NATIONAL FERTILIZERS LIMITED

(A Govt. of India Undertaking)

Naya Nangal(Punjab)-140126 India

Materials Department

Phone-+91-9464966819; Fax- 01887-220541

Email: ranjits@nfl.co.in,tilak@nfl.co.in

Specification Sheet SE/2022/48

Sr. No.	Material Code	Description of Material	UoM	Qty.
1	1521004	**Design, manufacturing, testing at works, supply and delivery in well-packed condition of 415VAC LT Panel to be used for Power cum Motor Control Centers including erection, testing & commissioning at NFL Nangal site after dismantling of existing Power cum Motor Control Centers of SILO NORTH & SOUTH for BAGGING plant. Detailed specifications are as per attached Annexure I & II.**	NO	1
2	1521005	**Design, manufacturing, testing at works, supply and delivery in well-packed condition of 415VAC LT Panel to be used for Power cum Motor Control Centers including erection, testing & commissioning at NFL Nangal site after dismantling of existing Power cum Motor Control Centers for BAGGING-1 & 2. Detailed specifications are as per attached Annexure I & II.**	NO	1

Note: - (1). Party to furnish a valid TENDER SPECIFIC authorization for this Tender from their Principal (in case offer is submitted by a dealer).

(2). You shall **Submit Annexure-I & II duly filled & signed and submit required documents as per Eligibility Criteria with your offer**

(3). Basis of evaluation will be over all L-1 basis item wise. which includes the cost of supply, cost of spares , and cost of erection, testing and commissioning **item wise.**

(4). Cost of commissioning spares are inclusive in main supply and will be considered part of supply**. No extra cost shall be considered in Price Bid.**

(5). Maximum Time of Installation & Commissioning shall be 50 days from the date of Handing Over of Site.

(6). Maximum Time for Installation & Commissioning shall be 8 month from the date of receipt & acceptance of material at our site.

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Annexure-I

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NFL

Technical Specification Sheet - Confirmation required

स्वच्छ भारत
एक कदम स्वच्छता की ओर

		NFL requirement	Party to confirm
SYSTEM DETAILS	Nominal Voltage with Variation	415 V ± 10 %	
	Rated Frequency with Variation	50 Hz ± 10 %	
	Combined V & F Variation	± 10 %	
	No. of Phases & Wires	3 Phase, 4 Wire	
	Insulation Level	1100 Volt	
	Fault Level	50 KA for 1 sec	
	Earthing Mode	System Neutral Solid Earhing	
Bus Bars	Continuous rating	800 A	
	Short Time for 1 sec.	50 KA	
	Bare / Insulated	Insulated	
	Type of Insulation	PVC Sleeved	
Execution	I/C & B/C	Air Circuit Breaker (ACB) Single Tier EDO type	
	Other Feeders	SFU Feed	
	Single front / Double front	Double front	
	Fixed / Drawout	Draw out	
	Cable Entry : Top / Bottom	Bottom	
Control Supply	Closing & Indication	110 V DC ± 5%, 2 Wire	
	Tripping	110 V DC ± 5%, 2 Wire	
	Contactors	110 V AC/ 240 V AC ± 10% 1 Ph, 2 Wire	
	Space Heater	240 V AC ± 10% 1 Ph, 2 Wire	
Painting	Type	Epoxy	
	Shade	Shade No.631 as per IS: 5 or Siemens Gray RAL7035.	

Annexure-II

DATA SHEET

Annexure-II

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Technical Requirement to be filled by the Bidder

1	**SCOPE**	Confirmation required from the Bidder
1.1	Design, manufacture, testing at works, Supply & delivery in well-packed condition of 415V Switchboards used for Power cum Motor Control Centers including erection, testing & commissioning at site.	
1.2	Dismantling of existing Power cum Motor Control Centers	
1.3	CONTENTS :	
	Annexure:III (LAYOUT PLAN MCC PANEL SILO NORTH SIDE & SOUTH SIDE FOR BAGGING)	
	Annexure:IV (LAYOUT PLAN MCC PANEL BAGGING-1 & 2)	
	Annexure:V(Equipment details of LT Panels)	
2	**STANDARDS TO BE FOLLOWED**	
2.1	The design, manufacture and testing of the equipment shall comply with the latest issue of the following Indian Standards, unless otherwise Specified. Equipment complying with equivalent IEC standards shall also be acceptable.	
2.1.1	IS 8623 - Specification for low voltage switchgear and control gear assemblies	
2.1.2	IS/IEC 60947 - Low-voltage switchgear and control gear (General Rules)	
2.1.3	IS 5578 - Guide for marking of insulated conductors	
2.1.4	IS 10118 - Code of practice for selection, installation and maintenance of switchgear and control gear	
2.1.5	IS 11353 - Guide for uniform system of marking and identification of conductors and apparatus terminals	
2.1.6	Various components housed in the switchboards shall conform to the Indian Standard specifications as mentioned against the component details or IEC specifications.	
2.2	The design and operational features of all the equipment offered shall also comply with the provisions of the latest issue of the Indian Electricity Rules and other Statutory Acts and Regulations, as applicable. The supplier shall, wherever necessary, make suitable modifications in the equipment to comply with the above	
2.3	Wherever any requirement, laid down in this standard, differs from that in Indian Standard Specification / IEC Specification, the requirement specified herein shall prevail.	
3	**SERVICE CONDITIONS**	
3.1	**Ambient Conditions**	
3.1.1	Max - 48 deg C	
3.1.2	Min - 1 deg C	
3.1.3	Design Ref - 50 deg C	
3.1.4	Relative humidity : 100%	
3.2	**System Details**	
3.2.1	Nominal Voltage with Variation : 415 V ± 10 %	
3.2.2	Rated Frequency with Variation : 50 Hz ± 10 %	
3.2.3	Combined V & F Variation : ± 10 %	
3.2.4	No. of Phases & Wires : 3 Phase, 4 Wire	
3.2.5	Insulation Grade: 1100 Volt	
3.2.6	Fault Level : as per applicable standard	
3.2.7	Earthing Mode : System Neutral Solid Earhing	
3.3	**Bus Bars**	
3.3.1	Continuous rating : 1250 A and 1600 A (as per MCC requirement)	
3.3.2	Short Time for 1 sec.: as per applicable standard	
3.3.3	Bare / Insulated : Insulated	
3.3.4	Type of Insulation : PVC Sleeved	
3.4	**Execution**	
3.4.1	I/C & B/C :Air Circuit Breaker (4Pole ACB) Single Tier EDO type	
3.4.2	Other Feeders : ACB and SFU Feeders	
3.5	**Control Supply**	
3.5.1	Tripping: 110 V AC ± 5%, 2 Wire	
3.5.2	Contactors : 110 V AC ± 10% 1 Ph, 2 Wire	
3.5.3	Space Heater :240 V AC ± 10% 1 Ph, 2 Wire	
4	**OPERATING REQUIREMENTS**	
	The 415V Switchboards shall be suitable for operating at the specified rating continuously, with the specified voltage and frequency variations under the ambient conditions indicated in Specification Sheet, without exceeding the permissible temperature rise and without any detrimental effect on any part.	
5	**DESIGN AND CONSTRUCTIONAL FEATURES**	
5.1	**General**	

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5.1.1	The switchboards shall consist of an assembly of a series of floor mounting, identical, metal clad, dead front type sheet steel panels of unitized design. The panels shall be placed side by side to form a compact assembly and shall be extensible on either side.	
5.1.2	The complete assembly shall be dust, damp and vermin proof having minimum degree of protection shall be as per IS/IEC 60947.	
5.1.3	The frame work of the cubicles shall be of bolted/welded construction. The minimum thickness of sheet steel shall be 2 mm for load bearing members, 1.6 mm for non-load bearing members and 3 mm for base channel. The doors and covers shall be fabricated from cold rolled sheets. Suitable reinforcement, wherever necessary, shall be provided.	
5.1.4	The door hinges shall be concealed type.	
5.1.5	All external hardwares shall be cadmium plated. The hardwares for fixing the removable parts shall be provided with retaining devices.	
5.1.6	The doors and the removable covers shall be provided with non-deteriorating neoprene gaskets. Gaskets without any discontinuity shall be preferred. Gaskets shall be held in position in groove, in shaped sheet steel work or these shall be of U type. Adhesive cement, if used, shall be of good quality so that the gaskets do not come off during service.	
5.1.7	All the components shall be accessible for inspection and maintenance without the necessity for removal of the adjacent ones.	
5.1.8	The layout of the component inside the module shall be liberal to facilitate maintenance and interconnecting wiring between the components shall not be subjected to any undue stresses at the bends	
5.1.9	Mounting height of components requiring operations and observation shall not be lower than 300 mm.	
5.1.10	Inter panel barriers shall be provided.	
5.1.11	All the live parts which are accessible after opening of front cover/cable alley cover/back cover shall be properly insulated or provided with insulating barrier to prevent accidental contact. Removal facility shall be provided for all such parts.	
5.1.12	Adequate arrangement for earthing shall be provided to safeguard the operator or other personnel from electric hazards under all conditions of operation.	
5.2	**Panel Arrangement**	
	The Switchboards shall be in draw out, Double front execution as specified in Specification Sheet, fully compartmentalized type and divided into distinct panels, each comprising of:	
i)	A completely metal enclosed bus-bars compartment running horizontally the top.	
ii)	Individual feeder modules.	
iii)	Enclosed vertical bus-bars serving all modules, in case of multi-tier panels.	
iv)	A vertical cable alley.	
v)	Separate horizontal enclosure for all auxiliary power and control buses.	
5.3	**Circuit Breaker Controlled Feeders**	
5.3.1	The panels housing circuit breaker feeders shall be in single front draw out execution. The incoming and bus coupler circuit breaker feeders shall be in single tier formation.	
5.3.2	A suitable barrier shall be provided between the circuit breaker and the associated control, protective and indication devices including instrument transformers.	
5.3.3	All the protective relays and meters shall be flush mounted type. The relays and meters pertaining to a particular circuit breaker shall be mounted on the same panel. Where it is not possible to accommodate all the relays and meters in the same panel, one metering panel shall be provided adjacent to the circuit breaker panel exclusively for that feeder. Location of these in the adjacent panel of other feeders shall not be acceptable.	
5.3.4	A spacious cable chamber suitable for accommodation, support and termination of required number of power cables shall be provided at the back. No bare bus-bars or live connection shall intrude into the cabling space.	
	The switchboard shall be provided with following inter locks and safety features:	
i)	It shall not be possible to open the compartment door unless the breaker is drawn to isolated position.	
ii)	The withdrawn and engagement of a circuit breaker shall not be possible unless it is in open position	
iii)	The operation of a circuit breaker shall not be possible unless it is in fully service, test or isolated position.	
iv)	It shall not be possible to close the circuit breaker in service position unless all auxiliary and control circuits are connected.	
v)	Insertion of the manual mechanism shall render the motorised mechanism in operation.	
vi)	Circuit breaker 'SERVICE', 'OFF' indication shall be provided at the back of each panel. And, alarm shall be provided in case panel back door is opened with breaker "ON".	
vii)	Caution nameplate shall be provided at the back of incomer's panels where terminals are likely to remain live and isolation is possible only from remote end.	

viii)	Automatic safety shutter, with Padlocking facility for locking in closed position, to completely cover the spouts for the bus-bars and cable connection when the breaker is withdrawn.	
5.4	**Switch/ACB Controlled Feeders**	
5.4.1	The panels housing motor starter or other feeders shall be draw out type in double front execution	
5.4.2	All components of one feeder shall be mounted on a rigid sheet steel chassis.	
5.4.3	Each panel shall be divided into a number of modules in tier formation placed one above the other. These modules shall be closed on all sides.	
5.4.4	The modules shall be so placed that largest one is placed at the bottom of the panel. Type modules shall be at least 300 mm from the base channel.	
5.4.5	The number of modules shall be so decided that the cables in the cable alley are not over crowded. However the number of module in any panel shall not exceed six.	
5.4.6	The minimum size of module shall be 300 mm and 200 mm for starter and switch fuse feeders respectively.	
5.4.7	The minimum clear width of cable alley shall be 250 mm.	
5.4.8	The module door shall be so interlocked that it shall not be possible to open the door with switch in closed position and close the door unless the module is fully plugged in. Defeat interlock facility shall be provided.	
5.5	**Special Features of Draw out Modules**	
5.5.1	The module shall be fully draw out type with sheet steel chassis moving freely on the guides. The draw out module shall be standardized and it must be interchangeable with any module of same size.. The minimum rating of the all draw-out modules shall be 150% of the required design capacity. All modules & cable alley shall have thumb tightening type screws.	
5.5.2	The module shall have the following distinct mechanical positions:	
i)	Service -- In which both power and control contacts shall be made.	
ii)	Test -- In which power contacts shall be isolated but control contacts shall be made.	
iii)	Isolated -- In which both power and control contacts shall be Isolated. Maintenance position shall be preferred.	
5.5.3	Each position shall be clearly marked. Padlocking facility shall be provided to padlock the chassis in any of the position.	
5.5.4	The movement of the chassis from one position to the other shall be controlled by using an appropriate racking mechanism. Stopper shall be provided to prevent over travel of the chassis beyond the isolated position.	
5.5.5	The guiding system shall permit smooth movement of the module and the power and control contacts shall be self-aligning type so that accurate alignment of the contacts is ensured.	
5.5.6	No wiring shall be taken to the door. Only the actuators of the push buttons and switches, lenses for the indicating lamps and Perspex cover for meters shall be mounted on the door.	
5.5.7	The power contacts shall be of plug-in/stab-in type made of silver plated copper, spring loaded and of adequate current carrying capacity. The contacts shall be so designed that contact pressure is maintained both under normal and short circuit conditions.	
5.5.8	The parting contacts, both on bus-bar side and outgoing cable side, shall always be copper to copper and both sides silver plated. A bimetallic strip shall be used where two dissimilar materials are in contact.	
5.6	**Bus-Bars and Connections**	
5.6.1	The bus-bars shall be for three phase and neutral. The main bus-bars and connections shall be made of electrolytic grade tinned copper of rectangular cross-section only. Auxiliary bus-bars for control supply, space heater supply etc. shall be made of electrolytic grade tinned copper of rectangular cross-section only.	
5.6.2	The horizontal bus-bars shall be insulated with heat shrinkable PVC sleeves (colour coded) of reputed make to protect against approach to live parts. The vertical bus-bars shall be PVC sleeved (colour coded) or shrouded by barriers. Removable type insulating shrouds shall be provided for all joints of horizontal bus-bars.	
5.6.3	The bus-bars shall be amply sized to carry the rated continuous current under the specified ambient temperature without exceeding temperature limits specified in IS: 8084. The thermal rating of the bus-bars shall be designed to withstand the system fault current for 1 second without exceeding the limiting temperature of 250°C for tinned Copper. Calculation for bus-bars sizing shall be furnished along with the offer.	
5.6.4	Horizontal bus-bars shall be of the same cross-section through out. Stepped bus-bars shall not be acceptable.	
5.6.5	The bus-bars shall be arranged and colour coded according to IS: 5578 / IS: 11353.	
5.6.6	The bus-bar chamber shall be sufficiently spacious and shall have separate screwed covers for maintenance purpose.	

5.6.7	The bus-bars shall be rigidly supported at equal intervals to withstand maximum short circuit stresses. The supports shall be of moulded construction with built-in anti-tracking barriers. The support materials shall be of DMC or fibreglass reinforced thermosetting plastic.	
5.6.8	Bus-bar joints shall be between the two transporting sections only.	
5.6.9	A minimum of two bolts shall be used in bus-bar joints. Only high tensile electric galvanized bolts, nuts and washers shall be used.	
5.7	**Earth Bus**	
	A continuous earth bus of tinned copper, running along the entire length of the lower part of the switchboard shall be provided with lugs at two ends for external connections. The minimum size of earth bus shall be suitable for carrying three phase fault current for 1 sec.	
5.8	**Clearances and Creepage Distances**	
5.8.1	The clearances and creepage distances shall not be lower than the values specified below:	
5.8.2	Minimum clearance between two live conductors -- 20 mm	
5.8.3	Minimum clearance between live parts and accidentally dangerous part -- 20 mm	
5.8.4	Minimum creepage distance -- 28 mm	
5.8.5	The clearances and creepage, as specified above, shall definitely be maintained in the bus-bar system. Provision of bus-bar insulation, separators or barriers shall not be considered to reduce the clearance from the values specified above.	
5.8.6	At the termination points in the equipment e.g. switches, contactors, thermal relays etc. It is realized that above clearances may not always be possible to be maintained. All such points, where above clearances and creepage distances are not possible to be maintained, shall be insulated or taped.	
5.9	**Insulation**	
5.9.1	The insulation used shall be non-hygroscopic and may be of porcelain, epoxy resins or fibreglass moulded with plastic. It shall be of adequate electrical, mechanical and thermal strength to give trouble free service during normal operation and short circuit conditions.	
5.9.2	The insulation shall be treated suitably to withstand the tropical conditions and atmospheric pollution, as specified in Service condition	
5.10	**Power Wiring**	
5.10.1	The connections from bus-bar to individual functional unit on the modules shall be of PVC insulated flexible copper cables or taped Copper/Aluminium strip.	
5.10.2	The power wiring size shall be decided based on rating of the switch/breaker after using a rating factor of not more than 50% over the current rating in free air.	
5.10.3	Power wiring size selected for breaker controlled module shall also be able to withstand full short circuit current for duration of 0.25 sec.	
5.10.4	In any case minimum size of power wiring shall not be less than 4 sq. mm copper.	
5.10.5	The size of connection from incomer to horizontal bus-bar and from horizontal bus-bar to bus-coupler shall not be less than the size adopted for horizontal bus-bar.	
5.10.6	Bimetallic washer shall be provided for power connection of two dissimilar metals.	
5.11	**Control Wiring**	
5.11.1	The switchboard shall be completely factory wired and ready for external connections.	
5.11.2	The wiring shall be carried out with flexible stranded PVC insulated copper conductor cables of 1100 Volt grade. The size of wires shall be as follows:	
5.11.3	C.T. Circuit -- 2.5 sq. mm	
5.11.4	V.T. and Control Circuits -- 1.5 sq. mm	
5.11.5	All wiring shall be provided with dependent both ends marking as per IS: 5578. Numbered ferrules, reading from the terminals outwards, shall be provided at both ends of all wiring for easy identification. These shall be interlocking type plastic ferrules.	
5.11.6	Control wiring circuits, fed from a supply common to a number of panels, shall be so protected that failure of a circuit in one panel does not effect the operation of the other panels.	
5.11.7	The wiring to the equipment mounted on the doors shall be carried out with flexible multi strand copper conductor cable and so supported that on opening of the door there is no undue strain on wire leads	
5.11.8	The control cables shall be neatly arranged and property supported.	
5.11.9	Control supply of all the auxiliary switch boards shall be 240VAC supply of suitable rating shall be provided on each side of bus.	
5.12	**External Cable Termination**	
5.12.1	All power and control cables shall enter the switchboard from the bottom. Sufficient space shall be provided for ease of connection and termination of cables.	
5.12.2	Compression type cable glands along with the cable lugs as required shall be provided for termination of cables.	

5.12.3	The cable glands shall be of rolled Aluminium or nickel/cadmium plated brass heavy duty double compression type and shall be mounted on a removable gland plate, provided at a minimum height of 75 mm from the bottom of the switchboard. Two number spare knockouts of size 20 mm shall also be provided on the gland plates for future use. Gland for termination of single core cables shall be nonmagnetic type.	
5.12.4	For all power cables, crimped type Aluminium lugs for Aluminium cables and tinned Copper lugs for Copper cables shall be provided.	
5.12.5	All terminal blocks shall be bolted lug type only. Double decker terminal arrangement shall not be acceptable. These shall be protected type and rated for 1100 Volts service.The minimum current rating of terminal block shall be 16 Amp. The construction shall be such that after the connection of cables by means of lugs, necessary clearance and creepage distance are available	
5.12.6	Where more than two cables in parallel are required to be terminated, a system of bus links shall be provided with adequate clearance and spacing.	
5.12.7	Suitable clamps to support the vertical run of cables shall be provided.	
5.12.8	The terminal block shall be grouped according to circuit functions and suitably numbered. 20% extra terminals shall be provided in the terminal block	
5.12.9	For power connections, suitable marking on the terminals shall be provided to identify the phases.	
5.13	**Feeder Details**	
5.13.1	The requirements of incomer, bus coupler and outgoing feeders is indicated in the feeder details and corresponding schematic diagrams, shall be submitted to NFL for approval.	
5.13.2	Interlocks shall be provided between incomers and bus section panels. The interlocks shall be either electrical or mechanical type. In addition, arrangement for defeating the interlock shall also be provided to facilitate manual changeover.	
5.13.3	Auto changeover scheme shall be provided.	
5.14	**Dummy Panels**	
	Dummy panels if required shall be provided,	
5.15	**Control Power Supply**	
5.15.1	D.C. Power required for closing, tripping and indication of circuit breaker feeders shall be supplied at the bus coupler panel through two completely separate circuits, one for tripping and other for closing and indication.	
5.15.2	For receiving each external control supply, a double pole miniature circuit breaker shall be provided. This power shall be distributed inside the switchboard for each circuit breaker feeder having its MCB unit.	
5.16	**Space Heater Power Supply**	
5.16.1	Panel space heater shall be fed from a separate bus common for the whole board.	
5.16.2	Power supply for space heaters of motors shall be tapped from this bus by means of a MCB located in the motor feeder compartment. These MCBs shall be of double pole and rated for 15 Amp.	
6.0	**COMPONENT DETAILS**	
	Components of the switchgear shall ensure type of coordination 'C' as per IS: 60947 (Part 4/ Section 1).	
6.1	**Circuit Breaker**	
6.1.1	The circuit breakers shall comply with the requirement of IS/IEC 60947.	
6.1.2	All circuit breakers shall be of P2 (0-3 min - CO - 3 min - CO) category, capable of carrying the specified current at the site conditions and making/breaking of the system fault current.	
6.1.3	Type test certificates from an independent testing authority shall be furnished along with the offer for each circuit breaker rating and type.	
6.1.4	The circuit breakers shall be of the 3 phases, 4 pole horizontal draw out, horizontal isolation, air break type.	
6.1.5	All LT circuit breakers shall be of ACB (Air Circuit Breaker) type. The ACBs shall have horizontal draw-out, horizontal isolation type & trolley mounted type only.	
6.1.6	The circuit breaker shall be suitable for electrical or manual closing as specified. Manual operated breakers shall have independent manual spring closing mechanism. In case of electrically operated breaker, it shall have motor wound spring mechanism. In all cases tripping shall be by means of shunt trip coil, unless other wise specified in Specification Sheet.	
6.1.7	All circuit breaker units of the same rating shall be physically and electrically interchangeable	
6.1.8	The circuit breakers shall be electrically and mechanically trip free and provided with anti-pumping feature.	

6.1.9	The circuit breakers shall have three positions i.e. service, test and isolated with the cubicle door closed. Necessary stoppers shall be provided to prevent the excessive movement of the breaker cradle than desired for the position. Service and test positions of the breaker shall have monitoring switch having 2NO+2NC contacts	
6.1.10	The circuit breaker shall be provided with emergency manual trip device, mechanical 'ON', 'OFF' and 'ISOLATED' position indicators and operation counter	
6.1.11	A maintenance truck/device for raising, lowering and withdrawal of the circuit breaker shall be supplied for each switch board.	
6.1.12	The arc interrupting devices shall be capable of interrupting satisfactorily current from zero to the rated interrupting current when used on predominantly capacitive or inductive circuits, without requiring excessive maintenance of the contacts. The arc shall be restricted within the interrupting chamber and no emission of flame shall be allowed which may cause electrical breakdown or damage to insulation on the apparatus.	
6.1.13	The main contacts shall be self aligning, adjustable and replaceable type.	
6.1.14	The arcing contacts shall be easily accessible for maintenance and inspection and shall be easily replaceable type. They shall be provided with, contact face of special arcresisting and non-pitting metal	
6.1.15	Mechanical safety interlock shall be provided for safe operation and movement of the breaker.	
6.1.16	The circuit breakers shall be provided with minimum of four normally open and four normally closed auxiliary switch contacts, over and above those required for its own control scheme, for Owner's use. The contacts shall be wired separately to the terminal board.	
6.1.17	Make of ACB shall be L&T/Schneider/Siemens/ABB/OEM make only.	
6.2	**Switches**	
6.2.1	The switches shall be motor duty type AC 23 Category having facility of built in single phase preventer and shall comply with the requirements laid down in IS/IEC 60947. Switches up to 63 Amps shall be rotary type and those of 100 Amps. & above, link type.	
6.2.2	ON' and 'OFF' position of the switches shall be indicated on the module. Provision shall be made to lock the switch in the 'OFF' position.	
6.2.3	The fixed contacts shall be shrouded type. All contacts shall be silver plated.	
6.4	**Fuses**	
6.4.1	The fuses shall be of non-deteriorating HRC cartridge link HN type and shall conform to IS: 13703. They shall be suitable for the load and service required in the circuit.	
6.4.2	Two no.s fuse puller shall be supplied along with Switchboard.	
6.5	**Air Break Contactors**	
6.5.1	The Air Break Contactors shall be of Category AC3/AC4, unless otherwise specified, conforming to IS: 60947 and flapper type.	
6.5.2	The dropout voltage shall not exceed 65% of rated voltage	
6.5.3	Each contactor shall be provided with auxiliary contacts as required. The rating of the auxiliary contacts shall be 5 Amps. AC or 1 Amp DC at the specified control voltages. The spare auxiliary contacts shall also be wired up to the terminal blocks.	
6.5.4	Make of Contactor shall be L&T/Schneider/Siemens/ABB make only.	
6.6	**Bimetal Thermal Overload Relays**	
6.6.1	The contactor shall be provided with three pole bimetal thermal overload relays, unless other-wise specified. The bimetal relays shall be of suitable range, ambient temperature compensated and shall be separate mounting type. They shall be adjustable through graduated scale and shall be provided with changeover contact. Thermal relays having long time/current characteristics, operated through saturated C.T.s shall be supplied, wherever required.	
6.6.2	Bimetal thermal relays shall conform to IS: 3231 and IS/IEC 60947 and shall have built in single phasing preventer.	
6.6.3	The bimetal relays shall be provided with a manual resetting device resettable after opening module door. Auto reset thermal relays are not acceptable.	
6.6.4	Make of Overload Relays shall be L&T/Schneider/Siemens/ABB make only.	
6.7	**Current Transformers**	
6.7.1	The current transformers shall conform to IS: 2705.	
6.7.2	C.T.s shall be Class F insulated and vacuum impregnated or resin cast. The C.T.s shall be rigidly mounted and shall be easily accessible for maintenance and testing.	
6.7.3	The short time thermal withstand ratings of C.T.s shall be same as the thermal withstand rating of the breakers.	
6.7.4	The C.T.s output shall be minimum 15VA for breaker feeders and 7.5 VA for the other feeders per phase and in any case, the output shall be adequate for the protection and metering duties involved with sufficient margin. The C.T.s shall have the following accuracies for the various applications as per IS: 2705:	
i)	For metering service Class- 1	
ii)	For use with protective relays - 5P	

6.7.5	The C.T. cores for metering and protection shall be separate.	
6.7.6	The ratio of C.T.s shall be as per Feeder rating.	
6.7.7	All the C.T.s shall be provided with terminals and shorting links. One of the terminals of the C.T. shall be earthed. The polarity of the C.T.s shall be clearly marked.	
6.7.8	The C.T.s shall be capable of withstanding momentary open circuit on the secondary side without injurious effects.	
6.8	**Voltage Transformers**	
6.8.1	The V.T.s shall be Class F insulated and vacuum impregnated or resin cast conforming to IS: 3156	
6.8.2	The primary nominal voltage shall be equal to the system nominal voltage. The secondary terminal voltage shall be 110 V.	
6.8.3	The primary and secondary winding shall be protected by HRC fuses in each phase except in the ground phase of the secondary side.	
6.8.4	The V.T.s shall be mounted on separate withdraw able carriage. The accuracy Class of V.T.s shall be class1.	
6.8.5	The rated output of each V.T. shall be adequate for the relays, meters and associated wiring connected to it and shall not be less than 50 VA per phase.	
6.9	**Control Transformers**	
	These shall be air cooled Class F insulated and vacuum impregnated. The rating of control transformer shall be twice the hold on VA of all contactor/relays or 2.5 KVA whichever is high. It shall be free from hum and rigidly mounted. Epoxy cast transformers shall be preferred.	
6.11	**Relays**	
6.11.1	All protective relays for Incomer and Bus Coupler shall be of latest version, microprocessor based numerical type with communication port and interlinked with online energy management system. 100% redundancy shall be provided for communication. Numerical relays shall be **L&T/Schneider/Siemens/ABB** make only.	
6.11.2	All outgoing motor feeder shall be protected with thermal overload relay and in addition motors which are 15KW and above shall be provided with instantneous over current , Earth Fault protections etc.	
6.11.3	Mastertrip relay shall be electromechanical type only. Make of relay shall be ABB/Alstom only.	
6.13	**Instruments and Meters**	
6.13.1	All instruments shall be flush mounting type with square face of 96 mm x 96 mm. They shall be tropicalised and dust tight.	
6.13.2	Meters shall be digital multifunctional meters with communication port for energy management at remote location. The minimum size of the instruments shall be minimum 96X96 mm for incomers, bus-couplers and other modules.	
6.13.3	All ammeters and voltmeters, to be provided separately, shall have 0-90° scale and shall be moving iron spring controlled type of class 1.5 accuracy as per IS: 1248.	
6.13.4	In case of motor feeders, the ammeters shall be graduated uniformly upto C.T. primary current and with compressed end scale upto 6 times C.T. primary current. Red pointer shall be provided, which shall be adjusted at site for indicating full load current of the motor.	
6.13.5	All Ammeters and Voltmeters shall be of moving coil type with Accuracy class 1.0	
6.14	**Push Buttons and Control Switches**	
6.14.1	The switches and push buttons shall conform to utilization category AC11/DC11 as per IS: 60947. The contact shall be rated to make, break and carry inductive current of 5 Amp at 415 V AC and 1 Amp at 110 V DC.	
6.14.2	The control switches shall be spring return rotary type, unless otherwise specified and provided with pistol grip type handle. The control switches for circuit breakers shall be additionally fitted with lost motion devices and sequencing devices.	
6.14.3	The selector switches shall be stay put rotary type and provided with oval shape handles.	
6.14.4	The push buttons shall be of momentary contact spring loaded type with a set of normally close and open contacts. The push button for 'Start' shall be shrouded type and coloured green, stop push button shall be un-shrouded type and coloured red and other push buttons shall be un-shrouded type coloured black. The fixing ring shall be metallic white.	
6.14.5	Emergency stop push buttons shall be lockable and mushroom type on each feeder.	
6.15	**Miniature Circuit Breakers**	
6.15.1	The miniature circuit breakers shall conform to IS: 8828 and shall be of duty category M-9.	
6.15.2	It shall be provided with overload and short circuit protective devices in a heat resistant housing.	
6.15.3	A certificate for short circuit rating and Current-Time tripping curve shall be furnished along with the offer.	
6.16	**Signal Lamps**	

	Signal lamps shall be provided to indicate the various circuit conditions. The colour of the lamps for various functions shall be as follows:	
	Red -- Circuit breaker/switch/contactor closed.	
	Green -- Circuit breaker/switch/contactor open.	
	White -- Trip circuit healthy.	
	Amber -- Alarm and auto trip.	
	Blue -- CB Spring charged	
	Blue -- Spring Charged	
	Red -- Space Heater ON	
	Blue - Ready to close	
	Clear - Breaker in service	
	Clear - Breaker in test	
6.16.2	All lamps shall be of low voltage glow protection (LVGP) LED type with lumen output of 200 mili candela in axial direction.	
7.0	**ACCESSORIES**	
7.1	The supply shall include the following accessories:	
	Maintenance truck/device for raising, lowering and withdrawal of circuit breaker	
	Fuse puller,-02 no.	
	Space Heater	
	Each vertical section shall be provided with a thermostatically controlled space heater, rated for 240 V, 50 Hz and controlled through double pole miniature circuit breaker.	
7.2	**Name Plates**	
7.2.1	The switchboard shall have large name plate on the top indicating its Name, Designation and Code No.	
7.2.2	Each feeder shall be provided with name plate. Each panel shall have name plate indicating panel number both in front and back.	
7.2.3	All control switches, push buttons, lamps etc. shall have functional identification labels.	
7.2.4	Name plate shall be of black Perspex with white engraving and of minimum 3mm thick	
7.3	Any other accessories required, but not specified, shall also be supplied to make the switchboard complete in all respects and ensure safe and proper operation.	
8.0	**PAINTING**	
8.1	The enclosure, after degreasing, pickling in acid, cold rinsing, phosphatising, passivating etc. shall be painted with two coats of anti-rust paint followed by two coats of anticorrosive paint.	
8.2	Epoxy based powder coating paint shall be used.	
8.3	All paints shall be carefully selected to withstand tropical heat and extremes of weather. The paint shall not scale off, crinkle or be removed by abrasion due to normal handling.	
8.4	Unless otherwise specified, the finishing shade shall be light grey having Shade No.631 as per IS: 5 or Siemens Gray RAL7035.	
8.5	One litre of paint shall be supplied along with each board for touch up at site.	
9.0	**TESTS AND INSPECTION**	
9.1	All the switchboards shall be subjected to routine test as per IS: 8623 and their components as per relevant standards.	
9.2	Acceptance tests on panel at party's works shall be carried out on panel (100 % panel) in presence of NFL engineer. Party shall give an advance notice of at least 15 days to NFL for deputation of its engineer at Party's works. Additional tests, wherever specified, shall be carried out by the Party.	
9.3	All the above tests shall be carried out in presence of Owner's /Consultant's representative. In addition, the equipment shall be subjected to stage inspection during process of manufacture at works and site inspection	
9.4	These inspections shall however, not absolve the contractor from their responsibility for making good any defect which may be noticed subsequently.	
10.0	**DRAWINGS AND DOCUMENTS**	
10.1	As bulit drawings and documents in 04 no. Hard Copy and 02 no. Soft Copy in Pen drive of shall be supplied by the party after sucessful commissioning of LT Panels.	
10.2	All drawings and documents shall have the following description written boldly:	
	Name of Client	
	Enquiry / Order Number / Plant Name	
	Code No. & Description	
11.0	**SPARES**	
	Commissioning spares, as required, shall be supplied with the main equipment.	
12.0	**PACKING**	
12.1	The board shall be properly packed before dispatch to avoid damage during transport, storage and handling.	

12.2	The packing box shall contain a copy of the installation, operation and maintenance manual.	
12.3	A sign to indicate the upright position of the panels to be placed during transport and storage shall be clearly marked. Also proper arrangement shall be provided to handle the equipment.	
13.0	For any clarification, Party may visit to site before quoting.	
14.0	Party shall clearly mention time required for the supply of LT Panels in the offer.	
15.0	Party shall submit the drawing within 20 days from the issue of PO.	
16.0	Job will carried subject to site clearance from NFL.	
17.0	As time is the essence of the work Maximum Time of execuation of Job shall be 15 days. Party shall clearly mention the execuation time in the offer.	
18.0	For Dismantling of existing MCC and Erection & commsissioning of Supplied Mobilization time shall be 15 days.	
19.0	Payment terms shall be 80% against supply of LT Panels and remaining 20 % against Sucessful Installation a& ommissioning of LT Panels.	
20.0	Evaluation of supply & Installation shall be done on overall Lowest basis.	
21.0	Party shall submit the technical detail alongwith offer:	
i	Manufacturer's Type	
ii	Ref. Standards	
iii	Rated Operational Voltage with ± %	
iv	Rated Insulation Voltage	
v	Rated Voltage of Aux. Circuits with ± %	
vi	Rated Current	
vii	Short Circuit Rating	
viii	Degree of Protection of Enclosure	
ix	Service Conditions : Indoor / Outdoor	
A	**DRAWOUT FACILITIES**	
i	Circuit Breakers	
ii	P.Ts.	
iii	Motor Starters	
iv	Protective Relays	
v	Meters	
B	**SINGLE FRONT /DOUBLE FRONT**	
i	C.B. Feeders	
ii	Other Feeders	
C	**MAXIMUM NOS. OFFEEDERS IN ONEPANEL**	
i	Circuit Breakers	
ii	Motor Starters	
iii	Switch Fuse	
D	**SHEET STEEL TYPE & THICKNESS**	
i	Load Bearing member	
ii	Non Load Bearing member	
iii	Base Channel	
iv	Material of Gaskets	
v	Material of External Hardware	
vi	Operating Height : Max. / Min.	
vii	Space Heater Rating of each Panel	
E	**PAINTING**	
i	Method of Pre-treatment	
ii	Type	
iii	Thickness of Paint	
iv	Finishing Shade	
v	Dimensions : L X B X H / Dim. Drg. Ref. No.	
vi	Shipping Dimensions of Largest Package	
vii	Weight	
F	**BUS - BARS**	
i	Material SIZE	
ii	HBB : Phase / Neutral	
iii	VBB : Phase / Neutral	
iv	Ground	
v	Supporting Calculations Attached	
vi	Between Phases	
vii	Between Phase & Earth	
viii	Minimum Creepage Distance	
ix	Current Rating : Continuous / Short Time	

	Temp. Rise for : Cont. Load / Short Time Current	
G	SUPPORT	
i	Material	
ii	BIL	
iii	Arrangement :Separate/Common	
iv	Material of Bus-bar Insulation	
v	Shrouding Material for Joints	
vi	No. & Type of Bolts	
H	CIRCUIT BREAKERS	
i	Make	
ii	Maker's Type	
iii	Ref. Standards	
iv	Type of Circuit Breaker	
v	Short Circuit Category	
vi	Maximum Operating Voltage	
vii	No. of Poles	
I	CURRENT RATING	
i	Continuous	
ii	1 second RMS	
iii	Momentary (kA Peak)	
J	BREAKING CURRENT	
i	Symmetrical KA	
ii	Asymmetrical KA	
iii	Sym. MVA at Rated Voltage	
K	Making Current (Peak)	
	INSULATION LEVEL	
i	1 Min. PF withstand Voltage	
ii	Impulse withstand Voltage	
iii	No. of Breaks per Pole	
L	TYPE AND MATERIAL OF	
i	Main Contacts	
ii	Arcing Contacts	
iii	Contact Pressure	
iv	Type of Closing Mechanism	
v	Type of Tripping Mechanism	
vi	Type of Arc Control Device	
vii	Anti Pumping Features with Details	
viii	Trip Free Features with Details	
ix	Total Closing Time	
M	Interrupting Time at 10%, 50%, 100% of rated Interrupting Capacity	
i	Total	
ii	Arcing Time	
N	SPRING CHARGING MOTOR	
i	Rating	
ii	Voltage	
iii	Insulation	
iv	Duty	
v	Spring Charging Time	
O	CONTROL VOLTAGE WITH RANGE	
i	Closing	
ii	Tripping	
iii	Alarm and Indication	
P	POWER/ CURRENT REQUIRED FOR	
i	Closing	
ii	Tripping	
Q	AUXILIARY CONTACTS	
i	No. of Spare Contacts : NO / NC	
ii	Contact Rating : AC / DC	
iii	Convertible : Yes / No	
iv	Net Weight of Breaker	
v	Type Testing Authority & Test Report Ref. No.	
R	CURRENT TRANSFORMERS	
i	Make / Maker's Type	
ii	Ref. Standard	

iii	Type of Primary Winding	
iv	Ratio	
v	Rated Burden	
vi	Accuracy Class	
vii	ALF / ISF	
viii	Insulation Class & Material	
S	**POTENTIAL TRANSFORMERS**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Winding Connection	
iv	Ratio	
v	Rated Burden	
vi	Accuracy Class	
vii	Insulation Class & Material	
T	**SWITCHES**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Type of Switch	
iv	Rated Operational Voltage	
v	Utilisation Category	
vi	Rated Operational Current	
vii	Short Time Withstand Current	
viii	No. of Poles / Break	
ix	Type Test Certificate Ref. No.	
U	**FUSES**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Type of HRC Fuse	
iv	Rated Voltage / Current	
v	Category of Duty	
vi	Prospective Breaking Current	
V	**CONTACTORS**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Rated Operational Voltage	
iv	Utilisation Category	
v	Rated Duty	
vi	Rated Thermal Current	
W	**OPERATING VOLTAGE OF COIL**	
i	Pick up Max./Min.	
ii	Drop off Max./Min.	
X	**RELAYS**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Type of Mounting	
iv	Burden	
Y	**INSTRUMENTS AND METERS**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Operating Principle	
iv	Scale Range	
v	Accuracy	
vi	Size	
vii	Type of Mounting	
Z	**CONTROL SWITCHES**	
i	Make / Maker's Type	
ii	Ref. Standard	
iii	Contact Rating	
iv	Utilisation Category	
23.0	**DEVIATIONS**	
	Deviations, if any, shall be clearly indicated in the offer with reasoning.	

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LAYOUT PLAN MCC PANEL SILO NORTH SIDE FOR BAGGING

1	2	3	4	5	6	7	8	9	10
MOTOR SCREEEN	SCRAPPERS RING MAIN SUPPLY	SPARE	MAGNET SWITCH	INCOMER-1	MOTOR ET-5A	Control Transformer SUPPLY 440/110V	ZERO SPEED TRANSFORMER SUPPLY	MOTOR ET-6	BUS COUPLER (COND-A & COND-B)
5.5KW					3.7KW			7.5KW	
SFU 63A	SFU 250A	SFU 125A	SFU 125A	ACB 800A	SFU 63A	SFU 125A	SFU 63A	SFU 63A	ACB 1250A
11	12	13	14	15	16	17	18	19	20
MOTOR ET-4	SPARE	INCOMER FROM MRSS	SCRAPPER-1 POWER SUPPLY	MOTOR CONTROL PANEL	MOTOR ET-2	MOTOR ET-5B	INCOMER-2 FROM NORTH S/S	SPARE	SPARE
11.5KW					24KW	30KW			
SFU 125A	SFU 125A	ACB 800A	SFU 250A	SFU 125A	SFU 125A	SFU 125A	ACB 800A	SFU 125A	SFU 125A

LAYOUT PLAN MCC PANEL SILO SOUTH SIDE FOR BAGGING

1	2	3	4	5	6	7	8	9	10	11
COMPRESSOR MOTOR	ALTERNATIVE SUPPLY FROM LIGHTING PANEL	Control Transformer 415/110V AC	POWER PLUG	INCOMER-1	RAIN WATER PUMP MOTORS	Control Transformer SUPPLY FOR ZERO SPEED	SCRAPPER NO.2 SUPPLY	AIR CONDITION SUPPLY	MOTOR ET-9317 CONTROL FUSE	BUS COUPLER (COND-A & COND-B)
45KW										
SFU 250A	SFU 125A	SFU 63A	SFU 63A	ACB 800A	SFU 250A	SFU 125A	SFU 250A	SFU 125A	SFU 125A	ACB 1250A
12	13	14	15	16	17	18	19	20	21	22
ALTERNATIVE SUPPLY FROM LIGHTING PANEL	DUST BLOWER SUPPLY	MOTOR ET-3B	MOTOR ET-9314	INTERLOCKING SWITCH	MOTOR SCREEN	SPARE FOR ET-4B	INCOMER-2	MOTOR ET-9317	SPARE	SPARE
		24KW	5.5KW		5.5KW	24KW		24KW		
SFU 125A	SFU 125A	SFU 125A	SFU 63A	SFU 63A	SFU 63A	SFU 125A	ACB 800A	SFU 125A	SFU 125A	SFU 125A

Annexure – III

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LAYOUT PLAN MCC PANEL BAGGING-1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
FILLING POST NO.2	LIGHTING PANEL FLOOR 1,2,3 & 4	EOT CRANE (1 TON)	FILLING POST NO.4	INCOMER-1 FROM NORTH S/S	WALL MOUNTED FAN GROUND FLOOR	Control Transformer SUPPLY TO INSTRUMENTATION	AIR CONDITION FOR INSTRUMENT	GROUND FLOOR LIGHTING	Control Transformer 415/110V	SPARE FOR WEIGHING MACHINE	DUST BLOWER ET-6	NEEM COATING MOTOR	BUS COUPLER (COND-A & COND-B)	SPARE
												3.7KW		
SFU 63A	SFU 125A	SFU 125A	SFU 63A	ACB 800A	SFU 125A	SFU 125A	SFU 125A	SFU 125A	SFU 63A	SFU 63A	SFU 125A	SFU 63A	ACB 1250A	SFU 63A
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
COMPRESSOR MOTOR SPARE	STACKING MOTOR-1	POWER POINT	STACKING MOTOR-2	MOTOR CONTROL PANEL	INCOMER-2 FROM MRSS	POWER SUPPLY TO INSTRUMENT	WEIGHING MACHINE POWER SUPPLY	FILLING POST NO.5	COMPRESSOR MOTOR	FILLING POST NO.6	FILLING POST NO.7	FILLING POST NO.8	STACKING MOTOR-3	SPARE
15KW	11.5KW		15KW						30KW				15KW	
SFU 125A	SFU 63A	SFU 63A	SFU 125A	SFU 63A	ACB 800A	SFU 63A	SFU 63A	SFU 125A	SFU 125A	SFU 63A	SFU 63A	SFU 63A	SFU 125A	SFU 125A

LAYOUT PLAN MCC PANEL BAGGING-2

1	2	3	4	5	6	7	8	9	10	11	12	13	14
SPARE	FIRE WATER PUMP MOTOR	MOTOR ET-9322	FILLING POST-1	INCOMER-1 FROM NORTH S/S	FILLING POST-2	Control Transformer 415/110V	FILLING POST-3	FILLING POST-4	MOTOR ET-9321	Control Transformer 415/110V	SPARE	NEEM COATING MOTOR	BUS COUPLER (COND-A & COND-B)
	30KW	7.5KW							7.5KW			3.7KW	
SFU 250A	SFU 125A	SFU 63A	SFU 63A	ACB 800A	SFU 63A	SFU 63A	SFU 63A	SFU 63A	SFU 63A	SFU 63A	SFU 125A	SFU 63A	ACB 1250A
15	16	17	18	19	20	21	22	23	24	25	26	27	28
ALTERNATIVE FEEDER	SPARE	EOT CRANE (1 TON)	AIR CONDITION SUPPLY	DUST BLOWER SUPPLY	FILLING POST-5	FILLING POST-6	STACKING MOTOR-1	INCOMER-2 FROM NORTH S/S	FILLING POST-7	STACKING MOTOR-2	FILLING POST-8	STACKING MOTOR-3	DUST BLOWER SUPPLY
							15KW			15KW		15KW	
SFU 250A	SFU 125A	SFU 125A	SFU 125A	SFU 125A	SFU 63A	SFU 63A	SFU 125A	ACB 800A	SFU 63A	SFU 125A	SFU 63A	SFU 125A	SFU 125A

Annexue-IV

Annexure-V

Equipments details- SUPPLY, DESIGN, MANUFACTURE, TESTING AT WORKS DELIVERY IN WELL-PACKED CONDITION OF 415V SWITCHBOARDS

Sno.	KW / Current Rating	Feeder Description	Bill of Material Required	Qty	Make
1	800 Amp	Incomer-1 & 2 with Incomer PT	ACB 4Pole	1 No.	L& T /Siemens/ ABB/ Schneider/OEM
			Numerical Feeder Protection Relay	1 No.	L& T /Siemens/ ABB/ Schneider
			Master Trip Relay (86)	1 No.	Alsthom/GEC/ ABB
			Trip Ckt Supervision Relay	1 No.	Alsthom/GEC/ ABB
			Aux. Contactor (110 V AC)	As per requirement	L& T /Siemens/ ABB/ Schneider
			Incomer PT	3 No.	As per Vendor Standard
			Current Transformer (Protection + Metering)	3 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Voltmeter (analog)	1 No.	AE / Indcoil /SKP
			MFM (for energy metering)	1 No.	L& T /Siemens/ ABB/ Schneider/Secure
			Emergency Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Local Remote Switch	1 No.	Kay Cee/ Switron/Salzer
			TNC Switch	1 No.	Kay Cee/ Switron/Salzer
			Control MCB	As per requirement	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110VAC [ON/OFF/ Trip Ckt Healthy/ Trip / CB in Test/ CB in Service/Spring Charged, Ready To close, R/Y/B Phase Indication]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
2	800 Amp	Bus coupler	ACB 4Pole	1 No.	L& T /Siemens/ ABB/ Schneider/OEM
			Numerical Feeder Protection Relay	1 No.	L& T /Siemens/ ABB/ Schneider
			Master Trip Relay (86)	1 No.	Alsthom/GEC/ ABB
			Trip Ckt Supervision Relay	1 No.	Alsthom/GEC/ ABB
			Aux. Contactor (110 V AC)	As per requirement	L& T /Siemens/ ABB/ Schneider
			Incomer PT	3 No.	As per Vendor Standard
			Current Transformer (Protection + Metering)	3 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Voltmeter (analog)	1 No.	AE / Indcoil /SKP
			MFM (for energy metering)	1 No.	L& T /Siemens/ ABB/ Schneider/Secure
			Emergency Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Local Remote Switch	1 No.	Kay Cee/ Switron/Salzer
			TNC Switch	1 No.	Kay Cee/ Switron/Salzer
			Control MCB	As per requirement	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110VAC [ON/OFF/ Trip Ckt Healthy/ Trip / CB in Test/ CB in Service/Spring Charged, Ready To close, R/Y/B Phase Indication]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
3	45 KW	SFU Starter module	Switch Fuse Unit - 250 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
4	30 KW	SFU Starter module	Switch Fuse Unit - 125 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
5	24 KW	SFU Starter module	Switch Fuse Unit - 250 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider

Annexure-V

			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
6	15 KW	SFU Starter module	Switch Fuse Unit - 125 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
7	11.5 KW	SFU Starter module	Switch Fuse Unit - 63 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
8	5.5 KW	SFU Starter module	Switch Fuse Unit - 63 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
9	3.7 KW	SFU Starter module	Switch Fuse Unit - 63 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Power Contactor (110 V AC) 5 NO + 3NC	1 No.	L& T /Siemens/ ABB/ Schneider
			Overload Relay with Single phase preventor	1 No.	L& T /Siemens/ ABB/ Schneider
			Aux. Contactor (110 V AC) 5 NO + 3NC	2 No.	L& T /Siemens/ ABB/ Schneider
			Current Transformer	1 No.	AE / Indcoil /SKP
			Ampere Meter (Analog)	1 No.	AE / Rishabh
			Stop Push Button	1 No.	L& T /Siemens/ ABB/ Schneider
			Control MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF/ OVER LOAD TRIP]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
10	63 Amp	SFU	Switch Fuse Unit - 63 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Outgoing MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
11	2.5KVA	SFU	415 V/ 110 V Transformer	1 No.	As per Vendor Standard
			Switch Fuse Unit - 63 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF] 110 V Ac	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
12	125 Amp	SFU	Switch Fuse Unit - 125 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Outgoing MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic
13	250 Amp	SFU	Switch Fuse Unit - 250 A + Fuse	1 No.	L& T /Siemens/ ABB/ Schneider
			Outgoing MCB	1 No.	L& T /Siemens/ ABB/ Schneider
			Indication Lamp 110 V AC [ON/OFF]	1 No. each	L& T /Siemens/ ABB/ Schneider/Essbee/ Binay/Technic

S. No.	Eligibility Criteria	Supporting Documents required
1	The bidder should be a manufacturer for 415 V MCC/LT Panel or an authorized Dealer of the manufacturer.	**In case of a Manufacturer:** Bidder shall submit a copy of valid industrial license issued by statutory Authority / Govt. Agency. **In case of a Dealer:** If the bidder is an authorised dealer of any manufacturer, tender specific authorisation certificate from the manufacturer is to be submitted.
2	The bidder should have supplied similar item during the last seven years ending last day of previous month in which NIT has been issued. **Similar item means:** Design, supply, installation , testing and commissioning of 415 V Switch Board	The bidder shall submit copies of Purchase Orders/ Contracts for at least one of the followings: Three PO's/ contracts for supply of similar items each costing not less than Rs. 20.00 Lacs including taxes OR Two PO's/ contracts for supply of similar items each costing not less than Rs. 25.00 Lacs including taxes OR One PO/ Contract for supply of similar item costing not less than Rs. 40.00 Lacs including taxes.
3	Bidder shall submit completion certificates against the submitted purchase orders/ contracts.	Completion Certificate against the PO/ Contracts submitted by the bidder as per point no. 2 above from the end user. In case party is not able to submit completion certificate from the End User, then party shall submit name & address of the customer and name, phone no. & email IDs of all the concerned persons of user plant. In such case decision of NFL on acceptance of bid will be final
4	Average Annual financial turnover of the bidder during the last 3 years ending 31st March of the previous financial year should be at least Rs 15.00 lacs.	Bidder shall submit self-attested copies of Audited Balance Sheet and Profit &Loss A/c for the last three financial years ending on 31st March of the Previous financial year. (i.e., FY2020-21, 2021-22 & 2022-23) In case the bidder does not fall under the ambit of statutory audit, and do not have audited annual reports / audited Balance Sheets and Profit & Loss Statements, then bidder shall submit a turnover certificate duly certified by practicing Chartered Accountant with UDIN detail.