONT AND REAR OF SUITABLE SIZE AND RATING SHALL BE PROVIDED.
14.	ALL CABLE LUGS FOR EXTERNAL CONNECTION ARE TO BE SUPPLIED ALONG WITH THE PANEL
15.	INDICATING LAMPS WILL BE OF CLUSTER LED TYPE.
16.	MINIMUM AIR CLEARANCE BETWEEN PHASES SHALL BE 25.4 AND PHASE TO EARTH SHALL BE 19MM FOR BUSBARS AND CABLE TERMINATIONS. FOR ALL OTHER COMPONENTS, THE CLEARANCES SHALL BE ATLEAST 10MM.
17.	CABLE GLANDS & LUGS SUITABLE FOR INCOMER CABLE SIZE 3Cx10 SQ.MM AL. PVC ARMoured TO BE PROVIDED.
18.	CAGE - CLAMP TYPE TERMINALS ARE PROVIDED. 20% SPARE TERMINALS SHALL BE PROVIDED.
19.	WORKING HEIGHT OF OPERATING HANDLE SHALL BE LIMITED BETWEEN 300MM AND 1900MM FROM FLOOR LEVEL.
20.	FOUNDATION BOLTS & NUTS, IF REQUIRED SHALL BE SUPPLIED ALONG WITH SBMCC.
21.	SBMCC SHALL BE FORM 3B TYPE 2 CONSTRUCTION.
22.	MOTORISED MCCB SHALL HAVE ELECTRICAL INTERLOCK, REMOTE OPERATION & AUTO CHANGEOVER FACILITY.

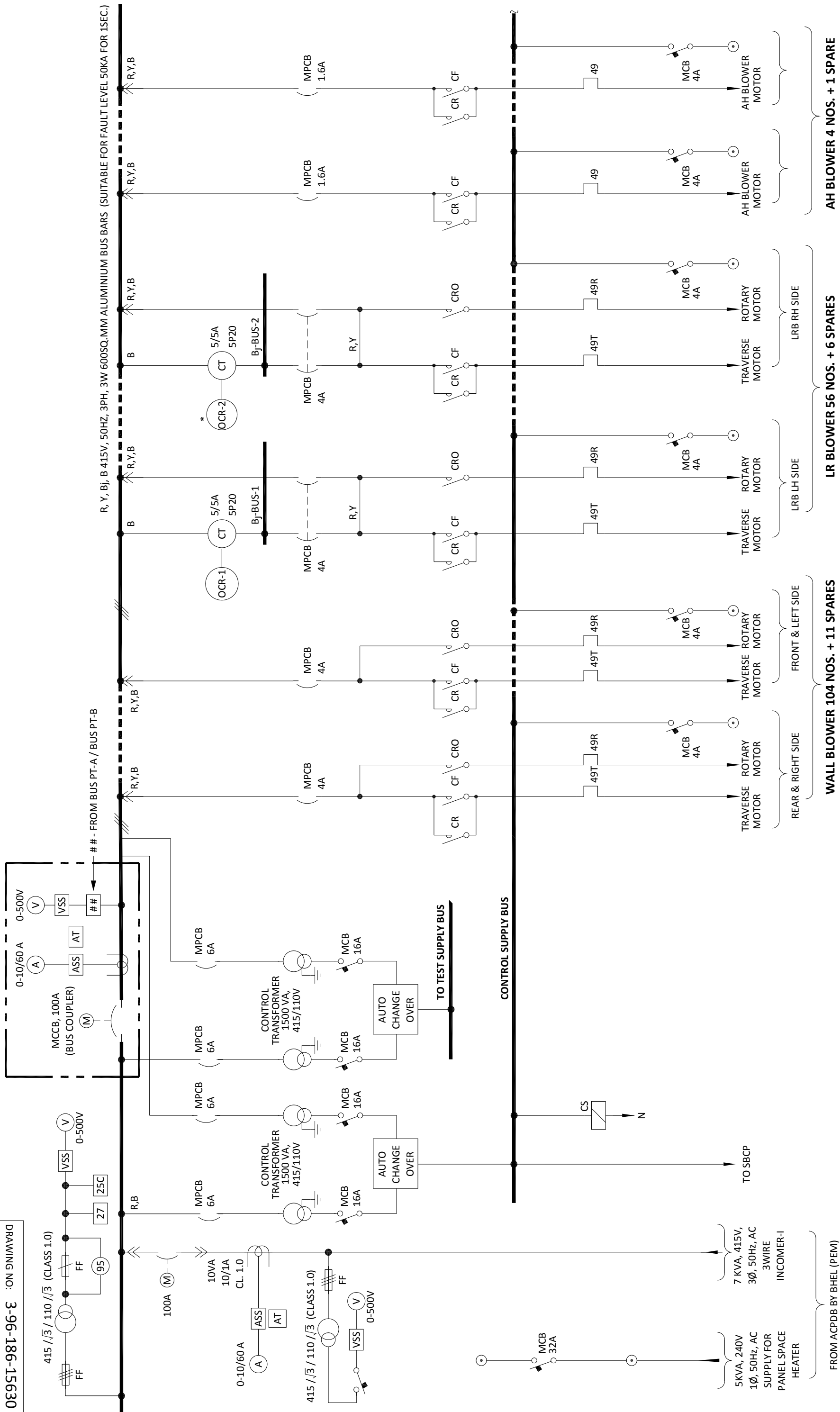
LEGEND	
25C	CHECK SYNCHRONIZING
27	UNDER VOLTAGE PROTECTOR
42	CONTACTOR FOR AH BLOWER
49	ELECTRONIC OVERLOAD RELAY
49R	ELECTRONIC OVER LOAD RELAY ROTARY
49T	ELECTRONIC OVER LOAD RELAY TRAVERSE
95	TRIP CIRCUIT SUPERVISION
74, CRM, CT, CX	AUX. CONTACTORS
AT	CURRENT TRANSDUCER
CC	CONTACTOR FOR CLOSE
CF	CONTACTOR FOR FORWARD
CO	CONTACTOR FOR OPEN
CR	CONTACTOR FOR REVERSE
CRO	CONTACTOR FOR ROTARY
CT	CURRENT TRANSFORMER
FF	FUSE
LSTE	WALL BLOWER HOME POSITION LIMIT SWITCH
LSTR	WALL BLOWER ROTARY LIMIT SWITCH
LSTS	WALL BLOWER FORWARD END POSITION LIMIT SWITCH
LS1	LRB/AHB FORWARD END POSITION LIMIT SWITCH
LS2	LRB/AHB HOME POSITION LIMIT SWITCH
MCB	MINIATURE CIRCUIT BREAKER
MCCB	MOULDED CASE CIRCUIT BREAKER
MFM	MULTIFUNCTION METER
MPCB	MOTOR PROTECTION CIRCUIT BREAKER
SBC	SOOTBLOWER CONTROLS SYSTEM
VT	VOLTAGE TRANSDUCER

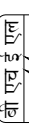
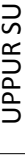
LEGEND	
	SB CP TERMINALS
	SB MCC TERMINALS
	LOCAL TERMINALS
	POWER / AUX. CONTACTOR
	"NO" CONTACT OF CONTACTOR
	"NC" CONTACT OF CONTACTOR
	OFF DELAY TIMER
	"NO" CONTACT OF TIMER
	INDICATING LAMP (A-AMBER) (B-BLUE)
	MPCB
	MCB
	MOTORISED MCCB
	SWITCH
	DRAWOUT TYPE TERMINALS

	
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DEPT. : C&I	
CODE : 392	

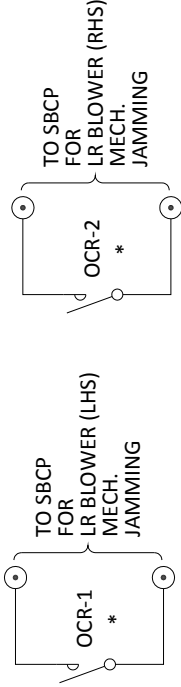
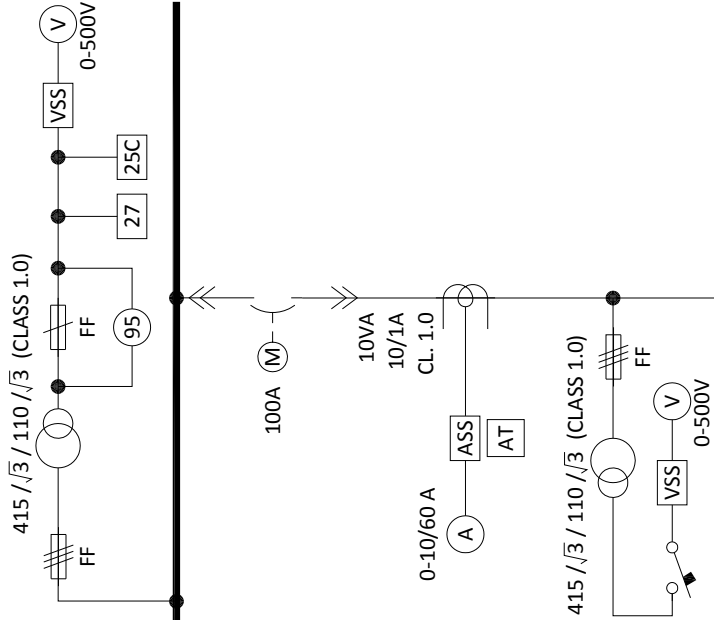
TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED		D.R.N.	NAME	SIGNATURE	DATE	S SCALE
UPPUR SUPER CRITICAL THERMAL POWER PROJECT		CH D.	A .ThambuRaj		15-04-17	
2x800 MW, UNIT-1 & 2, Cust. No. 1821 & 1822			SR / KB		15-04-17	NTS
		APPD.	A.K.Panda		15-04-17	
TITLE		SHEET NO.	DRAWING NO :		REV	
SOOT BLOWER MCC NOTES		02/14				
			3-96-186-15629			00

DRAWING NO: 3-96-186-15630



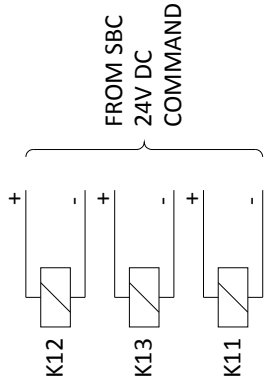
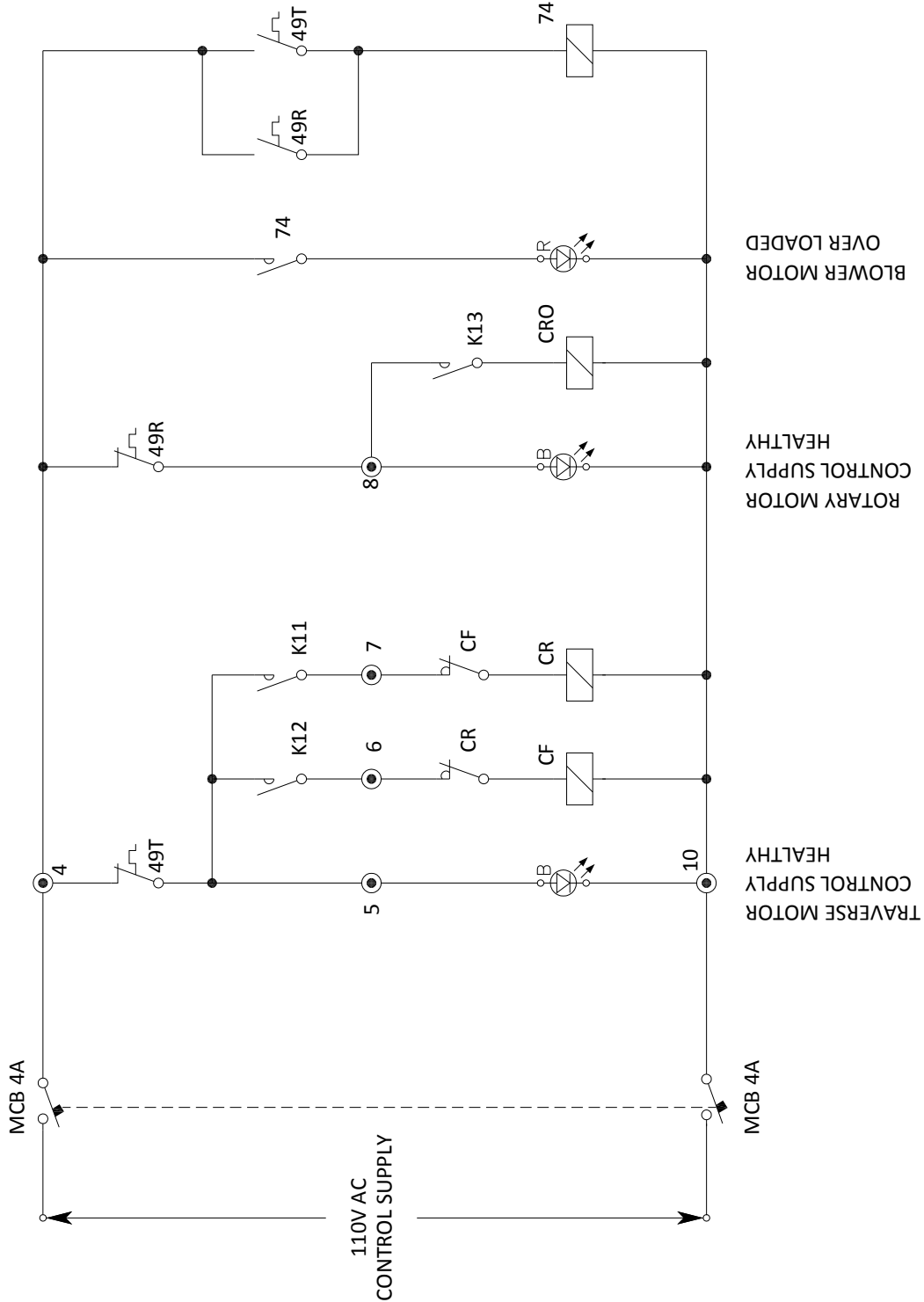
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					UPPUR SUPER CRITICAL THERMAL POWER PROJECT					C H D.	SR / KB		15-04-17	N T S
					2x800 MW, UNIT-1 & 2, Cust. No. 1821 & 1822					A P P D.	A.K.Panda		15-04-17	
				TITLE					SHEET N O.	DRAWING NO :		REV		
				DEPT. : C & I					SOOT BLOWER SINGLE LINE DIAGRAM					
				CODE : 392										
3-96-186-15630													00	

R,Y,B 415V, 50HZ, 3PH, 3W 600SQ.MM ALUMINIUM BUS BARS (SUITABLE FOR FAULT LEVEL 50KA FOR 1SEC.)



DESCRIPTION	INCOMER FOR SPACE HEATER	INCOMER-I	INCOMER-II	WALL BLOWERS		LR BLOWERS		AH BLOWER
FEEDER NO. DETAILS	1	1	1	104 + 11 SPARES		56 + 6 SPARES		4 NOS. + 1 SPARE
DRIVE DETAILS	-	-	-	TRAVERSE	ROTARY	TRAVERSE	ROTARY	
MOTOR CAPACITY IN KW	5.0 KVA	7.0 KVA	7.0 KVA	0.56	0.09	0.56	0.736	0.18
FULL LOAD CURRENT IN AMPS	-	-	-	1.36	0.64	1.4	1.65	0.56
O/L RELAY RANGE IN AMPS	-	-	-	0.9-1.5	0.45-0.75	0.9-1.5	1.0-2.0	0.45-0.75
MCCB/MPCB RATING IN AMPS	32A	100A	100A	4	4	4	4	1.6
POWER CONTACTOR	-	-	-	16	16	16	16	16
CABLE SIZE	3CX6SQ.MM(AL) PC	3CX10SQ.MM(AL) PC	3CX10SQ.MM(AL) PC	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)	3CX2.5SQ.MM(CU)

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							CHD.	SR / KB		15-04-17	NTS
							APPD.	A.K.Panda		15-04-17	
DEPT. : C & I		TITLE SOOT BLOWER SINGLE LINE DIAGRAM					SHEET NO.	DRAWING NO:		REV	
CODE : 392							04/14			3-96-186-15631	00



LIMIT SWITCH CONTACT DEVELOPMENT				
CONTACT	POSITION	HOME	INTER MEDIATE	FORWARD END
LSTS	1-2	-	-	X
	1-3	X	X	-
LSTE	4-5	-	X	X
	4-8	X	-	-
LSTR	6-7	-	-	MAKES AFTER 1 Rev.
X CONTACT CLOSED, - CONTACT OPEN				

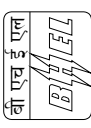
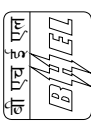
ALL LIMIT SWITCHES ARE WIRED TO DCS.

WRITE UP ON OPERATION OF WALL BLOWERS

There are 3 limit switches and two motors, one for traverse motion and the other for rotary motion. At a time only one motion will take place. When an impulse is given for the blower start, the forward Motion starts. When the blower reaches its full forward position , it actuates the limit switch LSTS. This gives an impulse to trip traverse motor and to start the rotary motor through SBC. When the blower completes its rotary motion, it actuates limit switch LSTR. This gives an impulse for the Blower to retract from SBC by energising the reverse contactor in the starter. Limit switch LSTR and LSTS resets. As soon as the blower leaves the forward end position resetting of LSTS, SBC trips the rotary motor. When it reaches its initial position, it actuates limit switch LSTE and the blower is stopped.

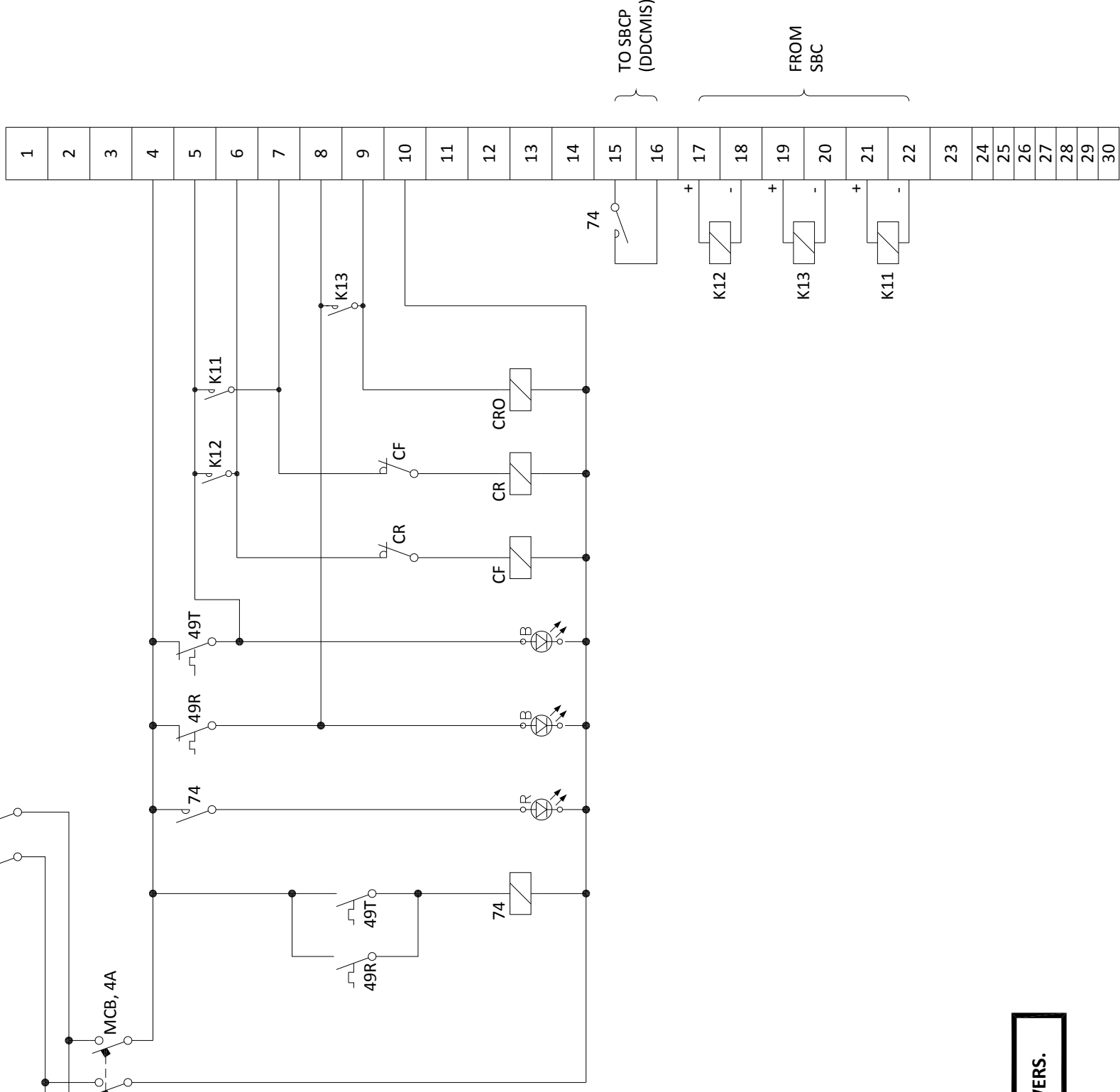
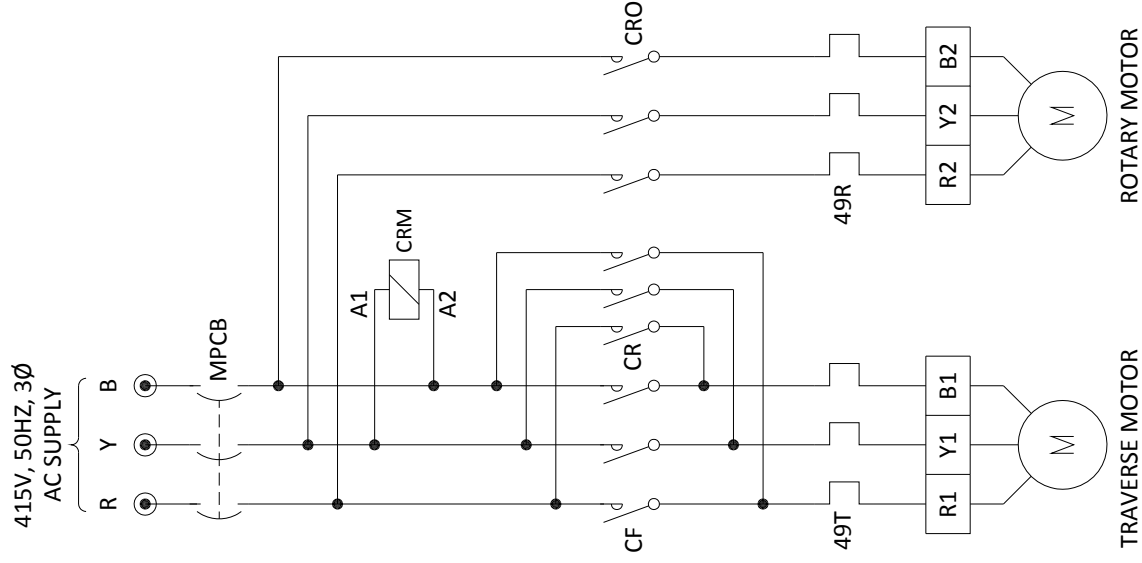
NOTE

K11, K12, & K13 ARE ENERGISED BY 24V DC COMMANDS FROM SBC.
K12 - ADVANCE COMMAND
K13 - ROTATE COMMAND
K11 - RETRACT COMMAND

 TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED UPPUR SUPER CRITICAL THERMAL POWER PROJECT 2x800 MW, UNIT-1 & 2, Cust. No. 1821 & 1822	REV	DATE	ALTERED :	 TIRUCHIRAPPALLI DEPT. : C & I CODE : 392	
	CHD	CHD	CHD/APPD. :		
	APPD	APPD	APPD		
	SHEET NO.	SHEET NO.	SHEET NO.		
TITLE WALL BLOWER CONTROL SCHEME					
DRAWING NO:			REV		
3-96-186-15632			00		
NAME A.Thamburaj			SIGNATURE 		
SR / KB			DATE 15-04-17		
A.K.Panda			DATE 15-04-17		
SHEET NO. 05/14			SCALE NTS		

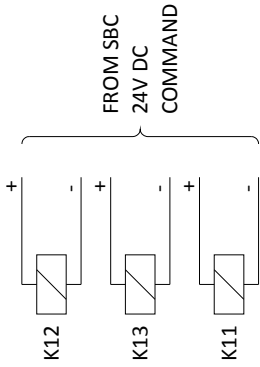
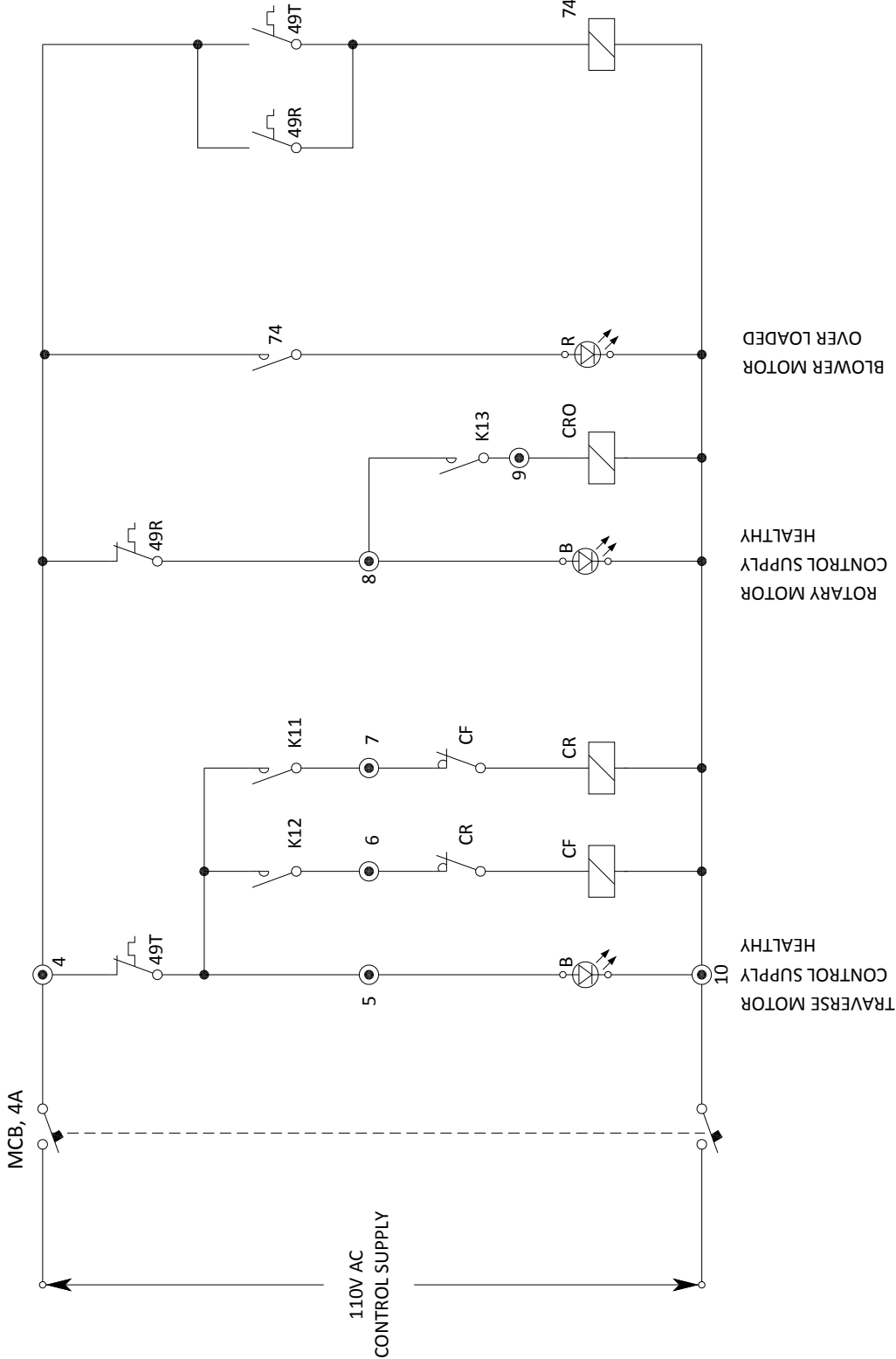
110V AC TEST BUS
110V AC CONTROL SUPPLY (FROM CST)

110V AC CONTROL SUPPLY (FROM CST)



WIRING SHOWN FOR BLOWER-1 & SIMILAR FOR OTHER BLOWERS.

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LIMIT SWITCH CONTACT DEVELOPMENT				
CONTACT	POSITION	HOME	INTER MEDIATE	FORWARD END
LS-1	1-2	X	X	-
LS-2	4-5	-	X	X
	4-6	X	-	-
X CONTACT CLOSED, - CONTACT OPEN				

ALL LIMIT SWITCHES ARE DIRECTLY WIRED TO DCs.

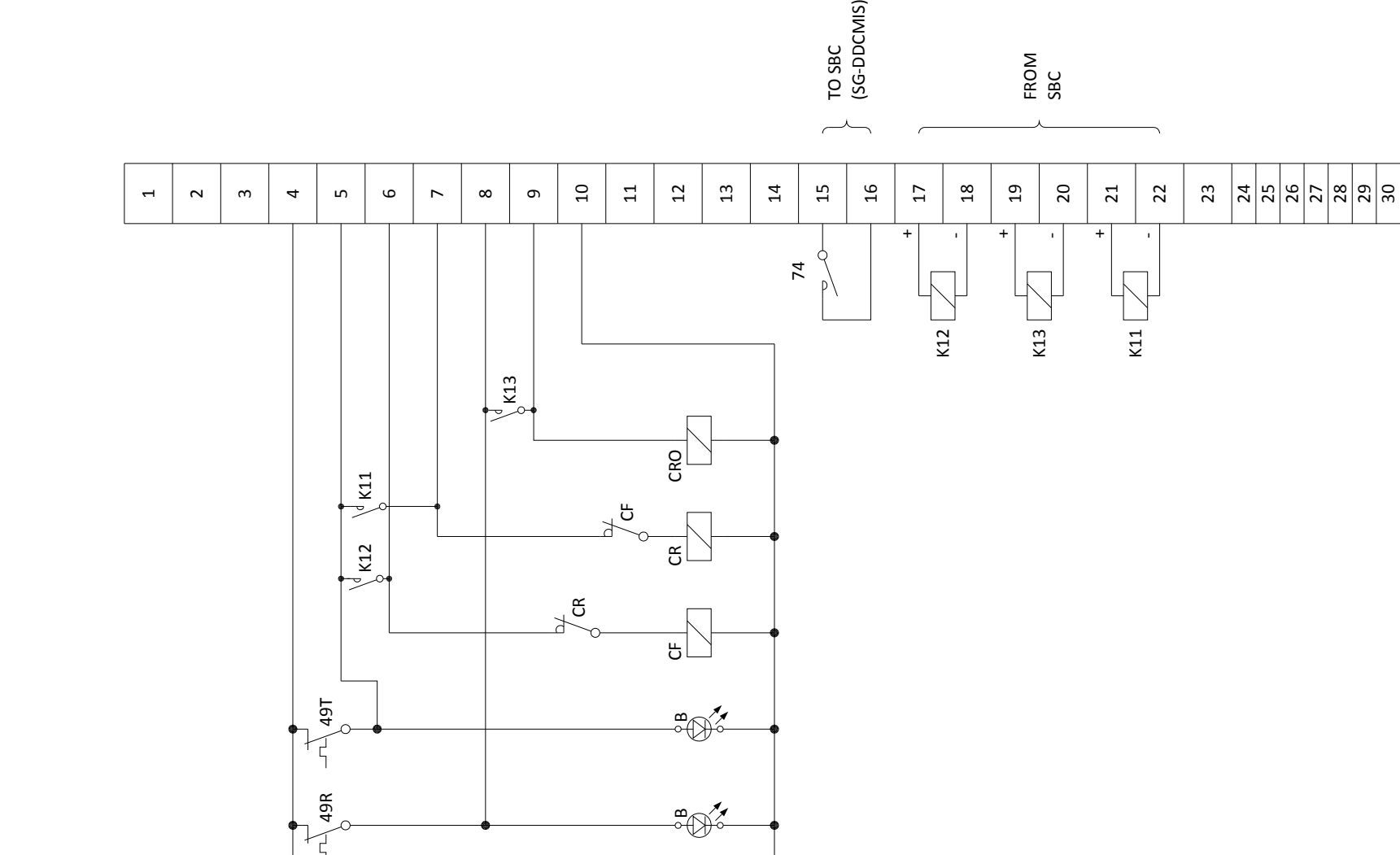
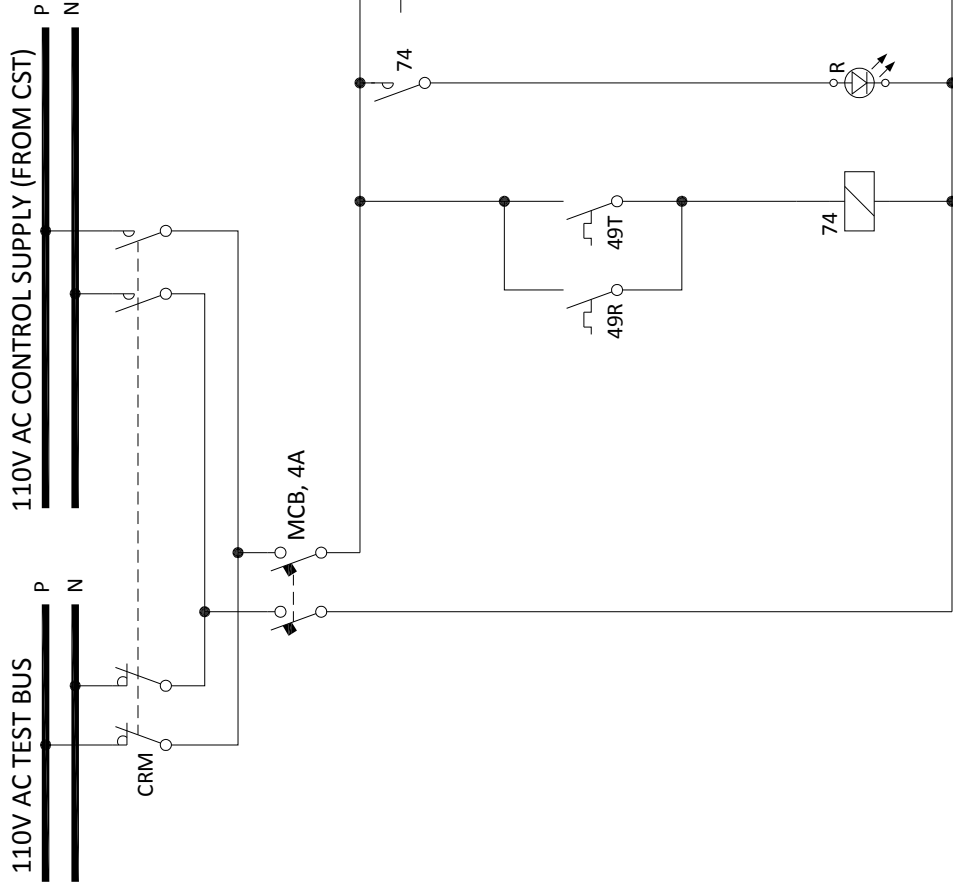
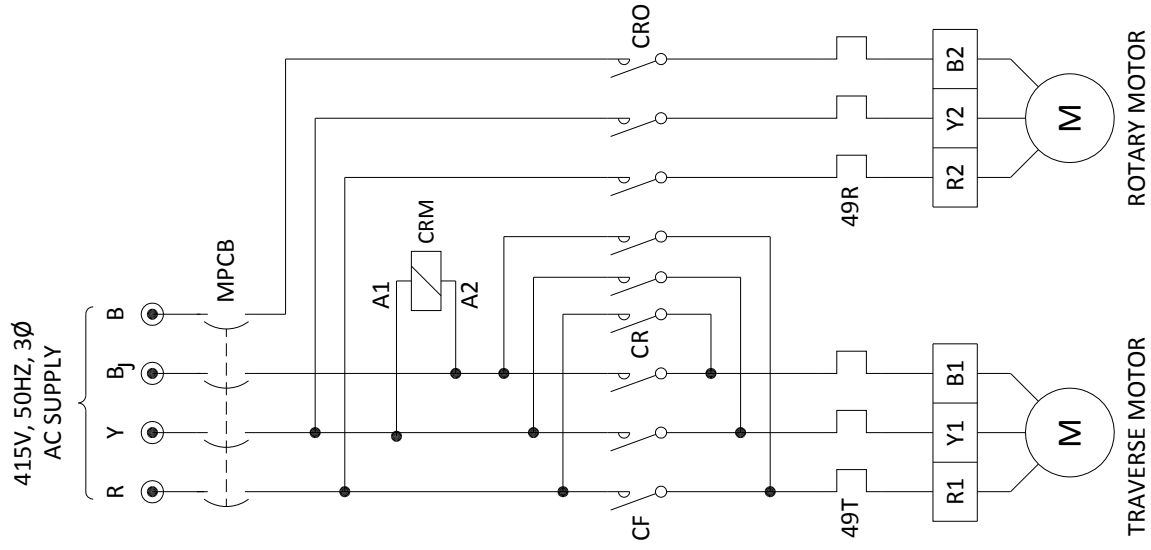
WRITE UP ON OPERATION OF LONG RETRACTABLE BLOWER.

The long retractable blower has dual electric motor drives. One motor moves the lance into and out of the boiler. The other rotates it always in the same direction. Rotation is continuous from the moment the lance starts to extend until retraction is completed. At the end of travel into boiler the two jets always return over a different path than that taken while the lance was extending. To start the LR blower, First the rotary motor is given command forward and starts rotating. Then the traverse motor starts is given start command. The limit switch LS-2 (contact 4,5) closes as soon as the blower starts moving. At the end of the forward Motion limit switch LS-1 opens (contacts 1,2). This will be used for resetting forward command and to issue retract command. When the blower reaches the home position. The limit switch LS-2 (contact 4,5) opens and 4,6 closes and the blower stops.

NOTE

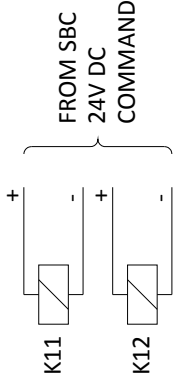
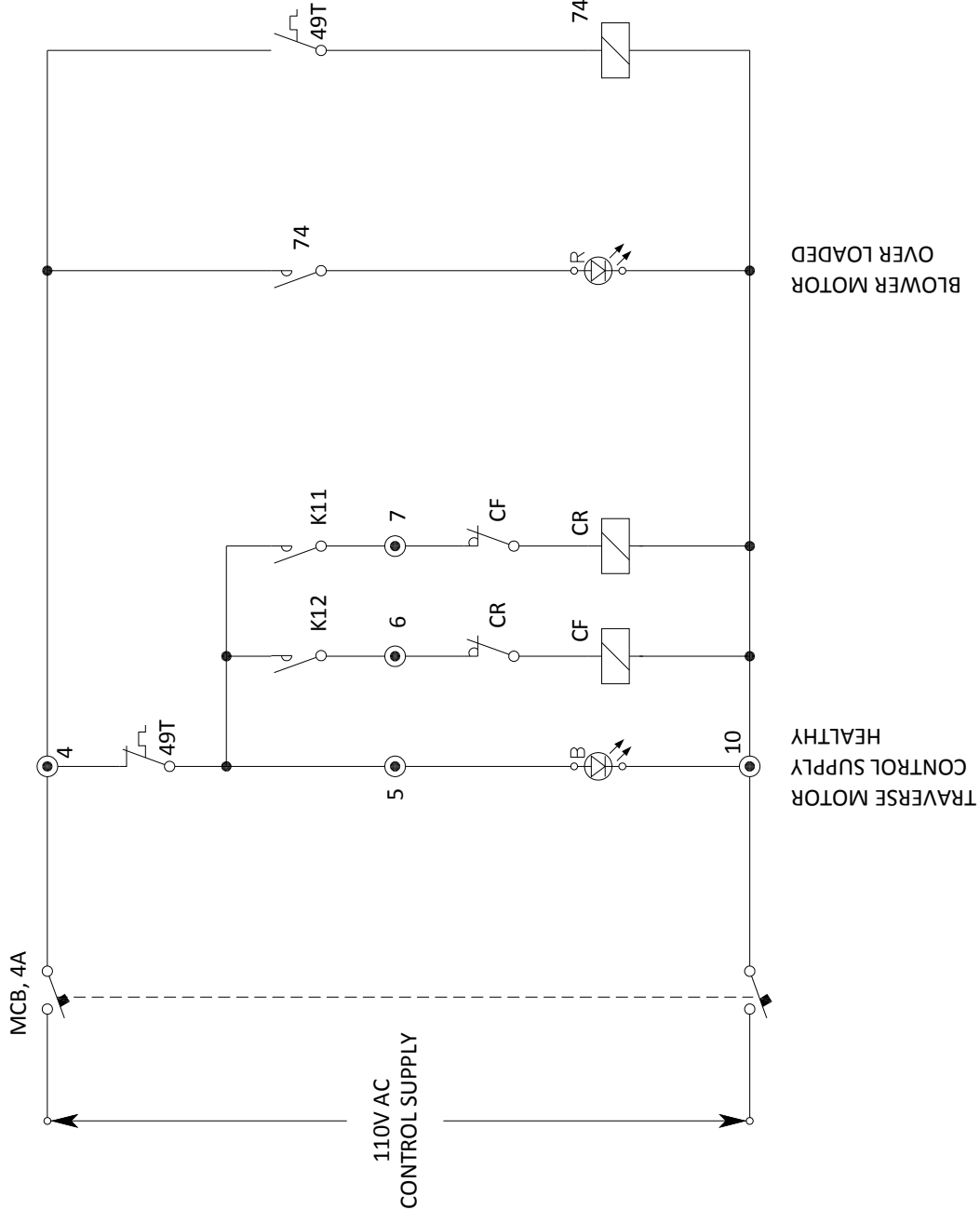
K11, K12, & K13 ARE ENERGISED BY 24V DC COMMANDS FROM SBC.
K12 - ADVANCE COMMAND
K13 - ROTATE COMMAND
K11 - RETRACT COMMAND

 TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED UPPUR SUPER CRITICAL THERMAL POWER PROJECT 2x800 MW, UNIT-1 & 2, Cust. No. 1821 & 1822 TIRUCHIRAPPALLI		REV DATE		SCALE
DEPT. : C & I		DRAWING NO:		00
CODE : 392		3-96-186-15634		
TITLE		07/14		
SHEET NO.		DRAWING NO:		REV
DRN.		SIGNATURE		DATE
CHD.		SR / KB		15-04-17
APPD.		A.K.Panda		15-04-17
3-96-186-15634		00		00



WIRING SHOWN FOR BLOWER-1 & SIMILAR FOR OTHER BLOWERS.

	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED						SHEET NO.	08/14	DRAWING NO.: 3-96-186-15635	REV 00
							TITLE			
TIRUCHIRAPPALLI							LONG RETRACTABLE BLOWER INTERCONNECTION DIAGRAM			
DEPT. : C & I							CODE : 392			
							UPPUR SUPER CRITICAL THERMAL POWER PROJECT			
							2x800 MW, UNIT-1 & 2, Cust. No. 1821 & 1822			
							D.R.N.	A.ThambuRaj	SIGNATURE 	DATE 15-04-17
							CH.D.	SR / KB		15-04-17
							APP.D.	A.K.Panda		15-04-17
							SCALE			
							NTS			



LIMIT SWITCH CONTACT DEVELOPMENT				
CONTACT	POSITION	HOME	INTER MEDIATE	FORWARD END
LS-1	1-2	X	X	-
LS-2	4-5	-	X	X
	4-6	X	-	-
X CONTACT CLOSED, - CONTACT OPEN				

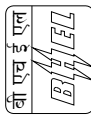
ALL LIMIT SWITCHES ARE WIRED TO DCS.

WRITE UP ON OPERATION OF AIR HEATER BLOWERS

There are 2 limit switches (LS-f & LS-R) and one motor, When an impulse is given for the blower start, the forward Motion starts. When the blower moves from home position limit switch LS-R contact makes and associated solenoid valve shall be given open command from DDCMIS. Opening the solenoid valve will admit the steam through AH blower. When the blower reaches forward end position limit switch LS-F makes. This issues retract command to the blower. During retract cycle there will be no steam blowing. When the blower completes its retract command motion, it actuates limit switch LS-R. This opens LS-R limit switch.

NOTE

K11, K12, & K13 ARE ENERGISED BY 24V DC COMMANDS FROM SBC.
K11 - RETRACT COMMAND
K12 - ADVANCE COMMAND

 TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED UPPUR SUPER CRITICAL THERMAL POWER PROJECT 2x800 MW, UNIT-1 & 2, Cust. No. 1821 & 1822					TITLE		REV	
DEPT. : C & I		DRAWING NO.:		SCALE				
CODE : 392		09/14		00				

PROJECT :	1X800MW NORTH CHENNAI TPS	Document No :	EP-4-BM-SBMCC-001
CUSTOMER :	TANGEDCO	Rev	00
ITEM :	SOOT BLOWER MCC (SBMCC)		

MODULE WISE BILL OF MATERIAL					
SL. NO.	ITEM DESCRIPTION	RATING	SPECIFICATION	QTY/ MODULE	QTY/ SBMCC
INCOMER					2
1	MCCB	63A	3-Pole, AC	1	2
2	MCCB RHOM	63A	Extended	1	2
3	FUSE BASE	32A	1-Pole	9	18
4	FUSE LINK	2A	HRC Fuse link	9	18
5	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	6
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	6
7	KILOWATT TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	2
8	KILOWATT HOUR TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	2
9	CT	10/1A	CL-1, 15VA	3	6
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	6
11	MFM		A,V, KW, KWH, Hz	1	2
12	INDICATING LAMP	63.5V AC	RED	1	2
13	INDICATING LAMP	63.5V AC	YELLOW	1	2
14	INDICATING LAMP	63.5V AC	BLUE	1	2
15	CTTB	10A	Disconnecting Type	7	14
16	Neutral Link	20A		2	4
17	Terminal Block	4sq.mm		36	72
18	Terminal Block End Plate	4sq.mm		2	4
BUS COUPLER					1
1	MCCB	63A	3-Pole, AC	1	1
2	MCCB RHOM	63A	Extended	1	1
3	Castle Key arrangement	3Lock + 2Key		1	1
CONTROL SUPPLY					2
1	FUSE BASE	32A	1-Pole	10	20
	FUSE LINK	4A		6	12
	FUSE LINK	16A		4	8
2	Power Contactor	18A	Coil Voltage : 110V AC	2	4
3	Add-on block for Power Contactor	2NO+2NC		1	2
4	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	2
7	Timer	On-delay	0-1Sec, 1NO contact	1	2
8	Indicating lamp	RED	110V AC	1	2
9	Control Supply Transformer	415/110V	1.5KVA	2	4
10	Neutral link	30A		1	2
11	Terminal Block	4sq.mm		14	28
12	Terminal Block End Plate	4sq.mm		2	4
JAMMING RELAY					2
1	Jamming Relay	CTR : 5/5A		1	2
2	CT	5/5A	CI-5P20, 10VA	1	2
3	CTTB	10A	Disconnecting type	4	8
4	Terminal Block	4sq.mm		6	12
5	Terminal Block End Plate	4sq.mm		2	4
WALL BLOWER					125
1	MPCB WITH SC ONLY	4A	415V AC, 3P	1	125
2	Extended RHOM	4A, TP		1	125
3	Power Contactor	18A	Coil Voltage : 110V AC	3	375
4	ADD-ON block for Power Contactor	2NO+2NC		2	250
5	OLR	1.0-1.6A	415V AC	1	125
6	OLR	0.63-1.0A	415V AC	1	125
7	Mounting Kit			2	250
8	Reset Chord	400mm		2	250
9	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	125
10	Interposing Relays	1C/O	24V DC, 4A	3	375
11	MCB	6A, 2P	415V AC	1	125
13	LED	Red	110V AC	1	125
14	LED	Blue	110V AC	2	250
15	Terminal Block	4sq.mm		36	4500
16	Terminal Block End Plate	4sq.mm		4	500
LONG RETRACTABLE BLOWER					65
1	MCCB SC ONLY	4A	415V AC, 4P	1	65
2	Extended RHOM	4A, TP		1	65
4	Power Contactor	18A	Coil Voltage : 110V AC	3	195
5	ADD-ON block for Power Contactor	2NO+2NC		3	195
6	OLR	1.0-1.6A	415V AC	1	65



7	OLR	1.6-2.5A	415V AC	1	65
8	Mounting Kit			2	130

9	Reset Chord	400mm		2	130
10	Auxiliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	65
11	Interposing Relays	1C/O	24V DC, 4A	3	195
12	MCB	6A, 2P	415V AC	1	65
13	LED	RED	110V AC	1	65
14	LED	Blue	110V AC	2	130
15	Terminal Block	4sq.mm		36	2340
16	Terminal Block End Plate	4sq.mm		4	260
AIR HEATER BLOWER					3
1	MPCB	4A	415V AC	1	3
2	Extended RHOM	4A, TP		1	3
3	Power Contactor	18A	Coil Voltage : 110V AC	2	6
4	ADD-ON block for Power Contactor	2NO+2NC		2	6
5	OLR	0.4-0.63A	415V AC	1	3
6	Mounting Kit			1	3
7	Reset Chord	400mm		1	3
8	Auxiliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	3
9	Interposing Relays	1C/O	24V DC, 4A	2	6
10	MCB	6A, 2P	415V AC	1	3
11	Fuse Base	32A		2	6
12	Fuse link	4A		2	6
13	LED	RED	110V AC	1	3
14	LED	Blue	110V AC	1	3
15	Terminal Block	4sq.mm		36	108
16	Terminal Block End Plate	4sq.mm		4	12
SPACE HEATER					1
1	MCB	32A	415V AC	1	1
2	Terminal Block	4sq.mm		6	6
CABLE ALLEY					52
1	MCB	6A, 2P	415V AC	1	52
2	LED	RED	240V AC	1	52
3	Thermostat	30-90deg C	240V AC	1	52
4	Spaceheater	60W	240V AC	1	52
5	Door limit Switch	NC	240V AC	1	52
6	CFL	11W	240V AC	1	52
7	Terminal Block	4sq.mm		5	260
8	Terminal Block End Plate	4sq.mm		2	104
SHIPPING SECTION					13
1	MCB	6A, 2P	240V AC	1	13
2	Power Socket	5A	240V AC	1	13
3	Terminal Block	4sq.mm		3	39
4	Terminal Block End Plate	4sq.mm		2	26
ENCLOSURE					1
1	1000MM DRAW-OUT MODULE		INCOMER	2	2
2	500MM DRAW-OUT MODULE		BUSCOUPLER	1	1
3	500MM DRAW-OUT MODULE		BLOWER	193	193
4	1000MM FIXED MODULE		MARSHALLING	2	2
5	500MM FIXED MODULE		VACANT	1	1
6	500MM FIXED MODULE		SPACE HEATER, JAMMING RELAY	3	3
7	500MM FIXED MODULE		CONTROL SUPPLY	2	2
8	NO. OF VERTICALS			26	26
9	400MM DUMMY PANELS			2	2
WIRING					1
1	INCOMER	63A		2	2
2	BUSCOUPLER	63A		1	1
3	WALL BLOWER	0.56KW		125	125
4	LONG RETRACTABLE BLOWER	0.736KW		65	65
5	AIR HEATER BLOWER	0.18KW		3	3
6	CONTROL SUPPLY	1.5KVA		2	2
7	JAMMING RELAY			2	2
8	SPACE HEATER SUPPLY	32A		1	1
10	CABLE ALLEY			1	1
11	SHIPPING SECTION			1	1



PROJECT :	2X800MW UPPUR STPP	Document No :	EP-4-BM-SBMCC-002
CUSTOMER :	TANGEDCO	Rev	00
ITEM :	SOOT BLOWER MCC (SBMCC)		

MODULE WISE BILL OF MATERIAL					
SL. NO.	ITEM DESCRIPTION	RATING	SPECIFICATION	QTY/ MODULE	QTY/ SBMCC
INCOMER					2
1	MOTORIZED MCCB	100A	3-Pole, AC	1	2
2	MCCB RHOM	100A	Extended	1	2
3	FUSE BASE	32A	1-Pole	9	18
4	FUSE LINK	2A	HRC Fuse link	9	18
5	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	6
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	6
7	KILOWATT TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	2
8	KILOWATT HOUR TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	2
9	CT	10/1A	CL-1, 15VA	3	6
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	6
11	INDICATING LAMP	63.5V AC	RED	1	2
12	INDICATING LAMP	63.5V AC	YELLOW	1	2
13	INDICATING LAMP	63.5V AC	BLUE	1	2
14	AMMETER	0-10/60	ANALOG	1	2
15	VOLTMETER	0-500V	ANALOG	1	2
16	AMMETER SELECTOR SWITCH		ROTARY	1	2
17	VOLTMETER SELECTOR SWITCH		ROTARY	1	2
18	CTTB	10A	Disconnecting Type	7	14
19	Neutral Link	20A		2	4
20	Terminal Block	4sq.mm		36	72
21	Terminal Block End Plate	4sq.mm		2	4
BUS COUPLER					1
1	MOTORIZED MCCB	100A	3-Pole, AC	1	1
2	MCCB RHOM	63A	Extended	1	1
3	CT	10/1A	CL-1, 15VA	3	6
4	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	6
5	AMMETER	0-10/60	ANALOG	1	2
6	VOLTMETER	0-500V	ANALOG	1	2
7	AMMETER SELECTOR SWITCH		ROTARY	1	2
8	VOLTMETER SELECTOR SWITCH		ROTARY	1	2
9	Castle Key arrangement	3Lock + 2Key		1	1
BUS PT					2
1	MPCB	16A	3-Pole, AC	1	2
3	MCB	32A	1-Pole	9	18
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	6
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	6
11	VOLTMETER 3PH	110V SECONDARY	V	1	2
12	INDICATING LAMP	63.5V AC	RED	1	2
13	INDICATING LAMP	63.5V AC	YELLOW	1	2
14	INDICATING LAMP	63.5V AC	BLUE	1	2
15	NUMERICAL RELAY WITH 25 & 27		WITH UNDER VOLTAGE & CHECK SYNC	7	14
16	Neutral Link	20A		2	4
17	Terminal Block	4sq.mm		36	72
18	Terminal Block End Plate	4sq.mm		2	4
CONTROL SUPPLY					2
1	FUSE BASE	32A	1-Pole	10	20
	FUSE LINK	4A		6	12
	FUSE LINK	16A		4	8
2	Power Contactor	18A	Coil Voltage : 110V AC	2	4
3	Add-on block for Power Contactor	2NO+2NC		1	2
4	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	2
7	Timer	On-delay	0-1Sec, 1NO contact	1	2
8	Indicating lamp	RED	110V AC	1	2
9	Control Supply Transformer	415/110V	1.5KVA	2	4
10	Neutral link	30A		1	2
11	Terminal Block	4sq.mm		14	28
12	Terminal Block End Plate	4sq.mm		2	4
JAMMING RELAY					2
1	Jamming Relay	CTR : 5/5A		1	2
2	CT	5/5A	CI-5P20, 10VA	1	2



BHARAT HEAVY ELECTRICALS LIMITED
ELECTRO PORECELAINS DIVISION

ANNEXURE-B

3	CTTB	10A	Disconnecting type	4	8
4	Terminal Block	4sq.mm		6	12
5	Terminal Block End Plate	4sq.mm		2	4

WALL BLOWER					125
1	MPCB WITH SC ONLY	4A	415V AC, 3P	1	125
2	Extended RHOM	4A, TP		1	125
3	Power Contactor	18A	Coil Voltage : 110V AC	3	375
4	ADD-ON block for Power Contactor	2NO+2NC		2	250
5	OLR	1.0-1.6A	415V AC	1	125
6	OLR	0.63-1.0A	415V AC	1	125
7	Mounting Kit			2	250
8	Reset Chord	400mm		2	250
9	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	125
10	Interposing Relays	1C/O	24V DC, 4A	3	375
11	MCB	6A, 2P	415V AC	1	125
13	LED	Red	110V AC	1	125
14	LED	Blue	110V AC	2	250
15	Terminal Block	4sq.mm		36	4500
16	Terminal Block End Plate	4sq.mm		4	500
LONG RETRACTABLE BLOWER					62
1	MCCB SC ONLY	4A	415V AC, 4P	1	62
2	Extended RHOM	4A, TP		1	62
4	Power Contactor	18A	Coil Voltage : 110V AC	3	186
5	ADD-ON block for Power Contactor	2NO+2NC		3	186
6	OLR	1.0-1.6A	415V AC	1	62
7	OLR	1.6-2.5A	415V AC	1	62
8	Mounting Kit			2	124
9	Reset Chord	400mm		2	124
10	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	62
11	Interposing Relays	1C/O	24V DC, 4A	3	186
12	MCB	6A, 2P	415V AC	1	62
13	LED	RED	110V AC	1	62
14	LED	Blue	110V AC	2	124
15	Terminal Block	4sq.mm		36	2232
16	Terminal Block End Plate	4sq.mm		4	248
AIR HEATER BLOWER					5
1	MPCB	4A	415V AC	1	5
2	Extended RHOM	4A, TP		1	5
3	Power Contactor	18A	Coil Voltage : 110V AC	2	10
4	ADD-ON block for Power Contactor	2NO+2NC		2	10
5	OLR	0.4-0.63A	415V AC	1	5
6	Mounting Kit			1	5
7	Reset Chord	400mm		1	5
8	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	5
9	Interposing Relays	1C/O	24V DC, 4A	2	10
10	MCB	6A, 2P	415V AC	1	5
11	Fuse Base	32A		2	10
12	Fuse link	4A		2	10
13	LED	RED	110V AC	1	5
14	LED	Blue	110V AC	1	5
15	Terminal Block	4sq.mm		36	180
16	Terminal Block End Plate	4sq.mm		4	20
SPACE HEATER					1
1	MCB	32A	415V AC	1	1
2	Terminal Block	4sq.mm		6	6
CABLE ALLEY					52
1	MCB	6A, 2P	415V AC	1	52
2	LED	RED	240V AC	1	52
3	Thermostat	30-90deg C	240V AC	1	52
4	Spaceheater	60W	240V AC	1	52
5	Door limit Switch	NC	240V AC	1	52
6	CFL	11W	240V AC	1	52
7	Terminal Block	4sq.mm		5	260
8	Terminal Block End Plate	4sq.mm		2	104
SHIPPING SECTION					13
1	MCB	6A, 2P	240V AC	1	13
2	Power Socket	5A	240V AC	1	13
3	Terminal Block	4sq.mm		3	39
4	Terminal Block End Plate	4sq.mm		2	26
ENCLOSURE					1
1	1000MM DRAW-OUT MODULE		INCOMER, BUS PT	4	4
2	500MM DRAW-OUT MODULE		BUSCOUPLER	1	1
3	500MM DRAW-OUT MODULE		BLOWER	192	192



BHARAT HEAVY ELECTRICALS LIMITED
ELECTROPORECELAINS DIVISION

ANNEXURE-B

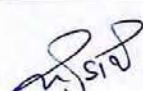
4	1000MM FIXED MODULE		MARSHALLING	2	2
5	500MM FIXED MODULE		VACANT	1	1
6	500MM FIXED MODULE		SPACE HEATER, JAMMING RELAY	3	3
7	500MM FIXED MODULE		CONTROL SUPPLY	2	2
8	NO. OF VERTICALS			26	26
9	400MM DUMMY PANELS			2	2
WIRING					1
1	INCOMER	63A		2	2
2	BUSCOUPLER	63A		1	1
3	WALL BLOWER	0.56KW		125	125
4	LONG RETRACTABLE BLOWER	0.736KW		62	62
5	AIR HEATER BLOWER	0.18KW		5	5
6	CONTROL SUPPLY	1.5KVA		2	2
7	JAMMING RELAY			2	2
8	SPACE HEATER SUPPLY	32A		1	1
10	CABLE ALLEY			1	1
11	BUS PT	50VA		2	2
11	SHIPPING SECTION			1	1

ANNEXURE – VII

DRAWING/DOCUMENT DISTRIBUTION LIST

All documents & drawings shall be in English and in metric units

Sl. NO.	DESCRIPTION OF MANUALS	NO OF PRINTS(sets)	NO. OF CD-ROMs (sets)
1.	PLANT DEFINITION MANUAL	-	3 CD-ROMs
2.	Drawings "FOR APPROVAL"	10	Soft copy
3.	Drawings "FOR INFORMATION"	10	Soft copy
4.	Drawings "FINAL APPROVED DRAWING"	8	Soft copy
5.	Drawings "AS BUILT "	8	3 CD-ROMs
6	DATASHEETS, DESIGN CALCULATIONS, PURCHASE SPECIFICATIONS, etc. and Other type of documents:		
	i) For Approval	10	Soft copy
	ii) Final Approved	8	3 CD-ROMs
	iii) Analysis reports of equipments/ piping/ structures components/ systems employing software packages as detailed in the specifications:		
	a) Input	10	Soft copy
	b) Output	10	Soft copy
	c) Drawings / Sketches	10	Soft copy
7	Erection manual "FINAL"	8	3CD ROMS
8	Operation & Maintenance manual	10	3CD ROMS
9	Plant Hand Book "DRAFT"	6	Soft copy
10	Plant Hand Book "FINAL"	15	3CD ROMS
11	Commissioning and Performance Procedure manual	10	3CD ROMS
12	Performance and Functional Guarantees test report	6	3CD ROMS
13	Progress Reports	6	3CD ROMS
14	Project completion report	10	3CD ROMS.
15	QA programme including Organization for implementation and QA system manual (with revision-servicing)	1	3CD ROMS.
S. NO.	DESCRIPTION OF MANUALS	NO OF PRINTS(sets)	NO. OF CD-ROMs (sets)
16	Vendor details in respect of proposed vendors including Bidder's evaluation report	2	--



17	Manufacturing QPs, Field QPs, Field welding schedules and their reference documents like test procedures, WPS, POR etc.:		
	(i) For review/comment	3	
	(ii) For final approval	4	1 set CD ROM.
18	Welding Manual, Heat Treatment Manuals,	4	
	Storage & preservation manuals Final	4	
19	Monthly Vendor Approval and QP approval status	2	1 CD ROM
20	QA Documentation Package for items / equipment manufactured and dispatched to site	2	2 CD ROMs
21	QA Documentation Package for field activities on equipment/systems at site	2	2 CD ROMs

Signature

Signature

PRICE FORMAT (PRICED)													
ITEM: SBMCC FOR NORTH CHENNAI TPS STAGE-III & UPPUR STPP													
TENDER REF: 12300695													
All values in INR													
						NAME OF BIDDER: M/S.....							
Sl.No	Material code	Item Description	HSN CODE (To be mentioned by Bidder)	U/M	Qty.	Unit Ex-Works Price Incl. Packing Charges	Total Ex-Works Price Incl. Packing Charges	Total Freight Price	Total Price Incl. Freight	CGST @ 9%	SGST @ 9%	IGST @ 0%	Total FOR Price
										0%	0%	0%	
					(1)	(2)	(3)=(1)x(2)	(4)	(5)=(3)+(4)	(6)=(5)x9%	(7)=(5)x9%	(8)=(5)x0%	(9)=(5)+(6)+(7)+(8)
1	ELSBMCCNCTP01	SBMCC FOR NORTH CHENNAI		EA	1		0.00		0.00	0.00	0.00	0.00	0.00
2	ELSBMCCUTPS01	SBMCC FOR UPPUR		EA	1		0.00		0.00	0.00	0.00	0.00	0.00
A	TOTAL FOR PRICE FOR ALL LINE ITEMS												0.00
B	LESS GST CREDIT												0.00
C	LANDED COST FOR EVALUATION PURPOSE ONLY												0.00

NOTE: Item is required for North Chennai TPS & UPPUR STPP
Specification No. EP-4-TS-18001-001 REV. 00

For ADD-DEL FOR NORTH CHENNAI - REFER SHEET 2

For ADD-DEL FOR UPPUR - REFER SHEET 3

	PROJECT :	1X800MW NORTH CHENNAI TPS		Document No :	EP-4-AD-SBMCC-001
	CUSTOMER :	TANGEDCO		Rev	00
	ITEM :	SOOT BLOWER MCC (SBMCC)			
ADD/DEL LIST FOR SBMCC (NCTPS-III)					
SL. NO.	ITEM DESCRIPTION	RATING	SPECIFICATION	QTY/ MODULE	UNIT PRICE
INCOMER					
1	MCCB	63A	3-Pole, AC	1	
2	MCCB RHOM	63A	Extended	1	
3	FUSE BASE	32A	1-Pole	9	
4	FUSE LINK	2A	HRC Fuse link	9	
5	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	
7	KILOWATT TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
8	KILOWATT HOUR TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
9	CT	10/1A	CL-1, 15VA	3	
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	
11	MFM		A,V, KW, KWH, Hz	1	
12	INDICATING LAMP	63.5V AC	RED	1	
13	INDICATING LAMP	63.5V AC	YELLOW	1	
14	INDICATING LAMP	63.5V AC	BLUE	1	
15	CTTB	10A	Disconnecting Type	7	
16	Neutral Link	20A		2	
17	Terminal Block	4sq.mm		36	
18	Terminal Block End Plate	4sq.mm		2	
BUS COUPLER					
1	MCCB	63A	3-Pole, AC	1	
2	MCCB RHOM	63A	Extended	1	
3	Castle Key arrangement	3Lock + 2Key		1	
CONTROL SUPPLY					
1	FUSE BASE	32A	1-Pole	10	
	FUSE LINK	4A		6	
	FUSE LINK	16A		4	
2	Power Contactor	18A	Coil Voltage : 110V AC	2	
3	Add-on block for Power Contactor	2NO+2NC		1	
4	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
7	Timer	On-delay	0-1Sec, 1NO contact	1	
8	Indicating lamp	RED	110V AC	1	
9	Control Supply Transformer	415/110V	1.5KVA	2	
10	Neutral link	30A		1	
11	Terminal Block	4sq.mm		14	
12	Terminal Block End Plate	4sq.mm		2	
JAMMING RELAY					
1	Jamming Relay	CTR : 5/5A		1	
2	CT	5/5A	CI-5P20, 10VA	1	
3	CTTB	10A	Disconnecting type	4	
4	Terminal Block	4sq.mm		6	
5	Terminal Block End Plate	4sq.mm		2	
WALL BLOWER					
1	MPCB WITH SC ONLY	4A	415V AC, 3P	1	
2	Extended RHOM	4A, TP		1	
3	Power Contactor	18A	Coil Voltage : 110V AC	3	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	1.0-1.6A	415V AC	1	
6	OLR	0.63-1.0A	415V AC	1	
7	Mounting Kit			2	
8	Reset Chord	400mm		2	
9	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
10	Interposing Relays	1C/O	24V DC, 4A	3	
11	MCB	6A, 2P	415V AC	1	
13	LED	Red	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
LONG RETRACTABLE BLOWER					
1	MCCB SC ONLY	4A	415V AC, 4P	1	
2	Extended RHOM	4A, TP		1	
4	Power Contactor	18A	Coil Voltage : 110V AC	3	
5	ADD-ON block for Power Contactor	2NO+2NC		3	
6	OLR	1.0-1.6A	415V AC	1	
7	OLR	1.6-2.5A	415V AC	1	
8	Mounting Kit			2	
9	Reset Chord	400mm		2	
10	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	

11	Interposing Relays	1C/O	24V DC, 4A	3	
12	MCB	6A, 2P	415V AC	1	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
AIR HEATER BLOWER					
1	MPCB	4A	415V AC	1	
2	Extended RHOM	4A, TP		1	
3	Power Contactor	18A	Coil Voltage : 110V AC	2	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	0.4-0.63A	415V AC	1	
6	Mounting Kit			1	
7	Reset Chord	400mm		1	
8	Auxiliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
9	Interposing Relays	1C/O	24V DC, 4A	2	
10	MCB	6A, 2P	415V AC	1	
11	Fuse Base	32A		2	
12	Fuse link	4A		2	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	1	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
SPACE HEATER					
1	MCB	32A	415V AC	1	
2	Terminal Block	4sq.mm		6	
CABLE ALLEY					
1	MCB	6A, 2P	415V AC	1	
2	LED	RED	240V AC	1	
3	Thermostat	30-90deg C	240V AC	1	
4	Spaceheater	60W	240V AC	1	
5	Door limit Switch	NC	240V AC	1	
6	CFL	11W	240V AC	1	
7	Terminal Block	4sq.mm		5	
8	Terminal Block End Plate	4sq.mm		2	
SHIPPING SECTION					
1	MCB	6A, 2P	240V AC	1	
2	Power Socket	5A	240V AC	1	
3	Terminal Block	4sq.mm		3	
4	Terminal Block End Plate	4sq.mm		2	
ENCLOSURE					
1	1000MM DRAW-OUT MODULE		INCOMER	2	
2	500MM DRAW-OUT MODULE		BUSCOUPLER	1	
3	500MM DRAW-OUT MODULE		BLOWER	193	
4	1000MM FIXED MODULE		MARSHALLING	2	
5	500MM FIXED MODULE		VACANT	1	
6	500MM FIXED MODULE		SPACE HEATER, JAMMING RELAY	3	
7	500MM FIXED MODULE		CONTROL SUPPLY	2	
8	NO. OF VERTICALS			26	
9	400MM DUMMY PANELS			2	
WIRING					
1	INCOMER	63A		2	
2	BUSCOUPLER	63A		1	
3	WALL BLOWER	0.56KW		125	
4	LONG RETRACTABLE BLOWER	0.736KW		65	
5	AIR HEATER BLOWER	0.18KW		3	
6	CONTROL SUPPLY	1.5KVA		2	
7	JAMMING RELAY			2	
8	SPACE HEATER SUPPLY	32A		1	
10	CABLE ALLEY			1	
11	SHIPPING SECTION			1	

	PROJECT :	2X800MW UPPUR STPP	Document No :	EP-4-AD-SBMCC-002	
	CUSTOMER :	TANGEDCO	Rev	00	
	ITEM :	SOOT BLOWER MCC (SBMCC)			
ADD/DEL LIST FOR SBMCC (UPPUR)					
SL. NO.	ITEM DESCRIPTION	RATING	SPECIFICATION	QTY/ MODULE	UNIT PRICE
INCOMER					
1	MOTORIZED MCCB	100A	3-Pole, AC	1	
2	MCCB RHOM	100A	Extended	1	
3	FUSE BASE	32A	1-Pole	9	
4	FUSE LINK	2A	HRC Fuse link	9	
5	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	
7	KILOWATT TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
8	KILOWATT HOUR TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
9	CT	10/1A	CL-1, 15VA	3	
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	
11	INDICATING LAMP	63.5V AC	RED	1	
12	INDICATING LAMP	63.5V AC	YELLOW	1	
13	INDICATING LAMP	63.5V AC	BLUE	1	
14	AMMETER	0-10/60	ANALOG	1	
15	VOLTMETER	0-500V	ANALOG	1	
16	AMMETER SELECTOR SWITCH		ROTARY	1	
17	VOLTMETER SELECTOR SWITCH		ROTARY	1	
18	CTTB	10A	Disconnecting Type	7	
19	Neutral Link	20A		2	
20	Terminal Block	4sq.mm		36	
21	Terminal Block End Plate	4sq.mm		2	
BUS COUPLER					
1	MOTORIZED MCCB	100A	3-Pole, AC	1	
2	MCCB RHOM	63A	Extended	1	
3	CT	10/1A	CL-1, 15VA	3	
4	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	
5	AMMETER	0-10/60	ANALOG	1	
6	VOLTMETER	0-500V	ANALOG	1	
7	AMMETER SELECTOR SWITCH		ROTARY	1	
8	VOLTMETER SELECTOR SWITCH		ROTARY	1	
9	Castle Key arrangement	3Lock + 2Key		1	
BUS PT					
1	MPCB	16A	3-Pole, AC	1	
3	MCB	32A	1-Pole	9	
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	
11	VOLTMETER 3PH	110V SECONDARY	V	1	
12	INDICATING LAMP	63.5V AC	RED	1	
13	INDICATING LAMP	63.5V AC	YELLOW	1	
14	INDICATING LAMP	63.5V AC	BLUE	1	
15	NUMERICAL RELAY WITH 25 & 27		WITH UNDER VOLTAGE & CHECK SYNC	7	
16	Neutral Link	20A		2	
17	Terminal Block	4sq.mm		36	
18	Terminal Block End Plate	4sq.mm		2	
CONTROL SUPPLY					
1	FUSE BASE	32A	1-Pole	10	
	FUSE LINK	4A		6	
	FUSE LINK	16A		4	
2	Power Contactor	18A	Coil Voltage : 110V AC	2	
3	Add-on block for Power Contactor	2NO+2NC		1	
4	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
7	Timer	On-delay	0-1Sec, 1NO contact	1	
8	Indicating lamp	RED	110V AC	1	
9	Control Supply Transformer	415/110V	1.5KVA	2	
10	Neutral link	30A		1	
11	Terminal Block	4sq.mm		14	
12	Terminal Block End Plate	4sq.mm		2	
JAMMING RELAY					
1	Jamming Relay	CTR : 5/5A		1	
2	CT	5/5A	CI-5P20, 10VA	1	
3	CTTB	10A	Disconnecting type	4	
4	Terminal Block	4sq.mm		6	
5	Terminal Block End Plate	4sq.mm		2	
WALL BLOWER					
1	MPCB WITH SC ONLY	4A	415V AC, 3P	1	
2	Extended RHOM	4A, TP		1	

3	Power Contactor	18A	Coil Voltage : 110V AC	3	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	1.0-1.6A	415V AC	1	
6	OLR	0.63-1.0A	415V AC	1	
7	Mounting Kit			2	
8	Reset Chord	400mm		2	
9	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
10	Interposing Relays	1C/O	24V DC, 4A	3	
11	MCB	6A, 2P	415V AC	1	
13	LED	Red	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
LONG RETRACTABLE BLOWER					
1	MCCB SC ONLY	4A	415V AC, 4P	1	
2	Extended RHOM	4A, TP		1	
4	Power Contactor	18A	Coil Voltage : 110V AC	3	
5	ADD-ON block for Power Contactor	2NO+2NC		3	
6	OLR	1.0-1.6A	415V AC	1	
7	OLR	1.6-2.5A	415V AC	1	
8	Mounting Kit			2	
9	Reset Chord	400mm		2	
10	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
11	Interposing Relays	1C/O	24V DC, 4A	3	
12	MCB	6A, 2P	415V AC	1	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
AIR HEATER BLOWER					
1	MPCB	4A	415V AC	1	
2	Extended RHOM	4A, TP		1	
3	Power Contactor	18A	Coil Voltage : 110V AC	2	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	0.4-0.63A	415V AC	1	
6	Mounting Kit			1	
7	Reset Chord	400mm		1	
8	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
9	Interposing Relays	1C/O	24V DC, 4A	2	
10	MCB	6A, 2P	415V AC	1	
11	Fuse Base	32A		2	
12	Fuse link	4A		2	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	1	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
SPACE HEATER					
1	MCB	32A	415V AC	1	
2	Terminal Block	4sq.mm		6	
CABLE ALLEY					
1	MCB	6A, 2P	415V AC	1	
2	LED	RED	240V AC	1	
3	Thermostat	30-90deg C	240V AC	1	
4	Spaceheater	60W	240V AC	1	
5	Door limit Switch	NC	240V AC	1	
6	CFL	11W	240V AC	1	
7	Terminal Block	4sq.mm		5	
8	Terminal Block End Plate	4sq.mm		2	
SHIPPING SECTION					
1	MCB	6A, 2P	240V AC	1	
2	Power Socket	5A	240V AC	1	
3	Terminal Block	4sq.mm		3	
4	Terminal Block End Plate	4sq.mm		2	
ENCLOSURE					
1	1000MM DRAW-OUT MODULE		INCOMER, BUS PT	4	
2	500MM DRAW-OUT MODULE		BUSCOUPLER	1	
3	500MM DRAW-OUT MODULE		BLOWER	192	
4	1000MM FIXED MODULE		MARSHALLING	2	
5	500MM FIXED MODULE		VACANT	1	
6	500MM FIXED MODULE		SPACE HEATER, JAMMING RELAY	3	
7	500MM FIXED MODULE		CONTROL SUPPLY	2	
8	NO. OF VERTICALS			26	
9	400MM DUMMY PANELS			2	

WIRING					
1	INCOMER	63A		2	
2	BUSCOUPLER	63A		1	
3	WALL BLOWER	0.56KW		125	
4	LONG RETRACTABLE BLOWER	0.736KW		62	
5	AIR HEATER BLOWER	0.18KW		5	
6	CONTROL SUPPLY	1.5KVA		2	
7	JAMMING RELAY			2	
8	SPACE HEATER SUPPLY	32A		1	
10	CABLE ALLEY			1	
11	BUS PT	50VA		2	
11	SHIPPING SECTION			1	

PRICE FORMAT (UN-PRICED)													
ITEM: SBMCC FOR NORTH CHENNAI TPS STAGE-III & UPPUR STPP													
TENDER REF: 12300695													
All values in INR													
						NAME OF BIDDER: M/S.....							
Sl.No	Material code	Item Description	HSN CODE (To be mentioned by Bidder)	U/M	Qty.	Unit Ex-Works Price Incl. Packing Charges	Total Ex-Works Price Incl. Packing Charges	Total Freight Price	Total Price Incl. Freight	CGST @ 9%	SGST @ 9%	IGST @ 0%	Total FOR Price
										0%	0%	0%	
					(1)	(2)	(3)=(1)x(2)	(4)	(5)=(3)+(4)	(6)=(5)x9%	(7)=(5)x9%	(8)=(5)x0%	(9)=(5)+(6)+(7)+(8)
1	ELSBMCCNCTP01	SBMCC FOR NORTH CHENNAI		EA	1		0.00		0.00	0.00	0.00	0.00	0.00
2	ELSBMCCUTPS01	SBMCC FOR UPPUR		EA	1		0.00		0.00	0.00	0.00	0.00	0.00
A	TOTAL FOR PRICE FOR ALL LINE ITEMS												0.00
B	LESS GST CREDIT												0.00
C	LANDED COST FOR EVALUATION PURPOSE ONLY												0.00

NOTE: Item is required for North Chennai TPS & UPPUR STPP
Specification No. EP-4-TS-18001-001 REV. 00

For ADD-DEL FOR NORTH CHENNAI - REFER SHEET 2

For ADD-DEL FOR UPPUR - REFER SHEET 3

	PROJECT :	1X800MW NORTH CHENNAI TPS		Document No :	EP-4-AD-SBMCC-001
	CUSTOMER :	TANGEDCO		Rev	00
	ITEM :	SOOT BLOWER MCC (SBMCC)			
ADD/DEL LIST FOR SBMCC (NCTPS-III)					
SL. NO.	ITEM DESCRIPTION	RATING	SPECIFICATION	QTY/ MODULE	UNIT PRICE
INCOMER					
1	MCCB	63A	3-Pole, AC	1	
2	MCCB RHOM	63A	Extended	1	
3	FUSE BASE	32A	1-Pole	9	
4	FUSE LINK	2A	HRC Fuse link	9	
5	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	
7	KILOWATT TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
8	KILOWATT HOUR TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
9	CT	10/1A	CL-1, 15VA	3	
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	
11	MFM		A,V, KW, KWH, Hz	1	
12	INDICATING LAMP	63.5V AC	RED	1	
13	INDICATING LAMP	63.5V AC	YELLOW	1	
14	INDICATING LAMP	63.5V AC	BLUE	1	
15	CTTB	10A	Disconnecting Type	7	
16	Neutral Link	20A		2	
17	Terminal Block	4sq.mm		36	
18	Terminal Block End Plate	4sq.mm		2	
BUS COUPLER					
1	MCCB	63A	3-Pole, AC	1	
2	MCCB RHOM	63A	Extended	1	
3	Castle Key arrangement	3Lock + 2Key		1	
CONTROL SUPPLY					
1	FUSE BASE	32A	1-Pole	10	
	FUSE LINK	4A		6	
	FUSE LINK	16A		4	
2	Power Contactor	18A	Coil Voltage : 110V AC	2	
3	Add-on block for Power Contactor	2NO+2NC		1	
4	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
7	Timer	On-delay	0-1Sec, 1NO contact	1	
8	Indicating lamp	RED	110V AC	1	
9	Control Supply Transformer	415/110V	1.5KVA	2	
10	Neutral link	30A		1	
11	Terminal Block	4sq.mm		14	
12	Terminal Block End Plate	4sq.mm		2	
JAMMING RELAY					
1	Jamming Relay	CTR : 5/5A		1	
2	CT	5/5A	CI-5P20, 10VA	1	
3	CTTB	10A	Disconnecting type	4	
4	Terminal Block	4sq.mm		6	
5	Terminal Block End Plate	4sq.mm		2	
WALL BLOWER					
1	MPCB WITH SC ONLY	4A	415V AC, 3P	1	
2	Extended RHOM	4A, TP		1	
3	Power Contactor	18A	Coil Voltage : 110V AC	3	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	1.0-1.6A	415V AC	1	
6	OLR	0.63-1.0A	415V AC	1	
7	Mounting Kit			2	
8	Reset Chord	400mm		2	
9	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
10	Interposing Relays	1C/O	24V DC, 4A	3	
11	MCB	6A, 2P	415V AC	1	
13	LED	Red	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
LONG RETRACTABLE BLOWER					
1	MCCB SC ONLY	4A	415V AC, 4P	1	
2	Extended RHOM	4A, TP		1	
4	Power Contactor	18A	Coil Voltage : 110V AC	3	
5	ADD-ON block for Power Contactor	2NO+2NC		3	
6	OLR	1.0-1.6A	415V AC	1	
7	OLR	1.6-2.5A	415V AC	1	
8	Mounting Kit			2	
9	Reset Chord	400mm		2	
10	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	

11	Interposing Relays	1C/O	24V DC, 4A	3	
12	MCB	6A, 2P	415V AC	1	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
AIR HEATER BLOWER					
1	MPCB	4A	415V AC	1	
2	Extended RHOM	4A, TP		1	
3	Power Contactor	18A	Coil Voltage : 110V AC	2	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	0.4-0.63A	415V AC	1	
6	Mounting Kit			1	
7	Reset Chord	400mm		1	
8	Auxiliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
9	Interposing Relays	1C/O	24V DC, 4A	2	
10	MCB	6A, 2P	415V AC	1	
11	Fuse Base	32A		2	
12	Fuse link	4A		2	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	1	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
SPACE HEATER					
1	MCB	32A	415V AC	1	
2	Terminal Block	4sq.mm		6	
CABLE ALLEY					
1	MCB	6A, 2P	415V AC	1	
2	LED	RED	240V AC	1	
3	Thermostat	30-90deg C	240V AC	1	
4	Spaceheater	60W	240V AC	1	
5	Door limit Switch	NC	240V AC	1	
6	CFL	11W	240V AC	1	
7	Terminal Block	4sq.mm		5	
8	Terminal Block End Plate	4sq.mm		2	
SHIPPING SECTION					
1	MCB	6A, 2P	240V AC	1	
2	Power Socket	5A	240V AC	1	
3	Terminal Block	4sq.mm		3	
4	Terminal Block End Plate	4sq.mm		2	
ENCLOSURE					
1	1000MM DRAW-OUT MODULE		INCOMER	2	
2	500MM DRAW-OUT MODULE		BUSCOUPLER	1	
3	500MM DRAW-OUT MODULE		BLOWER	193	
4	1000MM FIXED MODULE		MARSHALLING	2	
5	500MM FIXED MODULE		VACANT	1	
6	500MM FIXED MODULE		SPACE HEATER, JAMMING RELAY	3	
7	500MM FIXED MODULE		CONTROL SUPPLY	2	
8	NO. OF VERTICALS			26	
9	400MM DUMMY PANELS			2	
WIRING					
1	INCOMER	63A		2	
2	BUSCOUPLER	63A		1	
3	WALL BLOWER	0.56KW		125	
4	LONG RETRACTABLE BLOWER	0.736KW		65	
5	AIR HEATER BLOWER	0.18KW		3	
6	CONTROL SUPPLY	1.5KVA		2	
7	JAMMING RELAY			2	
8	SPACE HEATER SUPPLY	32A		1	
10	CABLE ALLEY			1	
11	SHIPPING SECTION			1	

	PROJECT :	2X800MW UPPUR STPP	Document No :	EP-4-AD-SBMCC-002	
	CUSTOMER :	TANGEDCO	Rev	00	
	ITEM :	SOOT BLOWER MCC (SBMCC)			
ADD/DEL LIST FOR SBMCC (UPPUR)					
SL. NO.	ITEM DESCRIPTION	RATING	SPECIFICATION	QTY/ MODULE	UNIT PRICE
INCOMER					
1	MOTORIZED MCCB	100A	3-Pole, AC	1	
2	MCCB RHOM	100A	Extended	1	
3	FUSE BASE	32A	1-Pole	9	
4	FUSE LINK	2A	HRC Fuse link	9	
5	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	
7	KILOWATT TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
8	KILOWATT HOUR TRANSDUCER		i/p : 63.5V AC, i/p : 1A, Aux: 110V AC	1	
9	CT	10/1A	CL-1, 15VA	3	
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	
11	INDICATING LAMP	63.5V AC	RED	1	
12	INDICATING LAMP	63.5V AC	YELLOW	1	
13	INDICATING LAMP	63.5V AC	BLUE	1	
14	AMMETER	0-10/60	ANALOG	1	
15	VOLTMETER	0-500V	ANALOG	1	
16	AMMETER SELECTOR SWITCH		ROTARY	1	
17	VOLTMETER SELECTOR SWITCH		ROTARY	1	
18	CTTB	10A	Disconnecting Type	7	
19	Neutral Link	20A		2	
20	Terminal Block	4sq.mm		36	
21	Terminal Block End Plate	4sq.mm		2	
BUS COUPLER					
1	MOTORIZED MCCB	100A	3-Pole, AC	1	
2	MCCB RHOM	63A	Extended	1	
3	CT	10/1A	CL-1, 15VA	3	
4	CURRENT TRANSDUCER		i/p : 1A, Aux: 110V AC	3	
5	AMMETER	0-10/60	ANALOG	1	
6	VOLTMETER	0-500V	ANALOG	1	
7	AMMETER SELECTOR SWITCH		ROTARY	1	
8	VOLTMETER SELECTOR SWITCH		ROTARY	1	
9	Castle Key arrangement	3Lock + 2Key		1	
BUS PT					
1	MPCB	16A	3-Pole, AC	1	
3	MCB	32A	1-Pole	9	
6	VOLTAGE TRANSDUCER		i/p : 63.5V AC, Aux: 110V AC	3	
10	PT	(415/RT(3)) / (110/RT(3))	1-PH, CL-1, 50VA	3	
11	VOLTMETER 3PH	110V SECONDARY	V	1	
12	INDICATING LAMP	63.5V AC	RED	1	
13	INDICATING LAMP	63.5V AC	YELLOW	1	
14	INDICATING LAMP	63.5V AC	BLUE	1	
15	NUMERICAL RELAY WITH 25 & 27		WITH UNDER VOLTAGE & CHECK SYNC	7	
16	Neutral Link	20A		2	
17	Terminal Block	4sq.mm		36	
18	Terminal Block End Plate	4sq.mm		2	
CONTROL SUPPLY					
1	FUSE BASE	32A	1-Pole	10	
	FUSE LINK	4A		6	
	FUSE LINK	16A		4	
2	Power Contactor	18A	Coil Voltage : 110V AC	2	
3	Add-on block for Power Contactor	2NO+2NC		1	
4	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
7	Timer	On-delay	0-1Sec, 1NO contact	1	
8	Indicating lamp	RED	110V AC	1	
9	Control Supply Transformer	415/110V	1.5KVA	2	
10	Neutral link	30A		1	
11	Terminal Block	4sq.mm		14	
12	Terminal Block End Plate	4sq.mm		2	
JAMMING RELAY					
1	Jamming Relay	CTR : 5/5A		1	
2	CT	5/5A	CI-5P20, 10VA	1	
3	CTTB	10A	Disconnecting type	4	
4	Terminal Block	4sq.mm		6	
5	Terminal Block End Plate	4sq.mm		2	
WALL BLOWER					
1	MPCB WITH SC ONLY	4A	415V AC, 3P	1	
2	Extended RHOM	4A, TP		1	

3	Power Contactor	18A	Coil Voltage : 110V AC	3	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	1.0-1.6A	415V AC	1	
6	OLR	0.63-1.0A	415V AC	1	
7	Mounting Kit			2	
8	Reset Chord	400mm		2	
9	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
10	Interposing Relays	1C/O	24V DC, 4A	3	
11	MCB	6A, 2P	415V AC	1	
13	LED	Red	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
LONG RETRACTABLE BLOWER					
1	MCCB SC ONLY	4A	415V AC, 4P	1	
2	Extended RHOM	4A, TP		1	
4	Power Contactor	18A	Coil Voltage : 110V AC	3	
5	ADD-ON block for Power Contactor	2NO+2NC		3	
6	OLR	1.0-1.6A	415V AC	1	
7	OLR	1.6-2.5A	415V AC	1	
8	Mounting Kit			2	
9	Reset Chord	400mm		2	
10	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
11	Interposing Relays	1C/O	24V DC, 4A	3	
12	MCB	6A, 2P	415V AC	1	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	2	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
AIR HEATER BLOWER					
1	MPCB	4A	415V AC	1	
2	Extended RHOM	4A, TP		1	
3	Power Contactor	18A	Coil Voltage : 110V AC	2	
4	ADD-ON block for Power Contactor	2NO+2NC		2	
5	OLR	0.4-0.63A	415V AC	1	
6	Mounting Kit			1	
7	Reset Chord	400mm		1	
8	Auxilliary Contactor	2NO+2NC	Coil Voltage : 110V AC	1	
9	Interposing Relays	1C/O	24V DC, 4A	2	
10	MCB	6A, 2P	415V AC	1	
11	Fuse Base	32A		2	
12	Fuse link	4A		2	
13	LED	RED	110V AC	1	
14	LED	Blue	110V AC	1	
15	Terminal Block	4sq.mm		36	
16	Terminal Block End Plate	4sq.mm		4	
SPACE HEATER					
1	MCB	32A	415V AC	1	
2	Terminal Block	4sq.mm		6	
CABLE ALLEY					
1	MCB	6A, 2P	415V AC	1	
2	LED	RED	240V AC	1	
3	Thermostat	30-90deg C	240V AC	1	
4	Spaceheater	60W	240V AC	1	
5	Door limit Switch	NC	240V AC	1	
6	CFL	11W	240V AC	1	
7	Terminal Block	4sq.mm		5	
8	Terminal Block End Plate	4sq.mm		2	
SHIPPING SECTION					
1	MCB	6A, 2P	240V AC	1	
2	Power Socket	5A	240V AC	1	
3	Terminal Block	4sq.mm		3	
4	Terminal Block End Plate	4sq.mm		2	
ENCLOSURE					
1	1000MM DRAW-OUT MODULE		INCOMER, BUS PT	4	
2	500MM DRAW-OUT MODULE		BUSCOUPLER	1	
3	500MM DRAW-OUT MODULE		BLOWER	192	
4	1000MM FIXED MODULE		MARSHALLING	2	
5	500MM FIXED MODULE		VACANT	1	
6	500MM FIXED MODULE		SPACE HEATER, JAMMING RELAY	3	
7	500MM FIXED MODULE		CONTROL SUPPLY	2	
8	NO. OF VERTICALS			26	
9	400MM DUMMY PANELS			2	

WIRING					
1	INCOMER	63A		2	
2	BUSCOUPLER	63A		1	
3	WALL BLOWER	0.56KW		125	
4	LONG RETRACTABLE BLOWER	0.736KW		62	
5	AIR HEATER BLOWER	0.18KW		5	
6	CONTROL SUPPLY	1.5KVA		2	
7	JAMMING RELAY			2	
8	SPACE HEATER SUPPLY	32A		1	
10	CABLE ALLEY			1	
11	BUS PT	50VA		2	
11	SHIPPING SECTION			1	

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GENERAL CONDITIONS OF CONTRACTS (GCC)

DEFINITIONS OF TERMS

ABBREVIATIONS

INSTRUCTIONS TO BIDDERS

GENERAL COMMERCIAL TERMS & CONDITIONS

ANNEXURES

ELECTROPORCELAINS DIVISION
BHARAT HEAVY ELECTRICALS LIMITED
 (A Govt. of India Undertaking)
 PROF. CNR RAO CIRCLE, IISc POST
 MALLESHWARAM
 BANGALORE - 560012

	ELECTRO-PORCELAINS DIVISION	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. R0 (For supply and services)	DEFINITION OF TERMS
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Not for Publication

For Official Use

DEFINITION OF TERMS

Throughout the Tender Documents including the Enquiry Letter, the following words shall have the meanings assigned to them herein, unless the subject matter or the context requires otherwise.

- 1 **Purchaser / BHEL** shall mean **M/s Bharat Heavy Electricals Limited** (A Govt. of India Undertaking) incorporated under the Companies Act 1956 acting through its **Electroporcelains Division (EPD)**, IISc Post, Prof. CNR Rao Circle, Malleswaram, Bangalore - 560012 (Karnataka) which expression shall include its successors and assigns.
- 2 **EXECUTIVE DIRECTOR**" or 'GROUP GENERAL MANAGER or "GENERAL MANAGER (In-charge)" or "GENERAL MANAGER" shall mean the Officer in Administrative charge of EPD, Bangalore.
- 3 **"COMPETENT AUTHORITY"** shall mean Executive Director or Group General Manager or General Manager (In -charge) or General Manager or BHEL Officers who are empowered to act on behalf of the Executive Director or General Manager (In-charge) or General Manager of BHEL.
- 4 **Owner** shall mean the **Customer or Client** for whose project the enquiry is issued by Purchaser and shall include its successors and assigns as well as authorized officer(s)/ representative(s).
- 5 **Consultant** shall mean the agency appointed by Owner or Purchaser to provide consultancy services for the project and shall include its successors and assigns as well as authorized officer(s)/ representative(s).
- 6 **Tenderer** shall mean the Firm/ Company/ Organization which quotes against the Tender Enquiry issued by Purchaser. It may also be referred as **Bidder or Vendor**.
- 7 **"CONTRACT"** or "CONTRACT DOCUMENT" shall mean and include the Agreement of Purchase order / Work Order, the accepted appendices of Rates, Schedules, Quantities if any, General Conditions of Contract, Special Conditions of Contract, Instructions to the Bidders, Drawings, Technical Specifications, the

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Special Specifications, if any, Integrity Pact (if applicable), the Tender documents, subsequent amendments mutually agreed upon and the Letter of Intent/Acceptance issued by BHEL. Any conditions or terms stipulated by the contractor in the tender documents or subsequent letters shall not form part of the contract unless, specifically accepted in writing by BHEL in the Letter of Intent/Award and incorporated in the agreement.

- 8 **Seller/Contractor** shall mean the Firm/ Company/ Organization with whom the Order/Contract is made and shall be deemed to include its successors, representatives, heirs, executors, administrators and permitted assigns, as the case may be. It may also be referred as **Supplier**.
- 9 **Sub-Contractor** shall mean the person/ firm/ company/ organization to whom any part of the work has been sub-contracted by Seller/ Contractor, with the written consent of Purchaser, and shall include sub-contractor's heirs, executors, administrators, representatives and assigns.
- 10 **"ENGINEER"** or **"ENGINEER IN CHARGE"** shall mean an Officer of BHEL as may be duly appointed and authorized by BHEL to act as "Engineer" on his behalf for the purpose of the Contract, to perform the duty set forth in this General Conditions of Contract and other Contract documents. The term also includes 'RESIDENT MANAGER1 or 'SITE INCHARGE1 as well as Officers at Site or at the Headquarters at Bangalore.
- 11 **"GENERAL CONDITIONS OF CONTRACT"** shall mean the 'Instructions to Bidders1 and 'General Conditions of Contract pertaining to the work for which above tenders have been called for.
- 12 **"TENDER SPECIFICATION"** or **"TENDER"** or **"TENDER DOCUMENTS"** shall mean General Conditions, Common Conditions, Special Conditions, Price Bid, Rate Schedule, Technical Specifications, Appendices, Annexure, Corrigenda, Amendments, Forms, procedures, Site information, etc and drawings/documents pertaining to the work for which the bidders are required to submit their offers or any other document(s) as mentioned in NIT. Individual specification number will be assigned to each Tender Specification.
- 13 **LETTER OF AWARD / INTENT"** shall mean the intimation by a Letter/Fax/email to the bidder that the tender has been accepted in accordance with provisions contained in the letter. The responsibility of the contractor

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commences from the date of issue of this letter and all terms and conditions of the contract are applicable from this date

- 14 **COMPLETION TIME**" shall mean the period by 'date/month' specified in the 'Letter of Intent/Award' or date mutually agreed upon for handing over of the intended scope of work, the erected equipment/plant which are found acceptable by the Engineer, being of required standard and conforming to the specifications of the Contract.
- 15 **"PLANT"** shall mean and connote the entire assembly of the plant and equipments covered by the contract.
- 16 **"EQUIPMENT"** shall mean equipment, machineries, materials, structural, electrical and other components of the plant covered by the contract.
- 17 **"TESTS"** shall mean and include such test or tests to be carried out on the part of the contractor as are prescribed in the contract or considered necessary by BHEL, in order to ascertain the quality, workmanship, performance and efficiency of the contractor or part thereof.
- 18 **"APPROVED", "DIRECTED" or "INSTRUCTED"** shall mean approved, directed or instructed by BHEL.
- 19 **"WORK or CONTRACT WORK"** shall mean and include supply of all categories of labour, specified consumables, tools and tackles and Plants required for complete and satisfactory site transportation, handling, stacking, storing, erecting, testing and commissioning of the equipments to the entire satisfaction of BHEL.
- 20 **"HEADING"** - The heading in these General Conditions are solely for the purpose of facilitating reference and shall not be deemed to be part thereof or be taken as instructions thereof or of the contract.
- 21 **"WRITING"** shall include any manuscript type written or hand written or printed statement or electronically transmitted messages, under the signature or seal or transmittal of BHEL.

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- 22** "TEMPORARY WORK" shall mean all temporary works for every kind required in or for the execution, completion, maintenance of the work.
- 23** 'CONTRACT PRICE or 'CONTRACT VALUE shall mean the sum mentioned in the LOI/LOA/Contract Agreement subject to such additions thereto or deductions there from as may be made under provisions hereinafter contained
- 24** "COMMENCEMENT DATE" or "START DATE" shall mean the commencement/start of work at Site as per terms defined in the Tender.
- 25** "SHORT CLOSING" or "FORE CLOSING" of Contract shall mean the premature closing of Contract, for reasons not attributable to the contractor and mutually agreed between BHEL and the contractor
- 26** "TERMINATION" of Contract shall mean the premature closing of contract due to reasons as mentioned in the contract.
- 27** "DE MOBILISATION" shall mean the temporary winding up of Site establishment by Contractor leading to suspension of works temporarily for reasons not attributable to the contractor
- 28** "RE MOBILISATION" shall mean the resumption of work with all resources required for the work after demobilization.
- 29** **Site** shall mean and include the land and place on which the power station and related facilities are to be constructed and any adjacent land which may be allocated or used by Owner or Seller/ Contractor in performance of the Order/ Contract.
- 30** **Tests on completion** shall mean such tests as prescribed in specifications and/ or tests mutually agreed upon by Purchaser and Seller/ Contractor, to be performed by Seller/ Contractor after erection of equipment to establish its satisfactory operation as per specifications.
- 31** "COMMISSIONING" shall mean the synchronization testing and achieving functional operation of the Equipment with associated system after all initial adjustments, trials, cleaning, re-assembly required at site if any, have been

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completed and Equipment with associated system is ready for taking into service.

- 32 Initial Operation or Trial Operation or Reliability Run** shall mean continuous integrated operation of the contracted/ ordered plant and materials under varying loads as proof of satisfactory operation for a specified period.
- 33 Inspection Agency (IA)** shall mean person(s) authorized by Purchaser / Owner to inspect the stores as per Order/ Contract at Contractor's/ Sub-Contractor's works. Vendors to raise inspection call on BHEL EPD.
- 34 Month** shall mean calendar month. Day' or 'Days' unless herein otherwise expressly defined shall mean calendar day or days of twenty four (24) hours each. A week shall mean continuous period of seven (7) days.
- 35 Consignee** shall mean the official(s)/ person(s) to whom the stores are required to be delivered in the manner indicated in the Order/ Contract.
- 36 Plant/ Equipment/ Stores** shall mean the goods, machinery, components, parts, spares etc. required to be supplied by Seller/ Contractor as per Order/ Contract.
- 37 Contract Engineer (CE)** shall mean the official who signs the Order/ Contract on behalf of Purchaser.
- 38 Site Engineer** shall mean officer of Purchaser/ Owner authorized to receive and verify the in-coming stores, and issue Material Receipt Certificate (MRC)/ Stores Receipt Voucher (SRV).
- 39 Site Inspection Agency (Site IA)** shall mean person(s) authorized by Purchaser/ Owner to inspect the stores/ works included in Order/ Contract at the Project Site.
- 40 GENERAL**

The words incorporating singular shall include plural and vice-versa, the words incorporating masculine gender shall include feminine gender and vice-versa, and the words incorporating persons shall include bodies, corporate, limited liability companies, partnership and other legal entities.

	ELECTRO- PORCELAINS DIVISION	GENERAL CONDITIONS OF CONTRACT (GCC) Revision No. R0 (For supply and services)	ABBREVIATIONS Issued on 01.04.2017
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ABBREVIATIONS

AWB	Airway Bill
BL	Bill of Lading
BOQ	Bill of Quantity
CAD	Cash Against Documents
CENVAT	Central Value Added Tax
CFR	Cost & Freight
CIF	Cost, Insurance and Freight
CIP	Carriage & Insurance Paid (up to destination)
CPT	Cost Freight Paid
CQ	Corporate Quality
CVD	Countervailing Duty
DMS	Document Management System
EMD	Earnest Money Deposit
E&C	Erection and Commissioning
FOB	Free on Board
GR	Goods Receipt
GRN	Goods Receipt Number
H1 bidder	Bidder quoting highest landed cost to BHEL
IP	Integrity Pact
IEM	Independent External Monitor
L1 Bidder	Bidder quoting lowest landed cost to BHEL
LC	Letter of Credit
LOI	Letter of Intent
LOA	Letter of Award

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LR	Lorry Receipt
MDCC	Material Despatch Clearance Certificate
MRC	Material Receipt Certificate
MSMED	Micro Small and Medium Enterprises Development
NIT	Notice Inviting Tender
O&M	Operation & Maintenance
PBG	Performance Bank Guarantee
P&ID	Process & Instrumentation Diagram
PO	Purchase order
PQR	Pre-Qualification Requirement
PVC	Price Variation Clause/compensation
QS	Quality Surveillance
RA	Reverse Auction
RAB	Running Account Bill
RBI	Reserve Bank of India
RFQ	Request for Quotation
RR	Railway Receipt
SAD	Special Additional Duty
SCC	Special Conditions of Contract

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INSTRUCTIONS TO BIDDERS

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GENERAL

These general terms & conditions shall apply to all enquiries, notice inviting tenders, request for quotations concerning the supply of goods and / or rendering of services to Bharat Heavy Electricals Ltd., - Electroporcelains Division (hereinafter referred to as BHEL or the Purchaser) or its Projects / Customers.

1.0 GENERAL INSTRUCTIONS

- 1.1 Tenderers are advised to study all the tender documents carefully. Any submission of tender by the tenderer shall be deemed to have been done after careful study and examination of the tender documents and with full understanding of the implications thereof. The specifications and terms & conditions shall be deemed to have been accepted unless otherwise specifically commented upon in 'Deviation sheets by the tenderer in his offer. Noncompliance with any of the requirements and instructions in the Tender Enquiry may result in rejection of the tender.

Integrity Pact (IP) will be applicable for all tenders/ contracts valuing more than a specific value or if specified in NIT/ RFQ. Integrity Pact document shall be issued as part of tender and shall be returned by bidders along with their technocommercial bids, duly signed by authorized signatories. Only those vendors/ bidders who enter into Integrity Pact with BHEL would be qualified to participate in the bidding process.

- 1.2 All commercial terms and conditions, except prices, should be submitted as part of techno-commercial offer (Part-I) along with unpriced copy of Annexure-II, which may be opened first. The price part (Part-II) along with price copy of Annexure-II is to be submitted in a separate sealed cover (or to be uploaded in website in case of e-procurement) along with techno-commercial offer. Purchaser reserves the right to open both the Parts at the same time.
- 1.3 A declaration as per Annexure-III must be sent before opening of Price Bids.

2.0 PROCEDURE FOR SUBMISSION & OPENING OF TENDERS

- 2.1 Tenders shall be submitted in **Two parts** on or before the Due Date and time indicated in the NIT/ RFQ.

PART - I : Techno-Commercial Bid

comprising of Technical Offer, Annexure-I, Commercial Terms & Conditions, Unpriced copy of Price Bid& Annexure II, PQR documents (if applicable) in two

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(2) sets.

PART – II: Price Bid

Containing Prices, cost of withdrawal of deviation as per Annexure-II, to be submitted in original, strictly, as per Price Schedule of BHEL for complete scope of Tender Enquiry.

NOTE: Offers are liable to be rejected for changes made by vendors in the Price Schedule, except those specified in the unpriced bid and accepted by Purchaser.

- 2.1.1 PART-I (Techno-Commercial bid) may be opened on Due Date and time specified in the NIT/ RFQ, or extension thereof, in presence of tenderers who may like to attend. Incomplete offers are liable to be rejected. Purchaser reserves the right to open both Part-I and Part-II together.
- 2.1.2 PART-II containing prices shall be submitted along with Part-I but in a separate sealed cover. Corrections/amendments shall be properly authenticated, else the offer is liable to be rejected.
- 2.1.3 Any discount/revised offer submitted by a bidder on its own shall be accepted provided it is received on or before the due date and time of offer submission. The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.

Unsolicited discounts/revised offers given after due date and time of offer submission shall not be accepted.

In case there is no change in the technical scope and/or specifications and/or commercial terms & conditions, the bidder/s shall not be allowed to change his/their price bids after the due date, within the validity period.

In case of changes in scope and/or technical specification and/or commercial terms & conditions, having price implications, 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. A cut-off date and time shall be given to all the techno-commercially acceptable bidders to submit the impact on their price bids.

In the event of any bidder, after finalizing the technical specification & scope of supply, opting to revise and submit their latest price bid instead of submitting impact on their price bid asked by BHEL, then their original price (i.e. the previous bid) shall also be opened.

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Price Impact/ Discount/ Revised Price Bid shall be duly superscribed as:

"Price Impact / Discount/ Revised Price Bid (Part-II) (delete whichever is not applicable), Revision No. ____ against Tender Enquiry No. _____ dated ____"

- 2.2 After technical & commercial examination of the offers received and clarifications obtained (if required), Part-II (Revised Price Bid/ Original Price Bid along with Price Impact and Discount, if any) shall be opened, for which the date and time shall be intimated to technically and commercially acceptable bidders in case of public opening. BHEL may opt to finalise the prices through Reverse Auction amongst technically and commercially acceptable bidders. BHEL reserves the right to open the earlier price bids, if any, submitted by the bidder(s), if required.
- 2.3 No correspondence shall be entertained from the tenderers after opening of Part-II (Price bid), except clarifications (if any) asked by BHEL in writing.
- 2.4 **Instructions regarding centralised tender room and tender opening:**
- Vendors are advised to submit the tenders in the tender box, containing Part-I & II offers in separate covers, preferably cloth lined envelopes should be used, properly marked before due date and time.
 - BHEL-EPD shall not accept any tender in torn condition and return the same to the courier immediately with the Stamping "Returned to Sender-Package Damaged". Offers in damaged condition will not be considered and no request for extension on this account will be considered.
 - Bidder's representative shall deposit the offer in tender box only.
 - Bidders shall be allowed in the tender room in area identified for bidders and only one/two authorized representative(s) from each bidder shall be allowed.
 - Bidder shall not be allowed to carry mobile/camera /laptop in the tender room. The same shall have to be deposited at security in advance and taken back after tender opening.
 - In case of two part bid system, bidder's representative(s), witnessing the tender opening shall have to sign on all the envelopes containing the price bids. Thereafter, all the price bid envelopes shall be put in a bigger envelope / box and the same shall be properly sealed. The sealed envelope / box shall have to be

signed by the tender opening official(s) / committee of Purchaser and bidder's representatives.

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- g) Details of offers shall be read out to bidders and in no case the offers shall be handed over to any of the bidders for noting down.
- h) Please ensure tender submission, minimum 1 hour before scheduled tender opening time.

Late tenders shall not be accepted.

2.5 Purchaser may negotiate the tender with L1 bidder after RA/ price bid opening.

2.6 MARKING ON ENVELOPES

2.6.1 Following shall be superscribed on the envelopes which shall be addressed by name and designation to the official inviting tender:

PART-I : 1. TENDER ENQUIRY No. AND ITEM DESCRIPTION
 2. DUE DATE FOR OPENING
 3. "TECHNO-COMMERCIAL BID".

PART-II : 1. TENDER ENQUIRY NO AND ITEM DESCRIPTION
 2. DUE DATE FOR OPENING
 3. "PRICE BID".

2.6.2 Both Parts - I & II shall be submitted in separate sealed covers duly superscribed as indicated above and shall be enclosed further in a main cover duly sealed and superscribed as:

"TENDER FOR _____ AGAINST TENDER ENQUIRY NO. _____ DUE ON _____ CONTAINING PART-I & PART-II BIDS"

2.6.3 Envelope not marked with tender enquiry number is liable to be ignored and may not be opened.

2.7 BID SUBMISSION

2.7.1 Tenders shall be addressed to BHEL officials by name & designation and sent to the following address:

Tender Box at the reception of EPD,
 Bharat Heavy Electricals Ltd.
 ELECTROPORCELAINS DIVISION
 Opp. IISc, PROF. C N R RAO CIRCLE ,
 MALLESWARAM , BANGALORE - 560 012
 Attention: 1) Mr.

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2) Mr.

- 2.7.2 Tenders can either be deposited in tender room in person or sent by Courier/Registered or Speed Post to the above mentioned address. It shall be bidders' responsibility to ensure that tenders are delivered latest by 14:00 hours (IST) of the enquiry due date.
- 2.7.3 Bidder can also submit offer through email, if called for in the enquiry, at the email address indicated in the enquiry. Such email offers shall be sent only on designated email-id to reach before 14.00 hrs of the tender due date. BHEL will not be responsible for incomplete offers and the ones delivered late through e-mail.
- 2.8 Tenders received after the Due Date and Time of submission as mentioned at 2.7.2 shall be rejected.
- 2.9 Name of vendor's dealing person with Contact No(s), Email ID and Address of correspondence shall be provided in the bid as per ANNEXURE XVIII.
- 2.10 Unsolicited tenders will not be entertained.
- 2.11 **OFFER SUBMISSION IN E-PROCUREMENT**

Tenders shall be submitted in Two parts on or before the Due Date and time indicated on the portal as per the following instructions:

PART - I : Technical & Commercial bid

Comprising of following:

1. PQ qualification documents (Mandatory, if shown on portal)
2. Annexure-I to GCC (Mandatory)
3. General conditions of contract, GCC (Mandatory)
4. Special conditions of contract, SCC (Mandatory)
5. Technical offer, comprising of technical specification and other documents as asked in technical specifications e.g. drawings, test report etc. (Mandatory)
6. Annexure-III to GCC (Declaration about completeness of price) - (Mandatory)
7. Annexure-XII to GCC (Optional)

"NO DEVIATION CERTIFICATE" FOR COMMERCIAL TERMS AND

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CONDITIONS as per General Conditions of Contracts (GCC, Rev.01), Special Conditions of Contracts and RFQ in case of no deviations

8. Integrity Pact Agreement (Mandatory if shown on portal, not applicable otherwise)
9. Unpriced copy of Annexure-II, cost of withdrawal of deviation (Mandatory)
10. Supplier details as per detail annexure.

Any deviation not mentioned in un-priced copy of this format, but mentioned in the priced copy, shall not at all be accepted.

Bidder to note all the points mentioned in "Notes" of Annexure-II to GCC Rev.01.

Cost of withdrawal for the deviations, for which, the "Cost of withdrawal" is not specified, shall be taken as NIL.

The vendors shall be forced by the system to upload the above documents which are marked mandatory. The Annexure mentioned at Sl no 2, 6 & 7 (if applicable), above should be duly filled by the bidder and should be printed on their letter head before uploading.

PART - II: Price bid

Containing

1. Prices as per price format,
2. Cost of withdrawal of deviation as per Annexure-II, to be uploaded strictly as per Price Schedule of BHEL for complete scope of Tender Enquiry.

NOTE: Offers are liable to be rejected for changes made by vendors in the Price Schedule, except those specified in the unpriced bid and accepted by Purchaser.

The clause nos 2.6 & 2.7 above of this GCC shall not be applicable in case of eprocurement

- 3.0 In case of TURNKEY PACKAGES total **erection & commissioning charges** including service tax should be minimum 15% (or as specified in NIT) of the total quoted package price (excluding mandatory spares but including all taxes and freight), failing which the break-up of prices shall be adjusted accordingly for ordering.

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4.0 Authority of the person signing the tender on behalf of the tenderer:

A person signing the tender or any other document in respect of Order/Contract on behalf of the tenderer, without disclosing his authority to do so shall be deemed to warrant that he has the authority to bind the tenderer. If it is discovered at any time that the person so signing had no authority to do so, the Purchaser may, without prejudice to any other right or remedy, cancel the Order/Contract and make or authorize the purchase of the stores at the risk and cost of such tenderer and hold such tenderer liable to Purchaser for all costs and damages arising from cancellation of the Order/Contract including any loss which Purchaser may sustain on account of such purchase.

Notes:

- a) Bids of Indian supplier shall be in Indian Rupee only.
- b) Bids of foreign suppliers shall preferably be in currency of the country of origin and on CPT/ CFR basis. In case of supplies from Indian origin, it shall be in INR on F.O.R BHEL EPD BANGALORE - 12.
- c) An authorized representative/ agent can represent only one bidder for the given package.

5.0 CLARIFICATIONS REQUIRED BY BIDDERS

Technical and commercial clarifications required before submission of the tender should be addressed to the official(s) inviting the tender. The bidders are requested to submit all their queries/clarifications by the date specified in the NIT after which it will be presumed that there are no queries/clarifications and BHEL will be under no obligation to reply queries/clarifications raised after the date.

6.0 DEVIATIONS - LISTING

- 6.1 Tenders shall be submitted strictly in accordance with the requirements of tender documents. In case of deviations from NIT, the tenderer shall give cost of withdrawal of such deviation in Sealed Cover as per Annexure-II.
- 6.2 If bidder insists for price variation clause (PVC) where NIT specifies Firm price, the offer should contain:-
 - a) PVC Formula
 - b) Ceiling for PVC
 - c) Base date and applicable indices for the base date.

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Open ended PVC formula is not acceptable. Indices shall be based on Government of India/ RBI publications/ IEEMA/ LME etc. However, BHEL reserves the right to accept/ reject the offer with PVC.

7.0 **VALIDITY OF OFFER**

Vendors' offers shall be submitted with the following validity periods:

- i) Original offer shall be valid for 90 days from Part-I opening.
- ii) If revised price bid/ price impact is asked by BHEL, the validity of the same shall be 60 days from the date of revised price bid/ price impact or 120 days from Part-I opening, whichever is later.
- iii) Prices of Recommended Spares, O&M Spares and Mandatory Spares (wherever these are Optional items) shall be valid till two years from the date of PO.
- iv) Unit prices for scope addition/ deletion shall be valid till two years from the date of PO.
- v) Prices of optional items shall be valid till the contract period for placement of order.
- vi) Offers with shorter validity are liable to be rejected.

8.0 **LANGUAGE & CORRECTIONS**

- a) Tenderer shall quote the rates in Hindi/English language and international numerals only. Total Price shall be entered in figures as well as in words. For the purpose of tender, metric system of units shall be used.
- b) All entries in the tender shall either be typed or written legibly in ink. Cancellations, corrections, insertions, erasements, over-writing (if unavoidable) shall be authenticated with signature and seal by the bidder.

9.0 **PRICE DISCREPANCY**

Following shall be considered for evaluation and ordering for non-conformities/ errors/ discrepancies 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

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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.

(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 of (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.

(e) Taxes and duties if not specified clearly as extra shall be considered as included in the basic price and, therefore, shall not be reimbursed.

10.0 TENDERER TO INFORM HIMSELF FULLY

10.1 Tenderer shall closely peruse all clauses, specifications & drawings etc. indicated in tender documents before quoting. In case of any doubt about meaning of any portion of tender specifications or discrepancies or omissions in drawings/tender document or clarifications regarding scope of work etc., tenderer shall contact the official(s) inviting the tender for clarifications, before submitting the offer.

10.2 Tenderer shall make independent enquiries as to conditions and circumstances affecting cost estimates, and possibility of executing supplies/works as described. Tenderer shall be deemed to have inspected and examined the site and its surroundings and to have satisfied himself as to the form and nature of the site, the quantities and materials necessary for completion of the work and means of transport and access to the site, the accommodation required, general labour position at site and to have quoted prices taking into consideration the risks, contingencies and other circumstances which may influence or affect execution of the Order/Contract.

10.3 It is the responsibility of tenderer to keep himself informed about all taxes & duties applicable on materials/services as prevailing at the time of tendering. If the rates assumed by tenderer are less than the tariff rates prevailing at the time of tendering, the tenderer will be himself responsible for such under quotations.

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11.0 ETHICS IN BUSINESS DEALINGS & FRAUD PREVENTION POLICY

11.1 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 their notice."

11.2 Integrity commitment, performance of the contract and punitive action thereof:

11.2.1 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(s) in a transparent and fair manner, and with equity.

11.2.2 Commitment by Bidder/ Supplier/ Contractor:

(a) The bidder/ supplier/ contractor commit to take all measures to prevent corruption and will not directly or indirectly influence any decision or benefit which he is not legally entitled to nor will act or omit in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India.

(b) The bidder/ supplier/ contractor 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 relevant guidelines issued from time to time by Govt. of India/ BHEL.

© The bidder/ supplier/ contractor will perform/ execute the contract as per the contract terms & conditions and will not default without any reasonable cause, which causes loss of business/ money/ reputation, to BHEL.

If any bidder/ supplier/ contractor during pre-tendering/ tendering/ post tendering/ award/ execution/ post-execution stage indulges in mal-practices, cheating, bribery, fraud or and other misconduct or formation of cartel so as to influence the bidding process or influence the price or acts or omits in any manner which tantamount to an offence punishable under any provision of the Indian Penal Code, 1860 or any other law in force in India, then, action may be taken against such bidder/ supplier/ contractor as per extant guidelines of the company available on [www. bhel.com](http://www.bhel.com) and/or under applicable legal provisions".

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12.0 INTEGRITY PACT

Vendors shall have to enter into Integrity Pact with BHEL if specified in NIT/ RFQ, failing which vendor's offer will be rejected (Refer Annexure-IX).

13.0 REVERSE AUCTION

BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid (priced format submitted along with the offer in case of e-procurement), submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Nonsubmission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).

The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid (priced format submitted along with the offer in case of e-procurement) already submitted to BHEL along with the offer. The envelope sealed price bid of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid (priced format submitted along with the offer in case of e-procurement) for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com)."

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14.0 REJECTION OF TENDER AND OTHER CONDITIONS

14.1 Acceptance of tender will rest with Purchaser and does not bind him to accept the lowest or any tender and reserves to itself full rights for the following without assigning any reasons whatsoever:

- a) To reject any or all the tenders.
- b) To split the work amongst two or more tenderers (where E&C is not in tenderer's scope).
- c) To award the work in part. (where E&C is not in tenderer's scope).
- d) To increase or decrease the quantities.
- e) To reject any commercial or technical deviation given in offer.

14.2 Standard pre-printed conditions of tenderer attached to offer will not be accepted and only those mentioned in the body of offer will be considered.

14.3 Purchaser will not be bound by any power of attorney granted by tenderer or by changes in composition of the firm made subsequent to award of Order/Contract. Purchaser may, however, recognize such power of attorney and changes after obtaining proper legal advice, the cost of which will be chargeable to the Seller/Contractor concerned.

14.4 If tenderer deliberately gives wrong information, Purchaser reserves the right to reject such an offer at any stage or cancel the Order/Contract, if awarded, and forfeit the security deposit and bank guarantee.

15.0 DEVIATIONS FROM NIT

15.1 Deviations (Commercial as well as Technical) from NIT are generally not acceptable. In case of deviations from NIT, the tenderer shall give cost of withdrawal of such deviation in Sealed Cover as per Annexure-II.

16.0 Loading For Commercial Deviations (where cost of withdrawal not given)

16.1 For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII will apply.

17.0 Interest Rate for loading will be taken as Base rate of SBI (as applicable on the date of bid opening, Techno-commercial bid, in case of 2 part bids) + 6% for the period of relaxation sought by the bidders.

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18.0 DISCOUNT

Discount offered by any bidder in the original price bid, against the present Tender Enquiry, which is also indicated to be applicable to any other Enquiry, shall be considered against the present Tender Enquiry only. In case only percentage discount is indicated, the same shall be applicable to optional prices also.

Discount offered shall be valid for full duration of offer validity.

Any conditional discount shall not be considered for evaluation.

19.0 EVALUATION CRITERIA

- 19.1 Evaluation of the tender shall be on the basis of delivered cost, i.e. 'total cost to BHEL' w.r.t the finalized technical scope and commercial conditions (after considering, inter alia, Customs Duty and CENVAT/ VAT/ Service Tax/Entry Tax as applicable) and taking into consideration loadings, if any, and all available financial advantages.
- 19.2 Exchange rate (TT selling rate of State Bank of India) applicable on the date of Part-I bid opening shall be considered for evaluation of foreign bids. If the relevant day happens to be a bank holiday in India, then the FOREX rate as on the previous bank working day shall be taken for evaluation.
- 19.3 Foreign suppliers shall ensure that the benefits as applicable under Comprehensive Economic Partnership Agreement (CEPA) with Government of India are disclosed in the bid & relevant documents such as Certificate of Country of Origin, issued by the appropriate authority in the country of Export, is provided by the vendor along with dispatch documents. Bids shall be evaluated with such applicable benefits. In the event of Seller failing to provide appropriate documents for Purchaser to avail disclosed concessional duty benefits in India, financial loss, so incurred, will be to the Seller's account.
- 19.4 The quoted CFR price shall be loaded by the following to arrive at the Delivered Cost:
 - Import duty as applicable at the time of Part-II (Price) bid opening.
 - Terminal handing charges at destination & other charges & Inland freight will be loaded at 1% of CFR value.

20.0 FOREIGN SUPPLIERS & INDIAN AGENTS OF FOREIGN SUPPLIERS

Please refer 'Annexure-V' for guidelines.

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21.0 MICRO & SMALL & MEDIUM ENTERPRISES

Extant regulations of Govt. of India titled “Public Procurement Policy for Micro & Small Enterprises (MSE’s) Order dated 23.03.2012” will be applicable.

22.0 Authorisation for participation in EPS portal through DSC

E-Tender Participation requirements

Either Principal or authorised agent shall register their Digital Signature Certificate (DSC) (Class 3- SHA2- 2048 BIT- SIGNING & ENCRYPTION). You are advised to pls go through the FAQ available in the web portal

(<https://bheleps.buyjunction.in>). DSC shall be registered for the authorised person and all transaction done using that DSC against our tenders shall be taken as valid communication and shall be binding on principal/ agent and is valid legally.

For foreign Principal

In case of Principal (being foreigner) they may apply for DSC through Indian embassy at their country and can register with us for participating in E-tenders. Details of the applicable procedure is available in the webpage <http://www.cca.gov.in/cca/>

For Indian agent

In case of agents participating/registering their DSC (of authorised person), it will be at the sole authorisation of principal to their agents to participate on their behalf and all transactions done using that DSC against our tenders shall be known as valid communication and shall binding on principal and is legally valid.

DSC Authorisation

Pls intimate the authorised person name, Mail ID for registering DSC with us to participate in E-Tenders

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GENERAL COMMERCIAL TERMS & CONDITIONS

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1.0 ACCEPTANCE OF ORDER

Seller/Contractor should acknowledge and accept the LOI/ Purchase Order issued by BHEL within 7 days of its receipt. Seller/Contractor should examine the LOI/ Purchase Order immediately upon receipt and bring to the notice of BHEL, within 7 days of receipt, any discrepancy with regard to scope of work, rates, taxes & duties, agreed terms & conditions etc. for due rectification. If the Seller/Contractor fails to give such intimation / acceptance within seven days, the Seller/Contractor shall be deemed to have agreed to supply the stores as per LOI/ Purchase Order.

2.0 CONTRACT

Contract between Purchaser and Seller/Contractor is merely a contract and shall not be treated as partnership between the parties to the contract.

3.0 PRICES

Prices shall be for the entire scope of work in line with the tender documents and subsequent clarifications/confirmations.

4.0 TAXES AND DUTIES

4.1 EXCISE DUTY for Indigenous purchase

4.1.1 Seller/Contractor is required to ensure that excise duty including cess, if any, is quoted as per the existing tariff on the date of the offer and all benefits as per existing rules have been considered.

4.1.2 Excise duty actually incurred by Seller/Contractor on self-manufactured items shall be reimbursed against documentary evidence.

Excise duty paid by bidder on inputs, bought out items, raw materials and components consigned directly from sources other than Seller/Contractor's factory/works shall be included by the bidder in the quoted ceiling amount of excise duty and the same shall be payable extra at actuals limited to the ceiling amount.

4.1.3 If excise duty is paid under protest or dispute, it shall not be reimbursed till the dispute is settled. If the Seller/Contractor claims/obtains any refund of the excise duty paid, the same shall be refunded to the Purchaser immediately

4.1.4 Invoice cum Excise duty gate pass (Excise Invoice) should contain the name of the ultimate consignee as per Order/Contract/ Special Conditions of Contract.

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4.1.5 If required by Purchaser, the Seller / Contractor will provide a certificate stating that CENVAT benefit has been availed of on the inputs and the same has been passed on to the Purchaser.

4.1.6 Excise duty shall be paid at actuals against documentary evidence but restricted to the amount and percentage indicated in the Order/Contract.

4.2 **SALES TAX/VALUE ADDED TAX (VAT) for Indigenous purchase**

4.2.1 Central Sales Tax / Value Added Tax shall be reimbursed only if the same is paid by the Seller / Contractor to the respective Govt. authorities on direct sales by the Seller/ Contractor to the Purchaser, meeting all statutory requirements and availing all exemptions/concessions under the respective Central Sales Tax / Value Added Tax Acts. The offer should clearly indicate CST/VAT percentage and the total amount along with concessional form(s), if any.

4.2.2 Purchaser is registered in Bangalore, Karnataka vide following Registration Numbers:

Central Sales Tax Registration No. : 00850070 w.e.f. 06-03-1999.

Karnataka TIN. : 29470052861

4.2.3 Central Sales Tax/Value Added Tax shall be reimbursed, as per tariff applicable, but restricted to the percentage and amount shown in the Order/Contract. If it is shown as included in the quoted price/ not applicable, it will not be reimbursed by the Purchaser.

4.2.4 For the purchase re-sold items, purchaser proposes to make sale-in-transit under section 6 (2) (b) of Central Sales Tax Act where goods movement is inter-state. Form-C shall be issued and exchanged against Form-E1/E2 based on quarterly transactions. Seller/Contractor is required to submit his request in the format enclosed at Annexure-VI within 30 days from end of the Quarter, giving State-wise invoice details. In compliance with the notification No. CCW/CR-44-2013-14 dt. 29/04/2014 issued by Commercial Tax Dept., Govt. of Karnataka, vendors shall submit all the requisite documents within 10 days of dispatch for the purpose of issuance of 'C' forms. Timely issuance of 'C' form will depend on the compliance of this condition.

Note: In case of non-receipt of E1/E2 forms amount of differential tax payable by BHEL shall be to vendors' account. Submission of E1/E2 forms shall be ensured by Vendor within the time specified in sales tax act.

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4.2.5 For the purchase re-sold items, VAT invoices, in format prescribed by the respective State Sales Tax Act, have to be submitted in the name of Nodal Agency, if specified in Special Conditions of Contract.

4.3 **SERVICE TAX for Indigenous purchase**

4.3.1 Service Tax and Cess leviable on taxable services for the time being in force paid by the Service Provider /contractor to the Government authorities directly shall only be paid at actuals against documentary evidence of Service tax payment (Service Tax remittance challan) made to concerned Service tax authorities corresponding to the tax claimed in the previous invoice / RAB, but restricted to the rate and amount mentioned in the order/contract. The offer should clearly indicate the percentage and the total amount of service tax as well cess. Cess to be indicated as separate line item in invoice.

4.3.2 Service provider/Contractor to ensure their registration for “Intended Service” to be provided, before claiming Service tax under the “intended category”. Decision of BHEL shall be final w.r.t. the “Intended category” in which the service will be falling.

4.3.3 If required by the Purchaser, the Service Provider/Contractor will provide a certificate stating that “CENVAT Benefit has been availed of on the input and the same has been passed on to the purchaser” or “CENVAT Benefit has not been availed of on the inputs”.

4.3.4 Vendor shall comply with the Point of Taxation Rules, as contemplated under the Service Tax Rules. In case, the CENVAT credit could not be availed by BHEL within the time limit (statutory), due to delay in submission of invoice(s) or for any other reason(s) attributable to vendor(s)/contractor(s), liability towards the loss of such CENVAT credit shall be to the vendor(s)/contractor(s) account. TDS shall be made for IT as per Income Tax act.

4.4 **OTHER TAXES & LEVIES for Indigenous purchase**

All taxes and duties other than Excise Duty, Sales Tax/ VAT, Service Tax shall be deemed to be included in the Ex-Works prices unless specified otherwise by the bidder in the price bid. No variation in other taxes and duties shall be payable by Purchaser. However, statutory variation in Octroi will be payable extra against documentary evidence. Anti-dumping duty, if any, shall be in the account of bidder and shall be included in their price. No separate payment shall be made by BHEL for the same.

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4.5 **CUSTOMS DUTY for Indigenous purchase**

- 4.5.1 Customs Duty element for imported items as per Special Conditions of Contract shall be included in the Ex-Works prices. No variation in customs duty and exchange rate for imported items shall be payable by Purchaser.
- 4.5.2 Seller/Contractor shall arrange for his own import license, if required, since Purchaser will not provide any import license. Therefore, Seller/Contractor alone shall be responsible for any delay in getting import license or non-availability of the same or completion of other related formalities. Purchaser shall not be responsible for any financial liability, whatsoever, on this account.
- 4.5.3 Essentiality Certificate or Project Authority Certificate (PAC) as per Import Policy, if required to avail concessional customs duty, shall be clearly specified in the offer. Import content (CIF value in rupees) with list of items, quantity, foreign currency, country of origin etc., shall be submitted by the bidder as part of Price bid.

4.6 **DIRECT TAX for Indigenous purchase**

- 4.6.1 Purchaser shall not be liable towards income tax of whatever nature including variations thereof, arising out of this Order/Contract, as well as tax liability of the Seller/Contractor and his personnel.
- 4.6.2 Deductions of Tax at source at the prevailing rates shall be effected by the Purchaser before release of payment, as a statutory obligation, if applicable. TDS certificate will be issued by the Purchaser as per statutory provisions.

4.7 **FOREIGN PURCHASE - Imports**

The offered prices shall be inclusive of all the Taxes and duties as applicable in the country of bidder / country of dispatch for the quoted price as per incoterms (FOB/CFR/CIF/CPT etc.). Any variation in the same will be in sellers account.

5.0 **STATUTORY VARIATION for Indigenous purchase**

- 5.1 If the rates for taxes and duties in respect of the quoted materials and/or services assumed by the Seller/Contractor are less than the tariff prevailing at the time of tendering, Seller/Contractor will be responsible for such under quotations. However, if the rates assumed are higher than the correct rates prevailing at the time of tendering, the difference will be to the credit of the Purchaser.

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- 5.2 Statutory Variations in Excise Duty, Service Tax and Central Sales Tax/Value Added Tax only on self-manufactured items/services rendered by vendor himself on the rates prevailing at the time of delivery/ completion in comparison to the date of offer, will be to the account of the Purchaser. No other variations such as on customs duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the Purchaser.
- 5.3 Notwithstanding the above, where the actual completion of the supply occurs beyond the period stipulated in the Order/Contract or any extension thereof, variations referred to above, will be limited to the rates prevailing on the dates of such agreed completion periods only. For variations after the agreed completion periods, the Seller/Contractor alone shall bear the impact for the upward revisions and for downward revisions, purchaser shall be given the benefit of reduction in taxes/duties. This will be without prejudice to the levy of penalty for delay in delivery/completion schedule.
- 5.4 Any new tax structure (like Goods & Services Tax) as and when implemented by the Government shall become applicable in addition to or in lieu of existing tax structure.
- 6.0 PRICE BASIS:**
- 6.1 For Supply:**
- 6.1.1 Indigenous purchase** – Firm, till the completion of contract (or with PVC if specified in NIT). Ex-works, inclusive of packing & forwarding charges. Taxes, duties and freight to be paid in line clause no 4 above.
- 6.1.2 Foreign purchase:** Firm, till the completion of contract (or with PVC if specified in NIT). CFR/CPT/CIF/CIP Indian (air) port basis inclusive of testing, inspection, sea worthy packing & forwarding charges to be paid in line with GCC.
- 6.2 For E&C:**
- Firm till completion of the contract (or with PVC if specified in NIT). WCT if any, to be included in price. Service tax along with cess to be indicated separately and will be reimbursed at actuals. TDS shall be made for IT as per Income Tax act.
- 6.3 Prices shall remain Firm (or with PVC if specified in NIT) for any increase or decrease in the Order/Contract value (Ex-works) upto plus or minus 30% within contract period unless specified otherwise in NIT. The Purchaser shall have the right to increase or decrease quantities and scope upto the above extent of value and

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Seller/Contractor shall be bound to accept the same at the contracted prices without any escalation.

7.0 **DRAWING SUBMISSION & APPROVAL:**

Drawing submission & Approvals as per technical specification is the responsibility of the vendor.

8.0 **DELIVERY TERMS**

8.1 **Indigenous Purchase**

Goods shall be delivered on 'FOR Destination' basis to the named destination unless otherwise called for in the enquiry.

8.2 **Foreign Purchase - Imports**

8.2.1. Goods shall be dispatched by sea, unless stated otherwise in the enquiry or purchase order.

8.2.2. The goods shall be delivered on CFR basis to the ICD-BANGALORE unless specified otherwise in enquiry or Purchase order.

8.2.3 The quote should be inclusive of all charges, including testing, packing, inspection etc. Additionally ocean freight (LILO basis) for CFR, ICD BANGALORE shall also be quoted separately as per price format.

8.2.4. Goods shall be handled for ocean freight / air freight by BHEL's freight forwarder only, under FOB contracts and OBL / HAWB issued by BHEL appointed forwarder or his authorized agent(s) shall only be accepted for negotiation.

8.2.5 For CFR terms, shipped in Break Bulk/ Container, supplier shall quote the freight charges on LILO (LINER IN LINER OUT) basis. Alternately shipment by container is also acceptable and In such cases B/L should bear the endorsement that "14 free days for Container Detention is applicable" and it would be presumed by BHEL that the freight charges quoted is on LILO (LINER IN LINER OUT) basis including extra charges, if any, like Container Imbalance Charges, Trade Imbalance charges, Port congestion charges or any other charges payable to the Liner. No other charges other than the quoted Freight rate will be paid by BHEL excepting applicable Terminal Handling Charges, Container cleaning Charges, DO charges to Shipping Liner at Discharge Port.

8.2.6 In the event there is a delay by the Supplier in negotiating / submitting the document, any demurrage / wharfage arising out of the same shall be to the account of the Supplier and shall be deducted from the final payment. Also, in such cases, the Supplier shall authorize the Steamer / Shipping agent / transporter to freely release the consignment to BHEL by providing a "Surrender Bill of Lading". Over-seas Suppliers have to give a No-Objection Certificate to BHEL,

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authorizing BHEL to get the Delivery Order from the Steamer Agent without producing the Original Bill of Lading. This is required to ensure avoidance of incidence of demurrage that may arise in case of delayed presentation of documents by the Seller.

- 8.3 Delivery shall be staggered in the manner as indicated in the tender for each item. Vendors shall submit their offer accordingly.

9.0 TERMS OF PAYMENT

9.1 SUPPLY PACKAGES (Main Supply and Mandatory Spares)

9.1.1 For indigenous purchase

Hundred percent (100%) of basic price of materials supplied, as per PO, along with 100% taxes and duties (as applicable) & freight charges, shall be paid on pro-rata basis after 45 days from the date of receipt of goods & receipt of complete documents as per order/ contract subject to acceptance of materials.

9.1.2 For Foreign Purchase – Imports

Hundred percent (100%) payment on CAD basis after 45 days from the date of receipt of documents specified in PO at BHEL BANK. Respective bank charges to respective account.

9.1.3 PG TEST, INSTALLATION CHECK, SUPERVISION OF ERECTION / COMMISSIONING CHARGES

100% payment shall be released after successful completion of the activity.

Vendors shall submit documents for payment directly to BHEL. Payment will be released within 45 days after receipt of complete documents as per order/ contract.

Note:

- 1) For indigenous suppliers, if the documents are routed through Bank, then all bank charges will be to vendor's account.
- 2) Foreign bidders can opt for payment (less agency commission, if applicable) through irrevocable and unconfirmed letter of credit. In that case for evaluation purpose, prices of foreign bidders will be loaded on account of payment through LC, equal to loading specified against 'Payment through Bank' in Annexure-VIII. No loading will be done if foreign vendors agree for 75 days issuance LC or submit the documents on collection basis for payment within 75 days of submission of complete documents.

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3) LC opening/ negotiation/ confirmation charges will be to vendor's account.

4) Any negative PVC, if not adjusted in earlier payments, will be adjusted at the time of subsequent payment.

9.2 **DOCUMENTS TO BE SUBMITTED BY VENDOR**

9.2.1 **For Recognition of Dispatch**

Copy of the following documents by e-mail/ fax immediately on despatch:

- a. Invoice
- b. LR /BL/ AWB
- c. Packing List
- d. Insurance Intimation
- e. Dispatch Clearance

9.2.2 **For Claiming Payments (under clause 9.1.1, 9.2.1, 9.3.1): (under clause 9.1.1)**

- a. Original Excise Invoice & Duplicate for transporter - original+3 copies
- b. Consignee Copy of LR
- c. Packing List - clearly showing number of packages, gross weight and net weight. - original+3 copies
- d. MDCC from BHEL/ Customer - as per SCC - 4 copies
- e. Guarantee Certificate - Original + 3 copies
- f. Insurance Intimation - 4 copies
- g. PVC Calculation and copy of all applicable indices, if PVC applicable. - 4 copies
- h. Duty drawback documents (original excise invoice, original disclaimer certificate, original certificate from excise authority for payment of excise duty), if applicable. - original + 3 copies

It is the responsibility of the vendor to submit invoices along with documents required for effecting payment within the stipulated period mentioned in the applicable statute for this tender. Non-submission of invoices due to delay/reasons attributable to vendor resulting in / leading to loss of tax credit for BHEL will be into vendor's account.

(Under clause 9.1.2)

- a. Commercial Invoice - original+3 copies
- b. Original clean on board Bill of Lading or clean copy of OBL in case of Telex.
- c. Packing List - clearly showing number of packages, gross weight and net weight container wise also. - original+3 copies
- d. Delivery/ship/airplane schedule mentioning the estimated date of Arrival (ETA) at port & destination in case of CFR/CPT.

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- e. MDCC from BHEL/Customer – as per SCC – 4 copies
- f. Guarantee Certificate – Original + 3 copies
- g. Insurance Intimation - 4 copies
- h. PVC Calculation and copy of all applicable indices, if PVC applicable. – 4 copies
- i. Original Certificate of country of Origin issued by chamber of commerce.
- j. One set of original test certificates & O&M manual where called for.
- k. Fumigation certificate wherever cargo is packed in wooden packing or packing of plant origin material is used wherever called for.
- l. TUV/UL certificates where ever called for.

In case the Seller decides to negotiate all 3 originals of BL through negotiating Bank, non-negotiable documents (NND) consisting of copy of BL / HAWB & all originals at sl.no. 9.2.2 (Except OBL) will be couriered to Purchaser. Soft Copy of same documents at sl. 9.2.2 will also be sent by e-mail to the Purchaser at his e-mail address given in the PO with one copy to be mailed at ketan@bhelepd.com & rb@bhelepd.com. Other documents, as required, will be separately indicated in the Purchase Order.

Additional expenditure, if any, incurred by the Purchaser by way of detention / demurrage, resulting out of delay attributable to the Seller in providing negotiable documents, will be recovered from the Seller.

Note for 9.2.2 Additionally, vendor may furnish mfg clearance/drg/docs approval date etc. for the purpose of determining contractual delivery for expeditious processing of Invoices.

9.2.3 For Claiming Payment for Services involving Service Tax

- a. Invoice as per rule 4A of Service Tax Act – Original + 1 copy
- b. Copy of Service Tax registration certificate
- c. Copy of challan for Service Tax payment corresponding to service tax claimed in the previous invoice
- d. Certification for having carried out the work as applicable.

9.2.4 All your invoices against our order shall reach BHEL –EPD addressed to:
 HEAD OF DEPARTMENT/MATERIAL MANAGEMENT,
 BHEL – ELECTROPORCELAINS DIVISION,
 Opp. IISc, PROF. C N R RAO CIRCLE,
 MALLESWARAM, BANGALORE - 560 012

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- a. The envelope shall be super-scribed with P.O No. / W.O No., and the Bill / Invoice numbers & Contact person.
- b. Bills / invoices which are brought personally by vendors to EPD are to be dropped in the "BHEL-EPD vendor bills Box" kept near Tender Box at the Reception Office.
- c. Any additional tax implication to BHEL due to delay in submission of bills by Vendor beyond one month shall be to vendor's account.

9.8 **LOADING DETAILS IN CASE OF DEVIATIONS:-**

Loading details in respect to deviations in Payment Terms, LD, PVC indicated in Annexure – VIII.

9.9 **BHEL'S BANKERS**

List of the consortium bankers of BHEL-EPD is as per Annexure-X.

9.10 **MODE OF PAYMENT**

Payments shall be made directly to the Seller/Contractor by E-transfer. Seller/Contractor to provide necessary information for the same as per Annexure-VII.

- 9.11 No interest shall be payable by the Purchaser on the security amount, bank guarantee amount or balance payment or any money which may become due owing to difference or misunderstanding or any dispute between the Purchaser and the Contractor, or any delay on the part of Purchaser in making periodical or final payment or any other aspects incidental thereto.

10.0 **RECOVERY OF OUTSTANDING AMOUNT**

In event of any amount of money being outstanding at any point of time against the Seller/Contractor due to excess payment or any other reason whatsoever, in the present order/contract or any other order/contract from any BHEL Unit, the outstanding amount shall be recovered from the payments due to the Seller/Contractor or at any other appropriate time and manner/mode as deemed fit by the Purchaser at its sole discretion.

11.0 **CONTRACT PERFORMANCE BANK GUARANTEE**

- 11.1 No Bank Guarantee is required where original Order/ Contract value is up to Rs. 25 Lakhs (excluding taxes, duties and freight).
- 11.2 For original order / contract values above Rs. 25 Lakhs (excluding taxes, duties and freight), only if specified in SCC, the vendor shall submit Contract Performance

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Bank Guarantee within 10 days from the date of LOI/LOA (as per Annexure-IV) for 10% of Order/ Contract value (excluding taxes, duties & freight) to cover the due performance of Order/ Contract and to fulfill the guarantee conditions stipulated in the Order/ Contract. However, BG value can be proportionality reduced after completion of Guarantee period Unit-wise/ Lot-wise/ Set-wise, as applicable.

- 11.3 In case the order is to be placed in foreign currency, the BG must also be in foreign currency, so specified by the Purchaser. Foreign vendors seeking payment through Letter of Credit (LC) should submit the Bank Guarantee before LC opening.
- 11.4 Value of the Bank Guarantee (at the time of submission) shall remain unchanged for any subsequent variations in order/ contract value up to 20%. Beyond this, the Seller/ Contractor shall arrange to enhance or reduce the value of the Bank Guarantee accordingly.
- 11.5 Validity of the Bank Guarantee shall be for the entire Guarantee period + 3 months claim period. Initially, it should be at least 18 months + 3 months claim period, later extended to cover the entire guarantee period, two months before its expiry.
- 11.6 Purchaser reserves the right to encash the bank guarantee and forfeit the amount in the event of any default, failure or neglect on part of the Seller/ Contractor in fulfillment of performance of the Order/ Contract.
- 11.7 Equivalent amount shall be recovered from payment due to the Seller/ Contractor, before releasing any payment, in absence of a valid bank guarantee.
- 11.8 Bank Guarantees shall be from Consortium Bank as per Annexure-X. Bank guarantees from cooperative banks/ non-scheduled banks are not acceptable.
- 11.9 In case of private sector banks, a clause to be incorporated in the text of bank guarantee that it can be enforced by being presented at any branch of the bank located in Bangalore.
- 11.10 Two witness signatures from bank officials, other than the bank official who has already signed is a must. BG is to be submitted directly by the issuing bank to concerned purchase officer, under registered post (A/D).
- 11.11 The Bank Guarantee to be provided in the hard and not in the SFMS format". Our bank details are as follows:

Name of Site/division: BHEL EPD

Name of Bank: IDBI BANK, SPECIALIZED CORPORATE BRANCH

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Branch Address: 102, SHAKTHI COMFORT TOWER,
KH ROAD, BANGALORE- 560027
PH NO 67121025
KIND ATTN: Mr. MANMOHAN SOMA
ALT: Mrs. VP SHIVA SHAKTI
PH NO 67121059.
Branch IFSC Code: IBKL0000377
Account No: 008103000003605

- 11.12 Wherever the contract is for supply of Goods processed on labour basis from BHEL supplied materials, the materials shall be issued against a suitable Bank guarantee as specified in the Enquiry.

12.0 GUARANTEE FOR PLANT/ EQUIPMENT/ STORES

- 12.1 Seller/ Contractor shall warrant that the stores supplied shall be free from all defects and faults in design & engineering, material, workmanship & manufacture and shall be of the highest grade and consistent with the established and generally accepted standards and in full conformity with the Order/ Contract specifications, drawing or samples, if any.
- 12.2 Guarantee period for **Supply** shall be eighteen (18) months from the date of last dispatch or as per SCC whichever is later.
- 12.3 All replacements and repairs during the guarantee period shall be delivered and completed promptly and satisfactorily within a period of one months from the time of reporting the defect/ loss/ rejection etc or any mutually agreed period without prejudice to purchaser's other legal rights. If the Seller/ Contractor so desires and the Purchaser agrees, subject to import control regulations, the replaced parts can be taken over by Seller/ Contractor or his representative or can be dispatched at Seller/ Contractor's cost. No claim, whatsoever shall be entertained by Purchaser on account of such replaced parts.
- 12.4 All the replaced and replenished stores shall also be guaranteed as per above clauses.
- 12.5 Decision of Purchaser with regard to Seller/ Contractor's liability and the amount involved, if any, payable by Seller/ Contractor under the guarantee shall be final, conclusive and binding. However, vendor's maximum liability will be limited to the total contract value including taxes, duties and freight.

13.0 DELIVERY / COMPLETION SCHEDULE

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13.1 Supply of plant/equipment/stores shall not be considered complete until they have been inspected and accepted at the place and destination specified for delivery by the time stipulated under the terms & conditions of the Order/Contract. Mere payment by itself shall not constitute acceptance of the goods or materials in any manner, whatsoever.

13.2 Vendor shall strictly adhere to delivery schedule. In case of non compliance to agreed schedules / milestones, then it would be presumed that vendor / contractor is not fulfilling contractual obligations. BHEL reserves the right to take suitable action like operating "Risk & cost clause".

14.0 INSPECTION AND TESTING AT CONTRACTOR'S PREMISES

14.1 Purchaser's nominated Inspection Agency shall have at all reasonable times access to Seller/ Contractor's premises or works and shall have the power at all reasonable times to inspect drawings of any portion of the work or examine the materials and workmanship of the stores during their manufacture, and if part of the stores is manufactured at other premises, the Seller/Contractor shall arrange for inspection, examination and testing by the Inspection Agency as if the store is manufactured on the Seller/Contractor's premises.

Inspection calls should be given adequate notice of one week or as mutually agreed period in advance in writing to the purchaser about the date & place where goods will be ready for inspection & testing, as provided for in the contract.

Such inspection, examination and testing by itself shall not relieve the Seller/Contractor from any obligation under the Order/Contract.

14.2 Seller/Contractor shall give Inspection Agency reasonable notice of any material being ready for testing and the Inspection Agency shall (unless the inspection of tests is voluntarily waived) attend at the Seller/Contractor's premises within fifteen (15) days of the date on which the material is notified as being ready. All standard shop tests, physical and chemical tests required by the standards or as may be prescribed or approved as per Order/ Contract shall be conducted by the Seller/Contractor. Purchaser/Inspection Agency reserves the right to waive any of the above tests requirements and to prescribe new tests, if found necessary, to complete the work so as to conform to the best practices. Seller/Contractor shall forthwith forward to the Inspection Agency, duly certified copies of the test certificates in quadruplicate, for approval. Further copies of the shop test certificates shall be bound with the instruction manuals referred to in "Seller/Contractor's documents, drawings and instruction manuals".

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14.3 Where the Order/Contract provides for tests/inspections at the premises or works of the Seller/Contractor or any sub-contractor, the Seller/Contractor, except specified otherwise, shall provide free of charge such assistance, labour, materials, electricity, fuel, water, stores, apparatus, measuring instruments and test equipment including any other facilities as may be reasonably required to carry out such tests efficiently. In case of inspection by BHEL or BHEL CUSTOMER, the cost of to & fro passage and boarding & lodging shall be borne by purchaser/customer, unless otherwise specifically agreed. In case of foreign vendors the cost of third party inspection, where called for shall be deemed to be included in the quoted price.

14.4 Inspection calls shall be addressed to BHEL-EPD Purchase Department irrespective of inspection categories.

14.5 INSPECTION MEASURING AND TEST EQUIPMENTS

14.5.1 Inspection Measuring and Test Equipments (IMTE) whether used by the Seller/Contractor or sub-contractor shall be calibrated, maintained and controlled. Calibration shall be valid and IMTE maintained in sound condition during usage.

14.5.2 In addition to above, Seller/ Contractor shall ensure the following :

- a) Measurement uncertainty is known and consistent with required measurement capability of the IMTE.
- b) Selection of IMTEs is compatible with the necessary accuracy and precision of required measurement.
- c) IMTEs are calibrated at the required intervals against certified equipments having known valid relationship to nationally recognized standards, at recognized calibration labs.
- d) Calibration records are available and traceable to the particular IMTE.
- e) In case, during recalibration, the IMTE is found out of calibration, report on action taken to validate the previous results along with both calibration records of the IMTE to be furnished to Inspection Agency.
- f) IMTEs are stored, handled and preserved such that accuracy and fitness are maintained and safeguarded from adjustments.

NOTE: Purchaser's decision on acceptability of the product in such cases shall be binding.

14.5.3 Responsibility of usage of valid and calibrated IMTEs by his sub-contractor(s) shall be of the Seller/ Contractor.

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14.5.4 In case, calibration records are required by purchaser, copies of the same shall be furnished.

14.6 Seller/Contractor shall be fully responsible for the Quality of products supplied by sub-contractors.

15.0 MATERIAL DESPATCH CLEARANCE CERTIFICATE (MDCC)

15.1 When the tests have been satisfactorily completed at Seller/Contractor's works, the Inspection Agency shall issue a certificate to that effect within fifteen (15) days after completion of the tests, but if the tests were not witnessed by the Inspection Agency or his representative, the certificate would be issued within fifteen (15) days after receipt of the test certificates by the Purchaser.

15.2 Purchaser/Owner will issue MDCC to the Seller/Contractor based on inspection report/ test certificates.

15.3 No item / equipments shall be dispatched without obtaining Material Dispatch clearance certificate from BHEL-EPD Purchase Department irrespective of inspection categories.

15.4 Satisfactory completion of tests or issue of MDCC shall not bind the Purchaser/Owner to accept the supply/ equipment should it, on further tests after erection, be found not to comply with the contract provisions.

16.0 DELIVERY FAILURE AND TERMINATION/LIQUIDATED DAMAGES

16.1 Timely dispatch/delivery and completion of other schedules as stipulated in Order/Contract shall be the essence of Order/Contract. If the Seller/Contractor fails to complete the dispatch/delivery and other schedules within the time period stipulated in Order/Contract, or within any extension of time granted by Purchaser, it shall be lawful for Purchaser to recover damages for breach of Order/Contract without prejudice to any other rights and/or remedies provided for, in the Order/Contract and hereunder. For any delay not attributable to the Seller/Contractor, the Seller/Contractor must report the same to Purchaser immediately.

16.2 DELAYED DELIVERY

16.2.1 Purchaser reserves the right to recover from the Seller/Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½) percent of the total contract price per week or part thereof, subject to a maximum of ten (10) percent of the total contract price excluding elements of taxes, duties and freight, if

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the Seller/ Contractor fails to deliver ordered stores within the period stipulated in the Order/Contract.

However, In case of staggered delivery schedule, the LD shall be half (1/2) percent of the undelivered portion per week or part thereof, subject to a maximum of ten (10) percent of the contract price **excluding** elements of taxes, duties and freight, if the Seller/ Contractor fails to deliver any part of the ordered stores within the period stipulated in the Order/Contract.

NOTE:

1. LR/ RR date for indigenous supplies and AWB/ BL date for FOB/CIF/CIP/CFR/CPT contracts shall be treated as the date of dispatch for levying LD as per Clause 16.
2. In case of any amendment/revision, LD shall be linked to the amended/revised contract value and delivery date(s).
3. If Order/ Contract involves two or more Units/ Sets/ Lots, then Liquidated Damages shall be for order/ contract value of the delayed Unit/ Set/ Lot, provided delivery stipulated in the Order/ Contract is Unit/ Set/ Lot wise, however total LD amount shall be limited to 10% of total order value. (excluding taxes, duties and freight)

16.2.2 Purchaser reserves the right to purchase from elsewhere on account of and at the risk and cost of Seller/Contractor, with notice to Seller/Contractor, the stores due for delivery but not so delivered, or their equivalent without cancelling the Order/Contract in respect of stores not yet due for delivery. The manner and method of such purchase shall be at the discretion of the Purchaser. The actual excess cost incurred for such purchases will be recovered from the bidder.

16.2.3 Purchaser reserves the right to cancel the Order/Contract or a portion thereof for the stores not so delivered at the risk and cost of the Seller/Contractor and the Seller/Contractor shall be liable to the Purchaser for any excess cost thereof. The actual excess cost incurred for such purchases will be recovered from the bidder.

16.2.4 Seller/Contractor shall continue performance of the Order/Contract, under all circumstances, to the extent not cancelled.

17.0 INSURANCE

17.1 Insurance shall be arranged by BHEL.

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17.2 Vendors shall inform the Underwriters, appointed/ nominated by BHEL/ Purchaser, the details of dispatches under intimation to BHEL such as LR No./BL/AWB and date, Truck No./vessel details/flight details, P.O. No. and value.

17.3 Insurance as applicable for field work such as third party liability, workmen compensation, Seller/Contractor's own Tools & Plants and automobile shall be arranged by the Seller/ Contractor.

18.0 INTER-CHANGEABILITY AND CHANGES

18.1 All similar components or parts of similar equipment supplied by Seller/Contractor shall be interchangeable with one another.

18.2 Even though all the work and materials necessary for satisfactory completion of the works may not be detailed in the specifications and schedules, the cost will be considered to be within the contract price and no extra charges shall be payable. However, if there are substantial changes in the specifications of the stores/plant, consequential changes in prices shall be mutually agreed between Purchaser and Seller/Contractor.

19.0 PACKING AND DISPATCH MARKING

19.1 Packing shall be in conformity with specifications and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage.

19.2 In case of shipment by sea, the packing shall be sea-worthy and of international standards.

19.3 Packing List shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate:-

- a) Packing size.
- b) Gross weight and net weight of each package.
- c) Contents of the package with quantity of each item separately.

19.4 The number of each package in a shipment shall be shown in fraction, numerator showing number of the package and the denominator showing total number of packages in a lot I consignment. The packages number shall be generally prepared in the sequence in which they will be required for erection.

19.5 Each package delivered under the Contract shall be marked by and at the expense of the supplier and such marking must be distinct and in English language (all previous irrelevant markings being carefully obliterated). Such marking shall

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show the description and quantity of contents, the name and address of consignee. the gross weight and net weight of the package, the name of the Contractor with a distinctive number of mark sufficient for purposes of identification. All markings shall be carried out with such materials as to ensure quickness of drying. fastness and indelibility. Each equipment or parts of equipment shall, when shipped or railed or otherwise dispatched be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the Contractor, the number and date of contract and the name of the office placing the contract, nomenclature of the stores and include a schedule of parts for each complete equipment giving the part numbers with reference to the assembly drawing and the quantity of each part, drawings nos. and tag numbers.

- 19.6 Besides wherever necessary, packing shall bear a special marking " TOP", " BOTTOM", "DO NOT TURN OVER", "KEEP DRY", "HANDLE WITH CARE".etc.
 - 19.7 All packing cases, containers (excluding marine container), packing and other similar materials shall be new.
 - 19.8 Notwithstanding anything stated in this clause, the Contractor shall be entirely responsible for loss, damage or depreciation or deterioration to the materials & supplies due to faulty and/or insecure packing.
 - 19.9 Each and every package box shall be marked with the following, as a minimum:
 - (i). Name and address of Consignee:
 - (ii). Project reference:
 - (iii). Contract No.:
 - (iv). Packing No.: (1110. 2110, 3110 when there are 10 packages For one consignment)
 - (v). Net Weight/Gross Weight:
 - (vi). Port of Loading:
 - (vii). Destination Port
 - (viii). Packing Mark: [symbols indicating "TOP" and other special markings as indicated above.
 - (ix). Type of Equipment:
- "E" (for Equipment supply)

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"T" (for Tools & Tackles)

"S" (for Mandatory Spares)

19.10 PACKING FOR SPARES

19.10.1 The commissioning spares shall be properly packed separately in separate box and each spare shall be properly tagged giving details (to match the description given in the packing slip) to facilitate their proper identification. Three copies of packing list is to be kept inside the box and one copy in a special packet at the outer side of the Box.

19.10.2 The Mandatory spares shall be properly packed separately in separate box indicating Mandatory Spares in bold letters and each spare shall be properly tagged giving details i.e. item number of the equipment in line with the Ultimate Customer/Owner Contract & Number per item (to match the description given in the packing slip) to facilitate their proper identification by ultimate Customer/Owner. Three copies of packing list along with Manufacturing drawing no. Reference. Catalogue reference etc. is to be kept inside the box and one copy in a special packet at the outer side of the Box.

20.0 STORAGE INSTRUCTIONS

Successful tenderer shall be required to submit detailed instructions for storage of supplies within two weeks of date of issue of LOI/ Order/ Contract.

21.0 MATERIAL/GOODS RECEIPT CERTIFICATE

Seller/Contractor shall arrange Material/Goods Receipt Certificate from the consignee, duly signed by Purchaser/Owner Site Engineer after receipt & physical verification of the material, wherever E&C is in the scope of Seller/ Contractor.

For Supplies, Material/Goods Receipt Certificate shall be arranged by BHEL. Vendor to provide copy of receipted LRs to enable BHEL to obtain MRC from site.

22.0 CONSIGNEE'S RIGHT OF REJECTION

22.1 Notwithstanding any approval of Purchaser or Engineer in respect of stores or materials or other particulars or work or workmanship involved in performance of order/contract (with or without any test carried out by Seller/Contractor or Inspection Agency or under direction of Contract Engineer), and notwithstanding delivery of the stores where so provided to the consignee, it shall be lawful for the consignee, on behalf of the Purchaser, to reject the stores or any part/ portion of consignment thereof, within 30 days after actual delivery at the stipulated place or

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destination, if such stores or part/ portion of consignment thereof is not in conformity with terms and conditions of order/contract whether on account of any loss, storage, deterioration or damage before despatch or otherwise, whatsoever.

- 22.2 Rejected goods or materials shall be removed by Seller/Contractor within a period of 15 days from the date of receipt of notice of such rejection. The expenses to be incurred in respect thereof shall be borne entirely by the Seller/Contractor.

23.0 RISK IN STORES (FOR E&C CONTRACTS)

Seller/ Contractor shall perform the order/ contract in all respects in accordance with terms and conditions thereof. Stores and every constituent part thereof, whether in possession or control of the Seller/Contractor, his agents or servants, or a carrier, or in joint possession of Seller/ Contractor, his agent or servants and Purchaser, his agents or servants, shall remain in every respect at the risk of Seller/Contractor until their actual delivery to consignee at the stipulated place or destination or where so provided in acceptance of offer, until their delivery to a person specified by Purchaser as interim consignee for the purpose of despatch to the consignee. Seller/Contractor shall be solely responsible for all losses, destructions, damages or deterioration to the stores from any cause whatsoever, while the stores await dispatch after approval by the Inspection Agency.

24.0 SHORTAGES/DAMAGES

24.1 FOR SUPPLY PACKAGES

- a) Shortages in sound cases shall be replenished free of cost by the vendor, as early as possible.
- b) For shortages/damages during transit/ handling at site, vendor shall supply replacements, as early as possible, at the old contractual rates upon intimation to vendor within one months of receipted LR.

24.2 FOR E&C PACKAGES

Any shortages or damages during unloading and handling at site, including at the time of erection and commissioning, shall be made good by the Seller/ Contractor at his risk and cost, to meet the project schedule. In case of faults/discrepancies in any material, component, sub-assembly, assembly, etc., the same shall be supplied/replenished free of cost to enable the equipment to be put to service.

25.0 CONFIDENTIALITY

Seller/Contractor shall, at all times, undertake to maintain complete confidentiality of all data, information, software, drawings & documents, etc. belonging to the

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Purchaser and also of systems, procedures, reports, input documents, manuals, results and any other company documents discussed and/or finalised during the course of execution of order/contract.

26.0 DEFAULT/BREACH OF CONTRACT, INSOLVENCY AND RISK PURCHASE

- 26.1 If Seller/Contractor fails to deliver goods or materials or any installment thereof within the period(s) fixed for such delivery or delivers goods or materials not of the contracted quality and failing to adhere to the contract specifications or at any time repudiates or otherwise abandons the contract before expiry of such period or refuses or is unable to supply goods or materials covered by the Order/Contract either in whole or in part or otherwise fails to perform the Order/Contract or commits any breach of Order/Contract not herein specifically provided for or in the event of the death or insanity or if the Seller/Contractor being an individual or if a firm on a partnership thereof, shall at any time, be adjudged insolvent or shall have a receiving order for administration of his estate made against him or shall take any proceeding for composition under any Insolvency Act for the time being in force or make any assignment of the Order/Contract or enter into any arrangement or composition with his creditors or suspend payment or if the firm is dissolved under the Partnership Act or if the Seller/Contractor being a company is wound up voluntarily or by order of a Court or a Receiver, Liquidator or Manager on behalf of the debenture holders and creditors is appointed or circumstances shall have arisen which entitles the Court of debenture holder and creditors to appoint a receiver, liquidator or manager, the purchaser without prejudice to his right to recover any expenses, losses or damages to which the Purchaser may be put to incur or sustain by reason of Seller/Contractor's default or breach of Order/Contract, Purchaser shall be entitled to cancel the Order/Contract either in whole or portion thereof without compensation to Seller/Contractor and if the Purchaser so desires, may procure upon such terms and in such manner as deemed appropriate, stores not so delivered or others of similar description where stores exactly complying with particulars are not, in the opinion of the Purchaser, which shall be final, readily procurable, at the risk and cost of the Seller/Contractor and the Seller/Contractor shall be liable to the Purchaser for any excess costs provided that the Seller/Contractor shall continue the performance of the Order/Contract to the extent not cancelled under the provisions of this clause. The Seller/Contractor shall on no account be entitled to any gain on such repurchases.

Except for Clause 26.2, vendor's maximum liability will be limited to the total contract value including taxes, duties and freight.

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- 26.2 Recovery on account of purchases made by Purchaser at the risk and cost of Seller/ Contractor shall be worked out as follows:

Excess of new purchase cost over old purchase cost, where the total value of new PO is more than total value of old PO.

27.0 TERMINATION OF CONTRACT

- 27.1 Purchaser shall have the right to cancel Order/Contract, wholly or in part, in case they are obliged to do soon account of any decline, diminution, curtailment or stoppage of their business and in that event, the Seller/Contractor compensation claim shall be settled mutually.
- 27.2 Purchaser shall have the right to cancel order/contract at the risk and cost of Seller/Contractor in case either the Seller/Contractor himself or any of his representative or agent is found to have been a previous employee of the Purchaser immediately before retirement and has within a period of two years of such retirement accepted the employment of the Seller/Contractor either as a Seller/Contractor or as an employee without having obtained prior permission of Purchaser.
- 27.3 In case of cancellation of main supply order/ contract, all other associated orders/ contracts like mandatory spares/ recommended spares/ E&C/ supervision of E&C would also get cancelled.

28.0 TRANSFER, SUB-LETTING/ASSIGNMENT/SUB-CONTRACTING

- 28.1 Seller/Contractor shall not sublet, transfer or assign order/contract or any part thereof or interest therein or benefit or advantage thereof save without the prior consent in writing of Purchaser. In the event of Seller/Contractor sub-letting, transferring or assigning order/contract or any part thereof or interest therein or benefit or advantage thereof without such permission, the Purchaser shall be entitled to cancel the Order/Contract and to purchase the stores from elsewhere at risk and costs of Seller/Contractor and the Seller/Contractor shall be liable for any loss or damage which Purchaser may sustain in consequence of or arising out of such risk purchase.
- 28.2 If Seller/Contractor is an individual or proprietary concern and the individual or the proprietor dies or the partnership is dissolved or substantially affected, then unless the Purchaser is satisfied that legal representative of individual seller/contractor or proprietor of proprietary concern and surviving partners of partnership firm are capable of carrying out and completing the order/contract, the Purchaser shall be entitled to cancel the order/ contract as to its incomplete portion

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and without being in any way liable to payment of any compensation to estate of seller/contractor and/or to surviving partners of seller's/contractor's firm on account of cancellation of the order/contract.

28.3 Decision of Purchaser that legal representatives of deceased seller/contractor or surviving partners of the seller's/contractor's firm can not carry out and complete the order/contract shall be final and binding on the parties hereto.

28.4 Terms and Conditions shall not get affected in case of merger/amalgamation/takeover/re-arrangement etc.

29.0 FORCE MAJEURE

29.1 Notwithstanding anything contained in Clause 13.0, if at any time during the continuance of the Order/Contract, the performance in whole or in part by either party of any obligations under the Order/Contract shall be prevented or delayed by reason of any war hostilities, acts of the public enemy, restrictions by Govt. of India, civil commotion, sabotage, fires, floods, explosion, epidemics, quarantine restrictions, strike, lock-outs, or acts of God (hereinafter referred to as 'event'), then, provided notice of the happening of such event is given by either party to the other within fifteen (15) days from the date of occurrence thereof, neither party shall by reason of such event be entitled to terminate the Order/Contract nor shall have any claim for damages against each other in respect of such non-performance and delay in performance. Performance under the Order/Contract shall be resumed immediately after such event has come to an end or ceased to exist and decision of Purchaser as to whether the deliveries have to be resumed or not shall be final, conclusive and binding on the parties hereto.

29.2 In the event of the parties hereto not able to agree that a force majeure event has occurred, the parties shall submit the disputes for resolution pursuant to the provisions hereunder, provided that the burden of proof as to whether a force majeure event has occurred shall be upon the party claiming such an event.

29.3 Notwithstanding the above provisions, Purchaser shall reserve the right to cancel the Order/Contract, wholly or partly, in order to meet the overall schedule and make alternative arrangements for completion of delivery and other schedules.

30.0 INDEMNIFICATION

Seller/Contractor shall fully indemnify and keep indemnified the Purchaser against all claims of whatsoever nature arising during the course and out of the execution of this Order/Contract.

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31.0 SETTLEMENT OF DISPUTES

- 31.1 Except as otherwise specifically provided in the Order/Contract, all disputes concerning questions of the facts arising under the Order/Contract, shall be decided by Purchaser, subject to written appeal by the Seller/Contractor to the Purchaser, whose decision shall be final.
- 31.2 Any dispute or difference shall be, to the extent possible, settled amicably between the parties hereto, failing which the disputed issues shall be settled through arbitration.
- 31.3 Seller/Contractor shall continue to perform the order/contract, pending settlement of dispute(s).

32.0 ARBITRATION & CONCILIATION

- 32.1 Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the parties, in respect of any dispute 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, 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 Unit/Region/Division issuing the Contract.
- 32.2 The Arbitrator shall pass a reasoned award and the award of the Arbitrator shall be final and binding upon the parties.
- 32.3 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 per the award of the Arbitrator.
- 32.4 Subject to the arbitration in terms of Clause 32.0 above, the Courts at **Bangalore** shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.
- 32.5 Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this contract with due diligence and expedition in a professional manner except where the contract has been terminated by either party in terms of this Contract.

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32.6 In case of contract with public sector enterprise (PSE) or a government Department, the following shall be applicable:

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.”

33.0 LAWS GOVERNING THE CONTRACT

Contract, including all matters connected with contract, shall be governed by the Indian Law, both substantive and procedural, for the time being in force including modification thereto, and shall be subject to the exclusive jurisdiction of the Indian courts at Bangalore.

34.0 JURISDICTION OF COURT

Courts at Bangalore shall have exclusive jurisdiction to decide the dispute, if any, arising out of or in respect of the contract(s) to which these conditions are applicable.

35.0 ORDER OF PRECEDENCE

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

1. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL.
2. Notice Inviting Tender (NIT)
3. Price Schedule

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4. Special Conditions of Contract (SCC)
5. Technical specification & scope of work
6. General Conditions of Contract (GCC)

36.0 SUPPLIER PERFORMANCE MONITORING AND RATING SYSTEM

Seller/Contractor's performance will be evaluated as per Supplier Performance Monitoring and Rating System of BHEL. Please refer BHEL website www.bhel.com for details.

37.0 DEALING WITH BANNED SUPPLIERS/ CONTRACTORS IN BHEL

Offers of the bidders who are on the banned list, as also the offers of the bidders who engage the services of the banned firms, shall be rejected. The list of banned firms is available on BHEL website www.bhel.com.

ANNEXURE No.	DESCRIPTION
I	OFFER SUBMISSION AS PER NIT
II	DEVIATION SHEET COST OF WITHDRAWAL)
III	DECLARATION
IV	CONTRACT PERFORMANCE BANK GUARANTEE
V	GUIDELINES FOR FOREIGN SUPPLIERS AND INDIAN AGENTS OF FOREIGN SUPPLIERS
VI	REQUEST FOR ISSUE OF FORM-C
VII	NEFT DETAILS
VIII	LOADING CRITERA
IX	INTEGRITY PACT
X	LIST OF CONSORTIUM BANKS
XI	REVERSE AUCTION GUIDLINES
XII	NO DEVIATION FORMAT
XIII	AUTHORISED SIGNATORY
XIV	FORMAT FOR POWER OF ATTORNEY
XV	RAB FORMAT FOR E&C
XVI	INDEMNITY BOND
XVII	CONSORTIUM AGREEMENT
XVIII	VENDOR PARTICULARS & LOGISTICS INFORMATION
XIX	NON DISCLOSURE AGREEMENT
XX	

ANNEXURE-I

(To be filled up by the Bidder)

Ref. No.:

Date :

M/s Bharat Heavy Electricals Ltd.,
Electroporcelains Division
Prof. CNR Rao Circle
Malleshwaram
Bangalore - 560012

Attention : Shri

Dear Sir,

1 Having examined the tender documents against your tender Enquiry No _____ dated _____ and having understood the provisions of the said tender documents and having thoroughly studied the requirements of BHEL related to the work tendered for, in connection with _____ (name of work & project site), we hereby submit our offer for the proposed work in accordance with terms and conditions mentioned in the tender documents, at the prices quoted by us in your price schedule format and as per the indicated delivery schedule.

2. If the work or any part thereof is awarded to us, we undertake to submit security-cumcontract performance bank guarantee as per your requirement.

3. We have annexed to this tender the following documents:-

Part-I (Techno Commercial Bid) - in a properly sealed cover (uploaded in website in case of e-procurement).

- a) Complete Techno-Commercial Offer.
- b) Un-priced copy of deviation sheet (cost of withdrawal) – Annexure-II
- c) Un-priced copy of Price Schedule using format given by BHEL.
- d) Any other documents (please specify).

Part-II (Price Bid along with Priced Annexure-II) - in a separate, properly sealed cover, in the format given by BHEL (uploaded in website in case of e-procurement).

Thanking you,

Yours faithfully,

(Signature of the bidder with Name, Designation and Company's Seal)

ANNEXURE - III

DECLARATION

It is hereby declared that the original/ revised* price bid for _____

_____ (Name of Package) for _____ project is complete in all respects and contains prices for complete scope of supply, including tests etc., as per BHEL's requirement. If in the original/ revised* price bids where itemized price is not available for any part of scope of supply, including tests etc. for completion of the package, the same should be treated to have been included in our original/ revised* price bid.

It is also agreed that no further chance for seeking clarification/ confirmation to any missing point will be necessary.

Absence of itemized prices against some items does not mean that they are not included. Even though itemized prices are given for major items, those items which are not specially shown, are also included to meet the entire system as per BHEL requirements.

Signature of authorized Representative Name
and Designation:

Name & Address of the Bidder

Date

Forwarded to:

BHARAT HEAVY ELECTRICALS LTD

Electroporcelains Division

Prof. CNR Rao Circle

Malleshwaram

Bangalore - 560012

* (Please delete whichever is not applicable)

ANNEXURE - IV

PROFORMA OF PERFORMANCE BANK GUARANTEE
(FOR INDIEGNOUS PURCHASE ORDERS)

Note: 1) To be executed in Rs 100/- Non-Judicial stamp paper.
2) To be submitted to Purchase Dept. directly by the Banker

PERFORMANCE GUARANTEE
(PROFORMA OF BANK GUARANTEE)

THIS DEED OF GUARANTEE made and executed on the _____ day of _____(month) _____(year), by the _____ (Bank), registered under the Companies Act 1956/Nationalised Bank constituted under the Banking Companies (acquisition and transfer of undertakings) Act/ constituted under the State Bank of India Act / Subsidiary Banks Act, having its registered / head office at _____ (Hereinafter called 'guarantor ' which term shall mean and include its successors and assigns)

IN FAVOUR OF BHARAT HEAVY ELECTRICALS LIMITED

a company registered under the companies Act, 1956 having its registered office at BHEL House at Siri Fort , New Delhi-100 049 and its Electroporcelains Division at Malleswaram, Bangalore-12 (hereinafter referred to as the 'Company' Which term shall include its successors and assigns):

Whereas the company has placed an order on _____ (State the name of the Seller- company / firm and its address) (hereinafter referred to as the 'Supplier' which term shall mean and include its liquidators, successors and assign) for the supply of system under Purchase Order No _____ Dt _____.

AND WHEREAS the supplier has agreed to supply the materials and carryout the works as detailed and in accordance with the terms set out in the said order.

AND WHEREAS the Contract inter-alia provides that the SUPPLIER shall furnish to the Company a sum of Rs..... (Rupees.....) towards security deposit for due and faithful performance of the CONTRACT in the form and manner specified therein.

AND WHEREAS the SUPPLIER has approached the GUARANTOR and in consideration of the arrangement arrived at between the SUPPLIER and the GUARANTOR, the GUARANTOR has agreed to give the Guarantee as hereinafter mentioned in favour of the

COMPANY.

NOW THIS DEED WITNESSES THAT in pursuance of the above said agreement, the guarantor hereby agrees and covenants with company is as follows :-

- 1) That during the period this contract of Guarantee remains effectual, the guarantor shall be liable in respect of the amount due and owing to the company in respect of the payments to the extent of Rs _____ (in words) _____ against any loss or damage caused to or suffered by the company by reasons of any breach of the terms of the said Purchase order by the supplier.
- 2) The Guarantor hereby undertakes to pay the amounts due and payable under this guarantee without any demur, merely on demand from the company intimating that the amount claimed is due by way of loss or damage caused to or suffered or would be caused or suffered by the supplier of any terms contained in the said Purchase order. Any such demand made on the guarantor shall be conclusive as regards the amount due and payable by the Guarantor irrespective of the fact whether the Supplier admits or denies.
- 3) The Guarantor further agrees that the agreement herein contained shall remain in force and effect till all the supplies to be made / Works to be performed / Services to be rendered under the said Purchase order are completed to the entire satisfaction of the company or till company certifies that the terms and conditions of the said order have been fully and properly carried out by the said supplier and accordingly discharges the Guarantee. Unless a demand or claim under this guarantee is made on the guarantor in writing on or before the expiry of claim period indicated in clause 6 below , the guarantor shall be discharged from all the liability under this guarantee thereafter.
- 4) The guarantor further agrees with the company that the company shall have the fullest liberty without the consent of the guarantor and without effecting in any manner the obligations of the guarantor hereunder to vary any of the terms of the said order or extend the time of performance by the said supplier from time to time or refrain from exercising the power exercisable by the company against the said supplier or to forebear or omit to enforce any of the terms and conditions relating to the said order, and the guarantor shall not be relieved of its liability in whole or in part , by reason of any act, commission or forbearance on the part of the company or by reason of any such variation, or extension being granted to the said supplier or by reason of any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving the guarantor.
- 5) The guarantor undertakes not to revoke this guarantee during the period it is in force except with the previous consent of the COMPANY in writing, and agree that any liquidation or winding up or dissolution or any change in the constitution of the

SUPPLIER or the GUARANTOR shall not discharge the GUARANTOR's liability hereunder.

- 6) Notwithstanding anything herein above contained, the liability of the guarantor under these presents is restricted to Rs_____. The guarantee shall be in force till its expiry on _____. Unless a demand is made on the guarantor within THREE months from the date of expiry, all the liability of the guarantor under this guarantee shall stand fully discharged. The decision of the claimant in regard to breach of contract is final and binding on the Bank.

(Seal of the Bank to be affixed)

NOTES: (NOT TO BE TYPED)

1. A minimum of TWO Bank Official Signatories
2. Signatories to sign on all pages of the Bank Guarantee
3. Any correction to be validated by the Banker Signatories
4. One common e-mail ID of issuing branch and e-mail & contact no of at least one issuing official should be provided on PBG forwarding letter.

ANNEXURE - V

FOREIGN SUPPLIERS & INDIAN AGENTS OF FOREIGN SUPPLIERS

1. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods/ services. However, if the foreign Principal desires to avail the services of an Indian Agent, then the foreign Principal should ensure compliance to regulatory guidelines – which require mandatory submission of an Agency Agreement.
2. 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.
3. An Indian Agent of foreign Origin Equipment Manufacturer (OEM)/ 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.
4. The Agency Agreement should specify the precise relationship between the foreign OEM/ Principal and their Indian Agent, and their mutual interest in the business. All services to be rendered by the 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/ Principal, whether as commission or as 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.
5. Any agency commission to be paid by BHEL to the Indian Agent shall be in Indian currency only.
6. Tax deduction at source is applicable to the agency commission paid to the Indian Agent as per the prevailing rules.
7. In absence of any Agency Agreement, BHEL shall not deal with any Indian Agent (authorized representative/ associate/ consultant, or by whatever name called) and shall deal directly with the foreign OEM/ Principal only for all correspondence and business purposes.
8. In a tender, either the Indian Agent on behalf of the foreign OEM/ Principal or foreign OEM/ Principal itself can bid but both cannot bid simultaneously for the same item/ product in the same tender.
9. If an Agent submits bid on behalf of one OEM/ Principal, the same Agent shall not submit a bid on behalf of another OEM/ Principal in the same tender for the same item/ product.
10. The "Guidelines for Indian Agents of Foreign Suppliers" at Annexure-A shall apply in all such cases.
11. The supply and execution of Purchase Order/ Contract (including indigenous supplies/ services) shall be in the scope of foreign OEM/ Principal. The foreign OEM/ Principal should submit their offer inclusive of all indigenous supplies/ services and

evaluation will be based on the 'Total Cost to BHEL'. In case foreign OEM/ 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 its 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. It will be responsibility of the foreign OEM/ 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 foreign OEM/ Principal. All bank guarantees to this effect shall be in the scope of the foreign OEM/ Principal.

Guidelines for Indian Agents of Foreign Suppliers

- 1.0 There shall be compulsory registration of agents for all Global (Open) Tenders and Limited Tenders. 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 photocopy 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/ retainership being paid by the Principal to the Agent before 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-B

This format is applicable only to Indian Suppliers/ Agents supplying indigenous portion of Foreign Purchases.

In all other cases, extant guidelines of SEARP, 2010 are to be followed.

SEARP (SRF) Clause No.	Detail
	Name & address of the firm
1.0	Products/ Systems / Services being considered for
2.0	General Information
2.2	Name of Chief Executive
2.3	Details of authorized signatory
3.0	Ownership Information
3.1	Type of Firm
3.2	Nature of Business <i>Attach authorization letter and agency agreement from Principal (from whom capital equipment is procured)</i> <i>Attach copy of declaration from Foreign Principal for total guarantee/ warranty of indigenous supplies</i>
3.3	Year of establishment
3.4	Year of commencement of business
4.0	Registration particulars
4.1	Permanent Account No.
4.2 / 4.3	Sales Tax / TIN No.

4.6	Service Tax No. (in case of Erection & Commissioning)
5.0	Organisational strength
6.0	Other particulars
6.1	If the company is already registered with other BHEL Units
6.2	Directors/ Partners, if related to any BHEL employee
6.9	If any Ex-BHEL personnel employed by the Company
6.12	Details of pending legal issues with BHEL
6.13	Bank Account information
9.0	Financial information
9.6	Sales/ Turnover details of last 3 years (or from the date of incorporation, whichever is less)

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ANNEXURE- VI

Request for Issue of Form-C

FINANCIAL YEAR -----

Supplier Name & Address	
Quarter-wise details of invoices for issuance of 'C' forms for a Financial Year	

Quarter	Seller Tin	Invoice No	Invoice Date	Net Value	Tax amount	Commodity Description	Purchase Order No	Purchase Order Dt
Q-1								

Quarter	Seller Tin	Invoice No	Invoice Date	Net Value	Tax amount	Commodity Description	Purchase Order No	Purchase Order Dt
Q-2								

Quarter	Seller Tin	Invoice No	Invoice Date	Net Value	Tax amount	Commodity Description	Purchase Order No	Purchase Order Dt
Q-3								

Quarter	Seller Tin	Invoice No	Invoice Date	Net Value	Tax amount	Commodity Description	Purchase Order No	Purchase Order Dt
Q-4								

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ANNEXURE-VII

NEFT Application Form

Vendors Name	
Vendor Address	
BANK NAME	
BANK BRANCH	
BANK ADDRESS	
BANK BRANCH CODE	
BANK 9 DIGIT MICR CODE	
BANK NEFT CODE(IFC)	
BANK SWIFT CODE	
BANK PHONE	
ACCOUNT NAME	
ACCOUNT TYPE	
ACCOUNT NO.	
PAN NO.	

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SERVICE TAX NO.	
TIN NO.	
E-MAIL ID	

Authorised Signatory Seal

Above details are to be submitted on company's letterhead. The details may either be attested by vendor's bankers or accompanied by a cancelled cheque leaf with IFSC code & A/c no. Printed on it.

Undertaking to report immediately any changes in the above to be submitted in company's letterhead.

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ANNEXURE-VIII

LOADING CRITERIA

No deviations in GCC terms and conditions are generally acceptable, and bids with deviations are liable to be rejected. However, in exceptional circumstances, BHEL may accept deviations with Loading as given below:

A) PAYMENT TERMS

1. Payment will be released within 45 days after receipt of complete documents as per order/ contract.

Loading will be done for vendors seeking earlier payment w.r.t. above, for the value and the period of deviation, as per Clause 17.0 of 'Instructions to Bidders'.

Time periods assumed by BHEL for a few activities are as follows:

Payment through Bank	- 30 days from receipt of invoice + documents.
Received LR	- 30 days from despatch.
Material Receipt Certificate (MRC)	- 120 days from despatch.

However, for Foreign Purchase, CAD at sight and Confirmed LCs are not permitted.

B) BANK GUARANTEE `

Non submission of Bank Guarantee – No deviation is permitted, if applicable as per NIT.

C) LIQUIDATED DAMAGES

If maximum limit asked for is 10% or 5% of Undelivered Portion – 10% value of the total quoted price including taxes, duties & freight.

If maximum limit asked is less than 10 % of contract value loading shall be to the extent to which not agreed by bidder (at offered value) .

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D) PRICE VARIATION CLAUSE (PVC)

PVC Instead of Firm Price – Maximum ceiling of PVC as demanded by vendor.

F) NO DEVIATION IS ALLOWED IN RISK PURCHASE/RISK & COST CLAUSE.

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ANNEXURE-X

List of Consortium Banks			
Nationalised Banks		Public Sector Bank	
1	Allahabad bank	20	IDBI
2	Andhra bank		
3	Bank of Baroda	Foreign banks	
4	Canara Bank	21	CITI Bank N.A
5	Corporation bank	22	Deutsche Bank AG
6	Central bank	23	HSBC
7	Indian Bank	24	Standard Chartered Bank
8	Indian Oversea Bank	25	J P Morgan
9	Oriental bank of Commerce		
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
15	State Bank of Travancore	29	Kotak Mahindra Bank
16	UCO Bank	30	ICICI
17	Union Bank of India	31	Indusind Bank
18	United Bank of India	32	Yes Bank
19	Vijaya Bank		

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ANNEXURE-XI

Terms & Conditions of Reverse Auction

Against this enquiry for the subject item/ system with detailed scope of supply as per enquiry specifications, BHEL may resort to “REVERSE AUCTION PROCEDURE” i.e., ON LINE BIDDING (THROUGH A SERVICE PROVIDER). The philosophy followed for reverse auction shall be English Reverse (No ties).

- 1 For the proposed reverse auction, technically and commercially acceptable bidders only shall be eligible to participate.
- 2 Those bidders who have given their acceptance for Reverse Auction (quoted against this tender enquiry) will have to necessarily submit „online sealed bid” in the Reverse Auction. Non-submission of „online sealed bid” by the bidder for any of the eligible items for which techno-commercially qualified, will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines in vogue.
- 3 BHEL will engage the services of a service provider who will provide all necessary training and assistance before commencement of on line bidding on internet.
- 4 In case of reverse auction, BHEL will inform the bidders the details of Service Provider to enable them to contact & get trained.
- 5 Business rules like event date, time, bid decrement, extension etc. also will be communicated through service provider for compliance.
- 6 Bidders have to fax the Compliance form (annexure IV) before start of Reverse auction. Without this, the bidder will not be eligible to participate in the event.
- 7 In line with the NIT terms, BHEL will provide the calculation sheet (e.g., EXCEL sheet) which will help to arrive at “Total Cost to BHEL” like Packing & forwarding charges, Taxes and Duties, Freight charges, Insurance, Service Tax for Services and loading factors (for non-compliance to BHEL standard Commercial terms & conditions) etc. for each of the bidder to enable them to fill-in the price and keep it ready for keying in during the Auction.

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- 8 Reverse auction will be conducted on scheduled date & time.
- 9 At the end of Reverse Auction event, the lowest bidder value will be known on auction portal.
- 10 The lowest bidder has to fax/e-mail the duly signed and filled-in prescribed format for price breakup including that of line items, if required, (Annexure VII) as provided on case-to-case basis to Service provider within two working days of Auction without fail.
11. In case BHEL decides not to go for Reverse Auction procedure for this tender enquiry, the Price bids and price impacts, if any, already submitted and available with BHEL shall be opened as per BHEL"s standard practice.
12. Bidders shall be required to read the "Terms and Conditions" section of the auctions site of Service provider, using the Login IDs and passwords given to them by the service provider before reverse auction event. Bidders should acquaint themselves of the „Business Rules of Reverse Auction", which will be communicated before the Reverse Auction.
13. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action *as per extant BHEL guidelines*, shall be initiated by BHEL and the results of the RA scrapped/ aborted.
14. The Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party.
15. In case BHEL decides to go for reverse auction, the H1 bidder(s) (whose quote is highest in online sealed bid) may not be allowed to participate in further RA process.
16. Updates:-
 - 16.1 "BHEL reserves the right to go for Reverse Auction (RA) (GUIDELINES as available on www.bhel.com) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA.

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Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit “Process Compliance Form” (to the designated service provider) as well as ‘online sealed bid’ in the Reverse Auction. Non-submission of Process Compliance Form or Online Sealed Bid by the agreed bidders will be considered as tempering of the tender process & will invite action by BHEL as per the extent guidelines for suspension of business dealings with suppliers/contractors (as available on www.bhel.com).

The bidders have to necessarily submit the online sealed bid less than or equal to their envelope sealed price bid already submitted to BHEL along with the offer. The envelope sealed price bid of successful L-1 bidder in RA, if conducted, shall also be opened after RA & the order will be placed on lower of the two bids (RA closing price & envelope sealed price) thus obtained. The bidder having submitted this offer specifically agrees to this condition & undertakes to execute the contract on thus awarded rates.

If it is found that L-1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid for any item, the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be consider as fraud & will invite action by BHEL as per the extent guidelines for suspension of business dealings with the suppliers/contractors (as available on www.bhel.com).

As a reminder to bidders, system will flash the following message (in RED color) during the course of ‘online sealed bid’:

“Bidders to submit online sealed bid less than or equal to their envelope sealed bid already submitted to BHEL”

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ANNEXURE-XII

FORMAT FOR NO DEVIATION CERTIFICATE

(To be submitted in the bidder's letter head)

TO
 BHARAT HEAVY ELECTRICALS LIMITED,
 Electroporcelains Division
 Prof. CNR Rao Circle,
 Malleshwaram Bangalore – 560012

Sub :	No deviation certificate
Job :	----
Ref :	Your enquiry No -
	All the pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)

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ANNEXURE-XIII

DECLARATION BY AUTHORISED SIGNATORY OF BIDDER

(To be typed and submitted in the Letter Head of the Company/Firm of Bidder)

To,

(Write Name & Address of Officer of BHEL inviting the Tender)

Dear Sir,

Sub : Declaration by Authorised Signatory

Ref : 1) NIT/Tender Specification No:

2) All other pertinent issues till date

I / We, hereby certify that all the information and data furnished by me with regard to the above Tender Specification are true and complete to the best of my knowledge. I have gone through the specifications, conditions, stipulations and all other pertinent issues till date, and agree to comply with the requirements and Intent of the specification.

I further certify that I am authorised to represent on behalf of my Company/Firm for the above mentioned tender and a valid Power of Attorney to this effect is also enclosed.

Yours faithfully,

(Signature, Date & Seal of Authorized
Signatory of the Bidder)

Date:

Enclosed : Power of Attorney

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ANNEXURE-XIV

POWER OF ATTORNEY for SUBMISSION OF TENDER/SIGNING CONTRACT

AGREEMENT

(To be typed on non judicial Stamp Papers of appropriate value as applicable and Notarised)

KNOW ALL MEN BY THESE PRESENTS, that I/We do hereby make, nominate, constitute and appoint Mr , whose signature given below herewith to be true and lawful Attorney of M/s_____ hereinafter called 'Company', for submitting Tender/entering into Contract and inter alia, sign, execute all papers and to do necessary lawful acts on behalf of Company with M/s Bharat Heavy Electricals Ltd, Electroporcelains Division, Bangalore in connection with vide Tender Specification
No _____ dated _____

And the Company do hereby agree to ratify and confirm all acts, deeds, things or proceedings as may be lawfully done by the said attorney and by or on behalf of the company and in the name of the company, by virtue of the powers conferred herein and the same shall be binding on the company and shall have full force and effect.

IN WITNESS WHEREOF the common seal of the company has been hereunto affixed in the manner hereinafter appearing on the document.

Dated at _____ , this _____ day of _____

Director/CMD/Partner/Proprietor

Signature of Mr _____ (Attorney)

Attested by:

Director/CMD/Partner/Proprietor

Witness

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Notary Public

ANNEXURE-XVI

INDEMNITY BOND

(To be executed on a Non Judicial Stamp Paper of the requisite value as per Stamp Duty prevalent in the respective State)

This Indemnity Bond executed by <name of company> having their Registered Office at <xxxxxxxxxxxx> in favour of M/s Bharat Heavy Electricals Limited, a Company incorporated under the Companies Act, 1956, having its Registered Office at BHEL House, Siri Fort, Asiad, New Delhi - 110049 through its Unit at Electroporcelains Division, Bangalore (Hereinafter referred to as the Company).

And whereas the Company has entered into a Contract with M/s xxxxxxxxxx, the executants of this Deed (hereinafter referred to as the Contractor) as its contractor in respect of the work of "xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx".

AND WHEREAS under the provisions of GCC further stipulates that the Contractor shall indemnify the Company against all claims of whatever nature arising during the course of execution of Contract including defects liability period of <xx Months > i.e till <xx xx xxxx>

Now this deed witness that in case the Company is made liable by any Authority including Court to pay any claim or compensation etc. in respect of all labourers or other matters at any stage under or relating to the Contract with the Contractor, the Contractor hereby covenants and agrees with the Company that they shall indemnify and reimburse the Company to the extent of such payments and for any fee, including litigation charges, lawyers' fees, etc, penalty or damages claimed against the Company by reason of the Contractor falling to comply with Central/States Laws, Rules etc, or his failure to comply with Contract (including all expenses and charges incurred by the Company).

The Contractor further indemnifies the Company for the amount which the Company may be liable to pay by way of penalty for not making deductions from the Bills of the Contractor towards such amount and depositing the same in the Government Treasury.

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The Contractor further agree that the Company shall be entitled to with hold and adjust the Security Deposit and/or with hold and adjust payment of Bills of Contractor pertaining to this Contract against any payment which the Company has made or is required to make for which the Contractor is liable under the Contract and that such amount can be withheld, adjusted by the Company till satisfactory and final settlement of all pending matters and the Contractor hereby gives his consent for the same.

The Contractor further agrees that the terms of indemnity shall survive the termination or completion of this contract.

The contractor further agrees that the liability of the contractor shall be extended on actual basis notwithstanding the limitations of liability clause, in respect of:

1. breach of terms of contract by the contractor
2. breach of laws by the contractor
3. breach of Intellectual property rights by the contractor
4. breach of confidentiality by the contractor

Nothing contained in this deed, shall be construed as absolving or limiting the liability of the Contractor under said Contract between the Company and the Contractor. That this Indemnity Bond is irrevocable and the condition of the bond is that the Contractor shall duly and punctually comply with the terms and the conditions of this deed and contractual provisions to the satisfaction of the Company.

In witness where of M/s xxxxxxxxxxxxxx these presents on the day, month and year first, above written at xxxxxxxx by the hand of its signatory Mr. xxxxxxxxxxxx.

Signed for and on behalf of
M/s

xxxxxxxxxxxxxxxxxx

Witness:

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ANNEXURE-XVII

Annexure- A

CONSORTIUM AGREEMENT

(To be executed on Rs. 50/- Non - Judicial Stamp Paper)

THIS AGREEMENT is made and executed on ____ day of _____ by and between (1) M/s. _____, represented by Shri _____, designated as _____, having its registered office at _____, (The First Party, i.e, the Bidder) Company incorporated under the Company's Act 1956 having its registered office at _____ (hereinafter referred to as the "Bidder" which expression shall include its successors, administrators, executors and permitted assigns) and (2) M/s. _____, (The Second Party, i.e, the associates), a company incorporated under _____ (Company act), having its registered office at _____ (hereinafter called the "Associates", which expression shall include its successors, administrators, executors and permitted assigns).

WHEREAS, the Electroporcelains Division, one of the Units of M/s. Bharat Heavy Electricals, having its office at Prof. CNR Rao Circle, Opp. Indian Institute of Science, Malleswaram, Bangalore-560 012, A Government of India Undertaking (hereinafter called the "Employer", " which expression shall include its successors, administrators, executors and permitted assigns), proposes to issue / issued a Notice Inviting Tender (hereinafter referred to as NIT), inviting bids from the individual bidders for undertaking the work of " _____ (Package name) for _____ (Project name) at _____ (site location) (hereinafter referred to as the "Project") being set up by M/s. _____ (hereinafter referred to as the " Owner").

AND WHEREAS, the said NIT enables submission of a bid by a Party subject to fulfilment of the stipulations pre-qualification criteria specified in the said NIT.

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AND WHEREAS, the Bidder desirous of submitting bid in response to the said NIT for the said Project, and by itself is not meeting all the qualifying the Pre-qualification Criteria specified in the said NIT and in order to fully meet the qualifying requirements of NIT, the Bidder entered into this Consortium Agreement with the Associates.

AND WHEREAS the Bidder and the Associates are contractors engaged in the business of carrying out various items of works. WHEREAS, the two parties have agreed to and constitute themselves into a consortium for the purpose of carrying out the said works relating to this Project, and that the consortium will be continued till the completion of the works in all respects including the performance guarantee period as may be specified in the NIT or Purchase Order/Work Order.

AND WHEREAS, with this consortium Agreement, the Bidder and Associates together meets all the pre-qualification criteria as mentioned in the NIT.

WHEREAS, the parties have agreed to certain terms and conditions which forms a part of this consortium agreement, as mentioned hereinbelow :

NOW therefore, this agreement witnesseth as follows :

1. The Bidder and Associates hereby constitute themselves into a Consortium for the purpose of submitting a Bid and undertaking the said works pursuant to the said NIT as hereinafter stated.
2. The Bidder will be the leader (Lead Partner) and will be responsible for the execution of the entire scope of works and its complete functioning as stated in the NIT.
3. The Bidder shall undertake the entire scope of work as detailed in the NIT jointly with the Associates.
4. The Associates shall undertake their part of work as detailed in the NIT jointly with the Bidder.
5. The Bidder and the Associates hereby declare and confirm that each of them jointly and severally will fulfil the required minimum qualifying requirements as prescribed in the said NIT for the works agreed to be undertaken by them as stated herein above.

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6. The Bidder and the Associates also hereby agree that both of them shall be jointly and severally responsible for the completion of the said works as per the schedule. Further, if the Employer and or the Owner sustains any loss or damage on account of non-performance or any breach of contract, both the Bidder and Associates, as a consortium partners, individually and severally undertake to compensate and pay such losses / damages so caused to the Employer and or the Owner on its written demand without any demur, reservation, contest or protest in any manner whatsoever.

7. AND WHEREAS, the Bidder and the Associates, do hereby undertakes to indemnify both the Employer and the Owner to make good any losses/damages sustained by them due to the negligence or any acts of Bidder and or the Associates which results in loss / damages to the Employer / Owner.

8. AND WHEREAS Bidder and the Associates hereby agree that in case of any dispute arising in and out of this consortium agreement shall be dealt in accordance with the provisions of Indian Arbitration and Conciliation Act, 1996 and the place of Arbitration will be at India and the language of Arbitration will be English.

9. AND WHEREAS both the Bidder and the Associates hereby agree and undertake that they shall provide adequate finances, suitable Tools, Plants, equipments, tractors, trailers, other transportation equipment, other Tools and Plants, Measuring and Monitoring Equipments (MMEs), Men and Machinery etc., for the proper and effective execution of the works to be undertaken by them as specified herein above.

10. AND WHEREAS, it was agreed to interse, between the parties hereto that all the consequential liabilities ec., arising out of any default in the due execution of the said works shall be borne by the consortium leader and or party in default, that is by party in whose area of works default has occurred, provided however, so far as the Employer is concerned, both The bidder and the Associates shall be jointly and severally liable irrespective of their scope of work.

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IN WITNESS WHEREOF, the parties above named have signed this agreement on the day month and year first above written at Faridabad.

For and on Behalf of The Bidder

AUTHORISED SIGNATORY ::

OFFICIAL ADDRESS :

COMPANY SEAL

WITNESSES :

1.

2.

For and on Behalf of the Associates

AUTHORISED SIGNATORY ::

OFFICIAL ADDRESS :

COMPANY SEAL

WITNESSES :

1

2

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ANNEXURE XVIII

Vendor Particulars & Logistics Information

Vendor's particulars & logistics information (Bidder to give details against each of the provisions)

1. Name of the vendor's executive to deal with this tender / project:-
2. E-mail address of the contact person
3. Telephone no. of the contact person
4. Name of location from where the goods shall be offered for inspection and dispatch
5. Additional logistics information for Imports
6. Bid currency
7. Name of the load port where the goods are offered for Delivery on FOB terms
8. Name of Airport in the country of dispatch for FCA delivery terms
9. Additional freight over FOB price, for delivery on CFR named port in the country of destination, if the Seller decides to bid on CFR / CIF / CPT basis

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10. Numbers, Type & size of containers estimated for delivery of Tendered quantity (Applicable where the goods are to be sent in containers)
11. No. of Packages with cumulative gross weight and CBM volume (Applicable for break-bulk shipment)
12. Additional FOB cost for loading the cargo on-board in case of EX-Works or FAS delivery terms
13. Approx. distance in km. from Vendor's works to Port of loading
 - a Sea port
 - b Air port

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ANNEXURE XIX

NON DISCLOSURE AGREEMENT

I, _____, on behalf of the _____ (Name of Company), acknowledge that the information received or generated, directly or indirectly, while working with BHEL, EPD on contract is confidential and that the nature of the business of the BHEL, EPD is such that the following conditions are reasonable, and therefore:

I warrant and agree as follows:

I, or any other personnel employed or engaged by our company, agree not to disclose, directly or indirectly, any information related to the BHEL, EPD Without restricting the generality of the foregoing, it is agreed that we will not disclose such information consisting but not necessarily limited to:

- Technical information: Methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs/data/configuration and research projects.
- Business information: Customer lists, project schedules, pricing data, estimates, financial or marketing data,

On conclusion of contract, I, or any other personnel employed or engaged by our company shall return to BHEL, EPD all documents and property of BHEL, EPD, including: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, EPD's business, or in any way obtained by me during the course of contract. I further agree that I, or any others employed or engaged by our company shall not retain copies, notes or abstracts of the foregoing.

This obligation of confidence shall continue after the conclusion of the contract also.

I acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the BHEL, EPD and are reasonable given the nature of the business carried on by the BHEL, EPD I agree that this agreement shall be governed by and construed in accordance with the laws of country.

I enter into this agreement totally voluntarily, with full knowledge of its meaning, and without duress.

Place:- _____

Date:- _____

Name

Company

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Signature

ANNEXURE-I

(To be filled up by the Bidder)

Ref. No.:

Date :

M/s Bharat Heavy Electricals Ltd.,
Electroporcelains Division
Prof. CNR Rao Circle
Malleshwaram
Bangalore - 560012

Attention : Shri

Dear Sir,

1 Having examined the tender documents against your tender Enquiry No _____ dated _____ and having understood the provisions of the said tender documents and having thoroughly studied the requirements of BHEL related to the work tendered for, in connection with _____ (name of work & project site), we hereby submit our offer for the proposed work in accordance with terms and conditions mentioned in the tender documents, at the prices quoted by us in your price schedule format and as per the indicated delivery schedule.

2. If the work or any part thereof is awarded to us, we undertake to submit security-cumcontract performance bank guarantee as per your requirement.

3. We have annexed to this tender the following documents:-

Part-I (Techno Commercial Bid) - in a properly sealed cover (uploaded in website in case of e-procurement).

- a) Complete Techno-Commercial Offer.
- b) Un-priced copy of deviation sheet (cost of withdrawal) – Annexure-II
- c) Un-priced copy of Price Schedule using format given by BHEL.
- d) Any other documents (please specify).

Part-II (Price Bid along with Priced Annexure-II) - in a separate, properly sealed cover, in the format given by BHEL (uploaded in website in case of e-procurement).

Thanking you,

Yours faithfully,

(Signature of the bidder with Name, Designation and Company's Seal)



ANNEXURE-II: UN-PRICED DEVIATION SHEET (COST OF WITHDRAWAL)

Item: SBMCC FOR NORTH CHENNAI TPS STAGE-III & UPPUR STPP

Tender Ref: 12300695 (UN-PRICED)

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWAL OF DEVIATION	PORTION OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWAL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWAL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION	REMARKS
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TECHNICAL DEVIATIONS

COMMERCIAL DEVIATIONS

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE

- NOTES:
1. For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
 2. For directly dispatchable items, cost of withdrawal of deviation will be applicable on the FOR site price including taxes, duties & freight.
 3. All the bidders have to list out all their Technical & Commercial Deviations in detail in the above format only on cost basis (if any). Cost of withdrawal for the deviations, for which, the “Cost of withdrawal” is not specified, shall be taken as NIL.
 4. Any deviation not mentioned above and shown separately will not be taken cognizance of.
 5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
 6. Bidder shall furnish price copy of above format along with price bid.
 7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
 8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
 9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
 10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not at all be accepted.
 11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
 12. Cost of withdrawal is to be given seperately for each deviation. In no event, bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of each deviation which have been clubbed together shall be considered as NIL.
 13. In case nature of cost of withdrawal (positive/negative) is not specified, it shall be assumed as positive.
 14. In case of discrepancy in the nature of impact (positive/negative), positive will be considered for evaluation and negative for ordering.



ANNEXURE-II: PRICED DEVIATION SHEET (COST OF WITHDRAWAL)

Item: SBMCC FOR NORTH CHENNAI TPS STAGE-III & UPPUR STPP

Tender Ref: 12300695 (PRICED)

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF WITHDRAWAL OF DEVIATION	PORTION OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWAL OF DEVIATION IS APPLICABLE	NATURE OF COST OF WITHDRAWAL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION	REMARKS
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TECHNICAL DEVIATIONS

COMMERCIAL DEVIATIONS

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	DESIGNATIONS	SIGN & DATE

- NOTES:
1. For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
 2. For directly dispatchable items, cost of withdrawal of deviation will be applicable on the FOR site price including taxes, duties & freight.
 3. All the bidders have to list out all their Technical & Commercial Deviations in detail in the above format only on cost basis (if any). Cost of withdrawal for the deviations, for which, the “Cost of withdrawal” is not specified, shall be taken as NIL.
 4. Any deviation not mentioned above and shown separately will not be taken cognizance of.
 5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
 6. Bidder shall furnish price copy of above format along with price bid.
 7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
 8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
 9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
 10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not at all be accepted.
 11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
 12. Cost of withdrawal is to be given seperately for each deviation. In no event, bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of each deviation which have been clubbed together shall be considered as NIL.
 13. In case nature of cost of withdrawal (positive/negative) is not specified, it shall be assumed as positive.
 14. In case of discrepancy in the nature of impact (positive/negative), positive will be considered for evaluation and negative for ordering.

ANNEXURE - III

DECLARATION

It is hereby declared that the original/ revised* price bid for _____

_____ (Name of Package) for _____
project is complete in all respects and contains prices for complete scope of supply, including tests etc., as per BHEL's requirement. If in the original/ revised* price bids where itemized price is not available for any part of scope of supply, including tests etc. for completion of the package, the same should be treated to have been included in our original/ revised* price bid.

It is also agreed that no further chance for seeking clarification/ confirmation to any missing point will be necessary.

Absence of itemized prices against some items does not mean that they are not included. Even though itemized prices are given for major items, those items which are not specially shown, are also included to meet the entire system as per BHEL requirements.

Signature of authorized Representative Name
and Designation:

Name & Address of the Bidder

Date

Forwarded to:

BHARAT HEAVY ELECTRICALS LTD

Electroporcelains Division

Prof. CNR Rao Circle

Malleshwaram

Bangalore - 560012

* (Please delete whichever is not applicable)

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ANNEXURE-VII

NEFT Application Form

Vendors Name	
Vendor Address	
BANK NAME	
BANK BRANCH	
BANK ADDRESS	
BANK BRANCH CODE	
BANK 9 DIGIT MICR CODE	
BANK NEFT CODE(IFC)	
BANK SWIFT CODE	
BANK PHONE	
ACCOUNT NAME	
ACCOUNT TYPE	
ACCOUNT NO.	
PAN NO.	

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SERVICE TAX NO.	
TIN NO.	
E-MAIL ID	

Authorised Signatory Seal

Above details are to be submitted on company's letterhead. The details may either be attested by vendor's bankers or accompanied by a cancelled cheque leaf with IFSC code & A/c no. Printed on it.

Undertaking to report immediately any changes in the above to be submitted in company's letterhead.

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ANNEXURE-XII

FORMAT FOR NO DEVIATION CERTIFICATE

(To be submitted in the bidder's letter head)

TO
 BHARAT HEAVY ELECTRICALS LIMITED,
 Electroporcelains Division
 Prof. CNR Rao Circle,
 Malleshwaram Bangalore – 560012

Sub :	No deviation certificate
Job :	----
Ref :	Your enquiry No -
	All the pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)

SPECIAL TERM(S)

The following clause shall supersede the clause no 2.1 of INSTRUCTIONS TO BIDDERS of GCC:

Tenders shall be submitted in Two parts on or before the Due Date and time indicated on the portal.

PART I: Technical & Commercial bid Comprising of following:

1. Documents pertaining to Technical Pre-Qualification Requirement (Tech.-PQC) (As applicable)
2. Documents pertaining to Commercial Pre-Qualification Requirement (Comm.-PQC) (As applicable)
3. Annexure-I to GCC (Mandatory)
4. General conditions of contract, GCC (Mandatory)
5. Special conditions of contract, SCC (Mandatory)
6. Technical offer, comprising of technical specification and other documents as asked in technical specifications e.g. drawings, test report etc. (Mandatory)
7. Annexure- III to GCC (Declaration about completeness of price) - (Mandatory)
8. Annexure-XII to GCC (Optional)

NO DEVIATION CERTIFICATE FOR COMMERCIAL TERMS AND CONDITIONS as per General Conditions of Contracts (GCC, Rev.01), Special Conditions of Contracts and RFQ in case of no deviations

9. Integrity Pact Agreement (Mandatory if shown on portal, not applicable otherwise)
10. Unpriced copy of Annexure-II, cost of withdrawal of deviation (Mandatory)

Any deviation not mentioned in un-priced copy of this format, but mentioned in the priced copy, shall not at all be accepted.

Bidder to note all the points mentioned in Notes of Annexure-II to GCC Rev. 00.

Cost of withdrawal for the deviations, for which, the Cost of withdrawal is not specified, shall be taken as NIL.

11. Unpriced copy of price format (Mandatory)

Tenderer must submit UN-PRICED Price format duly filled mentioning the word QUOTED in place of actual price in each row/column. The actual price is to be filled in separately and submitted in price bid part.

Prices are to be quoted separately for each item as per price format. In no event, bidder should club cost of more than one item.

The vendors shall be forced by the system to upload the above documents which are marked mandatory.

All the documents are to be stamped and uploaded. The Annexure mentioned at Sl n o 2, 6 & 7 (if applicable), above should be duly filled by the bidder and should be printed on their letter head before uploading.

PART II: Price bid Containing

1. Prices as per price format,
2. Cost of withdrawal of deviation as per Annexure-II, to be uploaded strictly as per Price Schedule of BHEL for complete scope of Tender Enquiry.

NOTE: Offers are liable to be rejected for changes made by vendors in the Price Schedule, except those specified in the unpriced bid and accepted by Purchaser.

The clause nos. 2.6 & 2.7 of INSTRUCTIONS TO BIDDERS of GCC shall not be applicable for Tender being published and processed through E-procurement System (EPS).

1. Tenders shall be submitted strictly in accordance with the requirements of the above tender documents. In case of deviations (Technical/ Commercial), the same shall be highlighted separately giving clause references along with the Cost of withdrawal of Deviations as per Annexure-II to GCC Rev. 00 of DEVIATION SHEET (COST OF WITHDRAWAL) along with reasons for taking such deviations. Bidder to note all the points mentioned in Annexure-II to GCC Rev.00. Cost of withdrawal for the deviations, for which, the "Cost of withdrawal" is not specified, shall be taken as NIL.
2. Purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept & reject any/all tender(s) in part or full without assigning any reason whatsoever.
3. Bidders shall submit all their queries/clarifications 4 days before the due date after which it will be presumed that there are no queries/clarifications and BHEL will be under no obligation to reply queries/clarifications raised after the date.
4. Bidder to note that this is a conditional enquiry for those who are not registered with BHEL ISG for the subject item / package, and the price bid (Part-II) opening/RA shall be subject to following criterion: Vendors who are already registered with BHEL ISG for the tendered materials are requested to submit the copy of registration certificate issued by BHEL ISG.
5. Bidders to indicate their import content (CIF), if any, in the format provided along with the price schedule given with NIT
6. BHEL reserves the right to go for Reverse Auction (RA) (Guidelines as available on www.bhel.com) instead of opening the sealed envelope price bid (priced format submitted along with the offer in case of e-procurement), submitted by the bidder. This will be decided after techno-commercial evaluation. Bidders to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case BHEL decides to go for RA. Those bidders who have given their acceptance to participate in Reverse Auction will have to necessarily submit 'Process compliance form' (to the designated service provider) as well as 'Online sealed bid' in the Reverse Auction. Non-submission of 'Process compliance form' or 'Online sealed bid' by the agreed bidder(s) will be considered as tampering of the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com). The bidders have to necessarily submit online sealed bid less than or equal to their envelope sealed price bid (price format submitted along with the offer in case of e-procurement) already submitted to BHEL along with the offer. The envelope sealed price bid (price format submitted along with the offer in case of e-procurement) of successful L1 bidder in RA, if conducted, shall also be opened after RA and the order will be placed on lower of the two bids (RA closing price & envelope sealed price (price format submitted along with the offer in case of e-procurement)) thus obtained. The bidder having

submitted this offer specifically agrees to this condition and undertakes to execute the contract on thus awarded rates.

If it is found that L1 bidder has quoted higher in online sealed bid in comparison to envelope sealed bid (priced format submitted along with the offer in case of e-procurement) for any item(s), the bidder will be issued a warning letter to this effect. However, if the same bidder again defaults on this count in any subsequent tender in the unit, it will be considered as fraud and will invite action by BHEL as per extant guidelines for suspension of business dealings with suppliers/ contractors (as available on www.bhel.com).”

7. All the above Tender Documents shall automatically become a part of the Order/Contract after its finalization.

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

8. For all clarifications/ issues related to the tender, Please contact:

1. For Commercial:

Name: (UPENDER KUMAR)

Dept.: Purchase

Address: BHEL-EPD Bangalore

Phone: (8022182342)

Email: upender.kumar@bhel.in

2. For Technical:

Name: (James M)

Dept.: Engineering (CPBG)

Address: BHEL-EPD Bangalore

Phone: (8022182127)

Email: james.joy@bhel.in

9. Order of Precedence

In the event of any ambiguity or conflict between the Tender Documents, the order of precedence shall be in the order below:

1. Amendments/Clarifications/Corrigenda/Errata etc issued in respect of the tender documents by BHEL
2. Price Schedule
3. Special Conditions of Contract (SCC)
4. Technical specification & scope of work
5. General Conditions of Contract (GCC)

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These Conditions shall be read in conjunction with General Condition of Contract (GCC Rev R0) enclosed along with the tender enquiry. In case of any conflict or inconsistency, the requirement of SCC shall prevail over the GCC.

Terms & Conditions:		
1.	Type of Contract	Supply
2.	Consignee address	STORES INCHARGE BHARAT HEAVY ELECTRICALS LIMITED ELECTROPORCELAINS DIVISION PROF. CNR RAO CIRCLE, SCIENCE INSTITUTE POST, MALLESWARAM, BANGALORE-560012. Consignee address in LR should be strictly as per above.
3.	Buyer and Paying Authority	BHARAT HEAVY ELECTRICALS LIMITED - ELECTROPORCELAINS DIVISION
4.	Mode of Dispatch	By Road/Sea. Note: It is Vendor's responsibility to ensure availability of Trucks/ships schedule etc. well in advance for dispatch of material to meet contractual delivery requirement. It is also the vendor's responsibility to ensure material is dispatched through shortest possible route.
5.	Price basis	Indigenous purchase – Firm, till the completion of contract. F.O.R. BHEL-EPD Bangalore, inclusive of packing & forwarding charges and freight. Taxes to be paid in line with GCC. Foreign purchase: NOT APPLICABLE
6.	Transit Insurance	In BHEL Scope. Insurance details as follows Open Policy number : 93000021170200000012 Email id: radha.ramakrishnan@newindia.co.in Prior Dispatch intimation shall be issued to Insurance agency about the value of consignment, dispatch details, along with one set of documents consisting of LR /AWB copy, Packing List, Challan indicating the items dispatched (with their weights). A copy of above should be sent by email to the following : a) upender.kumar@bhel.in b) pradipta@bhel.in c) gopal59@bhel.in
7.	Unloading at EPD/ Transportation from ICD Bangalore to EPD in case of imports	NOT APPLICABLE
8.	Delivery	Delivery of material shall be 60 Days from drawing approval date.
9.	Payment terms	As per GCC R0
10.	Guarantee Period	As per GCC R0
11.	Submission of Performance Bank Guarantee (PBG)	APPLICABLE as per GCC R0

	ELECTRO-PORCELAINS DIVISION	SPECIAL CONDITIONS OF CONTRACT (SCC) Revision No. 00	CPBG MATERIAL (12300695-SBMCC FOR NORTH CHENNAI TPS STAGE-III & UPPUR STPP)
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12.	Integrity Pact	NOT APPLICABLE.
13.	Details of IEM	NOT APPLICABLE.
14.	Inspection Agency	Inspection call should be furnished in the enclosed format only. It is responsibility of the vendor to inform BHEL at least 7 days prior for carrying out inspection, along with all the relevant test certificates and internal test reports. Such inspection, examination and testing by itself shall not relieve the Seller/Contractor from any obligation under the Order/Contract. Penalty for items not ready after inspection call / failure during inspection: The expenses incurred by BHEL/Representative for travel, stay etc. shall be in vendor's account. In case of inspection by BHEL or BHEL Representative or Third Party Inspection arranged by the bidder, the item shall be packed in the presence & under seal of the inspector. BHEL reserves the right not to accept any package received without/tempered seal. No item / equipment shall be dispatched without obtaining prior Material Dispatch clearance certificate from BHEL-EPD Material Management Department irrespective of inspection categories. A detailed QAP for manufacturing & inspection shall be submitted by the vendor along with the offer (if applicable).
15.	Organization Chart	Not Applicable
16.	LATE DELIVERY CHARGES	APPLICABLE AS PER GCC R0
17.	TAXES AND DUTIES (Clause No. 4.1, 4.2 & 4.3)	Clause No. 4.1, 4.2 & 4.3 of GCC to be read as: 4.1 CGST/SGST/UTGST/IGST 4.1.1 Seller/ Contractor is required to ensure that CGST/SGST/UTGST/IGST (whichever is applicable) is quoted as per the existing tariff on the date of the offer and all benefits as per existing laws have been considered. 4.1.2 It is the responsibility of the seller/contractor to issue the Tax Invoice strictly as per the format prescribed under the relevant applicable GST law (CGST Act/SGST Act/UTGST Act/IGST Act). Vendor to indicate the proper GSTN Registration/ HSN code in their tax invoice. 4.1.3 The purchaser is registered in the State of Karnataka vide following GST registration number: 29AAACB4146P1ZB. 4.1.4 Seller/contractor is required to mention the above registration number in their tax invoice unless stated otherwise in NIT/SCC. 4.1.5 CGST/SGST/UTGST/IGST shall be paid at actuals against Tax Invoice but restricted to the amount and percentage in the order/contract.
18.	OTHER TAXES & LEVIES (Clause No. 4.4)	Clause No. 4.4 of GCC of GCC to be read as: 4.2 OTHER TAXES & LEVIES 4.2.1 All taxes/duties/Cess other than CGST/SGST/UTGST/IGST shall be deemed to be included in the Ex-Works prices unless specified otherwise by the bidder in the price bid. No variation in other taxes and duties shall be payable by Purchaser.

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19.	CUSTOMS DUTY (Clause No. 4.5 of GCC)	Clause No. 4.5 of GCC to be read as: 4.3 CUSTOMS DUTY 4.3.1 Customs Duty/IGST/Goods and Services compensation cess under Goods and Services Tax (Compensation to States) Act, 2017 element for imported items as per Special Conditions of Contract shall be included in the Ex-Works prices. 4.3.2 Seller/ Contractor shall arrange for his own import license, if required, since Purchaser will not provide any import license. Therefore, Seller/ Contractor alone shall be responsible for any delay in getting import license or non-availability of the same or completion of other related formalities. Purchaser shall not be responsible for any financial liability, whatsoever, on this account. 4.3.3 Essentiality Certificate or Project Authority Certificate (PAC) as per Import Policy, if required to avail concessional customs duty, shall be clearly specified in the offer. Import content (CIF value in rupees) with list of items, quantity, foreign currency, Country of origin etc., shall be submitted by the bidder as part of Price bid.
20.	DIRECT TAXES (Clause No. 4.6 of GCC)	Clause No. 4.6 of GCC to be read as: 4.4 DIRECT TAXES 4.4.1 Purchaser shall not be liable towards income tax of whatever nature including variations thereof, arising out of this Order/ Contract, as well as tax liability of the Seller/ Contractor and his personnel. 4.4.2 Deductions of Tax at source at the prevailing rates shall be effected by the Purchaser before release of payment, as a statutory obligation, if applicable. TDS certificate will be issued by the Purchaser as per statutory provisions.
21.	STATUTORY VARIATION (Clause No. 5.0 of GCC)	Clause No. 5.0 of GCC to be read as: 5.0 STATUTORY VARIATION 5.1 Statutory variation for CGST/SGST/UGST/IGST is available provided the actual completion of supply does not occur beyond the period stipulated in the order/contract or any extension (without levy of penalty). 5.2 For variation after the agreed completion periods, the seller/contractor alone shall bear the impact for the upwards revisions and adjust the price in their basic price in such a manner that total price with tax matches with the ex-works with taxes of Purchase Order/Contract. For downward revisions, purchaser shall be given the benefit of reduction in CGST/SGST/UGST/IGST. This will be without prejudice to the levy of penalty for delay in delivery/completion schedule. 5.3 No other variations such as on Custom Duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the purchaser.3
22.	TRANSPORTATION & FREIGHT CHARGES (Clause No. 8 of GCC)	Clause No. 8 of GCC to be read as: 8.0 TRANSPORTATION & FREIGHT CHARGES 8.1 All dispatches shall be through road carriers approved by Purchaser/ Bank, on freight pre-paid basis. 8.2 Road Permit/E-way bill, if required, will be arranged by Supplier.
23.	New Clause of GCC	9.8 Other clauses 1. Vendor/Supplier will intimate & upload the Tax invoice along with LR/RR(as applicable) on web portal & intimate BHEL immediately on removal of goods from vendor/supplier works. In case of Services, Vendor is required to upload the Tax invoice on Web Portal immediately after raising the invoice. BHEL will issue the delivery order/instruction to dispatch the material to the customer as indicated in SCC.

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		2. All payments against Tax Invoice to vendors/contractors shall be released only after: a) Vendor/contractor declaring such invoice in GSTR-1 within the prescribed timeline as per the relevant Act. b) The tax component charged by the vendor in the invoice should be matched with the details uploaded by vendor in GSTR-1. c) Confirmation of payment of GST thereon by vendor on GSTN portal 3. In case, any GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry to timeline prescribed in the relevant Act for availing such ITC, or any other reasons not attributable to BHEL, tax amount shall be recoverable from the vendor/contractor along with interest levied/leviable on BHEL. 4. Wherein GST liability arises on BHEL under reverse charge, any interest levied/leviable due to any reasons not attributable to BHEL shall be recovered from the vendor/contractor.
24.	DOCUMENTS TO BE SUBMITTED BY VENDOR (Clause No. 9.2 of GCC)	Clause No. 9.2 of GCC to be read as: 9.2 DOCUMENTS TO BE SUBMITTED BY VENDOR (All Same) (a) To be replaced with GST compliant Invoice (b) Duty drawback documents as per applicable law (original+1 copy)
25.	Clause No. 16.2 of GCC	Clause No. 16.2 of GCC to be read as: Purchaser reserves the right to recover from the Seller/ Contractor, as agreed liquidated damages and not by way of penalty, a sum equivalent to half (½) percent plus applicable GST of the total contract price per week or part thereof, subject to a maximum of ten (10) percent of the total contract price excluding elements of taxes, duties and freight, if the Seller/ Contractor fails to deliver any part of the ordered stores within the period stipulated in the Order/ Contract. For Turnkey packages (Supply and E&C in vendor's scope), Liquidated Damages shall be levied on the total contract value of both Supply and E&C orders (excluding taxes, duties and freight) if E&C completion of the package is delayed beyond the contractual completion date or extension thereof. Liquidated Damages will not be withheld from supply payment. LR/ GR/ RR/ eway bill date for indigenous supplies and AWB/ BL date for C&F contracts shall be treated as the date of dispatch for levying LD as per Clause 16. However, for indigenous supply if receipted LR/eway bill date is beyond three months from the date of LR/e- way bill, such excess period shall also be considered for LD purpose. In case of any amendment/ revision, LD shall be linked to the amended/ revised contract value and delivery date(s)
26.	New Clauses of GCC	a) In case of discrepancy in CGST/SGST/UTGST/IGST rate corresponding to HSN ;code and quotes rates, the evaluation shall be done on quoted price and correct CGST/SGST/UTGST/IGST rate shall be considered for ordering (limited to quoted FOR Site Price) b) The bidder should have been registered with the appropriate authority under relevant GST laws. c) The bidder to specify in their offer (part 1 bid) the category of registration under GST i.e. registered dealer and composite dealer d) No CGST/SGST/UTGST/IGST will be reimbursed to composite dealer. In the event of any GST quoted by composite dealer, the same shall be considered for evaluation purpose. However, the ordering will be done without considering the tax.

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		e) In the event of any change in the status of vendor from composite to regular dealer after the submission of the bid but before the supply, no reimbursement of CGST/SGST/UTGST/IGST will be made. However, the vendor has to raise the invoice strictly, as per the law, by adjusting their ex-works price.
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<u>PRE-QUALIFICATION REQUIREMENT</u>	
<u>REF: TENDER REFERENCE NO. 12300695</u>	
Technical PQR	
1. Company shall be ISO 9001 Certified. 2. Bidder shall have manufacturing facility for 100 Verticals per Month to be certified by Chartered Engineer/Accountant or Factory license officer. 3. Credential on LV switchgear supplies made to Power Plant Customers/Utilities/Similar Industries in the past Five years. The supply should include at least 30 Breaker Verticals and 50 MCC verticals in a single contract. 4. To register Vendors in Fixed/Draw out Category the Vendor must have proven Fixed/Draw out Single Front Design, Double front Design working for the past three years in Power Plant or similar environment. 5. Valid Type Test Certificates complying with IEC 60439/61439/Equivalent or Higher standards. 6. Credentials of Supply made in the past two years with details of documents on the supply to be submitted for evaluation to prove continuity in the business. 7. Vendor do not possess any Design/ Manufacture/ Assemble/Testing Facility but are only Channel partners/Dealers of OEM are also qualified subject to engineering back up and warranty/guarantee for product from OEM.	
Financial PQR:	
1. Bidder should have average minimum Annual Turnover of Rs. 10.0 Cr. During the last 3 (THREE) Financial Years, ending on 31-03-2017. Vendors needs to submit Balance Sheets/Profit & Loss (P&L) Account Statement or Letter from CA in support of the same.	