ELECTRIFICATION WORK

FOR

STATE BANK OF INDIA

AT

ZANZARDA ROAD BRANCH

JUNAGADH

Name of the Contractor: ……..

NOTICE INVITING TENDER

State Bank of India sealed tenders from empanelled contractors for the work of Electrification Work

Asst. General Manager, State Bank Of India, REGION -4, State Bank of INDIA,3Rd floor,Merry Gold , Opp. Bahuddin College,Junagadh

Invites sealed item rate tender for below mentioned work from the contractors.

1)	Description of work	:	Electrification Work for ZANZARDA ROAD, Junagadh
2)	Time Limit	:	4 weeks
3)	Earnest money deposit	:	Demand Draft of Rs. 4,500=00 in favour of SBI C.M (Admin), Region-4. Cheque will not be accepted.
5)	Date of Tender Issue	:	**23/03/2017**
6)	Last date of issue of tender	:	**31/03/2017**
7)	Last date & time for receiving complete tender	:	**31/03/2017** During Banking Hours. To, C. M. (ADMIN.) REGION -4, State Bank of INDIA, Regional Business Office-4, 3rd floor, Merrygold, Opp. Bahuddin college,, Junagadh-362001.
8)	Opening of tender	:	**03.04.2017**

The Bank will not be bound to accept the lowest tender & reserve the right to accept or reject any or all the tenders without assigning any reason whatsoever.

Asst. General Manager
State Bank Of India
Regional Business Office-4,
3rd floor, merrygold,
Opp. Bahuddin College,
Junagadh-362001

GENERAL CONDITIONS

(1) Sealed tenders in **Two part system (Part-A for Techical bid, Part -B for Price Bid), Both should be in separate cover** addressed to **Assistant General Manager, State Bank Of India**, **Regional Business Office-4, 3Rd Floor, Merrygold, Opp. Bahuddin college,Junagadh-362001** and super scribed Name of work.

Electrification Work for ZANZARDA ROAD branch,Junagadh reaches the Bank on or before dd.mm.yyyy

(2) No tenders will be received after06.06.2015 **and** the tenders will be opened on the same day unless otherwise informed.

(3) The tenders will remain valid for a period of **3 month** from the date of opening of tenders, Bank reserves the right to accept of reject any or all the tenders without assigning any reason to do so. Bank does not bind itself for accepting the lowest tender.

(4) At the time of submission of every tender, It must be accompanied by a **Demand Draft** of **Rs. 4,500=00** only in favour of **State Bank Of India, Junagadh** as earnest money + ISD. No interest will be paid on earnest money. Any tender which is not accompanied by the earnest money shall be summarily rejected. **Tender with cheque will be directly rejected.**

(5) The tenderers should quote the rates in figures as well as in words.

(6) Please ensures that corrections and alterations made while filling the tender must be attested by initials of tenderers, overwriting of the figures is not permitted.

(7) The Bank reserves the right to rejected any or all the tenders, accept part of any tender or entrust the entire work to any contractor or divide the work to more than one contractor (item wise) without assigning any reason or giving any explanation. The rates quoted by the contractor will hold good for this bifurcation and no compensation will be paid on this account.

(8) Joint tenders shall not be considered.

(9) Within 24 hours of receipt of Intimation regarding acceptance of his tender by the Bank, the tenderer should send his acceptance of the work order in writing. It the tenderer does not do that, or does not start the work within 24 hours of such intimation to him or fails to give justified reasons not to do so, acceptance of his tender would be withdrawn and Earnest Money Deposit would be liable to be forfeited.

(10) The rates quoted in the tender shall include all charges of scaffolding, lift, any tools and plants railway freight labour conditions and fluctuation in the rates, excise duty, sales tax, octroi, VAT and any other taxes or expenditure for carrying out the work.

(11) The Contractor will arrange for sweet water for completing the work for which no separate payment shall be made. Electricity will be provided by the Bank free of cost.

(12) No escalation in rates will be allowed under any circumstances.

(13) The successful tenderer is bound to carry out entire work within the period stipulated in the Appendix. The tenderer will have to pay liquidated damages for non-completion of job within

stipulated period at the rate of Rs. 1500/- per day after expiry of period of completion subject to maximum of 5% of the contract value.

(14) The liquidated damages as mentioned above may not be enforced if the contractor applies sufficiently in advance for extension of time mentioning the unavoidable reasons for extension. The Bank shall, if in its opinion (which shall be final and binding upon the contractor) finds genuine reasons shown by the contractor for such request, grant suitable extension in time limit. Any claim for damage or compensation in relation there to by contractor is not permissible. Also other terms and conditions of the contract will remain unaltered in the extended period.

(15) The successful tenderer is bound to carry out items of work necessary for completion of job even though the same are not included in the schedule of quantity. Rates of extra items will be derived from the tender. In case the rates do not exist in the tender and extra item is not similar to tender item, then the rates will be worked out on actual cost of material and labour, any other expenditure for completing that work plus 15% towards contractor's profit & overheads. For this contractor must submit the rate analysis supported by original vouchers for purchase and labour.

(16) The contractor must co-operate with other contractors appointed by the Bank so that entire work shall proceed smoothly with least possible delay and to the satisfaction of the Bank.

(17) The contractor shall remove all rubbish etc. out of site/premises wash and clean the floors and hand over the site in proper and tidy condition on the completion of work.

(18) The tenderer shall acquaint himself with the site conditions making his own arrangement for storing of material at site lift, cartage etc.

(19) Contractor shall shift furniture, cupboards records, for the purpose of painting and re-arrange the same as directed. No extra charge shall be paid for the same.

(20) Contractor shall be prepared to work at times convenient to the Bank. No charges shall be paid for the same.

(21) **5 %** percent of the value of work done shall be deducted as retention money from the running bill of the contractor, which shall be released after the defects liability period, provided no defects are noticed during the period.

(22) The contractor will attend to all defects noticed during defect liability period. If the contractor fails to attend to the defects within a reasonable time these defects will be rectified by the Bank and the expenditure incurred on this account will be recovered from security deposit, or any other money due on to time.

(23) The contractor shall make adequate arrangement for watch and ward of his material and shall ensure the safety, breakage and any theft of material fixed or unfixed by him or other sub-contractors.

(24) The work executed should be got approved by the Bank and contractor shall rectify and bad workmanship pointed out at any stage and remove from site all the rejected material immediately.

(25) The contractor shall be responsible for application of labour laws, compensation for injury and accident to person, whether employed by his or by his sub-contractor.

(26) The contractor will take necessary precautions for carrying out the work avoiding any damage to fixed or loose furniture, structures/decorative parts of the property. The contractor will rectify any damages done at his cost.

(27) The contractor shall ensure that workmen employed by him for execution of work are suitably covered against Workmen's Compensation Act and that all liabilities arisig out of Workmen's Compensation Act, ESIS and other legislative enactments applicable, to such works and workmen shall be to the contractor's account.

(28) The Contractor shall inform the Bank to check quality/measurements of any work which is likely to be hidden before covering. In case contractor fails to get hidden measurements checked before covering. Decision for the same shall be taken by the Architect which shall be binding on the contractor.

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(29) The contractor will submit running Bills for the value of work done not less than interim payments (as mentioned in the Appendix) mentioning full nomenclatures of items, rates, amount, measurement sheet, reasons for part rates claimed, if any.

(30) In case of non-completion or delay in completion of work or removal of defects in time, the Bank shall be free to appoint another agency to get the job done at contractor's risk and cost.

(31) Income-Tax at the rate of **2.06%** (or Applicable rate) of the Bill Amount will be deducted at source from the contractor's bill and will be deposited with the I.T.O as per rules.

(32) The Bank may delay the progress of work without, in any way, vitiating the contract and grant such extension of time for the commencement/completion of the contract as it may think proper and sufficient in consequence of such delay and the contractor shall not make claim for compensation of damages in relation there of.

(33) The Contractor will not execute any extra item without Bank's permission in writing.

(34) The quantities mentioned in the schedule of quantities are approximate. Payment will be on actual work done by the contractor. However the contractor should not deviate the quantity without Bank's permission.

(35) Conditional tenders quoted by the tender is liable to be rejected.

(36) The Bank has a right to alter the nature of work and to add or omit any items of work or to have the option of the same carried out departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this contract.

(37). The owner shall be free to terminate the contract by giving proper notice to the contractor if :

a) Contractor fails to commence the work within the reasonable period when asked to do so

b) Fails to show desired progress within the reasonable period despite being instructed to gear up the work

c) Does not follow the instructions given by the Architect**.**

d) The contractor fails to complete the work within the a specified period including the extension in time limit if any (either with liquidated damages or without liquidated damages).

(38) The contractor can terminate the contract by giving proper notice to the owner if,

a) The owner fails to instruct the contractor within the reasonable time to commence the work after the work order is issued and contract has been entered in to.

b) The owner stops the work for more than 3 months for the reasons not attributing to the contractor's default.

c) The owner fails to make the payment to the contractor within a period of one Month from the date of certification of the bill by the Architect without any justifiable grounds.

(39). In case the owner terminates the contract for the reasons mentioned above then and in that event the contractor shall be paid for the actual work carried out by him at the rates quoted in the tender /agreed during the negotiations and certified by the Architect, provided the work is found satisfactory. However the Retention money so deducted shall be forfeited.

(40). In case the contract is terminated by the contractor for the reasons mentioned in clause 30 then and in that event the contractor shall be paid for the actual work carried out by him at the quoted/ agreed rates and as certified by the Architect. However the retention amount shall be refunded as per clause No19. In such case the Defect's liability period shall be counted from the date of termination .

(41) The Contractors are required to obtain assist the Project Architects in obtaining any permission/s from the Muncipal/Local Authority and/or Liasion with the Authorities. Any out of pocket expenses etc. in this regard shall not be reimbursed to the contractor**.**

(42) Labour shall not be allowed to stay overnight in the premises.

(43) Material shall be delivered at site at time permissible by traffice rules and shall be stacked in such a way that it does not hinder normal working of branch.

(44) The Contractor shall inform 2 days in advance Bank/Architect to check quality/measurements of any work which is likely to be hidden before covering. Contractor is soly responsible to get work checked and certified in writing from Architect before covering

(45) Measurement for all items shall be taken as per actual work done and no claim for any wastage in all material shall be considered.

(46) Contractor must quote balanced rates as quantities mentioned in the tender are approximate and may vary to any extent. No extra shall be given on this account.

(47) The contractor should inspect the sites before quoting the rates.

(48) The contractor shall place order immediately after hearing the approval of the tender of the material required for the work in order to get them on site well in advance of their requirement. Sample of each material should be got approved in advance.

(49) The contractor shall have to make necessary arrangements for proper storage of the materials and will be responsible for any loss of material due to theft or otherwise.

(50) The items of work will be measured as per standard mode of measurements as laid down by I.S.I

(51) The quantities given in the Bills of quantities are approximate and given as a guide to tenderer and are liable to variations.

(52) Contractor shall be paid for the actual measured quantities of work execued by him.

(53) LIST OF APPROVED MAKE IS ENCLOSED

Banks reserves the right to select any of the manufactures party from the above list and to add or delete names of the other parties as and when required.

(54) Contractor shall have prepared any No of samples as directed by Architect/Bank before finalizing of scheme. For this No extra payment shall made.

(55) The contractor have read and understood the Banks "General condition of contract.

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Signature of Tenderer/s **Seal/stamp of the firm/company**

(Only authorized for tendering)

APPENDIX REFERRED TO IN THE GENERAL CONDITIONS

1.	Defects liability period	:	12 Months
2.	Date of commencement	:	Immediate on receipt of work order/Handing over the site.
3.	Date of Completion	:	4 weeks from issue of Letter of intent./Work order
4.	Stipulated period for completion	:	4 weeks
5.	Minimum value of work done for interim payment	:	Only full and final payment will be made on completion of work.
6.	Interim Payment	:	Only full and final payment will be made. .
7.	Retention money for defects liability period	:	5 % of the total value of work
8.	Liquidated damages for non-completion of work within stipulated period.	:	1500=00 Rs per day subject to maximum of 5 % of contract value.
9.	Validity of the Tender	:	Three months from the last date of opening of the Tender.
10.	Terms of Rates	:	The rates shall be at the site of the work and shall include all Taxes, Octroi, Labour, Transportation Sales Tax, work contract Tax Service Tax, VAT if any etc.
11.	Period of honouring interim Certificate	:	30 Working days after the submission of the interim Certificate.
12.	Period for honouring final Certificate	:	60 working days after the submission of the Final Certificate.
13.	Validity of Rates	:	The quoted Rates in the Tender shall remain valid till the completion of the work. No escalation in rates shall be allowed.
14..	Extra Items	:	The contractor shall not execute the item for which the rate cannot be derived form the Tender. He shall submit the Rate analysis for such item on actual cost plus 15% as over-heads, establishment charge and contractor's profit, and get it approved by Architect/Employer before starting the work of such items.

15.. Working Hours	:	Most of the work may take place at contractors workshop, However in case if the work is to be executed in a working premises of the Bank the same shall generally be execute after office hours of the Bank. I.E in the evening, nights and Bank holidays. The employer shall make necessary arrangements required or their part of such working. The work shall be carried out in such a way that minimum disturbance is caused to the functioning of the Bank. The Contractor shall make all necessary arrangement for cleaning the premises everyday and to ensure the complete safety of the furniture, machinery, computers, plants, equipment etc. lying in the premises and also provide safeguard from dust etc. For night working no extra charge shall be paid.
16.		Contractor shall shift and rearrange necessary Furniture/Fixture to keep site tidy and clean protect office equipment by covering during execution. If contractor fails then Branch Manager shall employ other agency for the job and cost incurred shall be recovered from the bill Amount.
17.		Electrician/NetworkTechnitian/Carpenter/A.C Technicians shall remain present at site at all the time during execution of work to avoid any power/Network failure/Disturbance of branch functioning.
18.		Contractors shall have to make necessary temporary arrangement to the satisfaction of Branch Manager for Electrification/Deta Cabeling/Furnishing/A.C no extra payment shall made for this.
19.		On completion of work all contractor shall give detailed measurements/circuit diagram/List of materials used Test reports duly signed and sealed.
20.		All hidden measurements must be got checked/reconded before concealing.
21.		All material and makes shall be as per specifications any deviation will not be accepted without written permission of Architect/Bank

Signature of Tenderer/s **Seal/stamp of the firm/company**

SPECIFICATION OF MATERIALS

All the material to be used shall be as per the specified make of the materials list and ISI approved Brand. Any deviation from this shall be got approved from Architect / Owner, the contractor shall submit samples of material to be used for verifications and Produce Bill in original.

1. SAMPLES : After receipt of the bids but prior to award of the contract, bidder shall, Upon notification from owner submit samples of materials he intends to Use.
The owner shall reserve the right to evaluate the sample with regard to the Specification before award of work. Samples as directed by the Architect / Owner for various items shall be prepared / brought for approval without Any cost.

Special Notes :

a) The successful tendered will have to supply the makeof the materials as recommended and in consultation with the Client / Architect / Consultant without any extra cost. Client / Architect / Consultant reserve the rights to choose any make out of above list.
b) Tenderer should have to specify the list of makes considered in the tender while quoting the rates in the tender, in covering letter of separate letter enclosure. However, the final decision for accepting make specified by tenderer would be of client / Architect / Consultants.
c) As far as possible, the successful tenderer will have to place order directly to the manufacturer or it's authorized dealer.
d) The client / Architect/ Consultant have right to Check the Challans of supplier.
e) The RCCB, RCBO, MCB and MCB DBs must be of same make.
f) Make of components required to be used by contractor to complete the installation, if not mentioned anywhere, shall be required to got it Approved by Client / Architect/ Consultant before installation in writing manner.
g) Within a week of work order, the contractor shall submit the sample of each item / component of above-mentioned approved make for the approval of the Client / Architect / Consultant.

APPLICABLE STANDARDS

Sr. No.	IS No.		Description
1)	IS:2026-1977 IS 3639	:	Distributing transformers & fittings. Fittings and acc. For P.T.
2)	IS:7886 IS:660	:	Installation of Transformer.
3)	IS:2516-1972	:	Specification for AC circuit Breakers.
4)	IS:335	:	Insulating oil for Transformers & switch gear.
5)	IS:2705	:	CT for measuring and protection.
6)	IS:3155	:	Voltage (Potential) Transformers.
7)	IS:3236 Part II	:	Voltage Transformer.
8)	IS:373	:	Busbar arrangement and marking.
9)	IS:2099	:	Bushing
10)	IS:5621	:	Large Hollow Porcelains
11)	IS:2544	:	Insulators
12)	IS:2629 & 2633	:	Hot Dip Galvanizing
13)	IS:3842	:	Relays.
14)	IS:1248-1958	:	Meters (measuring).
15)	IS:3072-1975	:	Installation of Switch gears.
16)	IS:692	:	HV cable.
17)	IS:1255	:	Installation of HV cables and jointing.
18)	IS:3043	:	Code of practice for earthing.
19)	IS:4047-1977	:	HD Air breaker, Switch gears and fuses for Voltage not exceeding 1000 Volts.
20)	IS:8106-1966	:	Selection, installation and maintenance of fuses upto 650 Volts.
21)	IS:4237-1967		for voltage not exceeding 1000 Volts.
22)	IS:2607-1976	:	Air-break isolators for Voltage not exceeding 1000 Volts.

23)	IS:8623-1977	:	Factory built assemblies of switch gears and control gears for voltage upto and including 1000 Volts A.C. and 1200 Volts D.C.
24)	IS:375-1963	:	Marking and arrangement of switch gear bus bars main connectors and auxiliary wiring.
25)	IS:2147-1962	:	Cubical Boards.
26)	IS:8084-1972	:	Insulated conductor rating.
27)	IS:2675-1983	:	Enclosed distribution fuse boards and cutouts for Voltage not exceeding 1000 Volts.
28)	IS:8828-1978	:	Miniature Circuit Breaker.
29)	IS:9926-1981	:	Fuse wire used in re-wearable type electric fuses upto 650Volts.
30)	IS:1554 (Part I)	:	PVC insulated electric cables Heavy duty.
31)	IS:3961 (Part II)	:	Recommended current rating for cables.
32)	IS:2982	:	Copper conductor in insulated cables and cores.
33)	IS:8130	:	Conductor for insulated electric cables and flexible rods.
34)	IS:3975	:	Mild steel wires, strips and tapes for armouring cables.
35)	IS:5831	:	PVC insulation and sheath of electric cables.
36)	IS:1753	:	Aluminum conductor for insulated ables.
37)	IS:4288	:	PVC insulated and PVC sheathed solid aluminum conductor cables of voltage rating not exceeding 1100 volts.
38)	IS:961	:	Recommended current rating for Cable.
39)	S:732	:	Code of practice for electrical wiring installation system Voltage not exceeding 650 Volts.
40)	IS:1646	:	Code of practice for fire safety of Buildings (general) electrical installation.
41)	IS:1653	:	Rigid steel conduits for electrical wiring.
42)	IS:2667	:	Fittings for rigid steel conduits for electrical wiring.
43)	IS:3480	:	Flexible steel conduit for electrical wiring.
44)	IS:3837	:	Accessories for rigid steel conduits for electrical wiring.
45)	IS:694	:	PVC insulated cables (wires).
46)	IS:2509	:	Rigid non-metallic conduits for electrical wiring.

47)	IS:6946	:	Flexible (playable) nonmetallic conduits for electrical installation.
48)	IS:1293	:	Three pin plugs and sockets.
49)	IS:8180	:	Conductors for insulated electrical cables and flexible codes.
50)	IS:9537-1980	:	Specification for conduit for electrical installation.
51)	IS:3419	:	Accessories for non-metallic conduits for electrical wiring.
52)	IS:3854	:	Switches.
53)	IS:6538	:	Plugs.
54)	IS:2834-1954	:	Shunt Capacitors for power systems.
55)	IS:2208	:	HRC cartridge fuse and links up to 660 volts.
56)	IS:1913-1969	:	General and safety requirement for lighting fittings.
57)	IS:2944-1981	:	Code of practice for lighting public thorough fares.
58)	IS:3528	:	Waterproof electric lighting fittings.
59)	IS:3553-1966	:	Water tight electric lighting fitting.
60)	IS:1239-1958	:	Mild Steel tubular and other wrought steel pipe fitting.
63)	IS:2149-1970	:	Luminaries for street light.
64)	IS:9224	:	HRC fuses having rupturing capacity of 90 KA.
65)	IS:2312-1967	:	Exhaust Fan.
66)	IS:374-1979	:	Class I Ceiling Fan.

NOTE : All codes and standards means the latest where not specified otherwise the installation shall generally follow the Indian Standard codes of practice or relevant British Standard Codes of Practice in the absence of corresponding Indian Standards.

PLEASE FOLLOW :

a. Indian Electricity Act of 1910 and rules issued there under revised up to date.
b. Special Attention should be given to Rule No. 50.
c. Regulations for electrical equipment in building issued by The Bombay Regional Council of insurance Association of India.

ELECTRICAL MATERIAL SPECIFICATION

DISTRIBUTION BOARDS

The scope of work shall cover supply, installation testing and commissioning of all distribution boards -

Standards :

AS PER SCHEDULE OF INDIAN STANDARDS, ATTACHED IN THE DOCUMENT.

Distribution Boards :

Distribution boards along with the controlling MCB's/Fuse or Isolator as shown shall be fixed in an M.S. Box with hinged door suitable for recessed mounting in wall. Distribution boards shall be made of 18 SWG steel sheet duly rust inhibited through a process of de-greasing, acid pickling, phosphate and powder coated to an approved color of adequate micron rating duly approved by architect/consultant.

Three phase boards shall have phase barriers and a wire channel on three sides. Neutral bars shall be solid tinned copper bars with tapped holes and chase headed screws. For 3 phase DB's, 3. independent neutral bars shall be provided. All DB's shall be internally pre-wired using copper insulated PVC wires brought to a terminal strip of appropriate rating for outgoing feeders.

Conduit knockouts shall be provided as required/shown on drawings and the entire board shall be rendered dust and vermin proof with necessary sealing gaskets. The top and bottom side of DB should be detachable.

MCB's shall have quick make and break non - welding self wiping silver alloy contacts for 10 KA short circuit both on the manual and automatic operation. Each pole of the breaker shall be provided with inverse time thermal over load and instantaneous over current tripping elements, with trip - free mechanism. In case of multi-pole breakers, the tripping must be on all the poles and operating handle shall be common. Breakers must conform to BS 3871 with facility for locking in OFF position. Pressure clamp terminals for stranded/solid conductor insertion are acceptable up to 4 sq.mm. aluminum or 2.5 sq.mm. copper and for higher ratings, the terminals shall be suitably shrouded. Wherever MCB isolators are specified they are without the tripping elements.

Fuses shall be HRC link type re-wire able with necessary fuse carriers and with rating of not less than 25 MVA. Bottle type fuses are not acceptable. Fuse carrier terminals shall be suitably shrouded. Re-wireable fuse carriers shall be porcelain. HRC fuses for motor duty should be time lag type.

Distribution boards shall have HRC/re-wire able fuses as shown on the schedule and drawings. Board shall meet with the requirements of IS 2675 and marking arrangement of bus bars shall be in accordance with I.S. standards.

Bus bars shall be suitable for the incoming switch rating and sized for a temperature rise of 35° C over the ambient. Each board shall have two separate earthing terminals. Circuit diagram indicating the load distribution shall be pasted on the inside of the DB as instructed. One earthing terminal for single phase and two terminals for 3 phase DB's shall be provided with an earth strip connecting the studs and the outgoing ECU earth bar.

In the case of MCB distribution boards, the backup fuses wherever shown shall be not less than 63 A with a delayed characteristic and a minimum pre-arcing time of 0.5 sec. At 9 KA/3 KA fault current.

All outgoing feeders shall terminate on a terminal strip which in turn is interconnected to the MCB/Fuse base by means of insulated single conductor copper wires as follows :

Up to 15 A	2.5 sq.mm.	40 A	10 sq.mm.
25 A	4.0 sq.mm.	63 A	16 sq.mm.
32 A	6.0 sq.mm.		

RCCB / MCB :

The RCCB should suffices all the requirements of IS as per code IS – 12640 – 1988. The RCA should be current operated and not on line voltage.

The RCCB should ensure mainly the following functions.

Measurement of the fault current value.

Comparison of the fault current with a reference value.

The RCCB should have a torroidal transformer witch has the main conductors of primary (P – N) which check the sum of the current close to zero.

All metal parts should be inherently resistant to corrosion and treated to make them corrosion resistant.

It should be truly current operated.
It should operate on core balance torroidal transformer.
It's accuracy should be ± 5 %.
It should operate even in case of neutral failure.
It should trip at a present leakage current within 30 M.S.
It's enclosure should be as per IP 30.
It's mechanical operation life should be more than 20,000 operations.

It should provide full protection as envisaged by IE rules – 61-A, 71 – ee, 73 – ee, 1985 and also rule 50 of IE rule1956.

It should conform to all national and international standards like IS 8828 : 1993, IS 12640 – 1988, BS 4293 – 1983, CEE 27 (International commission Rules for the approved of electrical equipment).

MEDIUM VOLTAGE CABLING

Scope :

The scope consists of Laying & testing L. T. Cable and its termination.

Standards :

AS PER SCHEDULE OF INDIAN STANDARDS; ATTACHED IN THE DOCUMENT

Cables :

All cables shall be 1100 Volt grade XLPE insulated, sheathed with or without steel armoring as specified and with an outer PVC protective sheath. Cables shall have high conductivity stranded aluminum or copper conductors and cores color coded to the Indian Standards. All cables laid up to load should be without any joint.

All cables shall be new without any kind or visible damage. The manufacturers name, insulating material, conductor size and voltage class shall be marked on the surface of the cable at every 600 mm centers.

Cable joints and termination:

Connectors :

Cable terminations shall be made with copper Heavy duty long nack copper crimping lugs only crimped type solder less lugs for all aluminum cables and stud type terminals. For copper cables copper crimped solder less lugs shall be used. Crimping shall be done with the help of hydraulically operated crimping tool. All cable lugs should be long neck type only.

Cable Glands :

Cable glands shall be of heavy duty brass single compression type as specified. Generally single compression type cable glands shall be used for indoor protected locations and double compression type shall be used for outdoor locations. Glands for classified hazardous areas shall be CMRS approved.

Ferrules :

Ferrules shall be of self sticking type and shall be employed to designate the various cores of the control cable by the terminal numbers to which the cores are connected, for ease in identification and maintenance.

Cable joints :

Kit type joint shall be done and filled with insulating compound. The joint should be for 1.1 KV grade insulation.

CONDUIT WIRING

1.0 Scope :

1.1 The scope of work shall cover supply, installation testing and commissioning of all.

2.0 Standards : **As per annexure - iv**

3.0 Rigid and Flexible conduits :

3.1 All PVC conduits shall be laid in open/concealed manner which are approved by F.I.A. & I.S.I. & of 25 mm. Diameter.

3.2 Flexible conduits shall be formed from a continuous length of spirally wound interlocked steel strip with a fused zinc coating on both sides. The conduits shall be terminated in brass adapters.

4.0 Accessories :

4.1 PVC conduit fittings such as bends, elbows, reducers, chase nipples, split couplings, plugs etc. shall be specifically designed and manufactured for their particular application. All conduit fittings shall conform to IS:2667-1974 and IS:3887-1966. All fitting associated with galvanized conduit shall also be galvanized.

5.0 Wires :

5.1 All wires shall be single core multi-strand/ flexible copper or single strand Aluminum / Copper, PVC insulated as per IS:694 and shall be 660v/ 1100V grade.

5.2 All wires shall be color coded as follows :

Phase	Colour of wire
R	Red
Y	Yellow
B	Blue
N	Black
Earth	Green (insulated)
Control (If any)	Grey
All off wires	Same as Phase wire

5.3 Color code should be strictly used for all wiring.

ii) Installation, commissioning and testing.
iii) Cable marking.

For cable buried underground :

i) Cables and protective bricks & tiles.
ii) Installation, commissioning & testing.
iii) Cable markers.

6.0 Switches & Sockets:

6.1 Switches shall be module type/ flush piano type with silver-coated contacts. Sockets shall be 3 pin with switch and plate type cover. Combination of multiple switch units and sockets should be used to minimize the switch boxes.

6.2 For heavy duty, metal clad sockets with M.C.B./ Isolator mounted in a galvanized steel box shall be provided.

7.0 Installation:

7.1 Conduits shall be kept at a minimum distance of 100 mm. From the pipes of other non-electrical services. And maintain minimum 300 mm distance between telephone, TV & Computer piping.

7.2 Separate conduits/raceways shall be used for:

1. Normal lights and 5 A 3 pin sockets on lighting circuit.
2. Separate conduit shall be laid from D.B. to switch board or point.
3. Power outlets – 15 A 3 pin 20 A/30 A, 2 pin scraping earth metal clad sockets.
4. Emergency lighting.
5. Telephones.
6. Fire alarm system.
7. Public address system & Music system.
8. For all other voltages higher or lower than 230 V.
9. T.V. Antenna.
10. Water level guard.
11. Computer Wiring.

7.3 Call bell wiring layout of conduits shall be generally indicated on drawings and the layout shall be supplemented and complemented by contractor on site with approval of the Engineer.

7.4 Wiring for short extensions to outlets in hung ceiling or to vibrating equipments, motors etc., shall be installed in flexible conduits. Otherwise rigid conduits shall be used. No flexible extension shall exceed 1.25 m.

7.5 Conduits run on surfaces shall be supported on metal 12 mm. thick saddles which in turn are properly screwed to the wall or ceiling. Saddles shall be at intervals of not more than 500 mm. Fixing screws shall be with round or cheese head and of rust-proof materials. Exposed conduits shall be neatly run parallel or at right angles to the walls of the building. Unseemly conduit bends and offsets shall be avoided by using fabricated mild steel junction/pull through boxes for better appearances. No cross-over of conduits shall be allowed unless it is necessary and entire conduit installation shall be clean and neat in appearance.

7.6 Conduits embedded into the walls shall be fixed by means staples at not more than 500 mm. intervals. Chases in the walls shall be neatly made and refilled after laying the conduit and brought to the finish of the wall but final finish will be done by the building contractor. The contractor shall provide wire mesh before making rough plaster.

7.8 Conduits buried in concrete structure shall be put in position and securely fastened to the reinforcement and got approved by the Engineer, before the concrete is poured. Proper care shall be taken to ensure that the conduits are neither dislocated nor choked at the time of pouring the concrete suitable fish wires shall be drawn in all conduits before they are embedded.

7.9 Inspection boxes shall be provided for periodical inspection to facilitate withdrawal and removal of wires. Such inspection boxes shall be flush with the wall or ceiling in the case of concealed conduits. Inspection boxes shall be spaced at not more than 12 meters apart or two 90^{o} solid bends or equal. All junction and switch boxes shall be covered by 6 mm. clear Perspex plate truly cut and fixed with cadmium plated brass screws. These junction boxes shall form part of point wiring or conduit wiring as the case may be including

the cost of removing the Perspex cover for painting and re-fixing. No separate charges shall be allowed except where specially mentioned.

7.10 Conduits shall be free from sharp edges and burrs and the threading free from grease or oil. The entire system of conduits must be completely installed and rendered electrically continuous before the conductors are pulled in. conduits should terminate in junction boxes of not less than 32 mm. deep.

7.11.1 An insulated earth wire of copper rated capacity shall be run in each conduit for entire length.

8.0 Lighting & Power Wiring:

8.1 all final branch circuits for lighting and appliances shall be single conductor/ stranded/ flexi-cables run inside conduits. The conduit shall be properly connected or jointed into sockets, bens, and junction boxes.

8.2 All circuits shall preferably be kept in a separate conduit up to the Distribution Board. No other wiring shall be bunched in the same conduit except those belonging to the same phase. Each lighting branch circuit shall not have more than ten outlets or 800 watts whichever is lower. Each conduit shall not hold more than three branch circuits of same phase.

8.3 Flexible cords for connection to appliances, fans and pendants shall be 650/1100V grade (three or four cores i.e with insulated neutral wire of same size) with tinned stranded copper wires, insulated, twisted and sheathed with strengthening cord. Color of sheath shall be subject to the Engineer's approval.

8.4 Looping system of wiring shall be used. Wires shall not be jointed. Where joints are unavoidable, they shall be made through approved mechanical connectors. No such joints shall be made unless the length of the sub-circuit, sub-main or main is more than the length of the standard coil.

8.5 Control switches shall be connected in the phase conductors only. Switches shall be fixed in 3 mm. thick painted or galvanized steel boxes with cover plates as specified. Cadmium plated brass screws shall be used.

8.6 Power wiring shall be distinctly separate from lighting wiring. Conduits not less than 25 mm. and wires not less than 2.5 sq. mm. copper shall be used.

8.7 Every conductor shall be provided with identification ferrules at both ends matching the drawings.

9.0 Testing :

9.1 The entire installation shall be tested for :

a) Insulation resistance.

b) Earth continuity.

c) Polarity of single pole switches.

A test certificate shall be submitted in the Performa shown under Appendix – I.

10.0 Mode of measurement:

10.1 The definition of point wiring shall be in accordance with sketch drawing and should wiring from D.B. onwards together with all junction boxes, connectors, earth wire, fixing accessories, connection to all light fittings switches etc. as specified and shown on drawings. The point rate shall include circuit wiring from distribution board to switch board and/or directly to the point. The circuit wire shall be in separate conduit. The contractor may draw maximum 2/3 circuits of the same phase in circuit mains conduit.

10.2 All switches sockets with boxes, earthing interconnection and plate type silver contact switch shall be inclusive in point wiring.

10.3 All empty conduit runs, including junction boxes fish wires etc. shall be paid on the basis of unit length.

Measurements shall be along the conduit and concurrent length of sub-circuit wiring.

10.4 Buzzer indicator of the ways specified shall consist of indicating lamps, reset button, electromagnet, Perspex cover plate, chromium plated brass screws etc. shall be considered as on unit for measurement and payment.

10.5 Two way light points shall be classified according to and consist of 2 Nos. 2 way plate type switches, wiring from the 1 st 2 way switch to the 2nd 2 way switch to the first light controlled. Subsequent lights, if any, shall be measured as ordinary secondary point.

EARTHING

Scope :

The Scope of work shall cover supply of earthing stations, laying copper earth strips and connecting the power panels, DB's and switch boards.

Standards :

AS PER ANNEXURE – IV.

Plate Earthing Station :

The substation earthing shall be with copper plate earthing station unless otherwise specified.

The earthing station shall be as shown on the drawing. The earth electrodes shall be 450 x 450 x 3 mm / 600 x 600 x 6 mm. Copper plate – as specified in B.O.Q. The earth resistance shall be maintained with a suitable soil treatment as shown on drawings.

The resistance of each earth station should not exceed 1 ohms.

The earth lead shall be connected to the earth plate through copper/brass bolts as shown on the drawing.

Minimum distance between two earth pits shall be 2 Mts.

All earth pits shall be minimum 1 Mt. Away from building foundation.

Pipe Earthing Station :

The earth station shall be as shown on the drawing and shall be used for equipment earth grid. The earth electrode shall be 2.5 m. long 50 mm. Diameter galvanized steel pipe. The earth resistance shall be maintained with a suitable soil treatment as shown on drawings.

The resistance of each earth station should not exceed 5 ohms.
The earth lead shall be fixed to the pipe with a and safety set screws. The clamps shall be permanently accessible.

Earth leads and connections :

Earth lead shall be bare copper or aluminum or galvanized steel as specified with sizes shown on drawings. At road crossings necessary Hume pipes shall be laid. Earth lead run on surface of wall or ceiling shall be fixed on saddles or wall.

The complete earthing system shall be mechanically and electrically bonded to provide an independent return path to the earth source.

Equipment Earthing :

All apparatus and equipment transmitting or utilizing power shall be earthed in the following manner. Copper earth wires shall be used unless otherwise indicated in the schedule of work and drawings.

Power transmission apparatus:

Metallic conduit shall not be accepted as an earth continuity conductor. A separate insulated/bare earth continuity conductor of size 50% of the phase conductor subject to the minimum and maximum shall be provided.

Non-metallic conduit shall have an insulated earth continuity conductor of the same size as for metallic conduit. All metal junction and switch boxes shall have an inside earth stud to which the earth conductor shall be connected. The earth conductor shall be distinctly colored (green) for easy identification.

In the case of cable, an earth continuity conductor shall either be run outside along the cable or should form a separate insulated core of the cable.

Three Ph. Power panels and distribution boards shall have 2 distinct earth connections of the size correlated to the incoming cable size. In case of 1 Ph. DB's a single earth connection is adequate. Similarly for 3 Ph and 1 Ph isolating switches there shall be 2 and 1 earth connections respectively, sizes being correlated to the incoming cable.

Testing :

The following earth resistance values shall be measured with an approved earth meggar and recorded.

Each earthing station

Earthing system as a whole

Earth continuity conductors

Mode of measurements :

Providing earthing station complete with excavation, electrode, watering pipe, soil treatment, masonry chamber with cast iron cover etc. shall be treated as one unit of measurement.

The following items of work shall be measured and paid per unit length covering the cost of the earth wires/strips clamps, labor etc.

Main equipment earthing grid and connections to the earthing stations.

Connections to the switchboard, power panels, distribution boards etc.

The cost of earthing the following items shall become part of the cost of the item itself and no separate payment for earthing shall be made.

Isolating switches and starters should form part of mounting frame, switch starter etc.

Light fittings – form part of installation of the light fitting.

Conduit wiring cabling – should form part of the wiring or cabling.

TELEPHONE DISTRIBUTION

This cover supply ,installation, testing, commissioning of telephone system.

1) The scope of work shall cover supply, installation, commissioning and testing of :

Telephone cables

Telephone Tag Blocks

Telephone wiring in conduits

The telephone exchange and the hand sets shall be supplied by the clients.

2) Conduits :

Conduits shall be as given below :

Indoor : medium gauge Rigid PVC conduit.
If in flooring provide heavy gauge.
The conduit shall generally be as specified under section `CONDUIT WIRING'.

3) Cables and Wires :

The type of cables and the services shall be as follows :

Indoor Multi pair, PVC insulated sheathed armored and sheathed.

Inside Twin core PVC insulated with conduit twisted cores.

All multi core cables and wires shall be of tinned copper conductor of not less than 0.5 mm dia and shall be color coded twisted pairs with rip cord.

The conductor resistance shall be less than 150 ohms per KM and the insulation resistance between the conductors not less than 50 mega ohms and the nominal capacitance of about 0.1 micro farad per kilometer.

Cables laid underground or locations subject to dampness and flooding shall be filled with polyethylene compound and shall have sufficient protection against moisture and water ingress.

All armoring shall be of galvanized steel wires and protected against corrosion by an outer sheath of PVC in the case of indoor cables and polyethylene in the case of outdoor cables. Outer sheathing must be fire retarding and anti - termite.

All unarmored single core cables and inner sheath of armored cables shall be provided with rip cord.

All single pair cables for final extension to the telephone outlet box shall be unarmored tinned copper conductors of not less than 0.6 mm. Diameter and shall be drawn in conduits. All telephone outlets shall consist of 2 A 2 pair polythene connector in G.I box with 6 mm bus bar cover with bus bar edges and chromium plated brass hardware.

Tag blocks :

The telephone tag blocks shall be suitable for the multi core telephone cables and shall have two terminal blocks, cross connect type. All incoming and outgoing cables shall be terminated on separate terminal blocks and termination shall be silver soldered. The cross connecting jumpers shall be insulated wires of same diameter and screw connected.

The tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with 2 coats of red oxide and stove bus bar.

Installation :

The installation of conduits shall generally be as specified under section `CONDUIT WIRING'.

Telephone / Data pipes shall be kept 100 from power conduit.

Separate J.B. shall be provided for telephone & Computer.

All cables shall be on cable racks and neatly stitched together.

The connection at the tag blocks shall be silver soldered so as to achieve minimum contact resistance.

The final branch connections with single pair cables in conduits and the maximum number of cables in each conduit shall be as follows :

Conduit diameter		**Max. No. of cables**
inch	**mm.**	
¾"	20	2 Nos. single pair
1"	25	6 Nos. single pair
1¼"	32	12 Nos. single pair
1½"	40	18 Nos. single pair

LIST OF APPROVED MAKE FOR THE MATERIALS TO BE USED

MCB/MCCB/ELCB/RCCB	-	Hager/Legrand/Schneider/C&S
SWITHCES AND ACCESSORIES	-	SALZER S90/LEGRAND miris/ L&T Oris
HGS CONDUIT	-	AEC/BEC/ICI/SCI
ELECT PVC WIRES	-	RR KABLE FRLS/POLYCAB FRLS/KEI FRLS
PVC TUNKING/PIPES AND ACCESSORIES	-	Precision/Clipsal/LEGRAND
ARMOURED CABLE	-	FPolycab, Finolex, KEI , RR Kable
CABLE GLANDS	-	HMI/Comet
CABLE LUGS AND SOCKETS	-	Dowell's/3D
CONNECTORS	-	Elmox/Connectwel
Change over switch (On Load)	-	L&T/C&S/ABB/SEIMENS
Button/Angle Holder, Ceiling rose	-	Anchor/Precision
DISTRIBUTION BOARD	-	L&T/Hager/Legrand/Schneider/c&s
TELEPHONE WIRES & CABLES	-	Delton/National/LEGRAND
METAL CLAD SOCKET	-	MDS/Clipsal/Haeger/LEGRAND
JUNCION BOX	-	Precision/Clipsal/LEGRAND
SWITCH BOARDS	-	MK India/SALZER/ LEGRAND
EXHAUST FAN	-	Crompton/ HAVELLS
CIELING/WALL/PEDESTAL FANS	-	Crompton/HAVELLS
SPEAKERS	-	Ahuja/Bosch/Philips
LIGHT FIXTURES	-	Philips/Wipro/Crompton/GE
SFU & HRC Fuses	-	C&S/L & T/Siemens/Legrand
METERS	-	AE/MECO
CONTACTORS & OL RELAY	-	L & T / Siemens/ C&S/ LEGRAND
Data CABLE	-	D-LINK/FINOLEX /LEGRAND
PATCH CORD	-	D-LINK /LEGRAND
CAT-5/CAT-6 I/O	-	D-LINK / LEGRAND
Telephone Outlet socket RJ-11 Complete with box	-	Anchor Roma/Cabtree /SALZER/ LEGRAND

[b] Contractor reserve rights to select any of the specified brands mentioned above.

INSTALLATION TESTS CERTIFICATE

BY ELECTRICAL CONTRACTOR

This contractor is to certify that the work is carried Out work confirming to IE Rules and code of practice. He has to give the test report is under.

(i) Insulation Resistance test is R - N M. Ohms
Y - N M. Ohms
B - N N. Ohms

(ii) Load test: -

5A - 1000 W Power Point - 15 Minutes

15A - 3000 W Power Point - 15 Minutes

(iii) Earth resistance for each electrode - 1 Ohm
- 2 Ohm
- 3 Ohm
- 4 - N - E Volts

(iv) Certificate of makes of materials used in the work

(v) Circuit diagram

(vi) Certified that the electrification work has been carried out under the supervision of licensed Electrical supervision.

(vii) Certified that the earthing plate / pipe has been verified and Placed at correct depth confirming to IE Rules.

Signature of Electrical Supervision **Signature of Contractor**

Name:

License No. :

IMPORTANT POINTS TO BE NOTED

1. **Rates for LIGHT, FAN, EX. FAN, CALL BELL, RAW POWER ETC. POINTS includes the cost of main wires and PVC pipes from LDB-ROW POWER DB to DIFFERENT SWITCHBOARDS WITH REQUIRE CIRCUITS.**
2. **Rates for COMPUTER POWER POINTS include the cost of wires and PVC pipes from UPS DB to COMPUTER POWER POINTS.**
3. **Rates for COMPUTER I/O include the cost of DATA cables and PVC pipes from SERVER SWITCH to COMPUTER NODES.**
4. **Rates for TELE POINTS include the cost of TELEPHONE Wires and PVC pipes from EPABX/CRONE BOX to TELE. POINTS.**
5. **Rates for A.C. / POWER POINTS include the cost of wires and PVC pipes from A.C. DB to DIFFERENT A.C. AND POWER POINTS WITH REQUIRE CIRCUITS.**
6. **The contractor should submit the builtup SLD of panel, SLD of different Dbs to different switchboards with numbering, SLD of data rack to different i/o points with numbering, tele. Krone box to different tele. Points with numbering, etc. After execution of the branch.**
7. **The contractor should use max. 3 circuits in one conduit for ups & raw power points.**
8. **The contractor should use max. 3 wires of data & tele. In one conduit of 25 mm dia.**
9. **Every conduit for ups , raw power , data & tele., power points, ac points ,lighting points switch board should be separate.**
10. **For data & tele. Points, big junction box must be required.**
11. **For ups & raw power points, big/ small junction box must be required.**
12. **Empty conduit must be laid for security system.**
13. **PVC conduits must be clamped with saddles in ceiling only.**
14. **Ele. Contractor must submit certified load list with ele. License no. /supervisor certificate no.**
15. **Electrical contractor must submit all the Guarantee/ Warranty certificate to the branch for all the electrical items like Fans/ Fixtures/ Luminaries/ Switches/ MCB etc.**
16. **Electrical contractor must submit main panel manufacturer certificate approved by CPRI.**

Signature of Contractor