4.16.00 Contractor shall provide fully compatible electrical system, equipment, accessories and services for the entire station/plant in his scope as well as those specifically required by the Owner.

4.17.00 Areas where flammable and combustible liquids, gases, and dusts are handled and stored shall be classified for the purpose of determining the minimum criteria for design and installation of electrical equipment to minimize the possibility of ignition. The criteria for determining the appropriate classification are as specified in the relevant codes and standards.

4.18.00 Electrical equipment in areas classified as hazardous shall be constructed and installed in accordance with the requirements of the appropriate codes and standards.

4.19.00 **System Particulars**

Description	220 kV System	11kV System	3.3kV System	415V System	415V System (Lighting & Welding System)	240V System	220V DC System
Nominal Voltage	220kV	11kV	3.3kV	415V	415V	240V	220V
Highest System Voltage	245kV	12kV	3.6kV	457V	457V	264V	242V
Number of Phases (Conductor)	Three (3)	Three (3)	Three (3)	Three (3)	Four (4)	Two (2)	Two (2)
Frequency	50Hz	50Hz	50Hz	50Hz	50Hz	50Hz	NA
Voltage Variation	±5%	±10%	±10%	±10%	±10%	±10%	+10% to –15%
Frequency Variation	±5%	±5%	±5%	±5%	±5%	±5%	NA
Combined Voltage & Frequency Variation	10%	10%	10%	10%	10%	10%	NA
Neutral Earthing	Solidly Grounded	Resistance Grounded	Resistance Grounded	Solidly Grounded	Solidly Grounded	Solidly Grounded	Un-grounded
Design Fault Level to be adopted	40kA for 3 second	40kA for 3 second	40kA for 3 second	50kA for 1second	20kA for 1second	9kA	25kA for 1second $$

Note: $$ denotes fault level at DCDB level shall be 25kA while at DLDB level fault level shall be 9kA.

outgoing tie feeders rated 630A & above and motor feeders rated above 90kW shall be equipped with air circuit breakers of fault interrupting capacity of 50KA rms. Incomers / bus- couplers, outgoing tie feeders rated up to 630A and motor feeders rated up to 90kW shall be equipped with motorized MCCB.

5.21.02 All the boards shall be sectionalized.

5.21.03 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.

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

5.21.05 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.

5.21.06 Restoration of normal operating condition shall be through planned manual changeover through synchro check paralleling or manual dead bus closing. Incase parallel running between two sources prolong over a set time, an alarm shall be generated and the last ACB to close shall be opened.

5.21.07 The AC control supply voltage for motors rated 90kW & below 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.

5.21.08 All circuit breakers shall have 220V DC control.

Draw-out Type PMCC

- 415V FGD PMCC-1
- 415V FGD PMCC-2

Fixed Type Distribution Boards

- DCDB
- Power Distribution Board (PDB)
- Main Lighting Distribution Boards (MLDB)
- Emergency Main Lighting Distribution Board (EMLDB)
- DC Lighting Distribution Board (DCLDB)

5.21.09 Any other PCC/PMCC/MCC/DB required as per the distribution of load and for any other system which is part of mechanical system under FGD package.

5.22.00 **Protection Philosophy**

5.22.01 Single comprehensive Numerical type protective relays of latest generation shall be provided to isolate the faulty equipment and system as early and as expeditiously possible. All numerical relays shall communicate with PLC through Open protocol (IEC 61850). Protection requirement for individual equipment have been elaborated under respective switchgear sections.

5.23.00 **LV Power Supply**

LV power supply feeders shall have moulded case circuit breaker (MCCB) for over current & short-circuit protection.

5.24.00 **Operation and Control Philosophy**

5.24.01 **Auxiliary Power supply system control**

a) All controls, indications, measurements, annunciation and sequential event logging for all drives shall be provided in PLC.

b) Control of all 415V incomer and bus coupler breakers of PCC / PMCC / MCC shall be done from PLC.

5.24.02 **Interface with PLC**

a) Control, monitoring, measurement, annunciation of complete electrical system supplied under this contract shall be possible from the PLC system.

b) All relevant data shall be made available to the PLC by the Contractor.

5.24.03 **Control**

a) All the electrical drives shall be generally controlled (starting, stopping and sequencing) from the FGD control room through the PLC. Remote position, service position, breaker healthiness, permissive for interlocks, status of emergency stop Push button etc., shall be considered as minimum inputs to the PLC.

b) Control of incomers and bus-coupler breakers of LV Switchgear shall be possible from the PLC. Check synchronizing relay shall be housed in the respective switchboards. Provision shall be made in PLC based system for selection of only one breaker at a time for synchronizing. The synchronizing selection shall also activate the check synchronizing relay provided in the respective switchgear panels.

c) Control of all breakers/contactors from PLC based control system shall be done through interposing relays. These interposing relays shall be available in the respective switchgear panels. Any auxiliary relay required for linking with PLC shall also be provided. Interposing relays shall be plug-in type.

d) No hard-wired switch is envisaged near the motor or control desk for selection of motors. Selection of motor is only through software through mouse click.

5.24.04 **Monitoring**

a) Indication-Status of breakers / vacuum contactors, position of Local/Remote selector switches, spring charged indication etc.

b) Abnormal conditions of LV System: -

- Breaker auto trip, individual protective relay operation, trip circuit failure, DC supply failure, bus under voltage, VT fuse failure. Successful/Unsuccessful changeover of 415V supplies.

c) Single line diagram showing voltage, current, frequency, MW and MVAR flows, breaker positions shall be available on CRT.

d) Trending facility shall be provided for all analogue parameters. Separate Transducers shall be considered for this.

5.24.05 **Measurement**

Multi-functional Transducers, if any required for giving analogue input to PLC system from LV modules shall be provided in the switchgear modules.

Sl No	Feeder Description	CRT
a)	Incoming feeders of LV Switchgears & MCCs rated 630A and above.	Voltage (All phases)
		Current (All phases)
		KW, KWH
b)	Incomer feeder of LV MCC rated below 630A	Current Y phase
c)	Bus coupler of LV switchgears & MCC rated 630A and above.	A (All phases)
d)	Bus coupler of LV MCC rated below 630A	Current Y phase
e)	LV Buses	Voltage (All phases)
f)	Outgoing feeder of LV Switchgear and MCC rated 630A and above.	Voltage (All phases)
		Current (All phases)
		KW, KWH
g)	Outgoing feeder of LV MCC rated below 630A	NIL
h)	Motor feeder rated above 90kW	Current (All phases)
		KW, KWH
i)	Critical drive feeder rated above 18.5kW upto 90kW	Current Y phase
j)	Motor feeder rated up to 18.5kW	NIL
k)	Incomer of ACDB/MLDB/PDB/MCCB	Voltmeter with voltmeter selector switch.
		Electronic energy meter with communication port suitable for IEC-61850 protocol. Electronic energy meter suitable for communication with protocol Modbus RS 485 is also acceptable.

5.24.06 **Event Logging**

Event logging shall be provided for all manual operations and relay operations as detailed below: -

a) Status of each ACB of all equipment being controlled

b) Close and open commands

c) Each protective relay, trip relay, alarm relay operation. Event logging for each phase shall be provided wherever applicable (e.g. fuse fail alarm, etc.).

Event logger shall be a part of the PLC based control system.

PLC based control system shall be directly interfaced with numerical relays for digital / analogue signals through open protocol IEC 61850. All sequence of event recorder (SER) signals shall be with time stamping in PLC based control system.

5.24.07 **Synchronizing**

LV Switchboards / MCC incomer and bus coupler breakers shall have facility for dead bus and synchronizing closure through PLC based control system.

5.25.00 **Motors**

5. 25.01 Motors rated up to and including 160kW shall be connected to 415V, 50Hz AC supply. Motors rated above 160kW up to and including 750kW shall be connected to 3.3KV, 50Hz supply. Motors rated above 750kW shall be connected to 11kV, 50Hz supply.

5. 25.02 All LT motors of S1 duty cycle shall conform to minimum efficiency performance standards (MEPS) of IE3 mentioned in IS: 12615. All HT motors shall have efficiency and power factor higher than 90% and 0.83 power factor respectively. For crane motors S4 duty with 40% cyclic duration factor shall be considered. Motors operating through variable frequency drives shall be suitable for inverter duty.

5. 25.03 The motor name-plate rating at 50°C shall have at least 15% margin for HT & LT system over the input power requirement of the driven equipment at rated duty point and also covering the 10% margin on maximum load demand of the driven equipment under entire operating range, including voltage and frequency variations, unless stated otherwise in driven equipment specification or in general electrical specification.

5. 25.04 All motors shall have Class F insulation with temperature rise limited to Class-B.

5.26.00 **Selection of Cables**

5.26.01 HV & MV cables and LV power cables shall be selected on the basis of current carrying capacity, short circuit rating and permissible voltage drop.

a) While sizing power cables, following aspects shall be considered: -

i) Ground / ambient air temperature.
ii) Depth of laying
iii) Power cables laid in touching formation for multicore cables and in trefoil formation for single core cables.
iv) Fault current & duration
v) Full load current of the circuit
vi) Steady state voltage drop with maximum load current
vii) Transient voltage dip on motor starting
viii) Consideration shall also be given to limit the cable to the nearest standard sizes instead of using too many types.
ix) The standard cable sizes, ampacities, de-rating factors, etc. shall be as given in IS or relevant standard.
x) Route length.

b) The fault current & interrupting time shall be as under: -

i) For 11kV - 40kA - 0.2 sec for outgoing motor feeders and transformer feeders and 40kA - 1sec for tie and incomer feeders.

ii) For 3.3kV - 40kA - 0.2 sec for outgoing motor feeders and transformer feeders and 40kA - 1 sec for incomers & tie feeders.

iii) For 415V - 50kA - 0.25 sec for motor feeders and 50kA -1sec for incomer & tie feeders.

For sizing of 11 kV incoming cable to FGD Switchgear from Station Transformer, contractor shall consider the secondary side full load current of the 63/31.5/31.5MVA Station Transformer as current carrying capacity of the cable.

5.26.02 For MCCB/MPCB protected feeders, minimum cross section criteria shall not apply. Also Outgoing feeders where only IDMTL protection is provided, 1sec shall be considered for cable sizing.

5.26.03 For ACB / MCCB / MPCB protected circuits the conductor size shall depend upon full load current subject to voltage drop limited to 3% during running of all feeders and 15% during starting of motors having rigid coupling. For motors having fluid coupling the starting voltage drop can be considered as 20%. In addition, transformer regulation shall also be considered for loads fed from 415V PMCC.

5.26.04 For all HV & LV power and 220V DC cable 10% design margin in load current shall be considered.

5.26.05 The voltage drop from main lighting distribution board to any fixture shall not exceed 3%. For welding receptacles 3% running drop shall only be considered.

5.34.08 At least one 5/15A, 230V AC universal socket outlet with switch shall be provided in each office, cabins, etc. 20A, 230V AC industrial receptacle with switch shall be provided strategically in all industrial area.

5.35.00 **Welding Sockets**

Suitable number of 63A, 3ph., 4 wire, 5 pin, 415V AC industrial receptacles shall be provided for entire plant for welding purposes, particularly near all major equipment and at an average distance of 50 M.

63A welding sockets shall be fed from 415V FGD PMCC.

5.36.00 **Degree of Protection for Enclosures of Electrical Equipment**

5.36.01 Degree of protection for various enclosures as per IS: 13947 shall be as follows:-

Description of Equipment	Degree of Protection
LV Switchgear/MCC/DBs/Fuse Boards	
Compartments and bus bar chambers up to 1600A	IP52
Compartments and bus bar chambers above 1600A	IP42
Switchgear located outdoor	IP55
Motors	
Indoor motors	IP55
Outdoor motors	IP55 with external FRP canopy
Actuator	IPW-67
Push button stations and any other kiosk/box/panel/ enclosure	
Indoor	IP42 for Control & Relay panels located in air-conditioned areas
Outdoor	IP55
In dusty areas, e.g. conveyor galleries, transfer points, bunker floor, lignite feeder, ESP area, Mill area etc	IP65
Junction boxes for cables/wires	IP55

6.00.00 LAYOUT CRITERIA

6.01.00 **Criteria of Oil Pit for Station FGD Transformer and FGD Auxiliary Transformer**

6.01.01 **Oil Pit under Transformer and its Cooler Bank (Station FGD Transformer):**

Gravel filled open oil pit shall be provided under each transformer and its cooler bank. The pit shall be such that it can take oil/water surge of 1/3 of the volume of the transformer oil when filled with gravel of size 38mm. Level of pit shall be such that there shall not be accumulation of oil/water in the pit. Each pit shall be

11.00.00 TROPICAL PROTECTION

11.01.00 All electrical equipment, accessories and wiring shall have fungus protection involving special treatment of insulation and metal against fungus, insects and corrosion.

11.02.00 Fine mesh screen of corrosion resistant material shall be furnished on all ventilating openings to prevent entry of insects.

12.00.00 TESTS

12.01.00 **Type Test**

All equipment / cables shall be of proven design and type tested as per relevant standards. Type test certificates / specific type tests shall be furnished / conducted, if asked for with reference to any specific equipment in the respective sub-section of the specification. In case of submission of type test if the contractor 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 contractor shall conduct all such tests without cost implication in the presence of the purchaser and submit the reports for approval.

12.02.00 **Routine Tests**

All routine and acceptance tests shall be conducted as per relevant standards in the presence of the purchaser or his representative.

13.00.00 SPECIFIC REQUIREMENT - SERVICES & INSTALLATION

13.01.00 **Methods and Workmanship**

13.01.01 All equipment shall be installed in a first class, neat workmanlike manner by mechanics/electricians skilled in the trade involved.

13.01.02 The erection work shall be supervised by competent supervisors holding relevant supervisory license from the Government.

13.01.03 All details on installation shall be electrically and mechanically correct.

13.01.04 The installation shall be carried out in such a manner as to preserve access to other equipment installed.

13.02.00 **Protection of Work**

13.02.01 For protection of this work, the Contractor shall provide fencing and lighting arrangement, connect space heaters and provide heating arrangement as necessary or as directed by the Owner/Consultant.

14.00.00 DRAWINGS, DATA, INFORMATION AND MANUALS

16.00.00 SAFETY

16.01.00 All equipment shall be complete with approved safety devices and with provision for safe access of personnel to and around the equipment for operation and maintenance. The design of plant & machinery shall include not only those usually furnished components but also the additional covers, stairways, ladders, steel structural platforms for operators control panels, handrails, partitions etc. which are necessary for safe operation of the plant.

16.02.00 The Contractor must take sufficient care in moving his construction plants and equipment from one place to another so that those may not cause any damage to the Property of the Purchaser/other Contractors particularly to the overhead and underground cables and other service lines.

16.03.00 When the work is carried out at night or in the obscure day light, adequate for flood lighting in the working area shall be made by Contractor at his own cost and got approved by the Purchaser.

16.04.00 The safety posters/regulation for prevention of accidents shall be displayed by the Contractor at appropriate places. Notices and warning signs shall be displayed for all sources of dangers.

16.05.00 All electrical drives and equipment must be equipped with safety devices. The safety provisions shall conform to the recognized standards, safety codes and statutory regulations.

16.06.00 All safety measures as required to be adopted as per the statutory regulations and the safety rules of the plant shall be strictly followed by the Contractor during the execution of the Contract.

16.07.00 Danger boards shall be provided in line with the statutory requirements.

16.08.00 Rubber mats shall be provided to meet the safety and other statutory requirements.

16.09.00 Adequate number of first aid boxes as defined in the State Factory Rules shall be provided and maintained at all work sites.

17.00.00 SPARES PHILOSOPHY

17.01.00 LV switch board, PMCCs, MCCs, PDBs and MLDBs shall be provided with 20% spare feeders or one no. of each type and rating whichever is higher shall be provided at the time of handing over the plant (irrespective of the spares finalized during detailed engineering).

17.02.00 DCDBs shall be provided with 20% of spare feeders shall be provided at the time of handing over the plant (irrespective of the spares finalized during detailed engineering).

17.03.00 20% spare terminals shall be provided in each module of PCC, PMCC, MCC and each ACB panel.

17.04.00 2 Nos. of interposing (24V) plug in type relays fully wired up to the terminal blocks shall be provided in all the incomer/bus coupler feeders of PCC/PMCC/MCC.

17.05.00 For HV and MV switchgears. In each switchgear sections

a) 1 no highest rated motor feeder
b) 1 no lowest rated motor feeder
c) 1 no highest rated transformer feeder

18.00.00 CONSTRUCTION POWER

18.01.00 The Contractor shall be provided with construction power at 415V, 630A, 2 feeders for the purpose of the erection construction under the Contract in the project "Site" free of charge. Maximum of 0.75 MVA shall be given free of Cost for FGD Package as Construction power. The Contractor shall make his own arrangement for further distribution. Contractor shall arrange necessary DBs, capacitor banks along with APFCR, armoured cables etc. for the distribution to various loads.

18.02.00 Contractor shall supply and install electrical equipment as per regulations of the local electrical inspectorate / statutory body for electrical installation. Contractor shall be responsible for getting all the necessary clearances from electrical inspector.

18.03.00 On award of contract, the Contractor shall furnish the electrical scheme for construction power supply for PURCHASER's review/ approval. The Contractor shall indicate 6 monthly maximum demand requirements with in the allotted maximum demand.

18.04.00 Operation and maintenance of all construction power supply equipment is in the scope of Contractor.

18.05.00 Capacitor banks shall be installed at each LT distribution board and at the load points for P.F. improvement to 0.95.

18.06.00 Distribution of 415V supply shall be done using underground cables. All cables being used for construction power shall be armoured only. For the areas like roads, nearer to buildings and areas where there are frequent vehicle movement the cable shall be routed in hume pipes or GI conduits. Buried cable shall be suitably identified by the route markers.

18.07.00 Detailing of LT (3 phase, 4 wire) switchgear, protection of transformers etc. are included in the scope of Contractor. Power distribution to loads shall be carried out by suitably rated cables buried under ground by the contractor. All CTs, PTs, necessary meters etc. for protection and metering are included in the scope.

Numerical relays & networking

These relays shall be connected to the Switchgear SCADA System, through Ethernet switches. Each numerical relay shall be connected to the Ethernet switch provided in the Switchgear through Cat5e Ethernet /FO cable. Ethernet Switches shall be connected through Fibre Optic cable to form a ring network. The alarm / status of each of protection function and trip operation shall be communicated to Switchgear SCADA / DDCMIS. The numerical relays shall have built in feature / hardware interface to provide such inputs to Switchgear SCADA / DDCMIS for analog / digital values. The required .ICD / .CID files of the Numerical relays under the scope of this package for the integration with the SCADA shall be provided by the Numerical relay vendor along with necessary engineering support. At least one no. of each type of Numerical Relay shall be made available during the Factory Acceptance Test (FAT) of the Switchgear SCADA system along with the necessary engineering support from the Numerical Relay vendor.

ETHERNET SWITCH

1. Ethernet switches shall be 'substation hardened', and shall comply with IEC61850 for communications and environment requirements. The Ethernet switches shall be of managed type with two (2) No of Fibre Optic cable ports and Sixteen / Eight Copper ports to achieve the LAN configuration indicated in the drawings. The Ethernet switches shall have features to support the dual redundant rings as shown in the architecture drawings. These switches shall be mounted inside the switchgear Panels and shall be suitable for accepting dual redundant power supplies. The FO ports shall be Single-mode 1000Mbps ports. Copper ports shall be 10/100Mbps ports.
2. Necessary software for configuration and real-time network monitoring shall be provided along with the Ethernet switches. Network monitoring feature shall be integrated with the SCADA software to provide complete network status on the HMI.

LAN CABLE & CONNECTOR

1.Cat5e Ethernet cable shall be used for connecting the numerical relays to Ethernet switches. In case FO ports are proposed on the numerical relays, Ethernet switches shall also have suitable FO ports as per the quantity mentioned above. Further, additional FO patch cords of maximum length (quantity – 10% of total quantity of IEDs) shall be supplied to facilitate maintenance.
FURTHER THE CONNECTION BETWEEN NUMERICAL RELAYS TO ETHERNET SWITCHES THROUGH cat5E/ OFC IS IN BIDDER'S SCOPE.
Ethernet switches shall have provision to receive dual redundant power supplies

DC FUSE DB & AC FUSE DB TECHNICAL SPECIFICATION:

Each DC MCCB Box shall comprise of the following :

(a.) 1 no. 63 A DP MCCB as incomer

(b.) 100 A fully insulated (PVC sleeved,UL224) busbars.

(c.) 8 nos. 16A outgoing DP MCCB feeders.

(d.) 1 no. auxiliary contactor for supply monitoring.

(e.) 1 no. Blue LED indicating lamp.

Each AC MCCB Box shall comprise of the following :

(a.) 1 no. 63A TPN MCCB as incomer.

(b.) 100 A, 3-phase, 4-wire, fully insulated (PVC sleeved,UL224) busbars.

(c.) 9 nos. 16 A DP MCCB and 3 nos. 16 A TPN MCCB units as outgoing feeders.
(d.) 3 nos. LED indicating lamps (R, Y, B) for incoming supply monitoring.

The handle of incoming MCCB shall be mounted on the door of the panel, with padlocking facility in both 'ON' and 'OFF' positions. All the outgoing feeders shall be accessible only after opening the panel door.

Cable entry facilities shall be provided at bottom with removable gland plates of suitable thickness. However, top cable entry may be allowed in case of layout constraints. All incoming and outgoing cables shall be terminated on suitable terminal blocks.

6. SCOPE OF SUPPLY

Sl. No.	MATERIAL CODE	Boards	Rating	UNIT	Qty
1	ELFGDTUTCPJ12101	415V FGD SERVICE PMCC UNIT 1 # 1DF	4000A	EA	1
2	ELFGDTUTCPJ12102	415V FGD SERVICE PMCC UNIT 2 # 2DF	4000A	EA	1
3	ELFGDTUTCPJ12103	415V EMERGENCY MCC # 0DG	800A	EA	1
4	ELFGDTUTCPJ12104	415V FGD HVAC MCC # 0TA	630A	EA	1
5	ELFGDTUTCPJ12105	415V WWTP MCC # 0SA	400A	EA	1
6	ELFGDTUTCPJ12106	415V WS,HVAC,Compressed AIR MCC # 0SB	800A	EA	1
7	ELFGDTUTCPJ12107	415V COMMON MCC # 0SC	2000A	EA	1
8	ELFGDTUTCPJ12108	220V MAIN DCDB # 0FA	400A	EA	1
9	ELFGDTUTCPJ12109	415V FGD LHP/GHP PMCC # 0DE	2500A	EA	1
10	ELFGDTUTCPJ12110	415V MLDB FOR LHP &GHP WITH 2X100KVA DRY TYPE TRANSFORMER	250A	EA	1
11	ELFGDTUTCPJ12111	415V WDB FOR LHP &GHP WITH 2X100KVA DRY TYPE TRANSFORMER	250A	EA	1
12	ELFGDTUTCPJ12112	DC FUSE DB	63A	EA	4
13	ELFGDTUTCPJ12113	AC FUSE DB	63A	EA	2
14	ELFGDTUTCPJ12114	Mandatory spares for LT switchgear (ANNEXURE-D)		LOT	1
15	ELFGDTUTCPJ12115	COMMISSIONING SPARES-ANNEXURE-E		LOT	1
16	ELFGDTUTCPJ12116	TOOLS & TACKLES -ANNEXURE-F		LOT	1
17	ELFGDTUTCPJ12117	COMMISSIONING CHARGE FOR NUMERICAL RELAY-ANNEXURE-G		LOT	1
18	ELFGDTUTCPJ12118	SITE MODIFICATION CHARGES (As per Annexure-H)		LOT	1
19	ELFGDTUTCPJ12119	SITE MODIFICATION MATERIAL @1 % OF TOTAL EXWORKS FOR SL NO 1 TO 13		LOT	1

7. BOARDWISE BOM –ANNEXURE-B1 TO B11

ANNEXURE-B1

Name of the Board: 415V FGD SERVICE PMCC UNIT-1 # 1DF, 4000A

TYPE OF CONNECTION: TOP/SIDE BUSDUCT ENTRY

DOUBLE FRONT D/O TYPE

FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DAE OG	2000A	2		
DAE OG	630A	2		
DAE OG	800A	3		
DK2	11.2KW	6		
DK21	22.5KW	4		
DK2	3.7KW	4		
DK21	30KW	8		
DK21	37KW	4		
DK21	55KW	4		
DM	110KW	3		
E1	16 A	11		
E1	30 A	3		
E1	32A	3		
E3	100A	9		
E3	160A	3		
E3	16A	47		
E3	32A	5		
E3	63A	6		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
DAET IC	4000A	2		
DAET BC	4000A	1		
ACB I/C PANELS	4000A	2		
ACB B/C PANEL	4000A	1		
ACB O/G PANELS	4000/2000A	2		
ACB O/G PANELS	4000/630A	1		
ACB O/G PANELS	4000/800A	2		
MCC (DFDO)	4000A	AS REQ		
DUMMY PANELS	4000A	1		
ETHERNET SWITCH		1		

ANNEXURE-B2

Name of the Board: 415V FGD SERVICE PMCC UNIT-2 # 2D, 4000A

TYPE OF CONNECTION: TOP/SIDE BUSDUCT ENTRY
DOUBLE FRONT D/O TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DAE OG	2000A	2		
DAE OG	630A	2		
DAE OG	800A	3		
DK2	11.2KW	6		
DK21	22.5KW	4		
DK2	3.7KW	4		
DK21	30KW	8		
DK21	37KW	4		
DK21	55KW	4		
DM	110KW	3		
E1	16A	12		
E1	32A	3		
E3	100A	9		
E3	160A	3		
E3	16A	47		
E3	32A	5		
E3	63A	6		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY -	2KVA	2		
DAET IC	4000A	2		
DAET BC	4000A	1		
ACB I/C PANELS	4000A	2		
ACB B/C PANEL	4000A	1		
ACB O/G PANELS	4000/2000A	2		
ACB O/G PANELS	4000/630A	1		
ACB O/G PANELS	4000/800A	2		
MCC (DFDO)	4000A	AS REQ		
DUMMY PANELS	4000A	1		
ETHERNET SWITCH		1		

ANNEXURE-B3

Name of the Board: 415V EMERGENCY MCC # 0DG, 800A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM
DOUBLE FRONT D/O TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DK2	11KW	4		
DK21	18.5KW	4		
DK21	22KW	4		
DK2	3KW	10		
DK2	5.5KW	22		
DK21	45KW	9		
DK21	55KW	6		
E3	100A	3		
E3	150A	3		
E3	16A	6		
E3	30A	4		
E3	63A	8		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
DAE IC	800A	2		
DAE BC	800A	1		
ACB I/C PANELS	800A	2		
ACB B/C PANEL	800A	1		
MCC (DFDO)	800A	AS REQ		
DUMMY PANELS	800A	1		
ETHERNET SWITCH		1		

ANNEXURE-B4

Name of the Board: 415V FGD HVAC MCC # 0TA, 630A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM
DOUBLE FRONT D/O TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DK2	2.2KW	3		
DK2	7.5KW	5		
E1	16A	15		
E3	16A	143		
E3	200A	5		
E3	32A	64		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
DAE IC	630A	2		
DAE BC	630A	1		
ACB I/C PANELS	630A	2		
ACB B/C PANEL	630A	1		
MCC (DFDO)	630A	AS REQ		
DUMMY PANELS	630A	1		
ETHERNET SWITCH		1		

ANNEXURE-B5

Name of the Board:415V WWTP MCC # 0SA , 400A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM

DOUBLE FRONT D/O TYPE

FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DK2	1.1KW	4		
DK2	15KW	4		
DK2	2.2KW	14		
DK2	3.7KW	14		
DK2	5.5KW	7		
DK2	7.5KW	6		
DK21	37KW	4		
E3	16A	6		
E3	32A	3		
BUS PT - VM		2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
EM3 IC	400A	2		
EM3 BC	400A	1		
MCC (DFD0)	400A	AS REQ		

ANNEXURE-B6

Name of the Board:415V WS,HVAC,Compressed AIR MCC # 0SB, 800A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM
DOUBLE FRONT D/O TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DK2	0.75KW	4		
DK2	1.1KW	3		
DK2	11KW	6		
DK21	18KW	5		
DK21	37KW	4		
DM	110KW	4		
E1	16A	5		
E3	16A	45		
E3	200A	4		
E3	63A	3		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
DAE IC	800A	2		
DAE BC	800A	1		
ACB I/C PANELS	800A	2		
ACB B/C PANEL	800A	1		
ACB O/G PANELS	800/630A	2		
MCC (DFDO)	800A	AS REQ		
DUMMY PANELS	800A	1		
ETHERNET SWITCH		1		

ANNEXURE-B7

Name of the Board:415V COMMON MCC # 0SC, 2000A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM
DOUBLE FRONT D/O TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DK2	0.5KW	4		
DK2	0.75KW	4		
DK2	1.1KW	6		
DK2	11KW	4		
DK2	15KW	17		
DK21	18.5KW	14		
DK2	2KW	6		
DK2	2.2KW	4		
DK2	3KW	6		
DK2	3.7KW	4		
DK21	30KW	4		
DK2	4KW	6		
DK2	5.5KW	16		
DK2	7.5KW	4		
DK2	9KW	3		
DK21	37KW	12		
DK21	45KW	6		
DK21	55KW	4		
E3	16A	76		
E3	32A	5		
E3	63A	9		
E3	100A	4		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
DAE IC	2000A	2		
DAE BC	2000A	1		
ACB I/C PANELS	2000A	2		
ACB B/C PANEL	2000A	1		
MCC (DFDO)	2000A	AS REQ		
DUMMY PANELS	2000A	1		
ETHERNET SWITCH		1		

ANNEXURE-B8

Name of the Board: 220V MAIN DCDB # 0FA, 400A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM

DOUBLE FRONT FIXED TYPE

FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
X	16A	44		
X	32A	12		
X	63A	10		
INCOMER - DB	400A	2		
INCOMER - CH	400A	2		
BUSCOUPLER - DC	400A	3		
DC BUS METERING - S	220V DC	2		
MCC (SFFT)	400A	AS REQ		

ANNEXURE-B9

Name of the Board: 415V FGD LHP/GHP PMCC #0DE, 2500A

TYPE OF CONNECTION: TOP/SIDE BUSDUCT ENTRY

DOUBLE FRONT D/O TYPE

FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
DK2	0.55KW	5		
DK2	2.2KW	3		
DK21	22KW	3		
DK2	3.7KW	5		
DK21	30KW	3		
DK2	5.5KW	3		
DK2	9.3KW	5		
DK21	37KW	3		
DN1	15KW	3		
DN1	3.7KW	3		
DN21	75KW	3		
E3	100A	8		
E3	125A	3		
E3	160A	2		
E3	16A	14		
E3	200A	3		
E3	32A	24		
E3	400A	3		
E3	63A	21		
BUS PT - G1	50VA	2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
DAET IC	2500A	2		
DAET BC	2500A	1		
ACB I/C PANELS	2500A	2		
ACB B/C PANEL	2500A	1		
MCC (DFDO)	2500A	AS REQ		
DUMMY PANELS	2500A	1		
ETHERNET SWITCH		1		

ANNEXURE-B10

Name of the Board:415V MLDB FOR LHP &GHP WITH 2X100KVA DRY TYPE TRANSFORMER , 250A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM
SINGLE FRONT FIXED TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
E3	63A	6		
E3	100A	2		
E3	32A	5		
DRY TYPE TRANSFORMER	100KVA	2		
BUS PT - VM		2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
EM3 IC	250A	2		
EM3 BC	250A	1		
MCC (SFFT)	250A	AS REQ		

ANNEXURE-B11

Name of the Board:415V WDB FOR LHP &GHP WITH 2X100KVA DRY TYPE TRANSFORMER , 250A

TYPE OF CONNECTION: CABLE ENTRY BOTTOM
SINGLE FRONT FIXED TYPE
FLOOR MOUNTED

Feeder type	Rating	Total feeders	Unit Price	Total price
E3	63A	12		
DRY TYPE TRANSFORMER	100KVA	2		
BUS PT - VM		2		
TEST SUPPLY - J2	1KVA	2		
ESSENTIAL SUPPLY - J1	2KVA	2		
EM3 IC	250A	2		
EM3 BC	250A	1		
MCC (SFFT)	250A	AS REQ		

8. MODULEWISE BOM-ANNEXURE-C

MODULE WISE BOM **ANNEXURE-C**

SL NO	MODULE TYPE	ITEM DESCRIPTION	QTY.
1	**DAET (I/C)**	**PMCC INCOMER OF 1600A, 2500A, 3000A, 3200A, 4000A SHALL COMPRISE OF:**	
		ACB TP, ELECTRICALLY OPERATED D/O TYPE, WITHOUT RELEASES, CONTROL SUPPLY VOLTAGE 220V DC,4NO + 4NC CONTACTS OF POSITION/ CELL SWITCH. SPRING CHARGE LIMIT SWITCH WITH minimum 2NO + 2NC contacts.	1
		CONTROL FUSE 6A	15
		CONTROL FUSE 16A	4
		FUSE BASE 32A	19
		Indicating Lamp	5
		CURRENT TRANSFORMER (PROTECTION) 10VA,CL-5P20	3
		CURRENT TRANSFORMER (PROTECTION) with VDR 10VA,CL-PS	3
		POTENTIAL TRANSFORMER -CAST RESIN, OVER VOLTAGE FACTOR 1.2 CONT./1.5 FOR 30 SEC . 415/110,50 VA CL-1 INSL CL-E	1
		CURRENT TRANSDUCER (DC),4-20mA, DUAL O/P,AUX.-220V DC	3
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	3
		KW TRANDUCER	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	3
		VOLTMETER (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		LOCKOUT RELAY HAND RESET TYPE	1
		FUSE FAILURE REALY	1
		NEUTRAL LINK 32A	1
		CONTROL TERMINALS(FIXED)	As required
		CT SHORTING TERMINAL-STUD TYPE	As required
		POWER TERMINAL	As required
		DOUBLE POLE ON/OFF SWITCH-16 A,220 V DC	2
		2POLE 2POSI SELECTOR SWITCH KEY LOCKABLE-10A, 220VDC	1
		NUMERICAL RELAY WITH COMMUNICATION FACILITY AS PER IEC-61850 FOR FOLLOWING FUNCTIONS: • SHORT CIRCUIT PROTECTION (51) • EARTH FAULT PROTECTION (51N) • OVER LOAD PROTERCTION • RESTRICTED EARTRH FAULT PROTECTION(64R) • RESIDUAL EARTH FAULT PROTECTION • TRIP CIRCUIT SUPERVISION (95) • CIRCUIT BREAKER MONITORING • PT FUSE FAILURE • ENERGY METERING • CURRENT, VOLTAGE & FREQUENCY MEASURENMENT • SYNCHRONIZING FEATURE • No of DI/DO SHALL BE AS PER SCHEME REQUIREMNET • ALL THE BINARY INPUTS SHALL BE CAPABLE OF TAKING THE 220V DC ,HOWEVER THE THERSHOLD VALUE FOR BINARY INPUT SHALL BE 18V DC (+/- 5%)	1
		•INSTANTANEOUS OVER CURRENT PROTECTION (50) •IDMT OVER CURRENT PROTECTION (51) • INSTANTANEOUS EARTH PROTECTION (50N) • IDMT EARTH FAULT PROTECTION (51N) • CIRCUIT BREAKER FAILURE PROTECTION (50BF) •UNDER VOLTAGE PROTECTION(27) •BACKUP (STANDBY) EARTH FAULT PROTECTION (64S) •ANTI PUMPING (94) •CHECK SYNCHRONIZING 25 THROUGH RELAY MOUNTED IN BUS COUPLER	
		INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		SPARE FOR INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	

2	**DAE (I/C)**	**MCC INCOMER OF 630A, 800A, 1000A, 1250A, 1600A, 2000A SHALL COMPRISE OF:**	
		ACB TP, ELECTRICALLY OPERATED D/O TYPE, WITHOUT RELEASES, CONTROL SUPPLY VOLTAGE 220V DC,4NO + 4NC CONTACTS OF POSITION/ CELL SWITCH. SPRING CHARGE LIMIT SWITCH WITH minimum 2NO + 2NC contacts.	1
		CONTROL FUSE 6A	15
		CONTROL FUSE 16A	4
		FUSE BASE 32A	19
		Indicating Lamp	5
		CURRENT TRANSFORMER (PROTECTION) 10VA,CL-5P20	3
		POTENTIAL TRANSFORMER -CAST RESIN, OVER VOLTAGE FACTOR 1.2 CONT./1.5 FOR 30 SEC . 415/110,50 VA CL-1 INSL CL-E	1
		CURRENT TRANSDUCER (DC),4-20mA, DUAL O/P,AUX.-220V DC	3
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	3
		KW TRANDUCER	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	3
		VOLTMETER (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		LOCKOUT RELAY HAND RESET TYPE	1
		FUSE FAILURE REALY	1
		NEUTRAL LINK 32A	1
		CONTROL TERMINALS(FIXED)	As required
		CT SHORTING TERMINAL-STUD TYPE	As required
		POWER TERMINAL	As required
		DOUBLE POLE ON/OFF SWITCH-16 A,220 V DC	2
		2POLE 2POSI SELECTOR SWITCH KEY LOCKABLE-10A, 220VDC	1
		NUMERICAL RELAY WITH COMMUNICATION FACILITY AS PER IEC-61850 FOR FOLLOWING FUNCTIONS: • SHORT CIRCUIT PROTECTION (51) • EARTH FAULT PROTECTION (51N) • OVER LOAD PROTERCTION • RESIDUAL EARTH FAULT PROTECTION • TRIP CIRCUIT SUPERVISION (95) • CIRCUIT BREAKER MONITORING • PT FUSE FAILURE • ENERGY METERING • CURRENT, VOLTAGE & FREQUENCY MEASURENMENT • SYNCHRONIZING FEATURE • No of DI/DO SHALL BE AS PER SCHEME REQUIREMNET • ALL THE BINARY INPUTS SHALL BE CAPABLE OF TAKING THE 220V DC ,HOWEVER THE THERSHOLD VALUE FOR BINARY INPUT SHALL BE 18V DC (+/- 5%)	1
		•INSTANTANEOUS OVER CURRENT PROTECTION (50) •IDMT OVER CURRENT PROTECTION (51) • INSTANTANEOUS EARTH PROTECTION (50N) • IDMT EARTH FAULT PROTECTION (51N) • CIRCUIT BREAKER FAILURE PROTECTION (50BF) •UNDER VOLTAGE PROTECTION(27) •RESTRICTED EARTRH FAULT PROTECTION(64R) •BACKUP (STANDBY) EARTH FAULT PROTECTION (64S) •ANTI PUMPING (94) •CHECK SYNCHRONIZING 25 THROUGH RELAY MOUNTED IN BUS COUPLER	
		INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		SPARE FOR INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	

3	**DAET/DAE (B/C)**	**PMCC/MCC BUSCOUPLER OF 630A, 800A, 1000A, 1250A, 1600A,2000A, 2500A, 3000A, 3200A,4000A SHALL COMPRISE OF:**	
		ACB TP, ELECTRICALLY OPERATED D/O TYPE, WITHOUT RELEASES, CONTROL SUPPLY VOLTAGE 220V DC	1
		CONTROL FUSE 6A	9
		CONTROL FUSE 16A	6
		FUSE BASE 32A	15
		AUXILIARY CONTACTOR 2NO+2NC 220VDC	1
		BREAKER CONTACT MULTIPLICATION RELAY TYPE VAJC 11 OR EQVT	1
		Indicating Lamp	2
		CURRENT TRANSFORMER (PROTECTION) 10VA,CL-5P20	3
		POTENTIAL TRANSFORMER -CAST RESIN, OVER VOLTAGE FACTOR 1.2 CONT./1.5 FOR 30 SEC . 415/110,50 VA CL-1 INSL CL-E	1
		CURRENT TRANSDUCER (DC),4-20mA, DUAL O/P,AUX.-220V DC	3
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	3
		KW TRANDUCER	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	3
		VOLTMETER (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		LOCKOUT RELAY HAND RESET TYPE	1
		FUSE FAILURE RELAY	1
		NEUTRAL LINK 32A	1
		CONTROL TERMINALS(FIXED)	As required
		CT SHORTING TERMINAL-STUD TYPE	As required
		POWER TERMINAL	As required
		DOUBLE POLE ON/OFF SWITCH-16 A,220 V DC	5
		2POLE 2POSI SELECTOR SWITCH KEY LOCKABLE-10A, 220VDC	1
		NUMERICAL RELAY WITH COMMUNICATION FACILITY AS PER IEC-61850 FOR FOLLOWING FUNCTIONS: • SHORT CIRCUIT PROTECTION (51) • EARTH FAULT PROTECTION (51N) • OVER LOAD PROTERCTION • RESTRICTED EARTRH FAULT PROTECTION(64R) • RESIDUAL EARTH FAULT PROTECTION • TRIP CIRCUIT SUPERVISION (95) • CIRCUIT BREAKER MONITORING • PT FUSE FAILURE • ENERGY METERING • CURRENT, VOLTAGE & FREQUENCY MEASURENMENT • SYNCHRONIZING FEATURE • No of DI/DO SHALL BE AS PER SCHEME REQUIREMNET • ALL THE BINARY INPUTS SHALL BE CAPABLE OF TAKING THE 220V DC ,HOWEVER THE THERSHOLD VALUE FOR BINARY INPUT SHALL BE 18V DC (+/- 5%)	1
		•INSTANTANEOUS OVER CURRENT PROTECTION (50) •IDMT OVER CURRENT PROTECTION (51) • INSTANTANEOUS EARTH PROTECTION (50N) • IDMT EARTH FAULT PROTECTION (51N) • CIRCUIT BREAKER FAILURE PROTECTION (50BF) •UNDER VOLTAGE PROTECTION(27) •BACKUP (STANDBY) EARTH FAULT PROTECTION (64S) •ANTI PUMPING (94) •CHECK SYNCHRONIZING 25 THROUGH RELAY MOUNTED IN BUS COUPLER	
		INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		SPARE FOR INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		DC SOURCE SLECTION SWITCH	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
4	**DAEG(-I/C)**	**EMERGENCY MCC INCOMER OF 800A, 1000A, 1250A, 1600A, 2000A, 2500A SHALL COMPRISE OF:**	
		ACB TP, ELECTRICALLY OPERATED D/O TYPE, WITHOUT RELEASES, CONTROL SUPPLY VOLTAGE 220V DC,4NO + 4NC CONTACTS OF POSITION/ CELL SWITCH. SPRING CHARGE LIMIT SWITCH WITH minimum 2NO + 2NC contacts.	1
		CONTROL FUSE 6A	15
		CONTROL FUSE 16A	4
		FUSE BASE 32A	19

		Indicating Lamp	5
		CURRENT TRANSFORMER (PROTECTION) 10VA,CL-5P20	3
		CURRENT TRANSFORMER (PROTECTION) with VDR 10VA,CL-PS	3
		POTENTIAL TRANSFORMER -CAST RESIN, OVER VOLTAGE FACTOR 1.2 CONT./1.5 FOR 30 SEC . 415/110,50 VA CL-1 INSL CL-E	1
		CURRENT TRANSDUCER (DC),4-20mA, DUAL O/P,AUX.-220V DC	3
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	3
		KW TRANDUCER	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	3
		VOLTMETER (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		LOCKOUT RELAY HAND RESET TYPE	1
		FUSE FAILURE RELAY	1
		NEUTRAL LINK 32A	1
		CONTROL TERMINALS(FIXED)	As required
		CT SHORTING TERMINAL-STUD TYPE	As required
		POWER TERMINAL	As required
		DOUBLE POLE ON/OFF SWITCH-16 A,220 V DC	2
		2POLE 2POSI SELECTOR SWITCH KEY LOCKABLE-10A, 220VDC	1
		NUMERICAL RELAY WITH COMMUNICATION FACILITY AS PER IEC-61850 FOR FOLLOWING FUNCTIONS: • SHORT CIRCUIT PROTECTION (51) • EARTH FAULT PROTECTION (51N) • OVER LOAD PROTERCTION • RESTRICTED EARTRH FAULT PROTECTION(64R) • RESIDUAL EARTH FAULT PROTECTION • TRIP CIRCUIT SUPERVISION (95) • CIRCUIT BREAKER MONITORING • PT FUSE FAILURE • ENERGY METERING • CURRENT, VOLTAGE & FREQUENCY MEASURENMENT • SYNCHRONIZING FEATURE • No of DI/DO SHALL BE AS PER SCHEME REQUIREMNET • ALL THE BINARY INPUTS SHALL BE CAPABLE OF TAKING THE 220V DC ,HOWEVER THE THERSHOLD VALUE FOR BINARY INPUT SHALL BE 18V DC (+/- 5%) • DIFFERENTIAL PROTECTION (HIGH IMPEDANCE) • REVERSE POWER PROTECTION • DG NEUTRAL DISPLACEMENT • DG MONITORING	1
		•INSTANTANEOUS OVER CURRENT PROTECTION (50) •IDMT OVER CURRENT PROTECTION (51) • INSTANTANEOUS EARTH PROTECTION (50N) • IDMT EARTH FAULT PROTECTION (51N) • CIRCUIT BREAKER FAILURE PROTECTION (50BF) •UNDER VOLTAGE PROTECTION(27) •BACKUP (STANDBY) EARTH FAULT PROTECTION (64S) •ANTI PUMPING (94) •CHECK SYNCHRONIZING 25 THROUGH RELAY MOUNTED IN BUS COUPLER	
		INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		SPARE FOR INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
5	**DAE/DAE-TIE (O/G)**	**OUTGOING BREAKER FEEDER OF 630A, 800A, 1000A, 1250A, 1600A, 2500A SHALL COMPRISE OF:**	
		ACB TP, ELECTRICALLY OPERATED D/O TYPE, WITHOUT RELEASES, CONTROL SUPPLY VOLTAGE 220V DC,4NO + 4NC CONTACTS OF POSITION/ CELL SWITCH. SPRING CHARGE LIMIT SWITCH WITH minimum 2NO + 2NC contacts.	1
		CONTROL FUSE 6A	8
		CONTROL FUSE 16A	2
		FUSE BASE 32A	10
		Indicating Lamp	2
		CURRENT TRANSFORMER (PROTECTION) 10VA,CL-5P20	3
		POTENTIAL TRANSFORMER -CAST RESIN, OVER VOLTAGE FACTOR 1.2 CONT./1.5 FOR 30 SEC . 415/110,50 VA CL-1 INSL CL-E	1
		CURRENT TRANSDUCER (DC),4-20mA, DUAL O/P,AUX.-220V DC	3
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	3

		KW TRANDUCER	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	3
		LOCKOUT RELAY HAND RESET TYPE	1
		FUSE FAILURE RELAY	1
		NEUTRAL LINK 32A	1
		CONTROL TERMINALS(FIXED)	As required
		CT SHORTING TERMINAL-STUD TYPE	As required
		POWER TERMINAL	As required
		DOUBLE POLE ON/OFF SWITCH-16 A,220 V DC	1
		2POLE 2POSI SELECTOR SWITCH KEY LOCKABLE-10A, 220VDC	1
		NUMERICAL RELAY WITH COMMUNICATION FACILITY AS PER IEC-61850 FOR FOLLOWING FUNCTIONS: • SHORT CIRCUIT PROTECTION (51) • EARTH FAULT PROTECTION (51N) • OVER LOAD PROTERCTION • RESIDUAL EARTH FAULT PROTECTION • TRIP CIRCUIT SUPERVISION (95) • CIRCUIT BREAKER MONITORING • PT FUSE FAILURE • ENERGY METERING • CURRENT, VOLTAGE & FREQUENCY MEASURENMENT • SYNCHRONIZING FEATURE • No of DI/DO SHALL BE AS PER SCHEME REQUIREMNET • ALL THE BINARY INPUTS SHALL BE CAPABLE OF TAKING THE 220V DC ,HOWEVER THE THERSHOLD VALUE FOR BINARY INPUT SHALL BE 18V DC (+/- 5%)	1
		•INSTANTANEOUS OVER CURRENT PROTECTION (50) •IDMT OVER CURRENT PROTECTION (51) • INSTANTANEOUS EARTH PROTECTION (50N) • IDMT EARTH FAULT PROTECTION (51N) • CIRCUIT BREAKER FAILURE PROTECTION (50BF) •ANTI PUMPING (94)	
		INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		SPARE FOR INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
6	**DM /PM**	**BREAKER CONTROLLED MOTOR ABOVE 90KW SHALL COMPRISE OF:**	
		ACB TP, ELECTRICALLY OPERATED D/O TYPE, WITHOUT RELEASES, CONTROL SUPPLY VOLTAGE 220V DC,4NO + 4NC CONTACTS OF POSITION/ CELL SWITCH. SPRING CHARGE LIMIT SWITCH WITH minimum 2NO + 2NC contacts.	1
		CONTROL FUSE 6A	9
		CONTROL FUSE 16A	2
		FUSE BASE 32A	11
		Indicating Lamp	2
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		CURRENT TRANSFORMER (PROTECTION) 10VA,CL-5P20	3
		CURRENT TRANSDUCER (DC),4-20mA, DUAL O/P,AUX.-220V DC	1
		KW TRANSDUCER	1
		ENERGY METER	1
		NEUTRAL LINK 32A	1
		CONTROL TERMINALS(FIXED)	As required
		CT SHORTING TERMINAL-STUD TYPE	As required
		POWER TERMINAL	As required
		SP ON/OFF SWITCH FOR MOTOR SPACE HTR. OF BREAKER MOTOR FDR-12A, 240VAC	1
		DOUBLE POLE ON/OFF SWITCH-16 A,220 V DC	1
		LOCKOUT RELAY HAND RESET TYPE	1
		2POLE 2POSI SELECTOR SWITCH KEY LOCKABLE-10A, 220VDC	1

		NUMERICAL RELAY WITH COMMUNICATION FACILITY AS PER IEC-61850 FOR FOLLOWING FUNCTIONS: • SHORT CIRCUIT PROTECTION (51) • EARTH FAULT PROTECTION (51N) • OVER LOAD PROTERCTION UNDER VOLTAGE • EARTH FAULT PROTECTION • TRIP CIRCUIT SUPERVISION (95) • CIRCUIT BREAKER MONITORING • PT FUSE FAILURE • ENERGY METERING • CURRENT, VOLTAGE & FREQUENCY MEASURENMENT • LOCKED ROTOR PROTECTION CURRENT UNBALANCE PROTECTION • No of DI/DO SHALL BE AS PER SCHEME REQUIREMNET • ALL THE BINARY INPUTS SHALL BE CAPABLE OF TAKING THE 220V DC ,HOWEVER THE THERSHOLD VALUE FOR BINARY INPUT SHALL BE 18V DC (+/- 5%) •NEGATIVE SEQUENCE PROTECTION •RESTART INHIBIT PROTECTION	1
		• ANTI PUMPING • TRIP CIRCUIT SUPERVISION • NEGATIVE PHASE CURRENT(46) • THERMAL OVERLOAD (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)	
		INTERPOSING RELAY REM302/EQVT. WITH BUILT IN LED, TEST KNOB & FREEWHEELING DIODE	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
7	**G1**	**BUS PT MODULE FOR PCC / PMCC SHALL COMPRISE OF:**	
		CONTROL FUSE-6A	7
		FUSE BASE-32A	7
		POTENTIAL TRANSFORMER -415/ROOT3 /110/ROOT3, 50 VA CL-1 INSL CL-E	3
		UNDER VOLTAGE PROTECTION (27)	1
		FUSE FAILURE PROTECTION	1
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		NEUTRAL LINK-32A	1
		CONTROL TERMINALS(FIXED)	As required
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
8	**G2**	**BUS PT MODULE FOR DG PCC SHALL COMPRISE OF:**	
		CONTROL FUSE-6A	7
		FUSE BASE-32A	7
		POTENTIAL TRANSFORMER -415/ROOT3 /110/ROOT3, 50 VA CL-1 INSL CL-E	3
		UNDER VOLTAGE PROTECTION (27)	1
		FUSE FAILURE PROTECTION	1
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		NEUTRAL LINK-32A	1
		CONTROL TERMINALS(FIXED)	As required
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
9	**VM**	**BUS PT MODULE FOR MCC/ACDB SHALL COMPRISE OF:**	
		CONTROL FUSE-6A	3
		FUSE BASE-32A	3
		AUX. CONTACTOR 2NO+2NC CV. 415 V AC	1
		VOLTMETER (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		RECTIFIER (AC TO DC),I/P-240V AC, O/P-220VDC	1
		UNDER VOLTAGE PROTECTION (27)	1
		FUSE FAILURE PROTECTION	1

		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
10 (A)	**CS**	**EACH CONTROL SUPPLY OUTGOING SHALL COMPRISE OF:**	
		CONTROL FUSE-6A	4
		CONTROL FUSE-25A	4
		FUSE BASE-32A	8
		AUX. CONTACTOR , 2NO+2NC,CV. 110 V AC	4
		NEUTRAL LINK-32A	6
		CONTROL TERMINALS(FIXED)	As required
		POWER TERMINALS	As required
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	2
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
10(B)	**TEST SUPPLY**	**EACH TEST SUPPLY OUTGOING SHALL COMPRISE OF:**	
		CONTROL FUSE-6A	4
		CONTROL FUSE-25A	4
		FUSE BASE-32A	8
		AUX. CONTACTOR , 2NO+2NC,CV. 110 V AC	4
		NEUTRAL LINK-32A	6
		CONTROL TERMINALS(FIXED)	As required
		POWER TERMINALS	As required
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	2
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
11	**DB**	**220V DC INCOMER FROM BATTERY SHALL COMPRISE OF:**	
		DC AMMETER WITH SHUNT AND CENTER ZERO	1
		LOAD VOLTAGE INDICATION	1
		BUS VOLTAGE INDICATION	1
		OVERLOAD ALARM TO DDCMIS	1
12	**DC**	**220V DC BUS COUPLER SHALL COMPRISE OF:**	
		DOUBLE POLE 250V MCCB WITH 2NO+2NC AUXILIARY CONTACTS	1
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		LOAD VOLTAGE INDICATION	1
		BUS VOLTAGE INDICATION	1
		OVERLOAD ALARM TO DDCMIS	1
13	**CH**	**220V DC INCOMER OF DCDB FROM CHARGER SHALL COMPRISE OF:**	
		Double pole, 250 V MCCB	1
		INDICATING LAMP	2
		VOLTMETER	1
		DC AMMETER WITH SHUNT	1
		CURRENT TRANSDUCER	1
		BUS VOLTAGE INDICATION	1
		LOAD VOLTAGE INDICATION	1
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		OVERLOAD ALARM TO DDCMIS	1
14	**HD**	**220V DC ISOLATING SWITCH/CIRCUIT BREAK MODULE SHALL COMPRISE OF:**	
		DOUBLE POLE 250V MCCB WITH REQUIRED AUXILIARY CONTACTS	1
		BUS VOLTAGE INDICATION	1
		LOAD VOLTAGE INDICATION	1
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		DC AMMETER WITH SHUNT	1
		OVERLOAD ALARM TO DDCMIS	1
15	**S**	**220V DCDB BUS MODULE FOR METERING & PROTECTION SHALL COMPRISE OF:**	
		UNDERVOLTAGE (INSTANNANEOUS WITH SETTING OF 95% OF 240VDC. THE RESETTING OF RELAY SHOULD NOT BE MORE THAN 1.05)	1

		OVERVOLTAGE(INSTANEOUS WHICH SHALL OPERATE AT 110% OF 240V DC. THE RESETTINGRATION SHOULD NOT BE LESS THAN .95)	1
		EARTHFAULT (CAEM21 OR EQV.)	1
		INDICATING LAMP	2
		CONTROL FUSE-6A	3
		FUSE BASE-32A	3
		NEUTRAL LINK	1
		DC VOLTAGE METER (0-300V)	1
		VOLTMETER SELECTOR SWITCH	1
		AUXILIARY CONTACTOR,2NO+2NC,CV 220AC	1
		PUSH BUTTON- SPRING RETURN WITH 1NO+1NC AUX, CONTACT	2
		FUSE FAILURE PROTECTION	
		VOLTAGE TRANSDUCER (AC),4-20 m A DUAL O/P AUX. 220 V DC,0-500/4-20mA, 415V DIRECT	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
16	**X**	**220V DC OUTGOING FEEDER SHALL COMPRISE OF:**	
		DOUBLE POLE 250V MCCB	1
		DC AMMETER WITH SHUNT	1
		OVERLOAD ALARM TO DDCMIS	1
		HRC FUSES	2
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
17	**CC**	**ISOLATOR INCOMER WITH CONTACTOR UPTO 630A SHALL COMPRISE OF**	
		TRI POLE LOAD BREAK ISOLATING SWITCH	2
		Power Fuse	3
		Auxiliary Switch	1
		INDICATING LAMP	2
		CONTROL FUSE-6A	5
		FUSE BASE-32A	5
		SERVICE POSITION LIMIT SWITCH	2
		TRIPLE POLE POWER CONTACTOR WITH COIL SUITABLE FOR 415V AC WITH 2NO+2NC AUX	2
		AUXILIARY CONTACTOR 2NO+2NC ,CV 415V AC	2
		TERMINAL BLOCKS	30
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
18(A)	**EM3 (I/C)**	**INCOMER MCCB (NON MOTORIZED) FOR ACDB/MLDB/PDB FOR RATING from 100A UPTO 630A**	
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		MCCB TP	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1

		VOLTMETER (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		ELECTRONIC ENERGY METER SUITABLE FOR COMMUNICATION WITH MODBUS RS485	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		KW TRANSDUCER	1
		AUX. SWITCH FOR MCCB-2C/O	2
		ALARM SWITCH FOR MCCB-1C/O	1
		SHUNT TRIP COIL 220VAC	1
		EXTENDED ROTORY HANDLE	1
		INDICATION LAMP	3
		NEUTRAL LINK 32A	1
		NEUTRAL LINK AS PER MCCB RATING	1
		CONTROL TERMINALS	AS REQUIRED
		CT SHORTING TERMINAL-STUD TYPE	AS REQUIRED
		TOTAL	
18(B)	**EM3 (I/C)**	**INCOMER MCCB (NON MOTORIZED) FOR ACDB/MLDB/PDB FOR RATING FOR RATING below 100A**	
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		MCCB TP	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		VOLTMETER (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE,0-500V DIRECT	1
		VOLTMETER SELECTOR SWITCH-12 A,415 V AC	1
		ELECTRONIC ENERGY METER SUITABLE FOR COMMUNICATION WITH MODBUS RS485	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		KW TRANSDUCER	1
		AUX. SWITCH FOR MCCB-2C/O	2
		ALARM SWITCH FOR MCCB-1C/O	1
		SHUNT TRIP COIL 220VAC	1
		EXTENDED ROTORY HANDLE	1
		INDICATION LAMP	3
		NEUTRAL LINK 32A	1
		NEUTRAL LINK AS PER MCCB RATING	1
		CONTROL TERMINALS	AS REQUIRED
		CT SHORTING TERMINAL-STUD TYPE	AS REQUIRED
		TOTAL	
19	**EM3 (B/C)**	**BUSCOUPLER MCCB (MOTORIZED) FOR FOR ACDB/MLDB/PDB FOR RATING UPTO 630A**	
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		MCCB TP	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER DUAL OUTPUT	1
		AUX. SWITCH FOR MCCB-2C/O	2
		ALARM SWITCH FOR MCCB-1C/O	1
		SHUNT TRIP COIL 220VAC	1
		EXTENDED ROTORY HANDLE	1
		INDICATION LAMP	3
		NEUTRAL LINK 32A	1
		NEUTRAL LINK AS PER MCCB RATING	1
		CONTROL TERMINALS	AS REQUIRED
		CT SHORTING TERMINAL-STUD TYPE	AS REQUIRED
		TOTAL	
20(A)	**E/E3**	**TPN AC OUTGOING MCCB (NON MOTORIZED) OPERATED FEEDER FOR RATING 100A AND ABOVE**	
		TP MCCB	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		EXTENDED ROTORY HANDLE	1
		NETURAL LINK EQUIVALENT TO POWER FUSE RATING	1

		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
20(B)	**E/E3**	**TPN AC OUTGOING MCCB (NON MOTORIZED) OPERATED FEEDER FOR RATING below 100A**	
		TP MCCB	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		EXTENDED ROTORY HANDLE	1
		NETURAL LINK EQUIVALENT TO POWER FUSE RATING	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
21(A)	**E2**	**DP AC OUTGOING MCCB (NON MOTORIZED) OPERATED FEEDER FOR RATING 100A AND ABOVE UPTO 630A**	
		DP MCCB	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		EXTENDED ROTORY HANDLE	1
		NETURAL LINK EQUIVALENT TO POWER FUSE RATING	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
21(B)	**E2**	**DP AC OUTGOING MCCB (NON MOTORIZED) OPERATED FEEDER FOR RATING below 100A**	
		DP MCCB	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		EXTENDED ROTORY HANDLE	1
		NETURAL LINK EQUIVALENT TO POWER FUSE RATING	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
22(A)	**E1**	**SP AC OUTGOING MCCB (NON MOTORIZED) OPERATED FEEDER FOR RATING 100A AND ABOVE UPTO 630A**	
		SP MCCB	1
		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		EXTENDED ROTORY HANDLE	1
		NETURAL LINK EQUIVALENT TO POWER FUSE RATING	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
22(B)	**E1**	**SP AC OUTGOING MCCB (NON MOTORIZED) OPERATED FEEDER FOR RATING below 100A**	
		SP MCCB	1

		OVER CURRENT PROTECTION	1
		SHORT CIRCUIT PROTECTION	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		EXTENDED ROTORY HANDLE	1
		NETURAL LINK EQUIVALENT TO POWER FUSE RATING	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
23	**DK2/PK2/ AK2**	**UNIDIRECTIONAL MOTOR FEEDER BELOW 18.5KW (AU/BU/CU CONTROLLED FROM ATRS/DDCMIS/PLC SHALL COMPRISE OF:**	
		MPCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2N0+2NC, CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		OVERLOAD RELAY,BUILT IN SPPR FEATURE 1NO+1NC AUX. & INDEPENDENT MOUNTING TYPE	1
		MOUNTING KIT FOR O/L RELAY	1
		RESET CORD ACTUATOR	1
		Indication lamp	3
		NEUTRAL LINK-32A	1
		CONTROL TERMINALS (DRAWOUT)	30
		COUPLING RELAY WITH BUILT IN DIODE	2
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
24	**EA1**	**1-PHASE MCCB (NON MOTORIZED) CONTACTOR CONTROLLED FEEDER SHALL COMPRISE OF:**	
		(TP) MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	2
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		2P POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2N0+2NC, CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		Indication lamp	3
		NEUTRAL LINK-32A	1
		CONTROL TERMINALS (DRAWOUT)	30
		COUPLING RELAY WITH BUILT IN DIODE	2
		OVER CURRENT PROTECTION	

		SHORT CIRCUIT PROTECTION	
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
25	**EA3**	**3-PHASE MCCB (NON MOTORIZED) CONTACTOR CONTROLLED FEEDER SHALL COMPRISE OF:**	
		(TP) MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		3P POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2N0+2NC, CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		Indication lamp	3
		NEUTRAL LINK-32A	1
		CONTROL TERMINALS (DRAWOUT)	As required
		COUPLING RELAY WITH BUILT IN DIODE	2
		OVER CURRENT PROTECTION	
		SHORT CIRCUIT PROTECTION	
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
26(A)	**DK21/PK21/ AK21**	**UNIDIRECTIONAL MOTOR FEEDER 18.5KW & ABOVE UPTO 50KW CONTROLLED FROM DDCMIS/PLC/ATRS SHALL COMPRISE OF:**	
		MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	2
		FUSE BASE-32A	2
		POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2NO+2NC CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		OVERLOAD RELAY,BUILT IN SPPR FEATURE 1NO+1NC AUX. & INDEPENDENT MOUNTING TYPE	1
		RESET CORD ACTUATOR	1
		Indication lamp	3
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		NEUTRAL LINK	1
		CONTROL TERMINALS (DRAWOUT)	50
		CT SHORTING TERMINAL-STUD TYPE	18
		SP ON/OFF SWITCH FOR MOTOR SPACE HTR. OF MOTOR FDR.,10A, 240VAC	1
		COUPLING RELAY WITH BUILT IN DIODE,24V DC 2C/O	2
		One (1) Digital Energy Meter with Analog output of Current (4-20 mA)	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
26(B)	**DK21/PK21/ AK21**	**UNIDIRECTIONAL MOTOR FEEDER 50KW & ABOVE UPTO 90KW CONTROLLED FROM DDCMIS/PLC/ATRS SHALL COMPRISE OF:**	
		MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	2
		FUSE BASE-32A	2
		POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1

		AUX. CONTACTOR,2NO+2NC CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		OVERLOAD RELAY,BUILT IN SPPR FEATURE 1NO+1NC AUX. & INDEPENDENT MOUNTING TYPE	1
		RESET CORD ACTUATOR	1
		Indication lamp	3
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		NEUTRAL LINK	1
		CONTROL TERMINALS (DRAWOUT)	50
		CT SHORTING TERMINAL-STUD TYPE	18
		SP ON/OFF SWITCH FOR MOTOR SPACE HTR. OF MOTOR FDR.,10A, 240VAC	1
		COUPLING RELAY WITH BUILT IN DIODE,24V DC 2C/O	2
		One (1) Digital Energy Meter with Analog output of Current (4-20 mA)	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		EARTH FAULT PROTECTION	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
27	**DKE2****	**UNIDIRECTIONAL MOTOR FEEDER (ESSENTIAL) BELOW 18.5KW CONTROLLED FROM DDCMIS/PLC/ ATRS SHALL COMPRISE OF:**	
		MPCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		Mounting Kit	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		INDICATING LAMP	3
		CONTROL FUSE	4
		Contorl Fuse base	4
		NEUTRAL LINK	2
		AUXILIARY CONTACTOR	2
		CT FOR METERING	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (DUAL OUTPUT)	1
		INTERPOSING RELAY RE302 OR EQVT	2
		TIMER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
28(A)	**DKE21****	**UNIDIRECTIONAL MOTOR FEEDER (ESSENTIAL) 18.5KW & ABOVE UPTO 50KW CONTROLLED FROM ATRS/DDCMIS/PLC SHALL COMPRISE OF:**	
		3P MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		INDICATING LAMP	3
		CONTROL FUSE	8
		Contorl Fuse base	8
		NEUTRAL LINK	2
		AUXILIARY CONTACTOR	2
		CT FOR METERING	1
		AMMETER SELECTOR SWITCH	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (DUAL OUTPUT)	1
		INTERPOSING RELAY RE302 OR EQVT	2

		TIMER	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
28(B)	**DKE21****	**UNIDIRECTIONAL MOTOR FEEDER (ESSENTIAL) 50KW & ABOVE UPTO 90KW CONTROLLED FROM ATRS/DDCMIS/PLC SHALL COMPRISE OF:**	
		3P MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		INDICATING LAMP	3
		CONTROL FUSE	8
		Contorl Fuse base	8
		NEUTRAL LINK	2
		AUXILIARY CONTACTOR	2
		CT FOR METERING	1
		AMMETER SELECTOR SWITCH	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (DUAL OUTPUT)	1
		INTERPOSING RELAY RE302 OR EQVT	2
		TIMER	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		EARTH FAULT PROTECTION	1
		One (1) Digital Energy Meter with Analog output of Current (4-20 mA)	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
29	**K3**	**UNIDIRECTIONAL MOTOR FEEDER BELOW 18.5KW CONTROLLED FROM LPBS SHALL COMPRISE OF:**	
		3P MPCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		Mounting Kit	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		INDICATING LAMP	3
		AUXILIARY CONTACTOR	1
		INTERPOSING RELAY RE302 OR EQVT	2
		CONTROL FUSE	1
		Control fuse base	1
		NEUTRAL LINK	1
		NO. OF TERMINALS	25
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	

30(A)	**K31**	**UNIDIRECTIONAL MOTOR FEEDER 18.5KW & ABOVE UPTO 50KW CONTROLLED FROM LPBS SHALL COMPRISE OF:**	
		3P MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		INDICATING LAMP	3
		AUXILIARY CONTACTOR	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		INTERPOSING RELAY RE302 OR EQVT	2
		CT FOR METERING	1
		CONTROL FUSE	1
		Control Fuse base	1
		NEUTRAL LINK	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		CURRENT TRANSDUCER (DUAL OUTPUT)	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
30(B)	**K31**	**UNIDIRECTIONAL MOTOR FEEDER 50KW & ABOVE UPTO 90KW CONTROLLED FROM LPBS SHALL COMPRISE OF:**	
		3P MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		INDICATING LAMP	3
		AUXILIARY CONTACTOR	1
		AMMETER	1
		INTERPOSING RELAY RE302 OR EQVT	2
		CT FOR METERING	1
		CONTROL FUSE	1
		Control Fuse base	1
		NEUTRAL LINK	1
		CURRENT TRANSDUCER (DUAL OUTPUT)	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		EARTH FAULT PROTECTION	1
		One (1) Digital Energy Meter with Analog output of	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint	
		TOTAL	
31	**DK2****	**HEATER FEEDER BELOW 18.5KW (AU/BU/CU CONTROLLED FROM ATRS/DDCMIS/PLC SHALL COMPRISE OF:**	
		(TP) MPCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	1
		FUSE BASE-32A	1
		POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2N0+2NC, CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		Indication lamp	3
		NEUTRAL LINK-32A	1
		CONTROL TERMINALS (DRAWOUT)	30
		COUPLING RELAY WITH BUILT IN DIODE	2
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	

32(A)	**DK21****	**HEATER FEEDER 18.5KW & ABOVE UPTO 50KW CONTROLLED FROM DDCMIS/PLC/ATRS SHALL COMPRISE OF:**	
		(TP) MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	2
		FUSE BASE-32A	2
		POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2NO+2NC CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		Indication lamp	3
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		NEUTRAL LINK	1
		CONTROL TERMINALS (DRAWOUT)	60
		CT SHORTING TERMINAL-STUD TYPE	60
		SP ON/OFF SWITCH FOR MOTOR SPACE HTR. OF MOTOR FDR.,10A, 240VAC	1
		COUPLING RELAY WITH BUILT IN DIODE,24V DC 2C/O	2
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
32(B)	**DK21****	**HEATER FEEDER 50KW & ABOVE UPTO 90KW**	
		(TP) MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	1
		HRC FUSE (POWER)	3
		CONTROL FUSE-6A	2
		FUSE BASE-32A	2
		POWER CONTACTOR(AC) WITH 1NO AUX CONTACT COIL VOLTAGE 110V AC	1
		AUX. CONTACTOR,2NO+2NC CV. 110 V AC	2
		ADD ON AUX. CONTACTOR BLOCK 2NO+2NC	1
		Indication lamp	3
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		NEUTRAL LINK	1
		CONTROL TERMINALS (DRAWOUT)	60
		CT SHORTING TERMINAL-STUD TYPE	60
		SP ON/OFF SWITCH FOR MOTOR SPACE HTR. OF MOTOR FDR.,10A, 240VAC	1
		COUPLING RELAY WITH BUILT IN DIODE,24V DC 2C/O	2
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		EARTH FAULT PROTECTION	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
33	**DW**	**220V DC SOLENOID VALVE FEEDER SHALL COMPRISE OF:**	
		DOUBLE POLE 250V DC ISOLATING MCCB	1
		HRC FUSE	2
		220V DC POWER CONTACTOR	1
		AUXILIARY CONTACTOR	1
		NEUTRAL LINK	1
		DIODE WITH PEAK INVERSE VOLTAGE OF 440V	1
		COUPLING RELAY	1
		Control fuse	2
		Control fuse base	2
		INDICATING LAMP	2
		OVERLOAD ALARM TO DDCMIS	1
		SHUNT WITH AMMETER	1
		Materials Cost	
		Integration Cost	

		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
34(A)	DN1	**BIDIRECTIONAL MOTOR FEEDER BELOW 18.5KW**	1
		(TP)MPCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	3
		HRC FUSE (POWER)	2
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		MOUNTING Kit	1
		THERMAL O/L RELAY RESET PUSH BUTTON	3
		INDICATING LAMP	4
		CONTROL FUSE	4
		Control fuse base	1
		NEUTRAL LINK	2
		AUXILIARY CONTACTOR	60
		NO. OF TERMINALS (240V AC/24V DC)	3
		INTREPOSING RELAY	1
		TEST PUSH BUTTON	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
34(B)	DN21	**BIDIRECTIONAL MOTOR FEEDER 18.5KW & ABOVE UPTO 50KW**	1
		(TP)MCCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	3
		HRC FUSE (POWER)	2
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		MOUNTING Kit	1
		THERMAL O/L RELAY RESET PUSH BUTTON	3
		INDICATING LAMP	4
		CONTROL FUSE	4
		Control fuse base	1
		NEUTRAL LINK	2
		AUXILIARY CONTACTOR	60
		NO. OF TERMINALS (240V AC/24V DC)	3
		INTREPOSING RELAY	1
		TEST PUSH BUTTON	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2,SCALE-250, CL ±2% OF FULL SCALE	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint	
		TOTAL	
34(C)	DN21	**BIDIRECTIONAL MOTOR FEEDER 50KW & ABOVE UPTO 90KW**	1
		(TP)MCCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	3
		HRC FUSE (POWER)	2
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		MOUNTING Kit	1
		THERMAL O/L RELAY RESET PUSH BUTTON	3
		INDICATING LAMP	4
		CONTROL FUSE	4
		Control fuse base	1
		NEUTRAL LINK	2
		AUXILIARY CONTACTOR	60
		NO. OF TERMINALS (240V AC/24V DC)	3
		INTREPOSING RELAY	1
		TEST PUSH BUTTON	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL	1
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-	1
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-	1
		EARTH FAULT PROTECTION	1
		Materials Cost	
		Integration Cost	

		Breakar Module Cost (Beakar Plat, Support, Paint	
		TOTAL	
35	K1	**UNIDIRECTIONAL MOTOR FEEDER BELOW 18.5KW CONTROLLED FROM MCC SHALL COMPRISE OF:**	1
		(TP)MPCB	1
		AUX. CONTACT FOR MPCB (1NO+1NC)	3
		HRC FUSE (POWER)	1
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	
		MOUNTING Kit	1
		THERMAL O/L RELAY RESET PUSH BUTTON	3
		INDICATING LAMP	1
		CONTROL FUSE	1
		CONTROL FUSE BASE	1
		NEUTRAL LINK	30
		NO. OF TERMINALS	
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
36(A)	K11	**UNIDIRECTIONAL MOTOR FEEDER RATED FROM 18.5KW to 50KW CONTROLLED FROM MCC SHALL COMPRISE OF:**	1
		(TP)MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	3
		HRC FUSE (POWER)	1
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	3
		INDICATING LAMP	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		CONTROL FUSE	
		CONTROL FUSE base	1
		NEUTRAL LINK	50
		NO. OF TERMINALS	1
		Single Phase switch for motor Space Heater	
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	
36(B)	K11	**UNIDIRECTIONAL MOTOR FEEDER RATED FROM 50KW to 90KW CONTROLLED FROM MCC SHALL COMPRISE OF:**	1
		(TP)MCCB	1
		AUX. CONTACT FOR MCCB (1NO+1NC)	3
		HRC FUSE (POWER)	1
		TRIPLE POLE POWER CONTACTOR	1
		THERMAL O/L RELAY OF SUITABLE RANGE	1
		THERMAL O/L RELAY RESET PUSH BUTTON	3
		INDICATING LAMP	1
		CURRENT TRANSFORMER (METERING) 10VA, CL-1	1
		AMMETER CTSEC 1A (AC),96 X 96 mm2, SCALE-250, CL ±2% OF FULL SCALE	
		CURRENT TRANSDUCER (AC),4-20mA, DUAL O/P,AUX.-11OV AC	1
		CONTROL FUSE	
		CONTROL FUSE base	1
		NEUTRAL LINK	50
		NO. OF TERMINALS	1
		Single Phase switch for motor Space Heater	
		SINGLE PHASE PREVENTER	1
		SHORT CIRCUIT PROTECTION	1
		CONTROL TRANSFORMER,DRY TYPE, CAST RESIN,415/110 V, 2KVA	1
		4POLE,2POSI, SELECTOR SWITCH FOR CONTROL TRF.-25A, 110V AC	1
		EARTH FAULT PROTECTION	1
		Materials Cost	
		Integration Cost	
		Breakar Module Cost (Beakar Plat, Support, Paint & Class-C items wire, lugs, Cable gland etc.)	
		TOTAL	

9. MANDATORY SPARE FOR LT SWITCHGEAR - ANNEXURE-D

INDEX No.	Sl. No.		Equipment/Package Name	Quantity to be supplied
507				
508				
509				
510				
511		6	***PCC (To be repeated for each type & rating)***	
512		6.1	Main power contact (Fixed and moving) Complete assembly	2 sets of each make, type and rating
513		6.2	Auxiliary contact assembly of breaker	
514		a.	Test position	3 sets of each type
515		b.	Service position	3 sets of each type
516		6.3	Closing and tripping coil	3 nos. of each type
517		6.4	Spring charging motor	2 nos. of each type
518		6.5	Arc chute for CBs	5 nos. of each type
519		6.6	Arching contacts (for fixed)	3 nos. of each rating
520		6.7	Arching contacts (for moving)	3 nos. of each rating
521		6.8	Main bus bar supporting insulators	10 nos. of each type
522		6.9	Dropper bus bar supporting insulators	5 nos. of each type
523		6.10	CTs	3 nos. for each type and ratio
524		6.11	PTs	3 nos. for each type and ratio

0.18

%

NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES				
INDEX No.	Sl. No.	Equipment/Package Name		Quantity to be supplied
525		6.12	Meters	
526		a.	Voltmeter	2 nos. of each type
527		b.	Ammeter	2 nos. of each type per board
528		6.13	Numerical Protection relays	1 no. of each type per board
529		6.14	Auxiliary relays	2 nos. of each type per board
530		6.15	Interposing relays	2 Nos. of each type
531		6.16	Check synchronizing relay	1no
532		6.17	MCB	1no. of each rating
533		6.18	Timers	2 nos. of each type per board
534		6.19	Misc. items	
535		a.	Push button with contact element	5 nos. of each type
536		b.	Selector switch	5 nos. of each type
537		c.	Voltmeter selector switch	5 nos. of each type
538		d.	Ammeter selector switch	5 nos. of each type
539		e.	Local-remote selector switch	3 nos. of each type
540		f.	Indicating lamp of LED (LVGP type)	10 nos.
541		g.	Terminal blocks	10 nos
542		h.	Breaker Test/Service limit switch	5 sets for each type
543		i.	Power and control circuit fuses	10 nos. of each type

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NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES				
INDEX No.	Sl. No.	Equipment/Package Name		Quantity to be supplied
544		j.	Control Transformer	1 no. each rating
545		7	***PMCC (To be repeated for each type & rating)***	
546		7.1	Sliding Main power contact (Fixed and moving) Complete assembly	2 sets of each make, type and rating
547		7.2	Auxiliary contact assembly of breaker	
548		a.	Test position	3 sets of each type
549		b.	Service position	3 sets of each type
550		7.3	Closing and tripping coil	3 nos. of each type
551		7.4	Spring charging motor	2 nos. of each type
552		7.5	Arc chute for CBs	5 nos. of each type
553		7.6	Arching contacts (for fixed)	3 nos. of each rating
554		7.7	Arching contacts (for moving)	3 nos. of each rating
555		7.8	Main bus bar supporting insulators	10 nos. of each type
556		7.9	Dropper bus bar supporting insulators	5 nos. of each type
557		7.10	CTs	3 nos. for each type and ratio
558		7.11	PTs	3 nos. for each type and ratio
559		7.12	Meters	
560		a.	Voltmeter	2 nos. of each type

BHARAT HEAVY ELECTRICALS LIMITED NEW DELHI PS-IIKTG

NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES				
INDEX No.	Sl. No.	Equipment/Package Name		Quantity to be supplied
561		b.	Ammeter	2 nos. of each type per board
562		7.13	Numerical Protection relays	1 no. of each type per board
563		7.14	Auxiliary relays	2 nos. of each type per board
564		7.15	Interposing relays	2 Nos. of each type
565		7.16	Check synchronizing relay	1no
566		7.17	MCB	1no. of each rating
567		7.18	Timers	2 nos. of each type per board
568		7.19	Misc. items	
569		a.	Push button with contact element	5 nos. of each type
570		b.	Selector switch	5 nos. of each type
571		c.	Voltmeter selector switch	5 nos. of each type
572		d.	Ammeter selector switch	5 nos. of each type
573		e.	Local-remote selector switch	3 nos. of each type
574		f.	Indicating lamp of LED (LVGP type)	10 nos.
575		g.	Terminal blocks	10 nos
576		h.	Breaker Test/Service limit switch	5 sets for each type
577		i.	Power and control circuit fuses	10 nos. of each type
578		j.	Control Transformer	1 no. each rating

NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES				
INDEX No.	**Sl. No.**	**Equipment/Package Name**		**Quantity to be supplied**
579		7.20	Electronic overload relays with single phase preventors	1 no. of each type
580		7.21	Auxiliary relay	2 nos. of each type
581		7.22	Indicating Lamp assembly (LED LVGP type)	10 nos. of each type & colour
582		7.23	Phase sequence meter	2 nos.
583		7.24	MPCB	1 no of each type and rating
584		7.25	MCCB	1 no of each type and rating
585		7.26	Single phase control transformer (415/110V)	1 no. of each type
586		7.27	Interposing relay	1 no. of each type
587		7.28	Push button with contact element	1 no. of each type
588		7.29	Meters	1 no. of each type
589		8	***MCC (To be repeated for each type & rating)***	
590		8.1	Bus bar support insulators	10 nos. of each type
591		8.2	Current transformers	1no. of each type & rating
592		8.3	Potential transformers 415/110V	1 no.
593		8.4	Male contact of ACB (main and aux.)	1 set
594		8.5	Female contact of ACB (main and aux.)	1 set
595		8.6	Limit switch of ACB	3 nos.

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NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES				
INDEX No.	Sl. No.	Equipment/Package Name		Quantity to be supplied
596		8.7	Spring charging motor of ACB	3 nos.
597		8.8	Closing coil of ACB	2 nos.
598		8.9	Tripping coil of ACB	2 nos.
599		8.1	Breaker control switch	2 nos.
600		8.11	Numerical Protection Relays	1no. of each type
601		8.12	Electronic overload relays with single phase preventors	1 no. of each type
602		8.13	Auxiliary relay	2 nos. of each type
603		8.14	Indicating Lamp assembly (LED LVGP type)	10 nos. of each type & colour
604		8.15	Phase sequence meter	2 nos.
605		8.16	MPCB	1no of each type and rating
606		8.17	MCCB	1no of each type and rating
607		8.18	Single phase control transformer (415/110V)	1 no. of each type
608		8.19	Interposing relay	1 no. of each type
609		8.2	Push button with contact element	1 no. of each type
610		8.21	Meters	1 no. of each type
611		9	***ACDB/PDB/LDB/SLDB/Auxiliary PDB/Distribution Panels (To be repeated for each type & rating)***	
612		9.1	Bus bar support insulators	3 nos. of each type
613		9.2	MCCB / SFU	2 nos. of each rating
614		9.3	MCB	2 nos. of each rating

NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES						0.18
INDEX No.	**Sl. No.**	**Equipment/Package Name**		**Quantity to be supplied**		
615		9.4	Control switch	2 nos. of each type		

NTPL 2X500 MW TPP AT TUTICORIN-MANDATORY SPARES

INDEX No.	Sl. No.	Equipment/Package Name		Quantity to be supplied
653		c.	*415V PROTECTIVE RELAYING SYSTEM-*	
654			Incomer Protection Relay	2 no. for each make, type and rating
655			Transformer Protection Relay	2 no. for each make, type and rating
656			Motor Protection Relay	2 no. for each make, type and rating
657			Out-going feeders Relay	2 no. for each make, type and rating
658			Bus PT & Line PT Relay	2 no. for each make, type and rating

10. COMMISSIONING SPARE-ANNEXURE-E

ANNEXURE-E

COMISSIONING SPARE

SL NO	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE(Rs)	TOTAL PRICE(Rs)
1	**Factory built assemblies (PCC/MCC/DB)**				
1.1	Busbar supports (Horizontal)	1 set of 3 ph	1		
1.2	Primary isolating contacts (Bus side) of each rating	1 set of 3 ph			
a)	100A		1		
b)	**250A**		1		
c)	400A		1		
1.3	Primary isolating contacts (Load side) of each rating	1 set of 3 ph			
a)	100A		1		
b)	**250A**		1		
c)	400A		1		
1.4	Secondary isolating contacts of each rating	1 set of 3 ph			
a)	100A		1		
b)	**250A**		1		
c)	400A		1		
1.5	Gaskets (each size)	Meter	10		
1.6	Fixed terminal (one way)	Nos	20		
1.7	Shrouds (for outgoing modules)				
	300mm	Nos	1		
	500mm	Nos	1		
	700mm	Nos	1		
	1000mm	Nos	1		
	2000mm	Nos	1		
1.8	Wire (for secondary wiring)				
	2.5mm2	Meter	100		
	1.5mm2	Meter	100		
1.9	Lugs (for secondary wiring)	Nos	100		
2	**Air circuit breaker (for each rating)**				
2.1	Shunt trip coil	Nos	5		
2.2	Spring charging motor (1 no for each rating)	Nos	1		
2.3	Closing coil	Nos	5		
2.4	Auxiliary switch	Nos	1		
3	**Isolating switch**				
3.1	Main contact kiot for each rating	1 set of 3 poles	1		
4	**Power Contactors**				
4.1	contactor coil of each rating	Nos	1		
4.2	contactor kit (main) for each rating	1 set of 3 poles	1		
5	**Auxiliary conatctors**				
5.1	Complete unit with 2NO+2NC contacts (1 no of each rating/ type)	Nos	1		
5.2	contactor coils				
a.	AC for each rating	set	1		
b.	DC for each rating	set	1		
6	**HRC fuse**				
6.1	Fuse base (each rating)	Nos	1		
6.2	Fuse link				
a.	Upto 40A (assorted ratings)	Nos	10		
b.	63A to 200A (assorted ratings)	Nos	10		
c.	250A to 400A (assorted ratings)	Nos	5		
7	**Push Buttons**				
7.1	Actuator contacts	Nos	5		
7.2	Element	Nos	5		
8	**Indicating Lamps**				

SL NO	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE(Rs)	TOTAL PRICE(Rs)
8.1	Complete unit	Nos	10		
8.2	Lens (assorted)	Nos	10		
9	**Others**				
9.1	Selector & control switch (each type)	Nos	1		
	AC Voltmeter (0-500V)	Nos	1		
	DC Voltmeter (0-300V)	Nos	1		

11. TOOLS & TACKLES-ANNEXURE-F

ANNEXURE-F

LIST OF TOOLS & TACKLES

S.No.	ITEM / COMPONENT	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
1	ACB RACKING HANDLE	Nos	20		
2	MODULE RACKING HANDLE	Nos	20		
3	FUSE PULLERS	Nos	15		
4	TROLLEY FOR ACB HANDLING	Nos	3		
5	TEST CABINET WITH COUPLING CABLES FOR TESTING THE BREAKER IN DRAWOUT POSITION	Nos	2		

12. COMMISSIONING CHARGE FOR NUMERICAL RELAY-ANNEXURE-G

ANNEXURE-G

COMMISSIONING CHARGES FOR NUMERICAL RELAYS AT SITE

SL.NO.	DETAILS	QUANTITY	UNIT PRICE	TOTAL PRICE
1	LUMP SUM ALL INCLUSIVE CHARGES PER VISIT FOR SERVICE ENGINEER (EXCEPT DAILY CHARGES)	1 VISITS		
2	LUMP SUM ALL INCLUSIVE PER NUMERICAL RELAY COMMISSIONING CHARGES	60 NOS		

NOTES:

1) AMOUNT PAYABLE FOR SERVICE ENGINEER PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 1 ABOVE + (PER NUMERICAL RELAY COMMISSIONING CHARGES AS PER SL. NO. 2 ABOVE X NO. OF RELAYS) (TO BE CERTIFIED BY BHEL SITE)

13. **SITE MODIFICATION CHARGES-ANNEXURE-H**

ANNEXURE-H

SITE MODIFICATION CHARGES

SL.NO.	DETAILS	QUANTITY	UNIT PRICE	TOTAL PRICE
1	LUMP SUM ALL INCLUSIVE CHARGES PER VISIT FOR SKILLED TECHNICIAN (EXCEPT DAILY CHARGES)	1 VISITS		
2	LUMP SUM ALL INCLUSIVE DAILY CHARGES FOR SKILLED TECHNICIAN	4 DAYS		
3	LUMP SUM ALL INCLUSIVE CHARGES PER VISIT FOR SERVICE ENGINEER (EXCEPT DAILY CHARGES)	1 VISITS		
4	LUMP SUM ALL INCLUSIVE DAILY CHARGES FOR SERVICE ENGINEER	4 DAYS		
			TOTAL	

NOTES:

1) AMOUNT PAYABLE FOR SKILLED TECHNICIAN PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 1 ABOVE + (DAILY CHARGES AS PER SL. NO. 2 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE)

2) AMOUNT PAYABLE FOR SERVICE ENGINEER PER VISIT TO SITE = VISIT CHARGES AS PER SL. NO. 3 ABOVE + (DAILY CHARGES AS PER SL. NO. 4 ABOVE X NO. OF DAYS AT SITE) (TO BE CERTIFIED BY BHEL SITE)

14. UNIT PRICE SCHEDULE FOR ADDITION/DELETION-ANNEXURE-I

FGD FOR NTPL TUTICORIN THERMAL POWER PROJECT(2X500MW)
UnPrice Schedule For Addition/Deletion **ANNEXURE-I**

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
1	**INCOMING FEEDER UNIT**		
a)	ACB Incomer to PCC/PMCC from Trafo. - Module Type DAET (I/C)		
	630A		
	1000A		
	1600A		
	2000A		
	2500A		
	3000A		
	3500A		
	4000A		
b)	ACB Incomer to MCC - Module Type DAE/ DAEN/ AE (I/C)		
	630A		
	800A		
	1000A		
	1600A		
	2500A		
	3200A		
c)	MCCB (NON MOTORIZED) Incomer for MCC / ACDB – Module Type EM3 (I/C)		
	200A – Fixed Type		
	125A – Fixed Type		
	200A – Fixed Type		
	250A – Fixed Type		
	400A – Fixed Type		
	630A – Fixed Type		
	125A – Drawout Type		
	200A – Drawout Type		
	200A – Drawout Type		
	250A – Drawout Type		
	400A – Drawout Type		
	630A – Drawout Type		
d)	MCCB (NON MOTORIZED) Incomer for MCC / ACDB – Module Type E3 (I/C)		
	Upto 100A – Fixed Type		
	Upto 100A – Drawout Type		
e)	220V DCDB Incomer from charger - Module type CH (I/C)		
	150A – CH Fixed Type		
	200A – CH Fixed Type		
	400A – CH Fixed Type		
	630A – CH Fixed Type		
	800A – CH Fixed Type		
	1250A – CH Fixed Type		
	150A – CH Drawout Type		
	200A – CH Drawout Type		
	400A – CH Drawout Type		
	630A – CH Drawout Type		
	800A – CH Drawout Type		
	1250A – CH Drawout Type		
f)	220V DCDB Incomer from battery - Module type DB (I/C)		
	150A – DB Fixed Type		
	200A – DB Fixed Type		
	400A – DB Fixed Type		
	630A – DB Fixed Type		
	800A – DB Fixed Type		
	1250A – DB Fixed Type		
	150A – DB Drawout Type		
	200A – DB Drawout Type		
	400A – DB Drawout Type		
	630A – DB Drawout Type		
	800A – DB Drawout Type		
	1250A – DB Drawout Type		
g)	220V DC Fuse DB Incomer from DCDB - Module type H2		
	32A		
	50A		
	63A		
h)	AC MCCB DB Incomer– Module Type H3		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	32A		
	63A		
	125A		
i)	ACB Incomer to Emergency Board - Module Type DAEG/ DAEGN (I/C)		
	1600A		
2	**BUSCOUPLER UNIT**		
a)	ACB Buscoupler to PCC/PMCC/MCC from Trafo. - Module Type DAET/ DAE (B/C)		
	630A		
	800A		
	1000A		
	1600A		
	2000A		
	2500A		
	3000A		
	4000A		
b)	MCCB (MOTORIZED) Buscoupler for MCC / ACDB – Module Type EM3 (B/C)		
	Upto 63A – Fixed Type		
	125A – Fixed Type		
	200A – Fixed Type		
	200A – Fixed Type		
	250A – Fixed Type		
	400A – Fixed Type		
	630A – Fixed Type		
	Upto 63A – Drawout Type		
	125A – Drawout Type		
	200A – Drawout Type		
	200A – Drawout Type		
	250A – Drawout Type		
	400A – Drawout Type		
	630A – Drawout Type		
c)	220V DCDB buscoupler - Module Type - DC		
	150A – DC Fixed Type		
	200A – DC Fixed Type		
	400A – DC Fixed Type		
	630A – DC Fixed Type		
	800A – DC Fixed Type		
	1250A – DC Fixed Type		
	150A – DC Drawout Type		
	200A – DC Drawout Type		
	400A – DC Drawout Type		
	630A – DC Drawout Type		
	800A – DC Drawout Type		
	1250A – DC Drawout Type		
d)	220V DCDB TIE - Module Type - HD		
	150A – HD Fixed Type		
	200A – HD Fixed Type		
	400A – HD Fixed Type		
	630A – HD Fixed Type		
	800A – HD Fixed Type		
	1250A – HD Fixed Type		
	150A – HD Drawout Type		
	200A – HD Drawout Type		
	400A – HD Drawout Type		
	630A – HD Drawout Type		
	800A – HD Drawout Type		
	1250A – HD Drawout Type		
e)	ACB BUSCOUPLER to Emergency Board - Module Type DAEG (B/C)		
	1600A		
3	**Outgoing ACB supply feeder - Module Type DAE/DAE-TIE (O/G)**		
	630A		
	800A		
	1000A		
	1600A		
	3000A		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
4	**Outgoing ACB motor feeder - Module Type DM/PM (controlled from DDCMIS/PLC)**		
	90.1- 200KW		
5.1	**DOL Motor Starter - Unidirectional Drive(MPCB/MCCB CONTROLLED) - Drawout Type**		
a)	Module Type K2 (Controlled from LPBS)(MPCB WITH CONTACTORS)		
	Upto 5.5KW		
	5.6 - 7.0KW		
	7.1 - 13KW		
	13.1 - 18.5KW		
b)	Module Type K21 (Controlled from LPBS)(MCCB WITH CONTACTORS)		
	18.5 - 24KW		
	24.1 - 29.9KW		
	30.0 - 37.0KW		
	37.1 - 40KW		
	40.1 - 50.0KW		
	50.1 - 75KW		
	75.1 - 90KW		
	90.1 - 110KW		
c)	Module Type K3 (Controlled from LCP)(MPCB WITH CONTACTORS)		
	Upto 5.5KW		
	5.6 - 7.0KW		
	7.1 - 13KW		
	13.1 - 18.5KW		
d)	Module Type K31 (Controlled from LCP)(MCCB WITH CONTACTORS)		
	18.5 - 24KW		
	24.1 - 29.9KW		
	30.0 - 37.0KW		
	37.1 - 40KW		
	40.1 - 50.0KW		
	50.1 - 75KW		
	75.1 - 90KW		
	90.1 - 110KW		
e)	Module Type DK2/PK2/AK2 (Controlled from DDCMIS/PLC/ATRS)(MPCB WITH CONTACTORS)		
	Upto 5.5KW		
	5.6 - 7.0KW		
	7.1 - 13KW		
	13.1 - 18.5KW		
f)	Module Type DK21/PK21/AK21 (Controlled from DDCMIS/PLC/ATRS)(MCCB WITH CONTACTORS)		
	18.5 - 24KW		
	24.1 – 29.9KW		
	30.0 - 37.0KW		
	37.1 - 40KW		
	40.1 - 50.0KW		
	50.1 - 75KW		
	75.1 - 90KW		
	90.1 - 110KW		
g)	Module Type DK2E/PK2E/AK2E (Controlled from DDCMIS/PLC/ATRS)(MPCB WITH CONTACTORS)		
	Upto 5.5KW		
	5.6 - 7.0KW		
	7.1 - 13KW		
	13.1 - 18.5KW		
h)	Module Type DK21E/PK21E/AK21E (Controlled from DDCMIS/PLC/ATRS)(MCCB WITH CONTACTORS)		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	18.5 - 24KW		
	24.1 – 29.9KW		
	30.0 - 37.0KW		
	37.1 - 40KW		
	40.1 - 49.9KW		
	50 - 75KW		
	75.1 - 90KW		
	90.1 - 110KW		
6.1	**RDOL Motor Starter – Bidirectional Drive(MPCB/MCCB CONTROLLED) Drawout Type**		
a)	Module Type DN1/ PN1/ AN1 (Controlled from DDCMIS/PLC/ATRS)(MPCB WITH CONTACTORS)		
	Upto 5.5KW		
	5.6 - 7.0KW		
	7.1 - 13KW		
	13.1 - 18.5KW		
a)	Module Type DN21/ PN21/ AN21 (Controlled from DDCMIS/PLC/ATRS)(MCCB WITH CONTACTORS)		
	18.5 - 24KW		
	24.1 – 29.9KW		
	30.0 - 37.0KW		
	37.1 - 40KW		
	40.1 - 49.9KW		
	50 - 75KW		
	75.1 - 90KW		
7	**Outgoing MCCB/ SFU (NON MOTORIZED) controlled feeders**		
a)	Outgoing SFU controlled supply feeder - Module Type E3 (O/G)		
	upto 10A - Fixed type		
	16A - Fixed type		
	25A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	125A - Fixed type		
	160A - Fixed type		
	200A - Fixed type		
	250A - Fixed type		
	400A - Fixed type		
	600A - Fixed type		
	upto 10A - Drawout type		
	16A - Drawout type		
	25A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
	125A - Drawout type		
	160A - Drawout type		
	200A - Drawout type		
	250A - Drawout type		
	400A - Drawout type		
	600A - Drawout type		
b)	Outgoing MCCB controlled supply feeder - Module Type E3 (O/G)		
	16A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	125A - Fixed type		
	160A - Fixed type		
	200A - Fixed type		
	250A - Fixed type		
	400A - Fixed type		
	600A - Fixed type		
	16A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
	125A - Drawout type		
	160A - Drawout type		
	200A - Drawout type		
	250A - Drawout type		
	400A - Drawout type		
	600A - Drawout type		
c)	Double pole SFU controlled 1-ph feeder - E1 (O/G)		
	10A - Fixed type		
	16A - Fixed type		
	25A - Fixed type		
	32A - Fixed type		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	63A - Fixed type		
	10A - Drawout type		
	16A - Drawout type		
	25A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
d)	Double pole MCCB controlled 1-ph feeder - E1 (O/G)		
	16A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	125A - Fixed type		
	16A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
	125A - Drawout type		
e)	1-Ph SFU controlled outgoing contactor feeder (EA1)		
	10A - Fixed type		
	16A - Fixed type		
	25A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	10A - Drawout type		
	16A - Drawout type		
	25A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
f)	1-Ph MCCB controlled outgoing contactor feeder (EA1)		
	16A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	16A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
g)	3-Ph SFU controlled outgoing contactor feeder (EA3)		
	10A - Fixed type		
	16A - Fixed type		
	25A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	125A - Fixed type		
	200A - Fixed type		
	250A - Fixed type		
	400A - Fixed type		
	600A - Fixed type		
	10A - Drawout type		
	16A - Drawout type		
	25A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
	125A - Drawout type		
	200A - Drawout type		
	250A - Drawout type		
	400A - Drawout type		
	600A - Drawout type		
h)	3-Ph MCCB controlled outgoing contactor feeder (EA3)		
	16A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	125A - Fixed type		
	200A - Fixed type		
	250A - Fixed type		
	400A - Fixed type		
	600A - Fixed type		
	16A - Drawout type		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	32A - Drawout type		
	63A - Drawout type		
	125A - Drawout type		
	200A - Drawout type		
	250A - Drawout type		
	400A - Drawout type		
	600A - Drawout type		
i)	3-Ph SFU controlled Contactor Changeover Between Two In Coming Supplies Module Type CC		
	16A - Fixed type		
	32A - Fixed type		
	63A - Fixed type		
	125A - Fixed type		
	200A - Fixed type		
	250A - Fixed type		
	400A - Fixed type		
	600A - Fixed type		
	16A - Drawout type		
	32A - Drawout type		
	63A - Drawout type		
	125A - Drawout type		
	200A - Drawout type		
	250A - Drawout type		
	400A - Drawout type		
	600A - Drawout type		
8	**1-Ph MCB controlled outgoing feeder (H1) from AC MCCB DB**		
	10A		
	16A		
9	**Outgoing MCCB feeders**		
a)	220V DC Outgoing MCCB feeder (X)		
	2A - Fixed type		
	4A - Fixed type		
	6A - Fixed type		
	10A - Fixed type		
	16A - Fixed type		
	25A - Fixed type		
	32A - Fixed type		
	50A - Fixed type		
	63A - Fixed type		
	100A - Fixed type		
	125A - Fixed type		
	200A - Fixed type		
	250A - Fixed type		
	400A - Fixed type		
	500A - Fixed type		
	630A - Fixed type		
	2A - Drawout type		
	4A - Drawout type		
	6A - Drawout type		
	10A - Drawout type		
	16A - Drawout type		
	25A - Drawout type		
	32A - Drawout type		
	50A - Drawout type		
	63A - Drawout type		
	100A - Drawout type		
	125A - Drawout type		
	200A - Drawout type		
	250A - Drawout type		
	400A - Drawout type		
	500A - Drawout type		
	630A - Drawout type		
10	**Common Auxiliary Module**		
a)	PT module		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
i	Bus PT module for PCC/PMCC-G1 Type		
ii	Bus PT module for Emergency MCC-G2 Type		
iii	Bus PT DCDB-S Type		
iv	Bus PT module for MCC/ACDB-VM Type		
b)	Space heater and Power Socket - TT		
c.1)	110V AC control supply module – Type CS (consisting of 415/110V control Trafo.)		
	1KVA		
	2KVA		
	2.5KVA		
	3KVA		
	5KVA		
	7.5KVA		
	10KVA		
c.2)	240 V AC control supply module – type CS (consisting of 415/240V control Trafo.)		
	1KVA		
	2KVA		
	2.5KVA		
	3KVA		
	5KVA		
	7.5KVA		
	10KVA		
d.1)	110V AC control supply module – Type CS-A (consisting of 415/110V control Trafo.)		
	1KVA		
	2KVA		
	2.5KVA		
	3KVA		
	5KVA		
	7.5KVA		
	10KVA		
d.2)	240 V AC control supply module – type CS-A (consisting of 415/240V control Trafo.)		
	1KVA		
	2KVA		
	2.5KVA		
	3KVA		
	5KVA		
	7.5KVA		
	10KVA		
e)	240V AC motor space heater module		
f)	220V DC supply module (for receiving 220V DC supply)		
g)	24 V winding heating module		
h)	Alarm module		
i)	Test supply module		
J.1)	240 V AC Panel Space hetaing supply module – type SH (consisting of 415/240V control Trafo.)		
	1KVA		
	2KVA		
	2.5KVA		
	3KVA		
	5KVA		
	7.5KVA		
	10KVA		
J.2)	240 V AC Panel Space hetaing supply module – type SH-A (consisting of 415/240V control Trafo.)		
	1KVA		
	2KVA		
	2.5KVA		
	3KVA		
	5KVA		
	7.5KVA		
	10KVA		
11	**Empty Panel with Horizontal & Vertical Busbar, Support & Auxiliary Busbar**		
a)	MCC Panel (Double Front Drawout Type)		
	250 / 250A		
	400 / 400A		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	630 / 630A		
	800 / 630A		
	1000 / 630A		
	1600 / 630A		
	2000 / 630A		
	2500 / 630A		
	3000 / 630A		
	4000 / 630A		
b)	MCC Panel (Double Front Fixed Type)		
	250 / 250A		
	400 / 400A		
	630 / 630A		
	800 / 630A		
	1000 / 630A		
	1600 / 630A		
	2000 / 630A		
	2500 / 630A		
	3000 / 630A		
	4000 / 630A		
c)	220V DCDB Panel (Double Front Fixed type)		
	UPTO 630A (with 630A VBB)		
	1000A (with 630A VBB)		
	1600A (with 630A VBB)		
d)	220V DCDB Panel (Double Front Drawout type)		
	UPTO 630A (with 630A VBB)		
	1000A (with 630A VBB)		
	1600A (with 630A VBB)		
12	**Empty Panel With Horizontal & Vertical Busbar, Support & Auxiliary Busbar**		
a)	PCC Panel (Single Front Drawout Type)		
	1600 / 1600A		
	2000 / 2000A		
	2500 / 2500A		
	3000 / 3000A		
	4000 / 4000A		
b)	MCC Panel (Single Front Drawout Type)		
	250 / 250A		
	400 / 400A		
	630 / 630A		
	800 / 630A		
	1000 / 630A		
	1600 / 630A		
	2000 / 630A		
	2500 / 630A		
	3000 / 630A		
	4000 / 630A		
c)	MCC Panel (Single Front Fixed Type)		
	250 / 250A		
	400 / 400A		
	630 / 630A		
	800 / 630A		
	1000 / 630A		
	1600 / 630A		
	2000 / 630A		
	2500 / 630A		
	3000 / 630A		
	4000 / 630A		
d)	220V DCDB Panel (Single Front Fixed Type)		
	UPTO 630A (with 630A VBB)		
	1000A (with 630A VBB)		
	1600A (with 630A VBB)		
e)	220V DCDB Panel (Single Front Fixed Type)		
	UPTO 630A (with 630A VBB)		
	1000A (with 630A VBB)		
	1600A (with 630A VBB)		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
13	**ACB Panel with Horizontal & Vertical Busbar, Support & Auxiliary Busbar**		
	630 / 630A		
	800 / 630A		
	800 / 800A		
	1000 / 630A		
	1000 / 800A		
	1000 / 1000A		
	1600 / 630A		
	1600 / 800A		
	1600 / 1000A		
	1600 / 1600A		
	2000 / 630A		
	2000 / 800A		
	2000 / 1000A		
	2000 / 1600A		
	2000 / 2000A		
	2500 / 630A		
	2500 / 800A		
	2500 / 1000A		
	2500 / 1600A		
	2500 / 2000A		
	2500 / 2500A		
	3000 / 630A		
	3000 / 800A		
	3000 / 1000A		
	3000 / 1600A		
	3000 / 2000A		
	3000 / 2500A		
	3000 / 3000A		
	4000 / 630A		
	4000 / 800A		
	4000 / 1000A		
	4000 / 1600A		
	4000 / 2000A		
	4000 / 2500A		
	4000 / 3000A		
	4000 / 4000A		
14	**Dummy Panel**		
	UPTO 630A		
	800A		
	1000A		
	1600A		
	2000A		
	2500A		
	3000A		
	4000A		
15	**Unit Prices For Circuit Components**		
a)	Air Circuit Breaker without releases		
	630A MDO		
	800A MDO		
	1000A MDO		
	630A ACB, 3P, EDO, AC		
	800A ACB, 3P, EDO, AC		
	1000A ACB, 3P, EDO, AC		
	4000A ACB, 3P, EDO, AC		
	3200A ACB, 3P, EDO, AC		
	2500A ACB, 3P, EDO, AC		
	2000A ACB, 3P, EDO, AC		
	1600A ACB, 3P, EDO, AC		
	1250A ACB, 3P, EDO, AC		
	1250A ACB, 2P, MDO, DC		
b)	MCCB, 2NO+2NC AUX, FSC		
	16A		
	25A		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	32A		
	63A		
	80A		
	115A		
	150A		
	185A		
	265A		
	315A		
	400A		
	630A		
c)	MCCB, 2NO+2NC AUX, ASC		
	16A		
	25A		
	32A		
	63A		
	80A		
	115A		
	150A		
	185A		
	265A		
	315A		
	400A		
	630A		
d)	MCCB with LSIG release		
	200A		
	250A		
	300A		
	350A		
	400A		
	630A		
e)	MCCB - Motorized with LSIG release		
	200A		
	250A		
	300A		
	350A		
	400A		
	630A		
f)	POWER FUSE LINK FOR SFU (AC) - TPN		
	Upto 16A		
	25A		
	32A		
	63A		
	125A		
	250A		
	400A		
	630A		
g)	POWER FUSE LINK FOR SFU (DC) - DP		
	Upto 16A		
	25A		
	40A		
	50A		
	60A		
	80A		
	100A		
	200A		
	300A		
	400A		
	630A		
h)	SFU WITHOUT POWER FUSE LINK (AC) - TPN		
	Upto 16A		
	25A		
	32A		
	63A		
	125A		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	250A		
	400A		
	630A		
i)	SFU WITHOUT POWER FUSE LINK (DC) - DP		
	Upto 16A		
	25A		
	40A		
	50A		
	60A		
	80A		
	100A		
	200A		
	300A		
	400A		
	630A		
j)	HRC Fuse Links (Offset tag Type)		
	Upto 10A		
	16A		
	25A		
	32A		
	50A		
	63A		
k)	HRC Fuse DIN Type (Blade Contact)		
	Upto 10A		
	16A		
	20A		
	32A		
	36A		
	50A		
	63A		
	80A		
	100A		
	125A		
	160A		
	200A		
	250A		
	315A		
	400A		
	Control Fuse Link		
l)	Power contactor (AC)		
	16A		
	25A		
	32A		
	63A		
	80A		
	115A		
	150A		
	185A		
	265A		
	315A		
	400A		
m)	Power contactor (DC)		
	16A		
	25A		
	32A		
	63A		
	80A		
	115A		
	150A		
	185A		
	265A		
	400A		
n)	Fuse Base		
	UPTO 20A		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	32A		
	50/63A		
	100A		
	250A		
	400A		
	630A		
o)	Auxiliary contactor AC/DC		
i)	AC Aux. contactor		
	2NO + 2NC		
	3NO + 3NC		
	4NO + 4NC		
	6NO + 6NC		
ii)	DC Aux. contactor		
	2NO + 2NC		
	3NO + 3NC		
	4NO + 4NC		
	6NO + 6NC		
p)	Protection Relay		
	VAGM 23		
	CTU 12		
	CTU 32		
	VTT 11		
	VAG 11		
	VAA 11		
	VAJHM 13		
	VAJHM 23		
	CDGM-12		
	CAG 12		
	CAG 34		
	CCUM 21		
	CDG 11		
	CDG 31		
	CDG 61		
	VDG 14		
	CDV 62		
	CAG 14		
	VAX 31		
	CAG 37		
	CAEM-21		
	VAG-21		
	VAJC-11		
	CTMM-501		
	MOTPRO		
	VAA21		
	VTT12		
	VTIG		
	VTU21		
	NUMERICAL RELAY FOR PROTECTION, T/C SUPERVISION, LOGIC, METERING FUNCTION & WITH CHECK SYNCHRONIZATION, REF PROTECTION, FUSE FAILURE, ENERGY METERING, OVER LOAD PROTECTION, 50, 50N, 51, 51N, 27, 98, 86, 25, 95, 30A, 30B, 64R		
	SEF NUMERICAL RELAY		
	NUMERICAL RELAY FOR PROTECTION, T/C SUPERVISION, LOGIC, METERING FUNCTION & WITH CHECK SYNCHRONIZATION, FUSE FAILURE, ENERGY METERING, OVER LOAD PROTECTION 50, 50N,51, 51N, 27, 98, 86, 25, 95, 30A, 30B		
	NUMERICAL RELAY FOR PROTECTION, T/C SUPERVISION, LOGIC, METERING FUNCTION & WITH CHECK SYNCHRONIZATION, FUSE FAILURE, 50, 50N,51, 51N, 27, 98, 86, 25, 95, 30A, 30B		
	NUMERICAL RELAY FOR PROTECTION, T/C SUPERVISION, LOGIC, METERING FUNCTION & WITH CHECK SYNCHRONIZATION, FUSE FAILURE, ENERGY METERING, OVER LOAD PROTECTION 50, 50N,51, 51N, 27, 98, 86, 25, 95, 30A, 30B, DG PROTECTION (Like Neutral Under-voltage-27N, Power Direction / Reverse Power (Islanding)-32, Negative Phase Sequence Over-current (Phase unbalance, reverse phase sequence) -46, , Negative Sequence Voltage -47, Ground Over-voltage trip or ground over-current trip-51G, Instantaneous Over-voltage trip (ferro-resonance)-59, Over-voltage trip-59T, Neutral over-voltage-59N, Over/Under Frequency trip-81O/ 81U etc.)		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	NUMERICAL RELAY FOR PROTECTION, T/C SUPERVISION, LOGIC, METERING FUNCTION & FUSE FAILURE, OVER LOAD PROTECTION 50, 50N,51, 51N, 27, 98, 86, 95, 30A, 30B		
	NUMERICAL RELAY FOR PROTECTION, T/C SUPERVISION-95, LOGIC, METERING FUNCTION & FUSE FAILURE-98, OVER LOAD PROTECTION, LOCKED ROTOR PROTECTION-14, RESTART INHIBIT PROTECTION-49, NEGATIVE SEQUENCE PROTECTION-46, 50, 50N, 51, 51N, 27, 86, 30A, 30B		
	Communicable type Numerical relay for O/C, E/F, TC Supervision on IEC-61850 protocol		
	Communicable type Numerical relay for O/C, E/F, Check Synchronization, TC Supervision on IEC-61850 protocol		
	Communicable type Numerical relay for Voltage control O/C, 3Phase O/C, Reverse power, Differential, Neutral Displacement, E/F, U/V, O/V protection, Check Synchronization, TC Supervision on IEC-61850 protocol		
	Communicable type Numerical relay for Under voltage, Over voltage etc. on IEC-61850 protocol		
	Communicable type Numerical relay for E/F protection for DCDB on IEC-61850 protocol		
	Communicable type Numerical relay for composite motor protection including TC Supervision on IEC-61850 protocol		
	Communicable type Numerical relay for Neutral Displacement on IEC-61850 protocol		
	Communicable type Numerical relay for O/C, E/F, TC Supervision on Modbus protocol		
	Communicable type Numerical relay for O/C, E/F, Check Synchronization, TC Supervision on Modbus protocol		
	Communicable type Numerical relay for Voltage control O/C, 3Phase O/C, Reverse power, Differential, Neutral Displacement, E/F, U/V, O/V protection, Check Synchronization, TC Supervision on Modbus protocol		
	Communicable type Numerical relay for Under voltage, Over voltage etc. on Modbus protocol		
	Communicable type Numerical relay for E/F protection for DCDB on Modbus protocol		
	Communicable type Numerical relay for composite motor protection including TC Supervision on Modbus protocol		
	Communicable type Numerical relay for Neutral Displacement on Modbus protocol		
	Numerical Check synchronising Relay		
	Check synchronising Relay Type-SKE11 or better		
	Guard Relay		
	NUMERICAL RELAY Over current and Earth fault		
	BATTERY EARTH FAULT RELAY, 1-7mA, NOMINAL VOLTAGE-220V DC, 1DV, 2NO S/R, FLUSH		
	OVERLOAD RELAY, NOMINAL VOLTAGE-220V DC, O/V VLTAGE SETTING-110%, 1/4NV, 1NO+1NC S/R		
	UNDER VOLTAGE RELAY, NOMINAL VOLTAGE-220V DC, U/V SETTING-80%, AUX..-240V AC, 1/2NH, 1NO+2NC S/R		
	JAMING RELAY - CAG17		
q)	Bimetal Thermal O/L Relays		
i)	Thermal O/L relay with SPP - OLR		
	Upto 5.5KW		
	5.6 to 11KW		
	11.1 to 22KW		
	22.1 to 45KW		
	45.1 to 75KW		
	75 to 110KW		
ii)	**Heavy Duty** Thermal O/L relay with SPP - OLR		
	Upto 5.5KW		
	5.6 to 11KW		
	11.1 to 22KW		
	22.1 to 45KW		
	45.1 to 75KW		
	75 to 110KW		
r)	Timer (DC)		
	ON DELAY TIMER, 0.5-5SEC., 220V DC, 2NO+2NC		
	ON DELAY TIMER, 1.0-10SEC. 220V DC, 2NO+2NC		
	240VAC MTR RESTART CONTROL TIMER (.2-60SECS)		
	240VAC ON DELAY TIMER(1-10SECNS)WITH 1NO		
	220VDC ON DELAY TIMER(.5-5SECS) WITH 1NO		
	220VDC 0N DELAY TIMER(0.5-5SECS)WITH 3NO		
	220VDC ON DELAY TIMER(1-10SECS) WITH 3NO		
s)	Meter		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	AC ammeter (Digital)		
	AC ammeter (Analog) linear scale		
	AC ammeter (Analog) compressed scale		
	DC ammeter (Digital)		
	DC ammeter (Analog)		
	AC voltmeter (Digital)		
	DC voltmeter (Analog)		
	Wattmeter (3 Phase)		
	Wattmeter (1 Phase)		
	TVM meter		
	DIGITAL ENERGY METER		
	Frequency meter		
	Synchroscope		
	Differential Voltmeter		
	Differential Frequency meter		
	Multifunction digital Energy meter with RS485 Port (0.2 Acc. Class)		
	Multifunction digital Energy meter with RS485 Port (0.5 Acc. Class)		
	Multifunction digital Energy meter with RS485 Port (1.0 Acc. Class)		
t)	Single Phase Preventor Relay		
u)	MCB		
	6A, 4P 415V AC		
	6A DP, 240V AC		
	10A DP, 240V AC		
	16A DP, 240V AC		
	32A DP, 240V AC		
	6A DP, 110V AC		
	10A DP, 110V AC		
	16A DP, 110V AC		
	32A DP, 110V AC		
	16A DP, 220V DC		
	6A DP, 220V DC		
	6A DP, 240V AC		
	10A SP, 240V AC		
	16A SP, 240V AC		
	32A SP, 240V AC		
	6A SP, 110V AC		
	10A SP, 110V AC		
	16A SP, 110V AC		
	32A SP, 110V AC		
	16A SP, 220V DC		
	6A SP, 220V DC		
v)	SWITCH & PUSH BUTTON		
	BREAKER CONTROL SWITCH, 16A,220V DC, 2CLOSE+2TRIP		
	DC ISOLATING SWITCH 16A,220V DC, DP, BASE MTG.		
	16A,240V AC SELECTOR SWITCH 3WAY, 4POLE, FLUSH MTG		
	25A,240V AC SELECTOR SWITCH 3WAY, 4POLE, FLUSH MTG		
	16A,240V AC SELECTOR SWITCH 2WAY, 2POLE, FLUSH MTG		
	NORMAL/ TRIAL SEL. SWITCH, 2POLE , 2WAY, 10A 240V AC, FLUSH MTG,		
	MCC/ NORMAL/ TRIAL SEL. SWITCH, 2POLE ,3WAY, 10A 240V AC, FLUSH MTG		
	SWGR/ REMOTE SEL. SWITCH 3POLE 2WAY,16A 220V DC, FLUSH MTG		
	SWGR/ NORMAL/ TRIAL SEL. SWITCH, 3POLE, 3WAY, 16A 220V DC, FLUSH MTG.		
	NORMAL/ TRIAL SEL. SWITCH, 2POLE , 2WAY, 10A 240V AC, FLUSH MTG, LOCKABEL TYPE		
	MCC/ NORMAL/ TRIAL SEL. SWITCH, 2POLE ,3WAY, 10A 240V AC, FLUSH MTG, LOCKABEL TYPE		
	SWGR/ REMOTE SEL. SWITCH 3POLE 2WAY,16A 220V DC, FLUSH MTG.LOCKABLE TYPE		
	SWGR/ NORMAL/ TRIAL SEL. SWITCH, 3POLE, 3WAY, 16A 220V DC, FLUSH MTG., LOCKABLE TYPE		
	AMMETER SELECTOR SWITCH		
	VOLTMETER SELECTOR SWITCH		
	TOGGLE SWITCH 5A, 240V AC		
	AC SWITCH SPST-5A,240V AC		
	10A, 220V DC SWITCH		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	Door Limit switch		
	Ammeter selector switch		
	Voltmeter selector switch		
	Synchronisation selector switch		
	Trip selector switch		
	Push Button		
	2NO + 2NC Shrouded		
	1NO + 1NC Shrouded		
	2NO + 2NC Mushroom head stayput		
	2NO + 2NC Lockable type		
w)	Indicating Lamp Assembly (LED Type)		
	240V AC-GREEN		
	240V AC-RED		
	240V AC- AMBER		
	110V AC-GREEN		
	110V AC-RED		
	110V AC- AMBER		
	220V DC-WHITE		
	220V DC-RED		
	220V DC-GREEN		
	220V DC-BLUE		
	220V DC- AMBER		
	63.5V AC-RED		
	63.5V AC-YELLOW		
	63.5V AC-BLUE		
x)	CT		
i)	Metering CT		
	Upto 75/1A		
	100/1A		
	125/1A		
	150/1A		
	200/1A		
	250/1A		
	300/1A		
	400/1A		
	500/1A		
	630/1A		
	800/1A		
	1000/1A		
	1250/1A		
	1600/1A		
	2000/1A		
	2500/1A		
	3000/1A		
	4000/1A		
ii)	Protection CT (5P20)		
	Upto 75/1A		
	100/1A		
	125/1A		
	150/1A		
	200/1A		
	250/1A		
	300/1A		
	400/1A		
	500/1A		
	630/1A		
	800/1A		
	1000/1A		
	1250/1A		
	1600/1A		
	2000/1A		
	2500/1A		
	3000/1A		
	4000/1A		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	630/5A		
	800/5A		
	1000/5A		
	1250/5A		
	1600/5A		
	2000/5A		
	2500/5A		
	3000/5A		
	4000/5A		
iii)	PS Class CT		
	1600/1A		
	2500/1A		
	3000/1A		
	4000/1A		
	1600/5A		
	2500/5A		
	3000/5A		
	4000/5A		
y)	Voltage Transformer		
i)	415/√3 : 110/√3V, 1ph, 50VA		
ii)	415/√3 : 110/√3V, 1ph, 100VA		
iii)	415/√3 : 240/√3V, 1ph, 50VA		
iv)	415/√3 : 240/√3V, 1ph, 100VA		
z)	Toggle switch (16A)		
aa)	Secondary Isolating Contact Block		
ab)	Control Terminal (Fixed)		
ac)	Thermostat		
ad)	CONTROL TRANSFORMER		
	415/240V,CL-E, 1 KVA		
	415/240V,CL-E, 2KVA		
	415/240V,CL-E, 2.5KVA		
	415/240V,CL-E, 3KVA		
	415/240V,CL-E, 5KVA		
	415/240V,CL-E, 10KVA		
	415/110V,CL-E, 1 KVA		
	415/110V,CL-E, 2KVA		
	415/110V,CL-E, 2.5KVA		
	415/110V,CL-E, 3KVA		
	415/110V,CL-E, 5KVA		
	415/110V,CL-E, 10KVA		
ac)	4-20mA Dual o/p, Aux sup 220V DC, 1A, Current Transducer		
	4-20mA Dual o/p, Aux sup 240V AC, 1A, Current Transducer		
	4-20mA Dual o/p, Aux sup 110V AC, 1A, Current Transducer		
	4-20mA Dual o/p, Aux sup 220V DC, VoltageTransducer, PTR 415/110V		
	4-20mA Dual o/p, Aux sup 240V AC, VoltageTransducer, PTR 415/110V		
	4-20mA Dual o/p, Aux sup 110V AC, VoltageTransducer, PTR 415/110V		
	4-20mA Dual o/p, Aux sup 220V DC, FrequencyTransducer, PTR 415/110V		
	4-20mA Dual o/p, Aux sup 220V DC, Input 0-75mV DC, Current Transducer-DC		
	4-20mA Dual o/p, Aux sup 240V AC, Input Voltage 0-220V DC, Voltage Transducer-DC		
ad)	4-20mA Dual Output kW transducer		
ae)	4-20mA Dual Output kVA transducer		
af)	4-20mA Dual Output PF transducer		
ag)	4-20mA Dual Output Frequency transducer		
ah)	Interposing relay RE 302 or Eqvt with freewheeling diode & LED		
ai)	Laptop PC alongwith software & hardware		
aj)	3 PIN SOCKET - 5A, 110V AC, 3PIN		
ak)	THERMOSTATE, DIAL TYPE		
am)	SPACE HEATER		
an)	CFL WITH HOLDER		
ao)	NEUTRAL LINK		
	20A FOR CONTROL CKT. & POWER CKT. UPTO 25A MCCB RATING		
	32A FOR 50A MCCB RATING		
	63A FOR 100A & 125A MCCB RATING		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	125A FOR 250A MCCB RATING		
	250A FOR 400A & 500A MCCB RATING		
ap)	CASTLE KEY INTERLOCK FOR MCCB - 3LOCK+2KEY		
aq)	MECHANICAL INTERLOCK FOR POWER CONTACTOR		
	16A		
	25A		
	32A		
	63A		
	80A		
	115A		
	150A		
	185A		
	265A		
	315A		
	400A		
ar)	AUX. CONTACTOR		
	2NO+2NC, CV-220V DC		
	4NO, CV-220V DC		
	2NO+2NC, CV-240V AC		
	3NO+1NC, CV-240V AC		
	2NO+2NC, CV-110V AC		
	3NO+1NC, CV-110V AC		
	1NO + 1NC 240V AC		
	1NO + 1NC 110V AC		
	1NO + 1NC 220V DC		
	1NO 240V AC		
	1NO 110V AC		
	1NO 220V DC		
as)	ISOLATING TRANSFORMER-15kVA		
	ISOLATING TRANSFORMER-20kVA		
	ISOLATING TRANSFORMER-25kVA		
	ISOLATING TRANSFORMER-30kVA		
16	**Foundation Frame**		
a)	MCC panel		
	upto 1600A (SF)		
	2500A (SF)		
	3000A (SF)		
	4000A (SF)		
	upto 1600A (DF)		
	2500A (DF)		
	3000A (DF)		
	4000A (DF)		
b)	220V DCDB panel		
	SF		
	DF		
c)	PCC / PMCC panel		
	upto 1600A		
	2500A		
	3000A		
	4000A		
17	**Connection from PMCC/MCC panel to PMCC/MCC panel**		
	250A		
	400A		
	630A		
	800A		
	1000A		
	1600A		
	2500A		
	3000A		
	4000A		
18	**Cable Glands & Lugs:**		
a)	**Single Compression Cable Glands for cable sizes:**		
	2C X 2.5 Sq. mm.		
	3C X 2.5 Sq. mm.		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	5C X 2.5 Sq. mm.		
	7C X 2.5 Sq. mm.		
	12C X 2.5 Sq. mm.		
	16C X 2.5 Sq. mm.		
	2C X 10 Sq. mm.		
	2C X 16 Sq. mm.		
	2C X 25 Sq. mm.		
	2C X 35 Sq. mm.		
	2C X 50 Sq. mm.		
	2C X 70 Sq. mm.		
	2C X 95 Sq. mm.		
	3C X 2.5 Sq. mm.		
	3C X 10 Sq. mm.		
	3C X 16 Sq. mm.		
	3C X 25 Sq. mm.		
	3C X 35 Sq. mm.		
	3C X 50 Sq. mm.		
	3C X 70 Sq. mm.		
	3C X 95 Sq. mm.		
	3C X 150 Sq. mm.		
	3C X 185 Sq. mm.		
	3C X 240 Sq. mm.		
	3.5C X 25 Sq. mm.		
	3.5C X 50 Sq. mm.		
	3.5C X 70 Sq. mm.		
	3.5C X 300 Sq. mm.		
	3.5C X 240 Sq. mm.		
	3.5C X 185 Sq. mm.		
	3.5C X 95 Sq. mm.		
	4C X 16 Sq. mm.		
	4C X 35 Sq. mm.		
	1C X 400 Sq. mm.		
	1C X 630 Sq. mm.		
b)	**Double Compression Cable Glands for cable sizes:**		
	2C X 2.5 Sq. mm.		
	3C X 2.5 Sq. mm.		
	5C X 2.5 Sq. mm.		
	7C X 2.5 Sq. mm.		
	12C X 2.5 Sq. mm.		
	16C X 2.5 Sq. mm.		
	2C X 10 Sq. mm.		
	2C X 16 Sq. mm.		
	2C X 25 Sq. mm.		
	2C X 35 Sq. mm.		
	2C X 50 Sq. mm.		
	2C X 70 Sq. mm.		
	2C X 95 Sq. mm.		
	3C X 2.5 Sq. mm.		
	3C X 10 Sq. mm.		
	3C X 16 Sq. mm.		
	3C X 25 Sq. mm.		
	3C X 35 Sq. mm.		
	3C X 50 Sq. mm.		
	3C X 70 Sq. mm.		
	3C X 95 Sq. mm.		
	3C X 150 Sq. mm.		
	3C X 185 Sq. mm.		
	3C X 240 Sq. mm.		
	3.5C X 25 Sq. mm.		
	3.5C X 50 Sq. mm.		

SL.NO.	ITEM DESCRIPTION	MODEL NO./ ITEM DESCRIPTION	UNIT PRICE (Rs.)
	3.5C X 70 Sq. mm.		
	3.5C X 300 Sq. mm.		
	3.5C X 240 Sq. mm.		
	3.5C X 185 Sq. mm.		
	3.5C X 95 Sq. mm.		
	4C X 16 Sq. mm.		
	4C X 35 Sq. mm.		
	1C X 400 Sq. mm.		
	1C X 630 Sq. mm.		
c)	**Cable Lugs for sizes:**		
	2.5 Sq. mm.		
	10 Sq. mm.		
	16 Sq. mm.		
	25 Sq. mm.		
	35 Sq. mm.		
	50 Sq. mm.		
	70 Sq. mm.		
	95 Sq. mm.		
	120 Sq. mm.		
	150 Sq. mm.		
	185 Sq. mm.		
	240 Sq. mm.		
	300 Sq. mm.		
	400 Sq. mm.		
	630 Sq. mm.		
19	**Daily 8 hour rate deployed at site:**		
	Engineer : (per day)		
20	**Module Name plate**		
21	**Wires for Secondary wiring:**		
a)	1.5 Sq. mm. per meter		
b)	2.5 Sq. mm. per meter		
c)	4.0 Sq. mm. per meter		
22	**Control Terminal for Secondary wiring suitable for cable size:**		
a)	0.5 Sq. mm.		
b)	1.5 Sq. mm.		
c)	2.5 Sq. mm.		
23	**Unit price for following tests:**		
a)	Local Push Button Station - Degree of protection test		
b)	Local motor Starter - Degree of protection test		
24	**Electrical Junction Boxes (for termination of 0.5 sqmm screened control cables)**		
a)	48 ways		
b)	64 ways		
c)	72 ways		
a)	96 ways		
25	**ISMC channels**		
a)	ISMC 75 channel per meter		
a)	ISMC 100 channel per meter		
26	**ANY OTHER ITEM WHICH MAY BE REQUIRED FOR ADDITION / DELETION DURING DETAILED ENGINEERING**		
27	**SBMCC**		
	WALL BLOWER FEEDER-0.56 KW		
	WALL BLOWER FEEDER-0.09 KW		
	LR BLOWER FEEDER-0.56 KW		
	LR BLOWER FEEDER-0.736 KW		
	AH BLOWER FEEDER-0.18 KW		
	ISOLATION BLOWER VALVE-4 KW		
28	**ETHERNET SWITCH**		
	8 PORT		
	16 PORT		
	24 PORT		