Support Services Dept., 7th Floor, Central Office, 239 Vidhan Bhavan Marg, Nariman Point, Mumbai 400 021

TENDER FOR ELECTRICAL WORKS ON SEVENTH FLOOR, MAKER TOWER, CUFFE PARADE, MUMBAI
(ONLY FOR EMPANELLED ELECTRICAL CONTRACTOR IN MUMBAI/THANE REGION IN A/B CLASS JOB ABOVE Rs. 15.00 LAKHS only)

OWNER:

UNION BANK OF INDIA,
UNION BANK BHAVAN,
239 VIDHAN BHAVAN MARG,
NARIMAN POINT,
MUMBAI - 400 021
TEL.NO: (022) - 22892521

NOTICE INVITING TENDER

To

M/s_____
_____
_____

Dear Sir,

Sub:

TENDER FOR ELECTRICAL WORKS(ELECTRICAL WIRING/TELEPHONE WIRING/DATA CABLING/LIGHTING ETC.) ON SEVENTH FLOOR, MAKER TOWER, CUFFE PARADE, MUMBAI

Union Bank of India invites sealed tenders from Bank's Empanelled Electrical Contractors in Mumbai / Thane Region in **A/B CLASS JOB ABOVE Rs. 15.00 LAKHS only** for Electrical Works on Seventh Floor, Maker Tower, Mumbai as per following details:

Name of the work : Electrical work at Seventh floor, Maker Tower, Cuffe Parade, Mumbai

Estimated Cost of the Work : Rs. 16.78 lacs excluding GST

Defect liability period : 12-months from the date of completion of work.

Total performance security deposit (Retention money): 8% of the final bill value will be deducted as performance security deposit including of EMD. Deposit shall be refunded after defect liability period of 12-months.

Earnest Money Deposit(EMD) : **Rs. 83,900/-(**Rs. Eighty three thousand nine hundred only) in the form of Pay order/DD in favour of **Union Bank of India**, Payable at **Mumbai** (MSME registered company exempted)

Period of Completion : 60 days

Validity of Tender : 90 days

Payment Terms : After 100% completion of Electrical work payment will made. No advance & no part payment will be entertained.

Liquidated damages : 1% of contract amount per week of delay subject to maximum of 10% of contract amount.

Date of Issue of Tender : Bid document can be downloaded from Bank's website **www.unionbankofindia.co.in** from **21.09.2023 till 2.00 pm on 27.09.2023**

Last date of submission of Tender : Upto 15.00 p.m. on 27.09.2023

Date and place of Opening of Tender : At 15.30 p.m on 27.09.2023, 7th Floor , Central Office, 239, Vidhan Bhavan Marg, Nariman Point, Mumbai - 400021

1) The tender document can be obtained from the office of the ***Asst.General Manager, Support Services Department, 7th Floor, Central Office, Mumbai*** **(without any payment)**and should be submitted in original, duly stamped, and sealed in the same office.

2) The item rates under the contract include for full, final & entire completion of all works in all respects described forming part of the contract. Contractor must quote item rates for all the items of work. Tenders will be opened in the presence of contracting agencies or their authorized representatives.

3) Tenders are to be submitted in one sealed envelope cover duly super scribed "**TENDER FOR ELECTRICAL WORKS ON SEVENTH FLOOR, MAKER TOWER, CUFFE PARADE, MUMBAI"** and put in the Tender Box kept at *Ground Floor, Reception, Central Office, Nariman Point, Mumbai.*

4) The tenderer must use only the tender forms issued for the purpose to fill in the rates. Intimation of tender quote by any other means like letter, email will not be accepted.

5) Tenderers are advised not to make any alteration/modification in the tender documents, Item of work or in any respect whatsoever. Violation of this requirement will make the tender liable for rejection.

6) Every page of the tender documents should be signed by the person or persons submitting the tender in token of his/their having acquainted himself/themselves with the Conditions of Contract, Specifications etc., as laid down. Any tender with any of the documents not so signed will be subjected to rejection.

7) No consideration will be given to a tender received after the time stipulated above and no extension will be allowed for submission of the tender.

8) The Union Bank of India shall not be bound to accept the lowest tender and reserves the right to accept or reject any or all the tenders without assigning any reason whatsoever.

9) This notice inviting tenders, the conditions of tender and the duly completed form of tender etc., will form part to be executed by the successful tenderer with the bank.

1) Each quotation shall be accompanied by **EMD of Rs. 83,900/-(Eighty three thousand nine hundred only)** in the form of Pay Order / Demand draft in favour of Union Bank of India, Payable at Mumbai. Sealed quotation without Earnest Money shall be summarily rejected. (MSME registered company exempted). Performance security deposit 8% of final bill value and will be released after completion of defect liability period of 12-month. Security money

deposit of the successful contractor who fails to carry out the job as per the work order, to the satisfaction of the Bank, shall be forfeited.

2) The EMD (Earnest Money Deposit) shall not carry any interest and will be refunded to the unsuccessful bidders. Earnest money paid by the successful contractor will be retained by the Bank till completion of the work.

~~2)~~3) No advance payment will be made against the work. Final bill will be settled against completion of work to the satisfaction of the Bank.

4) In case of any queries related to this RFP/tender, the same can be sent to us via email at deepak.mehta@unionbankofindia.bank Please note that queries shall be entertained till 03:30 PM, 25/09/2023 only.

13) After opening the price bid , the tenderer submitting the lowest bid shall be declared as L1 and the contract shall be awarded to L1.

For UNION BANK OF INDIA
ASST. GENERAL MANAGER

GENERAL INSTRUCTIONS: -

1. **Definitions:**

In the contract, the following expressions shall, unless the context otherwise requires, have the meaning hereby respectively assigned to them.

1.1 The term "**Contract**" shall mean and include the invitation to RFP incorporating also the instructions to TENDERERS/CONTRACTORS, the RFP, its Annexure, Appendices, acceptance of RFP and such general and special conditions as may be added to it.

1.2 The term "**Contractor**" shall mean and include the person(s), Firm (Proprietorship/Partnership/LLP) or Company with whom the contract has been placed including their Heirs, Executors, Administrators and Successors and the permitted Assignees as the case may be.

1.3 The term "**Bank**" or "**UNION BANK**" or "**Owner** "wherever they occur, shall mean **Union Bank of India** established under the Banking Companies (Acquisition and Transfer of Undertaking) Act, 1970, and shall include its successor(s) and assigns.

1.4 The term "**worker**" shall mean contractor's employee engaged in the canteen of bank for catering.

1.5 '**Month**' means calendar month.

1.6 '**Week**' means seven consecutive days.

1.7 '**Day**' means a calendar day beginning and ending at 00 hrs. and 24 hrs. respectively.

1.**8** **Engineer in-charge:** means an Engineer appointed by the owner as their representative to give instructions and supervise the work of the contractor at site.

1.10 **Completion Certificate**: Soon after the completion of the work, the contactor shall give notice of such completion to the owner and within 3 days of the receipt of such notice, the engineer-in-charge shall inspect the work and if there is no defect in the work, the engineer-in-charge on behalf of the owner shall furnish the contractor with a completion certificate.

TERMS AND CONDITIONS GOVERNING CONTRACT:

1. **COMPLETENESS OF TENDER: -**
All sundry fittings, assemblies, accessories, hardware items, foundation bolts, termination lugs for electrical connections as required, and all other sundry items which are useful and necessary for proper assembly and efficient working of the various components of the work shall be deemed to have been included in the tender, whether such items are specifically mentioned in the tender documents or not.

2. **RATES: -**
The rates tendered shall be for complete items of work inclusive of Cost of material, erection, connection, testing, labour, supervision, tool & plants, storage, contingencies, breakage, wastage, execution at any level & height and all charges for items contingent to the work, such as, packing, forwarding, insurance, freight, transportation and delivery at site for the materials to be supplied by the contractor.

3. **WORKS TO BE DONE BY THE CONTRACTOR: -**
The scope of internal and external electrification under this contract shall include the design, engineering, manufacture, assembly, testing, delivery, erection and commissioning of electrical system including supply of all material, labour, T&P etc for followings –

- Main Switches, Main L T Panels, meter board and external cable connection.
- Sub and branch distribution boards, MCB's and RCCB's etc.
- Mains and Sub mains between various panels, meter boards and distribution boards.
- Point wiring with Conduits for all type of wiring including circuits, sub mains, light, fans, power and AC etc.
- Switches and socket outlets for light, fans, plug, power, Tel, TV, computer network etc with suitable MS/GI boxes with accessories complete.
- Earthing and Lightning Protection with earth leads/strips.
- Conduits and wiring for Telephone, EPABX, TV system, PA system, Music system and Computer networking, fire alarm, broad band etc.
- Cables and other allied works.
- Provision of emergency electrical supply and distribution for complete light, fans and other specified points are also included in the scope of work. For the purpose of emergency distribution separate DB's shall be installed for Light/fans and fax machines & staircase lighting at every place, so that these can be separated.
- Lighting Fixtures fans and exhaust fans. (If these are supplied by the client, then the contractor will erect the fixture as required without any extra payment beyond the contract)

All the above work shall be complete in all respects up to the satisfaction of Bank as per the details mentioned in BOQ and any drawings supplied during execution of work.

Unless and otherwise mentioned in the tender documents the following scope of works shall be done by the contractor, and therefore their cost shall be deemed to be included in their tendered cost:

a) Furnishing of all labour, skilled and unskilled, supervisory and administrative personnel, erection tools and tackles, testing equipment, implements, supplies, consumables like welding rods and gas, oil and grease, cleaning fluids, insulating tape, anti corrosive paints, jute cotton waste etc., and hardware for timely and efficient execution of the erection work.

b) Transport vehicles necessary for efficient transportation of equipment from Owner's stores to site of erection and excess materials back to owner's stores.

c) Complete assembly, erection and connection, testing and commissioning, putting into successful and satisfactory commercial operations of above equipment.

d) The items of work to be performed on all equipment and materials shall include but not limited to the following:

(i) Receiving, unloading and transportation at site. (To Owner or Contractor's stores and from their upto actual place of erection).

(ii) Opening, inspecting and reporting all damages and short supply items.

(iii) Arranging to repair and/or re-order all damaged and short supply items.

(iv) Storing at site with suitable all weather protection.

(v) Assemblies, erection and complete Installation.

(vi) Necessary coordination between work done by other Contractors.

(vii) Final check-up, testing and commissioning in presence of Owner's representative.

(viii) Obtaining Owner's written acceptance of satisfactory performance.

4. PRICES

a) The price quoted for supply items shall include all packing, crating, any duties, taxes, insurance, freight, loading/ unloading, handling & all other charges.

b) The price quoted for erection & commissioning shall include cost of all consumables, taxes & duties. (If any). No additional taxes/duties shall be payable by Bank.

c) Prices quoted shall be firm and no variation shall be allowed during contract period.

5. PROVISIONS AGAINST ACCIDENTS AND SAFETY MEASURES

a) All safety rules and codes as applicable to work including rules applicable as per factory inspector shall be followed during execution of above work.

b) All safety appliances and protective devices including hand gloves, aprons, helmets, shields, goggles, safety belts etc. shall be provided by Contractor for his personnel.

c) The Contractor shall arrange to provide guards and prominent display caution notices if access to any equipment / area is considered unsafe and hazardous.

d) All the workers of the contractor as well as his sub-contractor must be properly covered by an Insurance policy under Workman's Compensation Act and Fatal Accident Act. The contractor at his own expenses arrange to effect and maintain until the completion of the contract, insurance policy in the joint name of the Bank and the contractor against this risk to be retained by the Bank until the virtual completion of the work, and indemnify the Bank from all the liabilities arising out of such events. In case of delay, contractor shall arrange to extend insurance policy till work is completed.

e) The contractor shall not assign, transfer, sublet (engagement of labour on a piece work basis or of labour with material not to be incorporated in the work, shall not be deemed to be sub-letting) or attempts to assign, transfer or sub-let the entire work, or portion thereof without the prior written approval of the owner.

6. SPECIFICATIONS

In the absence of specifications for any work or materials, relevant Indian Standard Specifications shall be applicable. If such codes for a particular subject have not been framed, the decision of the owner will be final and binding.

7. VARIATION IN QUANTITY

a) The Owner shall have right to delete or increase / decrease quantity specified in this specification as specified in preamble to Bill of Materials.

b) Quantities indicated in Bill of Materials are based on engineering status of the project as on date. It is necessary that the contractor before procurement of material carry out proper engineering.

c) For procurement of any material & sequential delivery at site from point of view of erection etc. Contractor shall take prior approval from the owner.

d) All left over material for which payment has been made by the owner, has to be taken back by the contractor. The owner shall make necessary deduction from the bills of contractor.

8. SITE VISIT

It is recommended that contractor shall visit site before submission of his offer. Time and date shall be fixed with owner.

9. TOOLS FOR HANDLING AND ERECTION: -

All tools and tackles required for handling of equipment and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the responsibility of the contractor.

10. CO-ORDINATION WITH OTHER AGENCY: -

The contractor shall co-ordinate with all other agencies involved in the other work so that the work is not hampered due to delay in his work. Recessed conduit and other works, which directly affect the progress of work, should be given priority.

11. CARE OF BUILDINGS: -

Care shall be taken by the contractor to avoid damage to the building during execution of his part of the work. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste materials arising out of his work from the site, from time to time as designed by the Engineer-in-charge.

12. STRUCTURAL ALTERATIONS TO BUILDINGS: -

i. No structure in the building shall be damaged/altered, without prior approval from the competent authority through the Engineer-in-charge.

ii. Structural provisions like openings, cutouts if any, provided by the department for the work, shall be used. Where these require modifications, or where fresh provisions are required to be made, such contingent works shall be carried out by the contractor at his cost.

iii. All such openings in floors provided by the department shall be closed by the contractor after installing the cables/conduits/rising mains etc. as the case may be, by any suitable means as approved by the Engineer-in-charge without any extra payment.

iv. All chase required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectural finish of the buildings.

13. WORK IN OCCUPIED BUILDINGS: -

i. When work is executed in occupied buildings, there should be minimum of inconvenience to the occupants. The work shall be programmed in consultation with the Engineer-in-charge and the occupying department. If so required, the work may have to be done even before and after working hours.

ii. The contractor shall be responsible to abide by the regulations or restrictions set in regard to entry into, and movement within the premises.

iii. The contractor shall not tamper with any of the existing installations including their switching operations or connections there to without specific approval from the Engineer-in-charge.

14. STATUTORY REGULATION AND APPROVALS: -

All electrical works shall be carried out only by those Contractors who are licensed by the concerned local authorities to execute this type of work. Only approved electrical contractor shall execute the job as per Govt. guidelines in the matter.

It shall be the responsibility of the Contractor to comply with the regulations laid down by the Indian Electricity Rules and local authorities. The Contractor shall also be responsible for obtaining all the statutory approvals/certificates for the work from the concerned Departments and these certificates shall be handed over to the Clients at the completion. All coordination with the local electric supply authorities, submitted of application, getting the desired load sanctioned shall be in the scope of contractor. The fees required obtaining the desired load sanctioned and other legal and miscellaneous charges by local electric supply authority / undertaking shall be given by the client but all follow-ups etc. shall be the contractor's responsibility.

The bidder shall be liable for compliance of all labour laws applicable in this connection with the contract and shall be responsible for payment of wages/arrears of wages under the applicable laws.

On completion of the work, the contractor shall obtain the certificates of final inspection and approval by the local electric supply authority and deliver these certificates to the Bank in original. The contractor shall bear all expenses and fees required to obtain these certificates without which the work shall not be taken over and shall not be considered complete.

15. STANDARDS AND CODE OF PRACTICE: -

The work shall be carried out as per the enclosed Specifications of work and the construction drawings to be issued from time to time. These specifications shall be read in conjunction with National Building Code, National Electrical Code 1985, Relevant Codes of Practices and Standards as issued by ISI and Indian Electricity Rules, CPWD specifications for electrical works (all with the latest amendments). The installation shall confirm in all respects to Indian Standard code of Practices. Following BIS codes shall be referred -

a) National Electrical Code

b) IS: 694 – 1977: PVC insulated cables for working voltage up to and including 1100 volts

c) IS: 732 -1989: Electrical wiring installation

d) IS: 1225 -1938: Installation and Maintenance of power Cables up to and including 33 KV Rating

e) IS: 1554: PVC insulated heavy-duty electrical cables.

f) IS: 1860: Installation operation and maintenance of passenger and goods elevator.

g) IS: 2309 -1989: Protection of building and allied structures against lightning.

h) IS: 3043 -1987: Earthing

i) IS: 3646 (Part-1) -1992: Interior Illumination

j) IS: 3661 (Part-2) -1967: Current rating for cable

k) IS: 3661 (Part-5) -1968: Current rating for cable

l) IS: 5216 (Part-1) -1982: Recommendations on safety procedures and practices in electrical work.

m) IS: 7098 (1 & 2): XLPE insulated cables

n) IS: 10028 (Part-1) -1985: selection, Installation and Maintenance of Transformers

o) IS: 10118 (Part-1) -1982: Selection, Installation and Maintenance of switchgear and Control gear

16. MATERIAL SAMPLES AND SHOP DRAWINGS: -

It shall also be the responsibility of the Contractor to submit without any extra charge the samples of make/equipment as and when asked by the Engineer- in-charge If the Contractor wishes to use an alternative make due to non-availability of the approved one, he should take the prior approval of the Engineer-in-charge. Under such situations the Contractor shall show such promptness as not to hamper the progress of the work.

The Contractor shall submit for Engineer-in-charge approval the shop drawings at approved scale indicating the custom built equipment, L.T. Panels, run of cables and conduits he proposes to install.

17. ELECTRICAL DRAWINGS: -

i) The electrical drawings issued from time to time to the contractor are diagrammatic but shall be following as closely as actual construction and work will permit. The Contractor at his own expenses shall make any deviation from the drawings required to conform to the building construction. The architectural drawings shall take precedence over the electrical drawings as for as the civil and other trades works are concerned.

ii) If there is any discrepancy due to in-complete description, ambiguity or omission in the drawings and other documents relating to this Contract found by the Contractor either before starting the work or during execution or after completion, the same shall be immediately brought to the attention of the Engineer-incharge and his decision would be final and binding on the Contractor.

18. TESTING AND COMMISSIONING: -

The Contractor shall be responsible for testing and commissioning the entire electrical installation described in these specifications and relevant IS specifications and will demonstrate the operation of the systems to the entire satisfaction of the Engineer-in charge and to the Client approval.

19 DEFECTS LIABILITY:

1. Any defects, or other faults which shall appear within the Defects Liability Period of 12 months from the date of handing over the works and which are due to materials or workmanship not in accordance with this contract or on account of failure on the part of the Contractor to comply with any of his obligations expressed or implied shall be specified by the engineer-in-charge in a schedule of defects which he shall deliver to the Contractor not later than 14 days after the expiration of the Defects Liability Period, and within a reasonable time after receipt of such schedule the defects or other faults therein specified shall be made good by the Contractor and (unless the engineer-in-charge shall otherwise instruct, in which case the contract sum shall be adjusted accordingly) entirely at his own cost.

2. The Contractor shall make good at his own costs and to the satisfaction of the engineer-in-charge, all defects, shrinkages or small faults arising in the opinion of the engineer-in-charge from Work or materials not being in accordance with the drawings or specifications or schedule of quantities or the instructions of the engineer-in-charge which may appear within the "**Defects Liability Period of 12 months from the date of issuance of completion certificate**" referred to in clause 1.10, General Instructions. All defects, shrinkages or small faults arising from any other cause not attributable to the Contractor shall be rectified by the Contractor as an additional work.

3. In the event of failure of the Contractor to carry out any such work to the satisfaction of the engineer-incharge, the Bank shall be entitled to carry out the same at the Contractor's costs and all expenses consequential and incidental thereto shall be deducted by the Bank from any monies due or to become due to the Contractor.

4. When in the opinion of the engineer-incharge any defects, shrinkages or other faults which he may have required to be made good under sub-clause (1) and (2) of this condition shall have been made good he shall issue a certificate to that effect, and completion of making good defects shall be deemed for all the purposes of this contract to have taken place on the day named in such certificate.

Penalty: If the Contractor/Tenderer fails to complete the works by the scheduled date/time, the Bank shall have the right to levy penalty up to maximum 10% of the bill amount which shall be over and above the security deposit given by the Contractor/Tenderer.

20. COMPLETION DRAWINGS

The contractor shall submit, after the completion of the work, one set of originals and two sets of prints of the As-Fitted drawings/Completion drawings, giving the following information:

a. Run and size of conduits, inspection, junction and pull boxes.
b. Size of conductor in each circuit.
c. Location and ratings of sockets and switches controlling the light/fan and power outlets.
d. Location and details of distribution boards, mains, switches, switchgears and other particulars.
e. A complete wiring diagram as installed and schematic drawings showing all connections in the complete electrical system.
f. Location of telephone outlets, junction boxes and sizes of various Conduits.
g. Location of all earthing stations, route and size of all earthing Conductors etc.
h. Layout and particulars of all cables.
i. Location of all equipments with dimensions and connections.

21. INSPECTION

All equipment *I* material covered under this specification is liable for inspection by the Owner/ his representative.

The contractor shall furnish data Sheets & other details. Additional information, if desired by the tenderer can also be furnished separately.

SYSTEM DESCRIPTION

1.0 GENERAL INFORMATION

1.1 Ambient air temperature shall be taken as 50 deg. C for the purpose of designing of electrical equipment.

1.2 This specification shall be read and constructed in conjunction with the drawings and annexure to determine the scope of work.

1.3 All equipment shall be capable of continuous operation satisfactorily under the following conditions:

a) Voltage variation : ± 10%

b) Frequency variation : ± 5%

c) Combined voltage & frequency variation : ± 10%

1.4 Nominal system supply available shall be as follows:

a) Incoming : 11 kV, 3 Ph., 50 Hz,

b) Utilization : 415V, 3 Ph., 4 wire, 50 Hz

2.0 CODES AND STANDARDS

2.1 All equipment and materials specified herein or not, shall be designed, manufactured and tested with the latest applicable standards & bureau of Indian standards.

2.2 All electrical equipment shall also conform to the latest electricity rules as regards safety and other essential provisions.

2.3 All electrical installation work shall comply with the requirements of the following Act / rules / codes as amended upto date:

a) Indian electricity act.

b) Indian electricity rules.

c) National electric code published by 818.

d) All relevant IS codes of practice.

e) Regulations published by tariff advisory committee.

3.0 DESIGN CRITERIA

3.1 GENERAL

a) The equipment shall be used in high voltage system having characteristics as listed in this specification.

b) The equipment shall be installed in a hot, dusty, humid and tropical atmosphere.

c) There shall be no radio interference when the equipment are operated at maximum service voltage.

d) The max. temp. in any part of the equipment at specified rating shall not exceed the permissible limits as stipulated in the relevant standards.

e) The equipment shall be capable of withstanding the dynamic and thermal stresses of listed short circuit current without any damage or deterioration.

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

g) The safety clearances of all live parts of the equipment shall be as per relevant standards.

h) All equipment/components of identical rating shall be physically and electrically interchangeable.

i) All outdoor equipment shall be suitable to mount on steel structure. Connectors shall be bimetallic conductor.

j) Wherever single core cables are terminated in any equipment, gland plate shall be of Aluminum (3-4 mm thick).

k) There shall be no straight through joints in power & control cables.

l) All cable terminations shall be with Double compression cable gland with Armour holding system.

m) The lighting fixture shall have loop in & loop out facility.

4.0 GENERAL & TECHNICAL:-

4.1. DEFINITION: -

A point (other than socket outlet point) shall include all work necessary in complete wiring to the following outlets from the controlling switch or MCB. The scope of wiring for a point shall, however, include the wiring work necessary in tapping from another point in the same distribution circuit.

i. Ceiling rose or connector (in the case of points for ceiling/exhaust fan points, pre wired light fittings and call bells).
ii. Ceiling rose (in the case of pendants except stiff pendants)
iii. Back plate (in the case of stiff pendants).
iv. Lamp holder (in the case of goose neck type wall brackets, batten holders and fittings which are not pre wired).

4.2. SCOPE: -

Following shall be deemed to include in point wiring.

i. Conduit/casing and capping as the case may be, accessories for the same and wiring cables between the switch box and the point outlet.
ii. All fixing accessories such as clips, nails, screws, Phil plug, rawl plug etc as required.
iii. Metal switch boxes for control switches, regulators, sockets etc, recessed or surface type, and Phenolic laminated sheet covers over the same.
iv. Outlet boxes, junction boxes, pull-through boxes etc, but excluding metal boxes if any, provided with switchboards for loose wires/conduit terminations.
v. Any special block required for neatly housing the connector.
vi. Control switch or MCB, as specified.
vii. 3 pin or 6-pin socket, ceiling rose or connector as required.
viii. Connections to ceiling rose, connector, socket outlet, lamp holder, switch etc.

ix. Interconnecting wiring between points on the same circuit, in the same switch box or from another.

x. Protective (loop earthing) conductor from one metallic switch box to another in the distribution circuits, and for socket outlets. (The length of protective conductor run along with the circuits/sub mains is excluded from scope of points)

xi. Bushes conduit or porcelain tubing where wiring cables passes through wall etc.

4.3 MATERIAL: -

The system of wiring shall consist of ISI marked single core PVC insulated flexible copper conductor wires as per IS: 694 amended up to date.

4.4 MEASUREMENT: -

i. Contractor shall measure the work jointly with the site engineer and prepare measurement sheets in triplicate. Three copies of measurement sheets shall be submitted along with running account bills. Bills received without proper measurements of work shall not be considered submitted.

ii. If the contractor neglect to measure the work, then the measurement taken by Engineer/Architect or a person approved by the Bank shall be final and binding to him. Such measurements shall be taken in accordance with the mode of measurements wherever specified or as per actual executed quantities.

iii. All authorized extra works; omissions and all variations made without the Engineer/Architect/Bank's knowledge, or subsequently sanctioned by him in writing (with the prior approval of the contractor in writing) shall be included in such measurement.

iv. All bills for the work shall be submitted in the tender price bid format.

4.5 POINT WIRING (OTHER THAN SOCKET OUTLET POINTS): -

i. Unless and otherwise specified, there shall be no linear measurement for point wiring for light points, fan points, exhaust fan points and call bell points. These shall be measured on unit basis by counting.

ii. No separate measurement will be made for interconnections between points in the same distribution circuit and for the circuit protective (loop earthing) conductors between metallic switch boxes.

4.6 POINT WIRING FOR SOCKET OUTLET POINTS: -

i. The light plug (5A/6A) point and power (15A/16A) point wiring shall be measured on linear basis, from the respective tapping point of live cable, namely switch box, another socket outlet point, or the sub distribution board as the case may be, up to the socket outlet.

ii. The metal box with cover, switch/MCB socket outlet and other accessories shall be measured and paid as a separate item.

iii. The power point outlet will be 15A/5A or 16A/6A six-pin socket outlet.

4.7 GROUP CONTROL POINTS WIRING: -

i. In the case of points with more than one point controlled by the same switch, such point shall be measured in parts i.e.(a) from the switch to the first point outlet as one point, and (b) for the subsequent points each shall be treated as separate point.

ii. No recovery shall be made for non-provision of more than one switch in such cases.

4.8 TWIN CONTROL LIGHT POINT WIRING: -

i. A light point controlled by two numbers of two way switches shall be measured as two points from the fitting to the switches on either side.

ii. No recovery shall be made for non-provision of more than one ceiling rose or connector in such cases.

4.9 MULTIPLE CONTROLLED CALL BELL POINTS WIRING: -

i. In the case of call bell points with a single call bell outlet, controlled from more than one place, the point shall be measured in parts i.e. (a) from the call bell outlet to one of the nearest ceiling roses meant for connection to bell push, treated as one point and (b) from that ceiling rose to the next one and so on, shall be treated as separate point(s).

ii. No recovery shall be made for non-provision of more than one ceiling rose or connector for connection to call bell in such cases.

5.0 CIRCUIT AND SUBMAIN WIRING: -

5.1 CIRCUIT WIRING: -

Circuit wiring shall mean the wiring from the distribution board up to the tapping point for the nearest first point of that distribution circuit, viz. up to the nearest first switch box.

5.2 SUB MAIN WIRING: -

Sub main wiring shall mean the wiring from one main/distribution switchboard to another and from Distribution Board to Power Outlet / AC Outlet.

5.3 MEASUREMENT OF CIRCUIT AND SUBMAIN WIRING: -

i. Circuit and sub main wiring shall be measured on linear basis along the run of the wiring. The measurement shall include all length from end to end of conduit or casing and capping as the case may be, exclusive of interconnections inside the switchboard etc. The increase on account of diversion or slackness shall not be included in the measurement.

ii. The length of circuit wiring with two wires shall be measured from the distribution board to the first nearest switch box in the circuit irrespective of whether the neutral conductor is taken to switch box or not.

iii. When wires of different circuits are grouped in a single conduit/casing and capping, the same shall be measured on linear basis depending on the actual number and sizes of wires run.

iv. When circuit wires and wires of point wiring are run in the same conduit/casing and capping, circuit wiring shall be measured on linear basis depending on the actual number and sizes of wires run in the existing conduit/casing capping.

iv. Protective (loop earthing) conductors, which are run along the circuit wiring and the sub main wiring, shall be measured on linear basis and paid for separately, if not included in item.

vi. Except as specified above for point wiring, circuit wiring and sub main wiring, other types of wiring shall be measured separately on linear basis along the run of wiring depending on the actual number and sizes of wires run.

5.4 SYSTEM OF DISTRIBUTION AND WIRINGS: -

i. Main distribution board shall be controlled by the circuit breaker. Each outgoing circuit shall be controlled by a circuit breaker on the phase or live conductor.

ii. The branch distribution board shall be controlled by a circuit breaker. Each outgoing circuit shall be provided with a MCB of specified rating on the phase or live conductor.

iii. The load of the circuits shall be divided, as far as possible, evenly between the number of ways of the distribution boards, leaving at least one spare circuit for future extension.

iv. The neutral conductors (incoming and outgoing) shall be connected to a common link (multi way connector) in the distribution board and be capable of being disconnected individually for testing purposes.

v. Wiring shall be separate for essential loads (i.e., those fed through stand by supply) and non-essential loads throughout.

5.5 BALANCING OF CIRCUITS: -

The balancing of circuits in three wire or poly phase installations shall be arranged up to the satisfaction of the Engineer-in-charge.

5.6 ___WIRING SYSTEM: -

i. Unless and otherwise specified the wiring shall be done only by the "Looping system". Phase or live conductors shall be looped at the switch boxes and neutral conductors at the point outlets.

ii. Lights, fans and call bells shall be wired in the 'lighting' circuits. 15A/16A socket outlets and other power outlets shall be wired in the 'Power' circuits. 5A/6A socket outlets shall also be wired in the "Lighting" circuit both in residential as well as non-residential buildings.

iii. The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switchgear.

iv. Surface wiring shall run, as far as possible, along the walls and ceiling so as to be easily accessible for inspection.

v. In no case, the open wiring shall be run above the false ceiling without the approval of Engineer-in-charge.

vi. In all types of wiring, due consideration shall be given for neatness, good appearance and safety.

6.0 PASSING THROUGH WALLS OR FLOORS: -

i. When wiring cables are to pass through a wall, these shall be taken through a protection (steel/PVC) pipe or porcelain tube of suitable size such that they pass through in a straight line without twist or cross in them on either end of such holes. The ends of metallic pipe shall be neatly bushed with porcelain, PVC or other approved material.

ii. Where a wall pipe passes outside a building so as to be exposed to weather, the outer end shall be bell mouthed and turned downwards and properly bushed on the open end.

7.0 JOINTS IN WIRING: -

i. No bare conductor in phase and/or neutral or twisted joints in phase, neutral, and/or protective conductors in wiring shall be permitted.

ii. There shall be no joints in the through-runs of cables. If the length of final circuit or sub main is more than the length of a standard coil, thus necessitating a through joint, such joints shall be made by means of approved mechanical connectors in suitable junction boxes.

iii. Termination of multi-stranded conductors shall be done using suitable crimping type thimbles.

8.0 CONFORMITY TO I.E. ACT, I.E. RULES AND STANDARDS: -

i. All electrical works shall be carried out in accordance with the provisions of the Indian Electricity Act, 1910 and Indian Electricity Rules 1956 amended up to date.

ii. The work shall also conform to relevant Indian Standard codes of practice for the type of work involved.

iii. In all electrical installation works, relevant safety codes of practice shall be followed.

iv. The complete wiring installation shall confirm to IS: 732 amended up to date.

8.1 GENERAL REQUIREMENTS OF COMPONENTS: -

8.1_QUALITY OF MATERIALS: -

All materials and equipment supplied by the contractor shall be new. They shall be of such design, size and material as to satisfactorily function under the rated conditions of operation and to with stand the environmental conditions at site.

8.2 RATING OF COMPONENTS: -

i. All components in a wiring installation shall be of appropriate ratings of voltage, current and frequency, as required at the respective sections of the electrical installation in which they are used.

ii. All conductors, switches and accessories shall be of such size as to be capable of carrying the maximum current, which will normally flow through them, without their respective ratings being exceeded.

8.3 CONFORMITY OF STANDARDS: -

All components shall conform to relevant Indian Standard specification, wherever existing. Materials with ISI certification mark shall be preferred. However for conduits, wiring cables, piano/tumbler switches and socket outlets, ISI marked materials shall only be permitted.

8.4 INTERCHANGEABILITY: -

Similar parts of all switches, lamp holders, distribution fuse boards, switch gears, ceiling roses, brackets, pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

9.0 SWITCHES & RECEPTACLES (Piano Type)

9.1 CONTROL SWITCHES FOR POINTS: -

i. The switch box or regulator box shall be made of metal on all sides, except on the front. In the case of cast boxes, the wall thickness shall be at least 3 mm and in case of welded mild steel sheet boxes, the wall thickness shall not be less than 1.2 mm (18 gauge) for boxes up to a size of 20 cm x 30 cm, and above this size 1.6 mm (16 gauge) thick MS boxes shall be used. The metallic boxes shall be duly painted with anticorrosive paint before erection.

ii. Where a large number of control switches and/or fan regulators are required to be installed at one place, these shall be installed in more than one outlet box adjacent to each other for ease of maintenance.

iii. An earth terminal with stud & 2 metal washers shall be provided in each MS box for termination of protective conductors and for connection to socket outlet/metallic body of fan regulator etc.

iv. Clear depth of the box shall not be less than 50 mm, and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.

v. The fan regulators can also be mounted on the switch box covers, if so directed by the Engineer-in-charge.

vi. Control switches (single pole switches) carrying not more than 16 A shall be of piano type, as specified, and the switch shall be "ON" when the knob is down.

vii. Only MCB’s shall be used for controlling industrial type socket outlets.

viii. Control switch shall be placed only in the live conductor of the circuit. No single pole switch or fuse shall be inserted in the protective (earth) conductor, or earthed neutral conductor of the circuit.

ix. All switches, regulators, outlets & other accessories shall be white colour with matching white cover plate. In no case ivory or off-white switches shall be accepted.

9.2 SOCKET OUTLETS: -

i. Socket outlet shall be of the same type, white piano type as their control switches. These shall be rated either for 5A/6A or 15A/16A. Combined 5A/15A or 6A/16A six pin socket outlet shall be provided in `power' circuits.

ii. In an earthed system of supply, socket outlets and plugs shall only be of 3 pin type, the third pin shall be connected to earth through protective (loop earthing) conductor. 2 pin or 5 pin sockets shall not be permitted to be used.

iii. Every socket outlets shall be controlled by a switch or MCB, as specified. The control switch/MCB shall be connected on the `live' side of the line.

iv. Outlet boxes for socket outlets (both15A/16A and 5A/6A) points shall be of size 175 mm x 100mm.

v. Unless and otherwise specified, the control switches for the 5A/6A and 15A/16A socket outlets shall be kept along with the socket outlets.

9.3 SWITCH BOX COVERS: -

Phenolic laminated sheets of approved white shade shall be used for switch box covers. These shall be of white 3 mm thick synthetic phenolic resin bonded laminated sheet as base material and conforming to grade P-I of IS: 2036-1974, Secured to the box with counter sunk C.P. Brass Screws. The corners of cover plates shall be at right angle.

9.4 SWITCHES & BOXES (Modular Type)

i. The switch box or regulator box shall be made of metal on all sides, except on the front. Since Modular type switches are to be used in the project, hence the boxes shall also be used of the same make and model. The size of box shall be governed by the number of switches/outlets/regulators on the respective board. The boxes shall be with zinc plating and yellow passivation to complies with the rust test as per IS 3854. The boxes should have slotted holes for level adjustments. The boxes shall be fitted with riveted brass earth terminals for earth connections.

ii. Clear depth of the box shall not in a range of 50 mm to 65 mm depending upon the size of board and manufacturer.

iii Control switch shall be placed only in the live conductor of the circuit. No single pole switch or fuse shall be inserted in the protective (earth) conductor, or earthed neutral conductor of the circuit. The switches shall be provided with silver contacts. The neutral should make first and breaks last.

iv. Socket outlet shall be rated either for 5A/6A or 15A/16A. 5/6 Amp sockets shall be of 5-pin type with shutters. Combined 5A/15A or 6A/16A six pin shuttered socket outlet shall be provided in `power' circuits. The earth pin shall be connected to earth through protective (loop earthing) conductor. All sockets shall be provided with safety shutters to allow easy entry of two pin plugs without the need to force the earth terminal by unsafe means. All sockets shall confirm to IS: 1293.

v. Every socket outlet shall be controlled by a switch, as specified. The control switch shall be connected on the `live' side of the line.

Vi The switches and sockets shall be manufactured using engineering plastic to make it fire retardant and highly resistant to impact.

vii. The fan speed regulators shall be of electronic and stepped type

viii. The RJ-45 data socket shall be suitable for cat5/cat 6 data cables.

ix. Gold plated contacts shall be provided in all communication jacks to enhance data and voice transmission.

10.0 SWITCHGEAR AND CONTROLGEAR

10.1 GENERAL ASPECTS: -

i. All items of switchgear and distribution boards (DB' s) shall be metal clad type.

ii. The types, rating and/or categories of switchgear and protective gear shall be as specified in the tender schedule of work.

iii. RCCB's, ELCB's and RCBO's where specified, shall conform to the requirements of current rating, fault rating, single phase or three phase configuration and sensitivity laid down in the tender documents.

iv. While each outgoing way of distribution board (D.B.) shall be of miniature circuit breaker (MCB) as specified, and of suitable rating on the phase conductor, the corresponding earthed neutral conductor shall be connected to a common neutral terminal block and shall be capable of being disconnected individually for testing purpose.

v. **Independent earth terminal block.**

Every distribution board (single phase as well as three phase) shall have an earth terminal block identical to, but independent from neutral terminal block, to enable termination of protective (loop earthing) conductors (incoming as well as out goings) individually by screwed connection and without twisting.

vi. Earthing terminal (1 for single phase and 2 for three phase) shall be provided on the metal cladding of switches and D.B.' s for body earthing. These shall be suitably marked.

vii. Knock out holes, with or without end plates as per standard design of manufacturers, shall be provided in the metal cladding of switches and D.B.' s for termination of conduits/cables.

viii. Each distribution board shall be provided with a circuit list giving details of each circuit, which it controls, and the current rating of the circuit, and the size of the fuse element.

10.2 MCB TYPE DISTRIBUTION BOARDS (MCB DB): -

i. MCB DB' s may be of single phase, three phase (horizontal type) suitable for feeding single phase loads or 3 phase (vertical type) suitable for feeding single phase as well as three phase loads, each phase isolation type three phase DB in which each phase can be isolated by a separate circuit breaker or RCCB, as specified. These shall be complete with accessories, but without MCB' s, which shall be specified as a separate item in the tender documents.

ii. The current ratings and the number of ways shall be as specified. Blanking plates shall be provided to close unused ways. These shall be indicated as a separate item in the Schedule of work.

iii. MCB DB' s shall be of surface/flush mounting pattern according to the requirement of their location, and shall be suitable to accommodate MCB' s and MCB type isolators and RCCB (ELCB) at incoming in single pole or multi pole configuration, as required.

~~iii.~~iv. MCB DB's shall be double door type; dust and vermin proof conforming to IP 42, and shall be fabricated out of CRCA sheet steel, 1.6 mm thick, with stove enameled paint finish.

v. In case of Concealed / Recessed D.B.'s, cutting of brick work, providing suitable lintel, making good the wall including plastering etc. with necessary civil work including all Civil material shall be included in contractor's scope for proper completion of work.

vi. MCB DB' s shall have removal type end plates with knockouts at the bottom and top, and shall have hinged covers with locking arrangement.

vii. Only the knobs of the MCB's shall protrude out of the front covers through openings neatly machine made for the purpose.

viii. The bus bars used shall be solid electrolytic copper of appropriate Sections.

ix. Din bar(s) shall be provided for mounting the MCB' s.

x. The complete board shall be factory fabricated and shall be duly pre-wired in the works, ready for installation at site.

xi. The board shall be fully pre wired with single core PVC insulated copper conductors/insulated solid copper links, and terminated on to extended type terminal connectors, suitable for connections to the sizes of the respective conductors.

xii. All incoming and outgoing wiring to the pre wired MCBDB' s shall be terminated only in the extended terminal connectors to be provided within the DB. The terminal connectors shall therefore be so provided as to facilitate easy cable connections and subsequent maintenance.

10.3 MCCB TYPE DISTRIBUTION BOARDS (MCCB DB): -

i. All MCCB DB' s shall be of three phase suitable for feeding single phase loads or 3 phase loads through SP/TP MCB's, IP 42 enclosure, sheet steel, double door with tinned copper bus bar, neutral bar, earth bar, knock outs etc. The DB's shall be original factory fabricated of approved make.

ii. The current ratings of Incomer MCCB shall be upto 250 amp and the number of ways shall be as specified. Blanking plates shall be provided to close unused ways.

iii. MCCB DB shall be of surface/flush mounting pattern according to the requirement of their location, and shall be suitable to accommodate Four pole MCCB at incomer and SP/TP MCB's at outgoings, as required.

~~iv.~~v. MCCB DB's shall be dust and vermin proof conforming to IP 42, and shall be fabricated out of CRCA sheet steel, 1.6 mm thick, with stove enameled paint finish.

v. In case of Concealed / Recessed D.B.'s, cutting of brick work, providing suitable lintel, making good the wall including plastering etc. with necessary civil work including all Civil material shall be included in contractor's scope for proper completion of work.

vi. MCCB DB's shall have removal type end plates with knockouts at the bottom and top, and shall have hinged covers with locking arrangement.

viii. The bus bars used shall be solid electrolytic copper of appropriate Sections.

ix. Din bar(s) shall be provided for mounting the MCB' s.

10.4 WORKMANSHIP: -

i. Good workmanship is an essential requirement to be complied with. The entire work of manufacture/fabrication, assembly and installation shall conform to sound engineering practice.

ii. **The work shall be carried out under the direct supervision of a first class licensed foreman,** or of a person holding a certificate of competency issued by the state Government for the type of work involved, employed by the contractor, who shall rectify then and there the defects pointed out by the Engineer-in-charge during the progress of work.

10.5 COMMISSIONING ON COMPLETION: -

Before the workman leaves the work finally, he must make sure that the installation is in commission, after due testing.

10.6 COMPLETION PLAN AND COMPLETION CERTIFICATE: -

For all works, the contractor shall give notice of such completion to the owner within 3 days of receipt of such notice, the engineer-in-charge shall inspect the work and if there is no defect in the work, the engineer in charge on behalf of the ownershall furnish the contract with completion

Completion plan drawn to a suitable scale in tracing cloth with ink indicating the following, along with three blue print copies of the same shall also be submitted.

a) General layout of the building.

b) Locations of main switchboard and distribution boards, indicating the circuit numbers controlled by them.
c) Position of all points and their controls.
d) Types of fittings, viz. fluorescent, pendants, brackets, bulkhead, fans and exhaust fans etc.
e) Name of work, job number, accepted tender reference, actual date of completion, names of Division/Sub-Division and name of the firm who executed the work with their signature.

10.7 ADDITION TO AN INSTALLATION: -

An addition, temporary or permanent, shall not be made to the authorized load of an existing installation until it has been definitely ascertained that the current carrying capacity and the condition of the existing accessories, conductors, switches etc affected, including those of the supply Authorities, are adequate for the increased load.

11.0 CIRCUIT BREAKERS

11.1 MINIATURE CIRCUIT BREAKERS (MCB): -

Miniature Circuit Breaker shall comply with IS-8828-1996/ IEC898-1995 amended upto date.

Miniature circuit breakers shall be quick make and break type for 240/415 V AC, 50 Hz applications with magnetic thermal release for over current and short circuit protection.

The breaking capacity shall not be less than 10kA at 415V AC.

MCBs shall be DIN mounted.

MCBs shall be current limiting type (class-3).

MCBs shall be C-curve.

MCBs shall have minimum power loss (watts) per pole defined as per the IS/IEC and the manufacturer shall publish the values.

MCBs shall be of self-extinguishing ULV0 grade thermoset plastic material. The housing shall be heat resistant and having high impact strength. The terminals shall be protected against finger contact to IP20 Degree of protection.

All DP, TP, TPN and 4pole MCBs shall have a common trip bar independent to external operating handle.

Mechanical Life shall be 20000 operations and Service life at rated load for In below 32A shall be 20000 and for In above 32A shall be 10000 operations.

11.2 MOULDED CASE CIRCUIT BREAKER (MCCB's)

The rated normal current should be specified at 40°C

1. General

Moulded case circuit breakers shall be incorporated in the switchboard wherever specified. MCCB shall conform to IS: 13947 (Part-2): 1993 or IEC-60947-2 in all respects. MCCB shall be suitable either for single phase AC 230 Volts or three phase 415 volts ± 10%. The rated insulation voltage shall be 600 volts. Suitable discrimination shall be provided between upstream and downstream breakers in the range of 10-20 milli seconds. The MCCBs will have earth fault module (if specifically asked) and front operated.

MCCB shall indicate its suitability for isolation and this should appear clearly on the MCCB with the symbol as specified in standard IS: 13947/IEC 60947

2. Construction

The MCCB cover and case shall be made of high strength heat-resistant and flame retardant thermosetting insulating material; operating handle shall be quick make/quick break. The operating handle shall have suitable `ON' `OFF' and `TRIPPED' mechanical indicators notable from outside. Three phase MCCBS shall have a common operating handle for simultaneous operation and tripping of all the three phases.

Suitable arc extinguishing device shall be provided for each contact. **Tripping unit shall be thermal-magnetic type upto 250A and Microprocessor based above 250A (or as specified specifically in Bill of Quantities and drawings)** provided on each pole and connected by a common trip bar such that tripping of any one pole operates all three poles to open simultaneously. Tripping device shall have IDMT characteristics for sustained over load and short circuits.

3. Contact tips shall be made of suitable arc resistant, sintered alloy for long electrical life. Terminals shall be of liberal design with adequate clearances.

4. Accessories

All the accessories shall be mounted from the front and shall be adjustment free. MCCBs shall have the electrical accessories fitted even without removing the circuit breaker from the switchboard so that site changes, if any, can be carried out easily. MCCB shall be provided with the following accessories, if specified in schedule of quantities, such as under voltage trip, Shunt trip, Alarm switch, auxiliary switches, Rotary and motorized operating mechanism, Plug in and with drawable mechanism etc.

5. Interlocking

Moulded case circuit breakers shall be provided with the following interlocking devices for interlocking the door of a switchboard.

a) Handle interlock to prevent unnecessary manipulations of the breaker.

b) Door interlock to prevent the door being opened when the breaker is in ON position.

c) Defeat-interlocking device to open the door even if the breaker is in ON position.

6. Rupturing capacity

The moulded case circuit breaker shall have a rupturing capacity as mentioned against each in Schedule of Quantity at 415 volts. Wherever required, higher rupturing capacity breakers to meet the system short circuit fault shall be used. In absence of any capacity specifically mentioned in the bill of quantities and drawings, following rupturing capacities shall be used –

100 / 125 Amp : 25 KA

160/200/250 Amp : 35 KA

300/400/630/800 Amp : 50 KA

7. The MCCB shall be **current limiting type** and comprise of quick make – break switching mechanism. MCCBs shall be capable of defined variable overload adjustment. For thermal magnetic protection the O/L adjustment should be 75%-100% and for microprocessor-based release the adjustment should be 40%- 100% and S/c for 2 to 12 times .All MCCBs rated 200 Amps and above shall have adjustable magnetic short circuit pick-up.

8. Electrical Features

All MCCB's & shall be selected on the basis of rated current. Four poles MCCBs shall be always supplied with neutral protection. The MCCBs having 400A & should have category B as per the IEC standards to ensure the selectivity. Minimum Electrical & Mechanical Endurance of MCCB Shall be as follows

Rating of MCCB	**Electrical Endurance**	**Mechanical Endurance**
Upto 160 A	7000 Opns	25000 Opns
Above 160 A	4000 Opns	15000 Opns

9. The trip command shall override all other commands. The manufacturer shall provide both the discrimination tables (with test certificates) and let-through energy curves. Line and Load connections shall be interchangeable.

11.3 Installation

It should be possible to terminate Aluminum cable of required size for the defined current carrying capacity. The requisite size should be made available by means of extended terminals (as a standard offer) in case the direct terminals are not of adequate size. Adequate phase-to-phase clearance has to be ensured in case of extended terminations.

The circuit breaker should provide the flexibility of terminating line and load from any direction. Manufacturers should test the circuit breaker for this condition and requisite test certificate should be available.

Phase barrier should be provided as a standard feature.

11.4 Testing

Original test certificate of the MCCB as per BS 3871 or JS-C-8370 shall be furnished.

a) Pre-commissioning tests on the switchboard panel incorporating the MCCB shall be done as per standard specifications.

12.0 PVC CONDUIT WIRING SYSTEM

12.1 SCOPE: -

This chapter covers the detailed requirements for wiring work in non-metallic conduits. This chapter covers both surface and recessed types of wiring work.

12.2 APPLICATION: -

1. Recessed conduit work is generally suitable for all applications. Surface conduit work may be adopted in places like workshops etc. and where recessed work may not be possible to be done. The type of work shall be as specified in individual works.
2. Flexible non-metallic conduits shall be used only at terminations, wherever Specified.
3. Special precautions: -

i. If the pipes are liable to mechanical damages, they should be adequately Protected.

ii. Non-metallic conduit shall not be used for the following applications: -

a) In concealed/ inaccessible places of combustible construction where ambient temperature exceeds 60°C.
b) In places where ambient temperature is less than 5°C.
c) For suspension of fluorescent fittings and other fixtures.
d) In areas exposed to sunlight.

13.0 MATERIAL: -

13.1 CONDUITS: -

i. All non-metallic conduit pipes and accessories shall be of suitable material complying with IS: 2509-1973 and IS: 3419-1988. for rigid conduits and IS : 9537(V)-2000 for flexible conduits. The interior of the conduits shall be free from obstructions. The rigid conduit pipes shall be ISI marked.

ii. The conduit shall be circular in cross-section. The conduit shall be designated by their nominal outside diameter. The dimensional details of rigid non-metallic conduits are given in **Table-3.**

iii. No non-metallic conduit less than 20 mm in diameter shall be used.

iv. **WIRING CAPACITY: -**

The maximum number of PVC insulated aluminium/copper conductor cables of 650/1100 V grade conforming to IS: 694-1990 that can be drawn in one conduit of various sizes is given in **table-4**. Conduit sizes shall be selected accordingly.

13.2 CONDUIT ACCESSORIES: -

i. The conduit wiring system shall be complete in all respect including

Accessories.

ii. Rigid conduit accessories shall be normally of grip type.

iii. Flexible conduit accessories shall be of threaded type.

iv. Bends, couplers etc. shall be solid type in recessed type of works, and may be solid or inspection type as required, in surface type of works.

~~v.~~vi. Saddles for fixing conduits shall be heavy gauge non-metallic type with base.

vi. The minimum width and the thickness of the ordinary clips or girder clips shall be as per **Table-5.**

vii. For all sizes of conduit, the size of clamping rod shall be 4.5mm (7 SWG) diameter.

14.0 INSTALLATION: -

14.1 COMMON ASPECTS FOR BOTH RECESSED AND SURFACE CONDUIT WORKS.

i. The erection of conduits of each circuit shall be completed before the cables are drawn in.

ii. **CONDUIT JOINTS: -**

a) All joints shall be sealed/cemented with approved cement. Damaged conduit pipes / fittings shall not be used in the work. Cut ends of conduit pipes shall have no sharp edges or any burrs left to avoid damage to the insulation of conductors while pulling them through such pipes.

b) The Engineer-in-charge, with a view to ensuring that the above provision has been carried out, may require that the separate lengths of conduit etc. after they have been prepared shall be submitted for inspection before being fixed.

iii. **BENDS IN CONDUITS: -**

a) All bends in the system may be formed either by bending the pipes by an approved method of heating, or by inserting suitable accessories such as bends, elbows or similar fittings, or by fixing non-metallic inspection boxes, whichever is most suitable. Where necessary, solid type fittings shall be used.

b) Radius of bends in conduit pipes shall not be less than 7.5 cm.

c) Care shall be taken while bending the pipes to ensure that the conduit pipe is not injured, and that the internal diameter is not effectively reduced.

iv. **PAINTING: -**

After installation, all accessible surfaces of metallic accessories shall be painted.

15.0 ADDITIONAL REQUIREMENTS FOR SURFACE CONDUIT WORK: -

i. Conduit pipe shall be fixed by heavy gauge non-metallic saddles with base, secured to suitable approved plugs with screws in an approved manner, at an interval of not more than 60 cm, on either side of couplers or bends or similar fittings, saddles shall be fixed at a closer distance from the center of such fittings. Slotted PVC saddles may also be used where the PVC pipe can be pushed in through the slots.

ii. Where the conduit pipes are to be laid along the trusses, steel joists etc. the same shall be secured by means of saddles or girder clips as required by the Engineer-in-charge. Where it is not possible to use these for fixing, suitable clamps with bolts and nuts shall be used.

16.0 ADDITIONAL REQUIREMENTS FOR RECESSED CONDUIT WORK: -

i. MAKING CHASE: -

a) Chase in the wall shall be neatly made, and of ample dimensions to permit the conduit to be fixed in the manner desired.
b) In the case of buildings under construction, the conduits shall be buried in the wall before plastering, and shall be finished neatly after erection of conduit.
c) In case of exposed brick/rubble masonry work, special care shall be taken to fix the conduit and accessories in position along with the building work.

ii. FIXING CONDUITS IN CHASE: -

a) The conduit pipe shall be fixed by means of staples, or by means of non-metallic saddles, placed at not more than 40 cm apart, or shall be fixed by any other approved means of fixing.
b) At either side of the bends, saddles/staples shall be fixed at a distance of 15 cm from the center of the bends.

iii. ERECTION IN RCC WORK: -

a) The conduit pipes shall be laid in position and fixed to the steel reinforcement bars by steel binding wires before the concreting is done. The conduit pipes shall be fixed firmly to the steel reinforcement bars to avoid their dislocation during pouring of cement concrete and subsequent tamping of the same.
b) Fixing of standard bends or elbows shall be avoided as far as practicable, and all Curves shall be maintained by bending the conduit pipe itself with a long radius, which will permit easy drawing of conductors.
c) Location of inspection/junction boxes in RCC work should be identified by suitable means to avoid unnecessary chipping of the RCC slab subsequently to locate these boxes.

iv. FIXING INSPECTION BOXES: -

a) Suitable inspection boxes to the minimum requirement shall be provided to permit inspection, and to facilitate replacement of wires, if necessary.
b) These shall be mounted flush with the wall or ceiling concrete. Minimum 65 mm Depth junction boxes shall be used in roof slabs.

c) Suitable ventilating holes shall be provided in the inspection box covers.

v. **FIXING SWITCH BOXES AND ACCESSORIES: -**

Switch boxes shall be mounted flush with the wall. All outlets such as switches, socket outlets etc. shall be flush mounting type, unless otherwise specified in the additional specification.

vi. **FISH WIRE: -**

To facilitate subsequent drawing of wires in the conduit, GI fish wire of 1.2 mm (18 SWG) shall be provided along with the laying of the recessed conduit.

17.0 BUNCHING OF CABLES: -

a) Cable carrying alternating current, installed in metal conduit, shall always be bunched so that the outgoing and return cables are drawn into the same conduit.
b) Where the distribution is for single-phase loads only, conductors for these phases shall be drawn in one conduit.
c) In case of three phase loads, separate conduits shall be run from the distribution boards to the load points, or outlets as the case may be.

18.0 EARTHING REQUIREMENTS: -

i. A protective (earth) conductor shall be drawn inside the conduit in all distribution circuits to provide for earthing of non-current carrying metallic parts of the installation. These shall be terminated on the earth terminal in the switch boxes, and/or earth terminal blocks at the DB's.
ii. Protective conductors of large size which may not be possible to be carried inside the conduits (as in the case of some sub mains etc.) may be laid external to the conduits and clamped thereto suitably.
iii. Gas or water pipes shall not be used as protective conductors (Earth medium).

TABLE - 3

DIMENSIONAL DETAILS OF RIGID NON-METALLIC CONDUITS

(All dimensions in mm)

Sr.No.	Nominal outside diameter (In mm)	Maximum outside diameter (In mm)	Minimum inside diameter (In mm)	Maximum permissible eccentricity (In mm)	Maximum permissible ovality (In mm)
1.	20	$20^{+0.3}$	17.2	0.2	0.5
2.	25	$25^{+0.3}$	21.6	0.2	0.5

3.	32	$32^{+0.3}$	28.2	0.2	0.5
4.	40	$40^{+0.3}$	35.8	0.2	0.5
5.	50	$50^{+0.3}$	45.0	0.4	0.6

TABLE - 4

MAXIMUM NUMBER OF PVC INSULATED 650/ 1100-VOLT GRADE COPPER CONDUCTOR CABLE THAT CAN BE DRAWN INTO RIGID PVC CONDUIT.

Nominal cross sectional area of conductor in Sq.mm.	20 mm	25 mm	32 mm	40 mm
1.50	5	10	14	-
2.50	5	8	12	-
4.00	3	8	10	-
6.00	2	5	8	-
10.00	-	3	5	6
16.00	-	-	3	6
25.00	-	-	2	4

Note: -

The above table shows the maximum capacity of conduits for a simultaneous drawing of cables.

TABLE - 5
ORDINARY CLIPS OR GIRDER CLIPS.

Sr.No.	Size of conduit	Width	Thickness
1.	20 mm & 25 mm	19 mm	20 SWG (0.9144 mm)
2.	32 mm & above	25 mm	18 SWG (1.219 mm)

CABLES

1. GENERAL

All cables shall be supplied, inspected, laid tested and commissioned in accordance with drawings, specifications, relevant Indian standards specifications and cable manufacturer's instructions. The cable shall be delivered at site in original drums with manufacturer's name clearly written on the drum.

The recommendations of the cable manufacturer with regard to jointing and sealing shall be strictly followed.

The laying of cable shall be done as per IS 1255 amended up to date.

Cable Identification

Cable identification shall be provided by embossing on the outer sheath the following:

(i) Manufacturer's name or trade mark
(ii) Voltage grade
(iii) Year of manufacture
(iv) Type of insulation
(v) Printing of cable length on each meter

Core Identification

Respective cores of power/control cables shall be identified with the following pattern:

2 core	:	red (R), black (BK)
3 core	:	5 core red (R), yellow (Y),blue (BL)
4 core	:	red (R),yellow (Y),blue (BL), black (BK)
5 core	:	red (R), yellow (Y),blue (BL), black (BK) & grey (GY)
7&14 cores	:	cores shall be numbered.

Tests

(i) Shop Tests

The cables shall be subject to shop tests in accordance with relevant standards to prove the design and general qualities of the cables as below:

(ii) Routine tests on each drum of cables.

(iii) Acceptance tests on drums chosen at random for acceptance of the lot.

(iv) Type tests on each type of cable, inclusive of measurement of armour D.C. resistance of power cables.

2. MATERIAL

L T Power Cables

The 1.1 KV cables shall be XLPE insulated PVC sheathed aluminum conductor armoured conforming to IS: 7098 (part - 1) amended up to date or PVC insulated, extruded PVC inner sheath, steel strip armored and extruded PVC overall sheath conforming to 15:1554 (PI) as mentioned in the Bill of Quantities and drawings, laid in trenches, ducts and underground as shown on drawing or as per instruction given by engineer-in-charge.

Control Cables

Control cables shall be of stranded annealed copper conductors with cross section area of 1.5/ 2.5 sq.mm, PVC insulated, colour coded or with core identification, extruded inner sheathed, steel wire armoured and over all PVC extruded outer sheath etc. The cable shall conform to 15: 1554 (P-I).

Cable Termination

L T power, control cable termination

(i) L T cable termination shall be provided with compression cable glands of brass suitable for holding the armour of the cable.

(ii) Lugs shall be crimping type and shall be of copper suitable for copper conductor cable and of aluminum for aluminum conductor cable.

(iii) Termination shall be carried out as per details furnished in this specification.

Compression Glands

Cable glands shall be made of brass casting, machined accurately to the required size with protective coating of nickel.

Cable glands shall be of heavy duty type and shall consist of: gland nipple, neoprene seal for inner sheath, armour clamping cone, gland body, neoprene seal for outer sheath, skid washer, gland body nut.

The Aluminum conductor shall be stranded; grade H4 class 2 as per IS 8130 and copper conductor shall be annealed copper class 2 as per IS 8130.

Technical data sheets for above cables, including all electrical & mechanical parameters shall be furnished with offer.

INDIAN STANDARD LT EQUIPMENT SPECIFICATIONS

1.	**LT air Circuit Breakers**	:	**IS 2516 - Latest PART I & II Section – I, 8828 / BS- 5311, 4752**
2.	**Fuse switch units and switch Fuse units not exceeding 1000V AC or 1200 V DC**	:	**IS 4064 Latest/ BS-5419/IEC-408**
3.	**Switch gear Bus bar**	:	**IS 375 Latest**
4.	**H R C fuse Links**	:	**IS 2208 Latest**
5.	**Distribution Boards**	:	**IS 2675 Latest**
6.	**Enclosures for low voltage Switch gears**	:	**IS 2147**
7.	**P V C cables (Heavy Duty)**	:	**IS 1554 Latest**
8.	**P V C cables (Working Voltage up to and including 1100V)**	:	**IS 694 Latest**
9.	**Tabular Fluorescent lamps**	:	**IS 2418 Latest**
10.	**Tungsten filament lamps**	:	**IS 415 Latest**
11.	**Ceiling fan**	:	**IS 374 Latest**
12.	**Flood light**	:	**IS 1947 Latest**
13.	**Industrial light fittings**	:	**IS 1771 Latest**

14. **Water proof electrical fittings : IS 3553 Latest**
15. **Steel boxes for enclosure of : IS 5133 Latest**
16. **Electrical accessories**

- **Fittings for rigid steel conduit : IS 2667 Latest**
- **Mild steel conduit for Electrical wiring : IS 653 Latest**
- **Accessories for rigid steel Conduit for electrical wiring : IS 3837 Latest**
- **Switch socket outlets : IS 4615 Latest**
- **Three pin plug& socket outlet : IS 1293 Latest**
- **Switches for domestic and Similar Purposes : IS 3854 Latest**
- **Call bell and buzzers : IS 2268 Latest**
- **Earthing : IS 3043 Latest**
- **Electrical wiring installation :IS 732 Latest**

17. **Switch gear : IS 3072 Latest**
18. **Lighting protection : IS 2309 Latest**
19. **HT Cable : IS 7098 Latest**
20. **Power transformer : IS 1886 Latest**
21. **Current Transformer : IS 2705 Latest**
22. **MCCB : IS 2516 part I & II/ Sector I Latest**
23. **Relays : IS 3231 Latest**
24. **Indicating Instruments : IS 1248 Latest**
25. **Auxiliary contactors : IS 2959 Latest**
26. **Power factor correction**
27. **Capacitors : IS 2834 Latest or**
28. **PVC / Metal conduiting : IS 9357 Latest Part I, 2,3 & 4**
29. **Bus-bar support insulators : IS 2544 Latest**

30. **Voltage Transformer : IS-3156/BS-3941IEC-44,186**

31. **Electrical relays : IS-3231, 3842**

32. **Contactors for voltage not exceeding 1000V AC or 1200V DC Control Switches: IS-6875/BS-4794/IEC-377**

33. **High Voltage fuse : IS-9385/BS-2692/IEC-269**

34. **Low Voltage fuse : IS-1248/BS-89/IEC-51**

35. **Indicating instruments A.C. electricity Meters IEC-of induction type 45,211 : IS-722, 8530 / BS-5685 /**

36. **Porcelain post insulators for system with nominal voltages greater than 1000volts. : IS-2544**

37. **Resistance wire, tapes and strips for heating elements : IS-3725**

38. **Wrought aluminum and aluminum alloy bars, rods, tubes and sections for electrical purposes. : IS-5082**

39. **Toggle switches : IS-3452 / BS-3676**

40. **Metal enclosed switchgear and control gear for voltage above 1000V, but not Exceeding 11000V : IS-3427 / BS-162**

41. **General requirement for switchgear and control gear for voltage not exceeding 1000 volts : IS-4237/BS-5486/IEC-439**

42. **Degree of protection provided by enclosures for low voltage Switchgears and control gear : IS-2147/IEC-144**

43. **Dimensions for panel mounted indicating and recording electrical instrument : IS-2419**

44. **Marking and arrangement for switch-gear, bus-bars, main connection and auxiliary wiring. : IS-375**

45. **Code of practice for selection, Installations and maintenance of fuses. : IS-10118**

APPROVED LIST OF ELECTRICAL MATERIAL

Description	Brand
M.C.B. / RCCB / RCBO	Legrand / Hager / Anchor /L&T / Indokupp/Havells
Distribution Boards(DB)	Legrand / Hager / Anchor /L&T / Indokupp/Havells
Moulded Case Circuit Breaker (MCCB)	Legrand / Hager / Anchor /L&T / Indokupp/Havells
Change Over Switches	GE / L&T / HH ELCON
Cable Glands and Sockets	SIEMENS / DOWELLS
PVC insulated Copper conductor wires**(FRLS)**	FINOLEX / RR / POLYCAB / KEI
Telephone Wires and cables	FINOLEX / POLYCAB
Television Coaxial cable	FINOLEX / RR / POLYCAB
Switches and Sockets outlets (Modular type)	L&T / Legrand / Anchor ROMA
PVC Conduits and accessories(FRLS)	Precision / Ashok / Modi
LED Light fixtures	Philips / Wipro /Crompton /Syska
Ceiling Fans / Exhaust Fans	CROMPTON / BAJAJ/HAVELLS/ORIENT
Floor / Wall Raceways to date	MK/ LK/ MDS
Computer networking - outlet	AMP/SYSTEMAX / D-Link / Polycab / Finolex
Ceiling Rose holders	Legrand / Hager / Anchor /L&T / Indokupp/Havells
Buzzers/Bell Push bell	Legrand / Hager / Anchor /L&T / Indokupp/Havells
MCB Distribution Board	Legrand / Hager / Anchor /L&T / Indokupp/Havells
Cable Glands/Lugs	SIEMENS/DOWELLS
FRLS COPPER WIRE	FINOLEX / RR / KEI / POLYCAB
MODULAR SWITCHES	L&T / Legrand / Anchor ROMA
MCBS AND DBS	Legrand / Hager / Anchor /L&T / Indokupp/Havells
TELEPHONE CABLES	FINOLEX / RR / POLYCAB / KEI
SDF/MCCB	Legrand / Hager / Anchor /L&T / Indokupp/Havells
PVC CONDUIT	Precision / Ashok / Modi
KRONE Box with Connector	Krone
CAPACITORS	SIEMENS, L&T
TIMERS	MERLIN GERIN, L&T
CONTACTORS	TE, SIEMENS, L&T, ABB
SPEAKER	BOSCH
MUSIC SYSTEM CABLE	FINOLEX/POLYCAB
APFC RELAY	SIEMENS, L&T
MULTIFUNCTION METER	CADEL, SOCOMEC

EXHAUST FAN	CROMPTON, BAJAJ, USHA. ORIENT
PVC CONDUIT (2MM THICK)	AVON PLAST, EMJAY, AKG, BEC, CAP, SEIKO

Support Services Dept., 7th Floor, Central Office, 239 Vidhan Bhavan Marg, Nariman Point, Mumbai 400 021

TENDER FOR ELECTRICAL WORKS(Electrical Wiring/Telephone Wiring/Data Cabling/Lighting etc.) ON SEVENTH FLOOR, MAKER TOWER BUILDING AT CUFFE PARADE
(ONLY FOR EMPANELLED ELECTRICAL CONTRACTOR IN MUMBAI/THANE REGION IN A/B CLASS JOB ABOVE Rs. 15.00 LAKHS only)

BILL OF QUANTITIES(PRICE BID)

Sr. No.	Description	Qty.	Unit	Rate in (Rs.)	Total Amount in(Rs.)
1.	Supply, Installation, Testing & Commissioning of Point wiring using 1.5 sq.mm Copper flexible cable **(FRLS)** drawn through PVC conduit pipe fixed with all the fixing accessories etc. complete with connections for the following.				
1.a	Primary light point wiring	70	Point		
1.b	Secondary Light Point Wiring	60	Point		
1.c	New On-Board Point Wiring (6amp Switch Socket) including all complete with connection.	20	Point		
2.	Supply, Installation, Testing & Commissioning of 16amp Switch, 16amp Socket for RAW power point. (Including surface box & plate).	95	Nos		
3	Supply, Installation, Testing & Commissioning of 2 nos x 1.5 Sq.mm Copper wire (FRLS) drawn through PVC conduit pipe fixed with all the fixing accessories etc complete with connection for Primary & Secondary light point wiring **(2-Nos x 1.5-Sq.mm considering 1-Rmt. / All cables FRLS)**	850	Rmt		
4.	Supply, Installation, Testing & Commissioning of 2 nos x 2.5 Sq.mm Copper wire (FRLS) & 1 No x 1.5 Sq.mm Cu earth wire drawn through PVC conduit pipe fixed with all the fixing accessories etc complete with connection for UPS &	1950	Rmt		

	RAW Power(**2 Nos x 2.5 Sq.mm + 1 no x 1.5 Sq. mm considering 1-Rmt. / All cables FRLS)**				
5.	Supply, Installation, Testing & Commissioning of modular plate with 3 Nos x 6amp Socket and 1No. x 16amp switch with PVC surface Box and plate fixed with all the fixing accessories etc complete with connection. (UPS power point)	85	Sets		
6.	Supply, Installation, Testing & Commissioning of 2 Pair Telephone cable drawn through PVC conduit pipe fixed with all fixing accessories etc complete with connection for telephone.	3000	Rmt		
7.	Supply, Installation, Testing & commissioning of modular plate with RJ11 telephone socket with PVC box fixed with all the fixing accessories etc. complete with connection.	85	Set		
8.	Supply, Installation, Testing & commissioning of 20 pair telephone cable fixed with all the fixing accessories.	50	Rmt		
9.	Supply, Installation, Testing & commissioning of 100 pair Telephone tag block with connectors(Krone Box).	02	Set		
10.	Supply, Installation, Testing & commissioning of CAT-6 networking cables drawn through PVC conduit pipe fixed with all the fixing accessories etc complete with connections.	3500	Rmt		
11.	Supply, Installation, Testing & commissioning of modular plate with CAT 6 I/O socket with PVC box with all the fixing accessories etc complete with connection.	85	Nos		
12.	Supply, Installation, Testing & commissioning of 1-Mtr/2-Mtr patch cord wire.	170	Nos.		
13.	Supply, Installation, Testing & commissioning of 2-feet x 2-feet Square LED fitting 36 watts with all the fixing accessories etc complete with connection (make: Philips/Wipro/Crompton).	45	Nos.		
14.	Supply, Installation. Testing & Commissioning of 18-Watt LED ceiling mounting spot light fitting with all the fixing accessories etc complete with connection.	60	Nos.		

	(make: Philips/Wipro/Crompton)				
15.	Supply & fixing Bell point wiring with indicator Bell (Use of FRLS cable make: Polycab/Finolex/KEI).	15	Nos.		
16.	Supply & laying of 2 nos x 4 sq.mm Copper(FRLS cables) & 1 nos. x 2.5 Sq.mm Copper earth wire drawn through PVC conduit pipe fixed with all the fixing accessories etc. complete with connections. **(2 Nos x 4 Sq.mm + 1 no x 2.5 Sq. mm considering 1-Rmt. / All cables FRLS)**	850	Rmt		
17.	Supply, Installation, Testing & commissioning of 4-Core x 4-Sq.mm Copper armoured cables fixed with all the fixing accessories etc. complete with connection.	90	Rmt		
18.	Supply and laying TV Antenna wire with PVC conduit pipe complete for Cable TV connection.	150	Rmt.		
19.	Supply and laying 2 Core Oxygen free speaker wire drawn through PVC conduit pipe fixed with all the fixing accessories etc. complete with connections. (Polycab/Finolex)	800	Rmt		
20.	Supply and fixing of 6-watt Ceiling mounted Speaker. (make: BOSCH/AHUJA)	15	Nos		
21.	Supply and fixing 100-watts amplifier with USB connection.(Make: Ahuja)	01	Set		
22.	Supply and fixing mike (make: Ahuja**)**	01	Set		
23.	Supply, Installation, Testing & Commissioning of 4-way TPN Distribution Board (DB) with 1 No, 63amp 4-pole MCB & 12 Nos, 20amp SP MCB.	09	Nos		
24.	Supply, Installation, Testing & Commissioning of 12-way SPN Double Door Distribution Board (DB) with 1 No, 63amp DP MCB & 10 Nos, 10amp SP MCB.	02	Nos		
25.	Supply, Installation, Testing & Commissioning 63amp 4P MCB with Water proof Box.	05	No		
26.	Supplying & laying 10sqmm 4core armoured copper conduit cable	120	Rmt		
27.	Supplying & laying 16sqmm 4core armoured copper conduit cable	90	Rmt		
28.	Supplying & laying 35 sq. mm 4 core aluminium Cable	30	Rmt		
29.	Supply & laying 2.5-sq. mm 3-core flexible Copper Cable	275	Rmt		
30.	Supply & laying 6 sq. mm 4 core armoured copper cable.	85	Rmt		
31.	Supply, Installation, Testing &	01	No		

	Commissioning of 6-way VTPN Double Door Distribution Board consist of 1 No, 125amp, 4 pole MCCB, & 6-nos 40amp TP MCB as outgoing.				
32.	Supply, Installation, Testing & Commissioning of 24 port patch panel.	04	Nos		
33.	Supply, Installation, Testing & Commissioning of 15 U Rack.	02	No		
34.	Supply & fixing 1" PVC pipe trenching work including Civil finishing work.	650	Rmt		
35.	Supply and laying 100mm x 40mm x 2mm thick aluminium Raceway including Civil finishing work	150	Rmt		
36.	Supply & Fixing of Junction Box with Steel Plate	30	Nos		
37.	**MAIN DISTRIBUTION PANEL** (Make: MDS Legrand/Siemens/Merlin Gerin) Supply, Installation, Testing, Commissioning (Including loading/unloading/lifting/shifting from Ground floor to 7th floor) of Main Distribution Panel as per given below: 440-Volts, 3-Phase, 50-Hz with 50KA fault level for 1-second. Floor/Wall mounted, 7 tank cleaning process with duly powder coated with Copper Bus Bar. Panel shall have appropriate numbers of top and bottom knockout for outgoing cables. The termination in the panel shall be with proper nut and bolt arrangement with lugging on both side and ferruling with circuit no. indication, all cables shall be properly labelled with proper size at regular intervals complete	01	Complete Panel Set		
a	**Incomer: -**				
a1	200 Amps, 4-Pole MCCB with 50KA breaking Capacity: 1-no.				
a2	Thermal Overload Release Range: 0.08-1.01r				
a3	Instantaneous Magnetic Short Circuit Trip Operation.				
a4	LED type Phase Indicating Lamp (Indicating R-Y-B).				
a5	Voltmeter(0-600V), Ammeter (0-150) with selector switch				
a6	Danger Notice Board Indicating Sign(DANGER) in Marathi, Hindi, English				
b	**Outgoing: -**				
b7	1-no 150amp 4-pole 35KA MCCB				
b8	12-nos 63amp 4-pole MCB				
38	**APFC PANEL: -**				

	Supply, Installation, Testing and Commissioning (Including lifting/Shifting/loading/unloading from Ground floor to 7th floor) of 30-KVAR APFC power control panel comprising of MS enclosure complete with 16 SWG frame & body duly powder coated & seven tank process with contractor & replays of adequate size and indicating lamps with Alu. Busbar interconnection as follows: -		Complete APFCR Panel Set		
a1	**Incomer: -** 1-no. 100 amp, 3-Pole MCCB's	01			
a2	Outgoing: - 2-no. 10KVAR & 2no. 5KVAR Phicap Capacitor				
a3	Outgoing: - 4-no. 16/20Amp. 3-Pole MCB's				
				TOTAL:	
				Discount if any:	
				Amount after discount:	
				GST@_____:	
				Grand Total:	

(Total Amount in words: _____)

SIGNATURE & SEAL OF CONTRACTOR