



COCHIN PORT TRUST

COCHIN-682009, KERALA, INDIA

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**E-QUOTATION DOCUMENT FOR "SUPPLY, INSTALLATION,
TESTING & COMMISSIONING OF 3 NOS. 11 KV ELECTRICAL
PANELS FOR PROVIDING POWER SUPPLY TO THE MOBILE
HARBOUR CRANE AT ERNAKULAM WHARF, COCHIN PORT TRUST"**

Website:www.tenderwizard.com/CPT; www.cochinport.gov.in; www.eprocure.gov.in

DY. CHIEF MECHANICAL ENGINEER(ELE)'S OFFICE
FIRST FLOOR, NEW ADMINISTRATIVE BUILDING,
COCHIN PORT TRUST
COCHIN-682009

Due Date & Time for submission : **14.30 hrs. on 18.05.2021**

Date & Time of Opening : **15.00 hrs. on 18.05.2021**

E-QUOTATION No. **F2/MHC 11 KV panel/2021/M**

Date: 04.05.2021

COCHIN PORT TRUST

Willingdon Island

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Deputy Chief Mechanical Engineer(Ele)'s Office,
Cochin 682 009.

e-QUOTATION No. F2/MHC 11 KV panel/2021/M

Date: 04.05.2021

e-QUOTATION NOTICE

1. Electronic Quotations (e-Quotations) on percentage basis are invited from "A" Class Electrical Contractors for carrying out the work of "SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF 3 NOS. 11 KV ELECTRICAL PANELS FOR PROVIDING POWER SUPPLY TO THE MOBILE HARBOUR CRANE AT ERNAKULAM WHARF, COCHIN PORT TRUST". Quotations shall be submitted before **2.30 pm on 18.05.2021** and shall be opened at **3.00 pm on the same day**. Bill of Quantities of Work, General Conditions, Scope of Work & Technical Specifications for carrying out the work are enclosed.
2. **The e-Quotations are invited on percentage basis.** The estimated amount is excluding GST. The Bidders shall quote percentage above or below the Departmental estimate as given in the Bill Of Quantities(BoQ) and submit it ONLINE in e-tender portal www.tenderwizard.com/CPT
3. The bidders are to obtain the one time User ID & password for log-in to the e-tendering Portal www.tenderwizard.com/CoPT from the service provider M/s.KEONICS by paying registration amount of Rs.1124/- through online Payment using Credit/Debit Card/Net banking or DD in favour of "KSEDCL, Bangalore".
4. The intending bidder must have valid Class-II or III digital signature certificate to submit the bid. For further details, please contact e-Tender Help Desk No. 080-40482000/ 080-49352000/ 9746118529/ 9605557738.
5. e-Quotations are invited from "A" Class Electrical Contractors and the bidders shall submit scanned copy of the valid Electrical contractor's along with the Bid.
6. The Quotation document will be available as two separate files in the e-quotation Portal; containing the following:
 - i. Quotation Notice with General Conditions, Scope of Work and Technical Specifications.
 - ii. Bill of Quantities of Work.
7. Both 6(i) & filled in 6(ii) above shall be submitted "Online" only. The name and address of the Bidder shall be necessarily entered in the space provided in the Bill of Quantities of Work.
8. The Bidder shall inspect the site before submitting the quotation in order to make them fully aware of the Scope of Work, Site and its conditions.

Sd/-

DY.CHIEF MECHANICAL ENGINEER(ELE)

GENERAL CONDITIONS

1. **Validity of Quotation** : The Quotations shall be valid for a period of 90 days from the due date of submission of quotation.
2. **Completion Period**: The whole work shall be completed within 60 days from the date of receipt of work order. In case the Bidder is not permitted to carry out the work due to some problem from Employer's side, he should maintain a record of such time lost, duly counter signed by the Engineer-in-Charge and this period will not be included while determining the delay in completion period. In case the works are not completed within the specified completion periods due to any fault of the Bidder, it will be considered as a breach of contract and the Bidder will not be considered for any other work in future.
3. **Payment Term** : Payments will be made online after completing the work to the entire satisfaction of the Engineer-in-Charge and also after deducting the taxes prevailing in force at the time of payment of bills. The quantities specified in the schedule of quantities of work are only approximate and shall be increased or decreased at the discretion of the Engineer-in-Charge according to actual requirements. Payment will be made as per actual measurements, according to the percentage quoted.
4. **Liquidated Damages**: In case of delay in completion of the contract, liquidated damages (L.D) may be levied at the rate of half percent (½%) of the Contract Price per week of delay, subject to a maximum of 10% of the Contract Price. The amount of Liquidated Damages can be adjusted or set-off against any sum payable to the Bidder.
5. **Defects Liability Period**: The defects liability period for the work shall be 12 months from the date of completion of the work. In the event of any defect/ deficiency being noticed during the period, which is attributable to the defective materials/design/ workmanship, the Bidder shall make good the same at his cost.
6. **Security Deposit**: Security deposit @ 3% of Contract Price shall be recovered from the Bidder's bill. The amount towards Security Deposit so deducted will be released only after successful completion of the defect liability period, subject to certification from the Engineer-in-Charge.
7. **Execution of Agreement**: The successful Bidder will be required to execute within 14 days from the date of receipt of work order, an agreement at his expense on proper value Kerala State Stamp Paper in the prescribed departmental form, consisting of the work order issued to the Bidder, together with the Quotation submitted by him including General Conditions, for the due and proper fulfillment of the contract. Till signing of agreement, the Quotation together with the acceptance letter shall constitute a binding contract between the Bidder and Cochin Port.
8. **Engineer-in-Charge**: The Engineer-in-Charge of the work is the Superintending Engineer (Ele), CoPT. Clarifications if any required can be obtained by contacting the Superintending Engineer (Ele) / Executive Engineer(Ele-P) of the Electrical Division of CoPT (0484-2582351 OR 0484-2582320).

9. **Water & Electricity:**

Water: Water, if required for the work, shall be arranged by the Bidder at his own cost.

Electricity: The Bidder shall make his own arrangements for the temporary connection for electricity required, if any, and make necessary payment for it direct to the Department concerned.

10. The Bidder shall have valid GST Registration number. GST as applicable for the work will be paid extra by the Port. The GST applicable as per law can be billed on the Port Trust, which will be paid to the Bidder by the Board along with the bills, for which the Bidder shall hold valid GST Registration number.
11. The Contractor shall comply with all the provisions of the Indian Workmen's Compensations Act, Public Liability Policy, Provident Fund Regulations, Employees Provident Fund and ESI Act etc. amended from time to time and rules framed there under and other laws affecting the Contract labour that may be brought in to force from time to time.
12. The Contractor shall be registered under EPF and ESI act and the employees employed under them shall be covered in the EPF and ESI Scheme, if required as per applicable rules. The Contractors shall regularly remit, the Employer & Employee contribution to the authorities in such cases. If not, the Dept. would be required to remit the same and the amount so remitted shall be deducted from the part/ final bill of Contractors.
13. All materials, tools, plants and equipments required for completing the work shall be provided by the Contractor at his own cost. All materials required for the work shall be got approved by the Engineer-in-Charge before using in the work. Any fittings or accessories which may not be specifically mentioned in the specification but are usual or necessary as per good industry practice, shall be provided by the Bidder without extra cost to the Port. All works shall be carried out as per relevant ISS.
14. All labour, skilled or unskilled for the work shall be provided by the Contractor at his own cost and settling any disputes with the labour shall be the Contractor's responsibility.
15. All care and precautionary measures for avoiding any kind of damage/ accidents in the work site shall be taken by the Contractor. All safety precautions shall be taken while carrying out the work. The Contractor shall supply the necessary safety equipments to the workers employed by him and also ensure that they use it, while carrying out the work. The Contractor shall be solely liable and responsible for accidents if any, occurring during the period of Contract.
16. The work shall be completed without causing any damage to the existing structures/cables etc. In case any damage is caused, the same has to be rectified at Bidder's risk and cost.
17. The Port will in no way be responsible for any loss/damages caused in connection with the work.

SIGNATURE OF THE BIDDER

SCOPE OF WORK

The scope of work is for Supply, Installation, Testing and Commissioning of three numbers of SS 316 11KV Outdoor type Electrical panels for providing power supply to the Mobile Harbour Crane installed at Ernakulam Wharf of Cochin Port Trust. Detailed scope of work is as below.

- a. SITC of 3 Nos. SS 316 11 KV Out door type looping boxes
- b. Dismantling of old looping boxes including cable
- c. Supply and providing indoor type H.T Heat Shrinkable End Terminations for 3C X 240 Sq.mm & 3C X 150 Sq.mm 11 KV cable
- d. Supply and providing HT Heat shrinkable straight joint kit for 3C x 240 Sq.mm, 11 KV cable
- e. Retrieving the existing 11/3.3 KV cable laid through the existing RCC trench and relaying the Concrete slab after laying the HT cable (Item No.5)
- f. Excavation of open trench and Laying of 11 KV, 3C x 240sqmm XLPE Al armoured UG cable (The cable will be supplied by CoPT) and connecting to the newly installed looping box (Item No.1 above)
- g. Earthing the installations.

TECHNICAL SPECIFICATIONS

1. TECHNICAL SPECIFICATION FOR SUPPLY & INSTALLATION OF ITEMS

1.1. SITC OF 11 KV SS Gr. 316 , 2 MM LOOPING BOXES OUTDOOR TYPE

Grade of SS shall be SS-316. In side space of box shall be have sufficient size to accommodate the incoming HT cables and outgoing HT cables as per the voltage and current rating. The Item shall be of outdoor type , weather proof , free standing with suitable SS stand, cable entry provisions dust and vermin proof suitable with double door for outdoor installation , door opening in front and canopy having IP 55 degree of protection of enclosure. Hinged lockable doors with locking provision shall be provided for all feeders/panels. The Bus bar shall be coated with highly conductive material at cable connecting points for better conduction and durability at the connecting area.

- a) Type of product is Base mounted Welded Box.
- b) Box body & Door shall be made of 2.00 mm SS-316.
- c) Gland plate shall be made of 2.0 mm SS-316.
- d) Front shall have Double leaf door provided with cam lock arrangement.
- e) Hinged cover shall be provided.
- f) The bus bar shall be COPPER with current carrying rating as 1.2A/ SQMM if not specified separately. (Min.40MMX4MM)
- g) Foamed in PU Gasket with UV resistant on door and other covers.
- h) Shall be Out Door type with transparent sheet in front of bus bar for protection.
- i) Rest of specification shall be as per relevant IS / IEC standard
- j) Stand / Leg shall be made of SS-316 with suitable angles and firmly fixed to ground by anchor bolts etc..

The 11 KV looping boxes shall be installed at locations at berth frontage area. The old looping boxes shall be dismantled including the cables and handed over to CoPT.

The Cable loop available inside the existing pit shall be taken out for connecting the same to the new boxes and shall be under the scope of the erection and commissioning of loop-in loop-out boxes.

The spacing of bushings and bus bars shall be done as per the relevant standards considering the voltage.

The drawing of the loop-in-loop-out box shall be got approved from the Engineer-in-charge before taking procurement action.

APPROVED MAKE OF 11 KV LOOP-IN-LOOP-OUT BOX :

ABB/ INTRANS/ MEGAWIN/ HESSEL/ WAVES/ POWER CONTORLS /
L&T/ SIEMENS/ SCHNEIDER / HENSEL/ MENNEKAS/ HAGGER/
IMPERIAL (The panel manufacturers shall have ISO certification)

1.2 SUPPLY AND PROVIDING HT CABLE END TERMINATION & STRAIGHT JOINT KITS (SUITABLE FOR 3C/3.5C X 240 SQMM & 3C X 150 SQMM)

1.2.1 Technical requirements

The Kits shall be of rating 11KV XLPE for HT Power Cables. (Including 3.3KV cables)

The Kits to be supplied must have manufactured as per latest IS and the reference there of be given with the offer. The literature for the cable jointing kits are to be used by the contractor must be supplied along with delivery of materials. The Kits shall be suitable for storage without deterioration at a temperature up to 45 0 C and unlimited self life. The contractor shall offer one year warranty after commissioning against defective design and for material / terminations and joints and for bad workmanship etc. For carrying out all the joint of the kit tenderer has to depute his representative with man and material without any extra charges. The cable termination shall be class-I termination as defined in IEEE standard 48-1975. The termination kits shall be tested as per IS-13573 with latest amendment from I & II. The test reports are to be submitted. The kits offered should have satisfactory working performance in Indian atmospheric condition.

1.2.2 Providing Cable Terminations And Connections

Method of cable jointing and connection of cables shall be as per IS/IEC or any other higher/equal approved standard and strictly in accordance with cable and termination kit manufacturer's instructions, drawing and/or as directed by the Owner. The work shall include all clamping, fittings, fixing, plumbing, soldering, drilling, cutting, taping, heat shrinking, (where applicable), connecting to cable terminal, shorting and grounding as required to complete the job. Cost of all consumable material shall be included in the erection rates quoted. The equipment will be generally provided with undrilled gland plates for cables/conduit entry. The Contractor shall be responsible for drilling of gland plates, painting and touching up. Holes shall not be made by gas cutting. The contractor shall tag/ferrule the control cable cores at all terminations, as instructed by the Owner. In panels where a large number of cables are to be terminated and cable identification may be difficult, each core ferrule may include the complete cable number as well. All cable entry points shall sealed be and made vermin and dust proof. Unused openings shall be effectively closed.

1.2.3 General requirements of joints and terminations

Supply and making of end terminations with brass/ PVC glands, lugs etc complete suitable for cables as per schedule of work. The item shall be Single compression type tinned/Nickel plated (coating thickness not less than 20 microns in case of Tin and 10 to 15 Microns in case of Nickel) brass cable/PVC glands shall be provided by the Contractor for all power and control cables to provide dust and weather proof terminations. They shall comprise of heavy duty brass casting, machine finished and tinned to avoid corrosion and oxidation. Rubber components used in cable gland shall be neoprene and of tested quality. Required number of packing glands to close unused openings in gland plates shall also be provided. For copper cable the termination materials shall be copper materials

The installed joints and terminations must provide the following:

- a) Complete external leakage insulation between the high voltage conductor and earth potential using anti-track heat shrink material.
- b) Electrical stress control using semi-conducting heat shrinkable tubing over the cores and by the insertion of high di-electric strength insulating material into the crutch of the termination such that electrical discharge activity does not occur in the termination after it has been energised at its rated voltage.
- c) Hermetic sealing of the interfaces between heat shrinkable materials and cable surfaces, bushings or cable lugs by use of track resistant hot melt adhesive which can accommodate the creep and relaxations that may occur with recovered heat shrink materials. This sealant shall be pre-coated inside the heat shrinkable components and activated by the heat applied to shrink the components which shall be in excess of 125 Deg. C.
- d) Uniform adhesive flow from the adhered heat shrink component into the adjoining surfaces will be used as an indicator that shrinking is complete, and therefore, the adhesive must be suitable for this purpose.
- e) Outdoor terminations shall incorporate a design feature to prevent flexing of the terminated cores under short circuit conditions.
- f) Joints and terminations must be insensitive to cable manufacturers tolerances allowed under BSS 6480-1969.
- g) The length of core insulation required is 450 mm per phase.
- h) Copper braid should be provided to connect the metal shield of XLPE cable and to make electrical contact with the outer screen of the joint for transition joints.

**APPROVED MAKE OF 11 KV CABLE TERMINATION KIT: RAYCHEM /
MAHINDRA / DENSON/ 3M/ CCI/ CABSEAL**

1.3 RETRIEVING THE CABLE

Existing trench is covered with concrete slabs. 11KV/3.3 KV cable laid along the covered trench shall be retrieved and handed over to CoPT. The cable and slabs shall be removed without damage. After laying the HT Cable provided by CoPT, the trench shall be covered as earlier with concrete slabs.

1.4 EXCAVATION OF OPEN TRENCH

Cable shall be laid along the open trench as per IS and site requirement. Necessary material such as brick /concrete slab, loose earth, fastening materials etc. shall also be supplied by the contractor, as per the schedule.

Contractor shall construct the cable trenches required for directly buried cables. The scope of work for construction of cable trenches shall include excavation, preparation of loose earth bedding, loose earth cover, supply and installation of brick or concrete protective covers, back filling and reaming, supply and installation of route markers and joint markers. The Contractor shall ascertain the soil parameters prevailing at site, before quoting the unit rates.

The trenches shall be excavated manually/by using JCB and utmost care shall be taken while excavating the trenches. The trenches shall be excavated with 45cm width and 60 cm depth from the ground level for LT cables. For HT cables, the trenches shall be of 60 cm width and 100 cm depth from ground level. For laying two or more cables in same trenches the width of the trench shall be as per the norms and both cables shall be laid horizontally with sufficient spacing and brick protection for all cables specified. The trenches shall be resurfaced and provided the compaction after laying the cable.

1.4.1 Precautions to be taken

All necessary measures must be taken to ensure that excavations are left in a safe condition, including the erection of suitable hard barricades, warning signs and hazard lights. The earthworks shall be set out in accordance with the design drawings. All excavations shall be made to the depth and extent as shown on the Drawings with proper allowance for fill, additional cover (where required) and formwork. The excavations shall be kept free and clear of loose materials, water and rubbish. The Contractor shall ensure that the terminal sections of pipe that are joined are connected with Central Plastics Electro fusion Couplings or connectors with tensile strength equivalent to that of the pipe being joined.

1.4.2 Safety

The Contractor shall undertake works in accordance with appropriate safety requirements by local & state regulations. Safety measures shall include, but not be limited to, personal protective equipments, operating of machinery within job site, and storage and transportation of materials and equipments.. Due Care shall be taken not to damage the cable while drawing .

1.4.3 Cable tags and marker

Each cable and conduit run shall be tagged with numbers that appear in the cable and conduit schedule. The tag shall be of aluminum with the number punched on it and securely attached to the cable conduit by not less than two turns of 20 SWG GI wire conforming to IS: 280. Cable tags shall be of rectangular shape for power cables and of circular shape for control cables. Alternately, the contractor may provide cable tags made up of nylon, cable marking ties of 'TY-CAB' or equivalent type with cable number heat stamped on the cable tags. Location of cables laid directly underground shall be clearly indicated with cable marker made of galvanized iron plate. Location of underground cable joints shall be indicated with cable marker with an additional inscription "Cable joint". The marker shall project 150mm above ground and shall be spaced at an interval 100 meters and at every change in direction. They shall be located on both sides of road and drain crossings. Cable tags shall be provided on all cables at each end (just before entering the equipment enclosure), on both sides of a wall or floor crossing, on each duct/conduit entry. Cable tags shall be provided inside the switchgear, motor control centers, control and relay panels etc., wherever required for cable identification, such as where a number of cables enter together through a gland plate. The price of cable tags and markers shall be included in the installation rates for

cables /conduits quoted by the Contractor. Specific requirements for cabling, wiring ferrules as covered in respective equipment section shall also be complied with.

1.5 LAYING OF CABLE

The cable shall be laid through the ground at a depth about 90 cm from the ground level and filled with loose excavated good soil/earth without brick protection after cable laying. In case laying of cables through ground is not possible, the cable shall be clamped along the wall. For drain / road crossing, the cable shall be laid through HDPE/GI pipe where ever possible, in open area and trench. The payment tiles etc. removed for laying the cables shall be replaced properly to the original condition .

1.6 SUPPLY AND PROVIDING PIPE EARTHING

The pipe earthing shall be done as per IS 3043/87 using GI pipes electrodes and GI strips. The life of the earth rod/pipe shall be minimum 20 years and earth resistance of the installation after earthing shall be of < 1 ohm. The earthing conductor (protective conductor from earth electrode up to the main earthing terminal/earth bus, as the case may be) shall be of GI. of at least 98% conductivity confirming to I.S. 3043, and in the form of wire or strip as specified.

The pipe earth pits shall be inter- connected with 40mm x 5 mm hot dipped GI strip. The jointing of the strips shall be done by welding / SS Nuts bolts and proper anti corrosive paints must be applied . Earth pit shall be provided with earth chamber and covered with concrete slab of Sufficient size and quantity. Identification of earth electrodes connected to equipments shall be done properly. The earth pits shall be cleaned, covered and named. Metallic parts of all the equipments including fencing shall be earthed by 2 separate and distinct connections with earth. Earthing system shall be mechanically strong to retain electrical continuity during the life of installation.

The size & material of earthing conductor and nos. of earth pits are worked out after arriving the fault level of installation by the contractor. The CoPT shall provide available technical inputs to the contractor. The contractor shall be responsible to prepare shop drawings for routes of complete system along with necessary calculations before execution for approvals along with location of pits as per site condition. It shall be the contractor's responsibility to achieve the necessary values for earthing. Contractor shall also incorporate necessary requirements as per local codes / approving authorities.

The existing earth strips already available near the panel shall be used and joining shall be done by the Contractor.

1.6.1 APPLICABLE STANDARDS

Earthing Materials shall conform to latest applicable standards

IS: 2062 Grade A Quality Specification for MS angles, MS channel & MS Flat

IS: 2062 Chemical & Physical composition of materials.

IS: 1852 Rolling & Cutting tolerances for Hot Rolled Steel products

The steel sections shall be re-rolled from the BILLETS/INGOTS of tested quality as per latest version of IS 2830 .The GI Flat shall be of size 25 mm x 3 mm. The GI Flats shall be free from any defects. The Zinc for galvanizing shall conform to grade Zen 98 specified in IS 209-1966 & IS : 4826-1979 with up to date amendments.

1.7 GENERAL TECHNICAL SPECIFICATION FOR SUPPLY OF ITEMS

All materials required to complete the work as per given specifications & drawings etc, must be manufactured and supplied using fresh raw materials. Re-moulded, re-circulated materials are not acceptable. The procurement of materials must be made directly from manufacturer or through authorized dealer/distributors. Documentary

evidences to this effect are to be made available to the engineer-in-charge for necessary checks / verification of source of supply of materials. Second hand materials/ partial used materials/ used materials would not be acceptable. The offer should be as per technical specification without any deviation. But any deviation felt necessary to improve performance, efficiency and utility of equipment must be mentioned in the deviation schedule with reasons duly supported by documentary evidences during pre bid meeting. Such deviations suggested may or may not be accepted by the employer. Any deviations projected after the pre bid meeting shall not be entertained at any cost.

2. GENERAL TECHNICAL SPECIFICATION FOR INSTALLATION OF ITEMS

2.1. Standards

Erection, testing and commissioning of the equipments covered shall be done as per standard codes of practice and shall comply with requirements of following Indian Standards and other relevant standards, Indian Electricity Rules and acts and also to the regulations that are in force at the place of installation.

IS: 1255 : Code of practice for installation and maintenance of power cables
Up to and including 33 kV rating.

IS: 5216 : Guide for safety procedures and practices in Electrical work

IS: 100118 : Code of practice for selection, installation and maintenance for
Switchgear and control gear-Part-III Installation.

IS: 13408 : Code of practice for the selection, installation and maintenance
of electrical apparatus for use in potentially explosive atmospheres
(other than mining application of explosives processing & manufacture)

IS: 3043/87 : Code of practice for installation & maintenance of earthing of installation

2.2. GENERAL CONDITIONS FOR INSTALLATION

- a) The erection/installation, testing and commissioning shall be carried out in accordance with specification, data sheets, drawings, manufacturer's recommendations, and relevant standards or as directed by owner/Engineer-In-Charge. Requirements regarding erection/installation, testing and commissioning of switchboards, cables, etc, are generally explained here in. It is the responsibility of the contractor to supply all equipment, items, accessories, materials, tools, tackles, transporting, and lifting vehicles, consumables etc. required for unpacking, checking, transportation, storage, safe custody, installation, erection, testing, commissioning, return of unused equipment/items which are supplied from owner's stores and handing over of the installation to the entire satisfaction of owner.
- b) The erection scope shall include supply of all hardware and accessories such as bolts, nuts, washers, gaskets, cable termination accessories, lugs, paint, primer, sand, etc. required for completeness of the work. All consumable materials such as insulation, tape, cleaning and paint brushes, welding electrodes, rust preventive materials, jute, cotton waste, hack saw blades, bolts, nuts, inhibitive grease, fuel, lubricants, etc. and any other material required in carrying out the work, but not for incorporation in to the permanent work, shall also be included in the scope of contractor.
- c) The equipment/items to be erected shall be handled with care by experienced workers under the guidance of the competent supervisor. Proper handling and transporting equipments are to be used and dragging is to be avoided.
- d) The equipment/items supplied by the owner, shall normally be kept at their stores. The contractor shall inspect these items at the stores by unpacking the containers, if necessary. Responsibility of safe custody of materials after delivery and till handing over shall rest with the contractor. Unused materials and containers shall be returned to

the stores. The items supplied by the owner shall be transported from the point of storage to the point of erection/ installation using proper capacity transporting vehicles. The scope shall include unpacking the containers, assembling parts, fixing loose items, components, etc. Materials supplied by the contractor or issued by the owner shall be given suitable protection against weather, dust and vermin. In storage places, equipments shall be placed over wooden sleepers to keep them above ground. Before carrying out erection/installation works of any item, proper care regarding leveling, alignment, access to working parts, facilities for removing the items for repair, statutory clearance, etc. shall be taken.

- e) Foundation bolts, nuts, lock nuts, washers, etc. will normally be supplied by the equipment supplier. Any further requirement of these items shall be under the scope of contractor. The equipment shall be installed on the foundation bolts firmly such that there will not be any vibration during operations. For mounting of equipment/items on the walls/ columns / supports, suitable MS/GI brackets shall be fixed/ grouted.
- f) Electrical connections shall be done with great care using spring washers, bimetallic strips, conducting grease, etc. wherever required, to ensure good contact without creating undue stresses. Copper bus bar joints shall be made after tinning the contact area. Supply of all required accessories or electrical connections shall be included in the contractor's scope. Discrepancies if any found between drawings/ statutory requirements and actual conditions at the site, shall be immediately brought to the attention of owner's representative. If any modification is found required in the writing or to suit site condition the same shall be carried out as per the instruction of the Engineer-In-Charge without any extra cost.
- g) All equipments under erection shall be kept properly cleaned and free of dust, vermin, moisture, etc. After erection, it shall be ensure that non-foreign materials, tools or tackles are left in the equipment. All unused cable entries, cutouts, etc. shall be sealed properly. For hazardous area, blanking plugs suitable for the area classification applicable shall be used.
- h) All tests shall be carried out in the presence of owner's representative and test shall be recorded on an approved proforma duly certified. The records of all tests shall be submitted to the purchaser's representatives. All interconnected wiring shall be checked thoroughly for correct connection with the wiring and schematic drawings of the manufacturer and the drawings supplied by owner before energizing.
- i) All power and bus bar connection shall also be thoroughly inspected and checked for connections, foreign materials, tightness, etc. before energizing the equipment All components within the main equipment shall be tested for proper performance and correct operation before commissioning the equipment.
- j) All labeling shall be checked for correctness. All nuts, bolts, clamps, joints, connections, etc. shall be checked for tightness and tightened wherever required. All moving parts shall be checked for its correct movement and proper lubrication. Apply lubrication wherever required. All equipment containing liquid shall be checked for correct quantity filling and all gaskets, walls, etc, shall be checked for leak proof. Oil filling, if found required, shall be done with dry and clean oil. Gaskets shall be replaced if found required. It shall be ensured that all CT leads are loaded or shorted prior to testing and commissioning. Insulation tests shall be carried on all electrical devices, whether specifically mentioned or not, as per this work after properly cleaning these devices.
- k) All the relays and its settings after commissioning shall be furnished to the owner detailing relay type number, panel number etc. In case of any component of an

equipment supplied by the owner is found to faulty/unsuitable, the same shall be replaced by the new one issued by owner. For all relays before installation, the rating, range and auxiliary supply voltages for the relay should be checked against drawings/schematic/ schedule.

2.3. CIVIL AND STRUCTURAL WORKS

- a) Miscellaneous civil works associated with the erection/installation such as excavation, dewatering and refilling of earth work for earth pits and cable trench, chipping, grouting, small cutting, etc, on floors/walls/columns/structures and bringing back the same to original finish, grouting of supports, providing suitable fixing arrangements for cables, push button stations, DBs etc. shall be included in the rates quoted for erection of the respective items, unless specifically excluded in the "Schedule of Items of Work". All structural works associated with cabling, earthing, equipment erection and supporting arrangements shall be included in the scope of the contractor. All the welding and cutting works shall be carried out by certified welders. Painting shall be done on all MS materials provided, by the contractor such as base channels, frames, supports, pedestals, cable trays/racks/risers, enclosures, boxes, conduits, chequered plates, etc. Before painting, the surface should be thoroughly scraped and cleaned to remove dust, grease, plaster or any other foreign materials. It is the responsibility of the contractor to supply and install all the required materials for painting including paint. Cement concrete footing shall be provided for cable trays/racks/risers, pedestals, supports, etc. Footing shall be provided using 1:2:4 PCC with 20mm broken stone. It is responsibility of the contractor to supply and install all materials such as river sand, reinforcement rods, 20mm broken stone, etc. without any extra cost to owner. All concrete works and grouting shall be cured for a minimum period of 48 hours.
- b) Chipping, grouting, etc as recommended shall be done for completion and installation work on the finished floor, wall, roof, etc. and the surfaces has to made good after the work. It is the responsibility of the contractor to supply all necessary materials and to bring the disturbed surface to the original finish. Touch painting of scratches found on equipment, other painted metallic surfaces, galvanized, etc. associated with this work is also included in the scope of contractor without any extra cost. Base steel structures shall be painted with 2 coats of epoxy primer and 2 coats of epoxy paint.
- c) Roofing for Transformer and Panels (item No. 15)
The roofing shall be provided with AL. Powder Coated corrugated sheet and Leg shall be done with min.50MM GI pipe of B Class and supported with CC footing at base. The roof support shall be done with GI Pipes 25MM / GI Tubes with Suitable size/ GI clamps, fixtures/ fasters etc .The structures shall be painted with 2 coats of epoxy primer and 2 coats of epoxy paint.

2.4. STANDARD REQUIREMENTS FOR TESTING AND COMMISSIONING

The standard requirements for testing and commissioning are furnished below.:

- a) All tests shall be carried out in the presence of Owner's representative and tests shall be recorded on an approved format duly certified. The records of all tests shall be submitted to the purchaser's representative.
- b) All interconnected wiring shall be checked thoroughly for correct connections with the wiring and schematic drawings of the manufacturer before energizing. All Power and bus bar connections shall also be thoroughly inspected and checked for correctness, foreign materials, tightness, etc. before energizing the equipment.
- c) All components within the main equipment shall be tested for proper performance and correct operation before commissioning the equipment. All labeling and nameplates

shall be checked for correctness. All nuts, bolts, clamps, joints, connections, etc shall be checked for tightness and tightened wherever required. All moving parts shall be checked for its correct movement and proper lubrication. Apply lubrication wherever required. All equipment containing liquid shall be checked for correct quantity filling and all gaskets, valves, etc., shall be checked for leak proofness. Oil filling if found required shall be done with dry and clean oil. Gaskets shall be replaced if found required. The condition of the oil shall be tested in accordance with IS-335.

2.5. TESTS

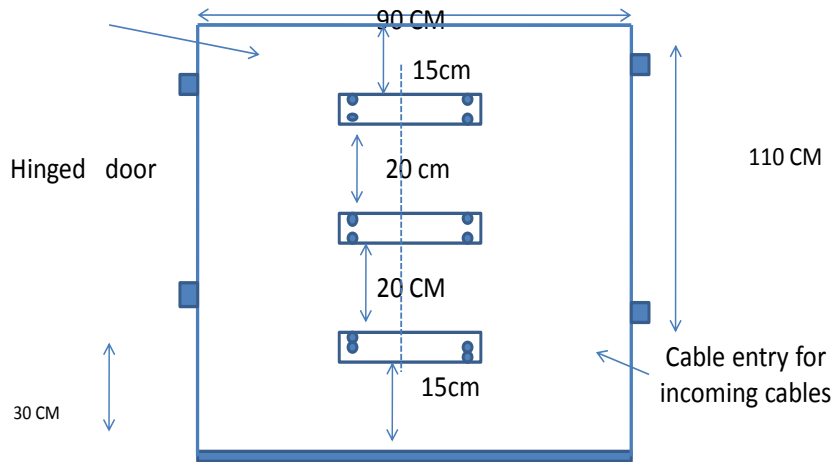
All standards, specifications and codes of practice referred to herein shall be the latest editions including all applicable official amendments and revisions as on date of opening of bid. In case of conflict between this specification and those (IS: codes, standards, etc.) referred to herein, the former shall prevail.

- (i) IS: 4237 : General requirement of switch gears and control gear for voltage not Exceeding 1000V
- (ii) IS: 375 : Switch gear, bus bars, main connection and auxiliary wiring marking and arrangements.
- (iii) IS: 2147 : Degree of protection provided by enclosures for low voltage switch gear and control gear
- (iv) IS:8197 : Terminal marking for electrical measuring instruments and their accessories.
- (v) IS: 2557 : Danger notice plates
- (vi) IS: 3072 : Code of practice for installation and maintenance of switch gear.
- (vii) IS:8623 : Specification for factory built switch gear and control gear voltage up to and including 1000V AC and 1200 V DC
- (viii) IS: 2705 : Current transformer
- (ix) IS 1248 : Indicating instrument
- (x) IS: 2959 : Auxiliary contactor

2.6. SPECIAL CONDITIONS FOR ELECTRICAL WORKS.

- a) All current carrying components in all installation shall be of appropriate rating of voltage and frequency as required at respective areas.
 - b) All equipments to be supplied and works to be executed shall conform to the CEA standards including protection and metering accessories. No extra amount will be paid in this regard.
 - c) All testing and calibration etc are to be carried out as per requirement of statutory authority concerned.
 - d) On completion of work the contractor has to obtain necessary safety/ energisation certificate from statutory agency concerned, by submitting necessary completion statement/ drawing, equipment details etc. before energisation.
 - e) All costs incurred in obtaining such approval/certificate are to be borne by the contractor. Statutory fees paid shall be reimbursed on presentation of document.
 - f) All HT cables shall be clamped using GI strips of suitable size without loading the termination points with proper supports/clamps .
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11 KV OUT DOOR TYPE 100 A SS (Gr. 304) LOOP
IN LOOP OUT BOX FOR TAPPING 3.3 KV SHORE
SUPPLY FOR CRANE



11 KV BUSH SUPPORTS mini. 2 NOS .PER CU. BUS
BAR , CABLES 2NOS. 3C 240 SQMM AND 1 NO.
35X3+16x3 COPPER CABLE. (Dimension given is
only approximate and shall be done as per STD)