



شركة توزيع الكهرباء  
Electricity Distribution Co.

THE HASHEMITE KINGDOM OF JORDAN  
ELECTRICITY DISTRIBUTION COMPANY (EDCO)

**Tender No.( 13/2024 )**

**توريد محطات مجمعة**

**Tenderer:**

- Name: \_\_\_\_\_
- Address: \_\_\_\_\_
- Telephone/ Cellular: \_\_\_\_\_
- Fax: \_\_\_\_\_
- Website: \_\_\_\_\_
- E-Mail: \_\_\_\_\_
- Contact Person: \_\_\_\_\_

**Director General**

**Electricity Distribution Company (EDCO)**

**P.O. BOX: 830878.**

**Amman - 11183 - Jordan.**

**The Hashemite Kingdom of Jordan.**

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## **INVITATION TO TENDER**

**(13/2024)**

**Dear Sir,**

You are kindly requested to tender for the supply of the below mentioned materials as per the quantities and technical specifications enclosed herewith, by filling in the schedules, signing the form of tender, and forwarding the complete tender documents to the attention of **EDCO-Director General** addressed as seen on the cover page, to be **received not later than 2: 00 pm (local time) ( 1/ 5 /2024)**.

All bids must be accompanied with a bid bond of a value not less than **5%** of the highest alternative tender price, otherwise your tender will not be considered. The bid bond shall be enclosed in the same envelope of the tender and must be delivered to the above office **not later than 2:00 pm (local time) ( 1/5 /2024)**.

- **The winning bidders/bidder shall bear the announcement costs in the local newspapers, no matter how often the announcement has been posted.**

## **GENERAL CONDITIONS**

- The below are general conditions of contract for the supply and delivery of plant and materials based on United Nations economic commission for Europe publication ref.: me/ 188 Geneva. March, 1953 And/or according to FIDIC 1999 if there is a constructions works.

### **1. Preamble**

1.1. These General Conditions shall apply, save as varied by express agreement accepted in writing by both parties.

### **1.2. Definition of Terms:**

The "**Purchaser**" shall mean "**ELECTRICITY DISTRIBUTION COMPANY.**" Hereinafter called "**EDCO**", and shall include **EDCOS** legal personal representatives and duly appointed engineers. The "**Engineer**" shall mean ". **ELECTRICITY DISTRIBUTION COMPANY** " or persons for the time being or from time to time duly appointed in writing by the purchaser to act as Engineer for the purpose of the contract.

The words "approved" and "approval" where used in these conditions or in the specification shall mean "**approved by**" and "**approval of**" the purchaser respectively. The "Vendor" shall mean the "Contractor" who's tender has been accepted by the purchaser and shall include the **Vendor's**. (Contractor's) legal personal representatives, successors and permitted assigns, "**F.O.B. Price**" shall mean the cost of the equipment delivered free on board the ship or truck or aircraft, all port charges and handling charges (also heavy lift if applicable) included .

The contractor must insure the material against all risks from the time it leaves the works until it is placed F.O.B "**CFR price**" shall mean F.O.B. price plus freight including unloading at the port of destination. All Marine Insurance will be affected by the purchaser.

**NOTE:-**The contractor must provide full details of the material to be shipped in good time for **EDCO** to arrange for Marine Insurance before the material is actually shipped.

## **2. Formation of Contract**

- 2.1. The contract shall be deemed to have been entered into when the purchaser has sent an acceptance in writing before the time set in the tender for acceptance or any such later date extended by the tenderer at the request of the purchaser.
- 2.2. Notwithstanding that the contract and correspondence in connection with the contract shall be in the English language, the contract shall be and be deemed to be a Jordan contract and shall accordingly be governed by and construed according to the laws for the time being in force in the Hashemite Kingdom of Jordan.
- 2.3. **Power to Vary The Work:** no alternations, amendments, omissions, additions, suspensions, or variations of the work, (hereinafter referred to as "variations") under the contract as shown by the contract drawings or the specification shall be made by the contractor except as directed in writing by the purchaser, but the purchaser shall have full power, subject to the provision hereinafter contained, from time to time during the execution of the contract by notice in writing to instruct the contractor to make such variation without prejudice to the contract and the contractor shall carry out such variations, and be bound by the same conditions, as far as applicable, as though they said variations occurred in the specification. If any suggested variations would, in the opinion of the contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the contract, he shall notify the purchaser thereof in writing, and the purchaser shall decide forthwith whether or not the same shall be carried out, and if the purchaser confirms his instructions, the contractor's obligations and guarantee shall be modified to such an extent as may be justified. The difference in cost, if any, occasioned by any such variations, shall be added to or deducted from the contract price as the case may require. The amount of such difference, if any, shall be ascertained and determined in accordance with the rates specified in the schedule of prices so far as the same may be applicable, and where the rates are not contained in the said Schedule, or are not applicable they shall be settled by the purchaser and the contractor jointly.

But the purchaser shall not become liable for the payment of any charge in respect of any such variations, unless the instruction for the

performance of the same shall have been given in writing by him. In the event of the purchaser requiring any variation, such reasonable a proper notice shall be given to the contractor as will enable him to make his arrangements accordingly, and in cases where goods or materials are already prepared, or any designs, drawings, or patterns made or work done that requires to be altered a reasonable sum in respect thereof shall be allowed by the purchaser. Provided that no such variations shall, except with consent in writing of the contractor, be such as will involve an increase or decrease of the total price payable under the contract by more than 25 percent thereof. The power given to the purchaser to make any alteration, amendment, omission, addition or variation to, from or in any part of the works shall include power to vary from time to time the date for the completion of the works or any part thereof, **also the purchaser shall have the absolute right to increase the quantities in such manner that the increment does not exceed the amount of 25% of the total price payable under the contract, however; the same prices awarded and any other relevant conditions shall remain the same for this purpose. This right is valid during the delivery period of the ordered material, implementation of works, or (90) days from the date of the letter of award, which is come later.**

**2.4. Precedence:** In the event of any discrepancy or contradiction between the provisions of the conditions of contract and of the specification, the conditions of contract shall take precedence. Furthermore in case of discrepancy between unit and total prices then unit price will be considered.

**2.5. Prices:** the tender calls for firm prices, unless; otherwise mentioned in the special requirements schedule.

### **3. Drawings and Descriptive Documents**

**3.1.** The weights, dimensions, capacities, prices, performance rating and other data included in catalogues, prospectuses, circulars, advertisement, illustrated matter and price lists constitute an approximate guide. These data shall not be binding save to the extent that they are by reference expressly included in the contract.

**3.2.** Any drawings or technical documents intended for use in the construction of the material or of part thereof and submitted to the purchaser prior or

subsequent to the formation of the contract remain the exclusive property of the Vendor. They may not, without the Vendor's consent, be utilized by the purchaser or copied, reproduced, transmitted or communicated to a third party. Provided, however, that the said plans and documents shall be the property of the purchaser.

- a. If it is expressly so agreed, or
  - b. If they are referable to a separate preliminary development contract on which no actual construction was to be performed and in which the property of the Vendor in the said plans and documents was not reserved.
- 3.3. Any drawings or technical documents intended for use in the construction of the material or of part thereof and submitted to the Vendor by the Purchaser prior or subsequent to the formation of the contract remain the exclusive property of the Purchaser. They may not, without his consent be utilized by the Vendor or copied, reproduced, transmitted or communicated to a third party.
- 3.4. The Vendor shall, if required by the purchaser, furnish free of charge to the purchaser at the commencement of the Guarantee Period, as defined in clause 9, information and drawings other than manufacturing drawings of the material in sufficient detail to enable the purchaser to carry out the erection, commissioning, operation and maintenance (including running repairs) of all parts of the material. Such information and drawings shall be the property of the purchaser and the restrictions on their use set out in paragraph 2 hereof shall not apply thereto. Provided that if the Vendor so stipulates, they shall remain confidential.

#### **4. Packing of the materials and shipping marks**

- 4.1. All materials, equipment and goods shall be very well packed, in seaworthy containers and/or wooden cases, etc. These should protect the material during shipping, handling, unloading for a reasonable period of storage at Aqaba and latter storage at EDCO stores.
- 4.2. Packing for indoor materials should be done in such manner as to adequately ensure no ingress of moisture, during the shipping and storage periods.

- 4.3. Packing of fragile equipment (e.g. including instruments and porcelain) should be done in a way which ensures a reasonable resistance to impact breakage during transport.
- 4.4. Packing shall in general be adequate and in compliance with the best international practice.
- 4.5. A descriptive and fully itemized list shall be prepared for the contents of each packing case. A copy of this list shall be placed in a waterproof envelope under a metal or other suitable plate and securely fastened to the outside of one end of the case. And its position adequately indicated by stenciling on the case. Where appropriate drawing showing the erection marking of the items concerned shall be placed inside the case.
- 4.6. **EDCO** will supply the successful tenderer with a drawing of its shipping mark for utilization.
- 4.7. All packing cases, crates, barrels and drums shall remain the property of the purchaser.

## 5. **Inspection and Tests**

All inspections and tests of the Plant and materials shall be performed to the extent and in the manner as stipulated in the Standards specified. Type test certificates shall be submitted for all important items supplied. They shall contain all major technical particulars which are mentioned in the Technical Data Sheets.

Routine test certificates showing the results of all tests performed on the individual Plant and materials shall be furnished to the Purchaser before dispatch of such equipment. The Purchaser reserves the right to have certain tests performed in the presence of his representative or an independent testing authority. A suitable program for such inspections and tests shall be agreed upon and adequate notice (at least 21 days) shall be given when the Plant and/or materials are ready for inspection or test and every facility shall be provided by the Contractor to enable the Purchaser to carry out the necessary inspections and tests. The performance of any such inspections and tests in the presence of the Purchaser and/or an independent testing authority does not relieve the Contractor from his Contractual obligations.



## **5.1 General Inspection Requirement**

The whole of the material by the contract will be subject to inspection and testing by the engineer during manufacture and on completion. The approval of the engineer or the passing of any such inspection or test will not, however; prejudice the right of the purchaser to reject the material if it fails to comply with the specification when erected or to give complete satisfaction in service. The costs of all tests and inspection shall be borne by the contractor and shall be deemed to be included in the contract price. Before any material is packed or dispatched from the main or sub-contractor's works, all tests called for are to have been successfully carried out in presence of the engineer. Adequate notice shall be given when the material is ready for inspection or test and every facility shall be provided by the contractor and his inspection and his sub-contractors to enable the Engineer to carry out the necessary inspections and tests.

Triplicate copies of all principal test records and test certificates shall be supplied to the Engineer for all tests carried out in accordance with the provisions of the contract.

- 5.1.1** If expressly agreed in the contract, the purchaser shall be entitled to have the quality of the materials used and the parts of the instruments, both during manufacture and when completed, inspected and checked by his authorized representatives.

Such inspection and checking shall be carried out at the place of manufacture during normal working hours after agreement with the Vendor as to date and time.

- 5.1.2** If as a result of such inspection and checking the purchaser shall be of the opinion that any materials or parts are defective or not in accordance with the contract, he shall state in writing his objections and the reasons therefore.

- 5.1.3 Sub-Contractors:** Within two months of acceptance of the tenders the contractor shall forward to the engineer a list of all sub-orders placed or intended. The contractor shall submit three copies of all sub-orders or selected by the engineer for progress or inspection. One copy

of all drawings referred to in the sub-order is to be submitted unless otherwise agreed by the engineer. The drawings and sub-orders submitted to the engineer will cover all major components which are subject to electrical and mechanical pressure or stress when the material is in operation and also auxiliaries and stores which will be dispatched to site direct from the sub-contractor's work. For the purpose of this clause inter-works orders are to be treated as sub-order. Sub-orders are to include a statement advising the sub-contractor that the items being order will be subject to inspection and test by the Engineer. It is important that all copies of such orders are clearly marked with the main contractor's name and the following reference:

**ELECTRICITY DISTRIBUTION COMPANY. CONTRACT No. (13/2024)**

Sub-Contractors are to comply with all the applicable requirements of this specification. Orders issued by the sub-contractor are also to include the main contractor's reference on their sub-order in addition to the above-mentioned heading.

## 5.2 **TESTS:**

All tests should meet the requirements of latest international standard mentioned in the contract or any relevant standard

5.2.1 Acceptance tests will be carried out and, unless otherwise agreed, will be made at the Vendor's works and during normal working hours. If the technical requirements of the tests are not specified in the contract, the tests will be carried out in accordance with the general practice obtaining in the appropriate branch of the industry in the country where the material is manufactured.

5.2.2 The Vendor shall give to the purchaser sufficient notice of the tests to permit the purchaser's representatives to attend. If the purchaser is not represented at the tests, the tests report shall be communicated by the Vendor to the purchaser and shall be accepted as accurate by the purchaser.

5.2.3 If on any test (other than a test site, where test on site are provided for in the contract) the material shall be found to be defective or not in accordance with the contract, the Vendor shall with all speed make good the defect or ensure that the plant complies with the contract. Thereafter, if the purchaser so requires, the test shall be repeated.

5.2.4 Unless otherwise agreed, the Vendor shall bear all the expenses of tests carried out in his works.

5.2.5 If the contract provides for tests on site, the terms and conditions governing such tests shall be such as may be specially agreed between the parties

5.2.6 **Material Tests:** The contractor shall provide test prices as required by the engineer to enable him to determine the quality of the material supplied free of charge and any cost of the tests shall be borne by the contractor. If any test pieces fails to comply with the requirements of the appropriate specifications for the material in question, the engineer may reject the whole of the material represented by that piece, the contractor's designers and

Metallurgists will be consulted before any material is so rejected. In the event of the engineer being furnished with the certified particulars of the tests which have been carried out for the

contractor by the suppliers of the material, he may, at his own discretion, dispense with the previously mentioned tests entirely.

**5.2.7 Tests at Manufacture's Works:** Works tests shall include all routine, electrical, mechanical and hydraulic tests in accordance with the relevant IEC standard or other standard may be approved except where departures there from and modifications thereto are embodied in this specification. For material not covered by an IEC or British standard or specifically mentioned in this specification the tests shall be agreed with the Engineer. After satisfactory completion of the witnessed tests at the works, the material shall be submitted for the engineer's approval preparatory to shipping. No item of material is to be dispatched to site until the Engineer has given his approval in writing.

**5.2.8 Test Certificates:** Triplicate sets of all principal test records test certificates and performance curves shall be supplied for all tests carried out in accordance with the provisions of this contract. These test records, certificates and performance curves shall be supplied for all tests, whether or not they have been witnessed by the engineer. The information given in such test certificates and curves shall be sufficient to identify the material or equipment to which the certificates refers and should also bear the contract reference and heading as given in clause 7.2 of this section.

**5.2.9 Rejection of the materials:** If Any item of material or component which fails comply with the requirements of this specification in any respect whatsoever at any stage of manufacture, test, erection or on completion at site may be rejected by the engineer either in whole or in part as he considers necessary, and after adjustment or modification if so directed by the Engineer, the contractor shall submit the item for the item for the further inspection and / or test.

In the event defects of such a nature that the requirements of this specification cannot be fulfilled by adjustment or modification shall be replaced by the contractor, at his own expense, to the entire satisfaction of the engineer.

### **5.3 Maintenance:**

The contractor must submitted maintenance bond equal to (5%) of the Order amount to guarantee the efficient and good working of the material supplied under the contract for a period of 12 months (Gregorian) from the date of delivery of the material to EDCO SORES in accordance with the General conditions of contract.

## **6. Passing of Risk**

Save as provided in paragraph 7.6, the time at which the risk shall pass shall be fixed in accordance with the International Rules for the Interpretation of Trade Terms (Incoterms) of the International Chamber of Commerce in force at the date of the formation of the contract.

## **7. Delivery:**

- 7.1. Unless otherwise agreed the delivery period shall run from the latest of the following dates:
  - a. The date of the formation of the contract as defined in clause 2.
  - b. The date on which the Vendor receives notice of the issue of a valid import license where such is necessary for the execution of the contract.
  - c. The date of the receipt by the Vendor of such payment in advance of manufacture as stipulated in the contract.
- 7.2. Should delay in delivery be caused by any of the circumstances mentioned in clause 10 or by an act or omission of the purchaser and whether such cause occur before or after the time or extended time for delivery, they shall be granted subject to the provisions of paragraph 5 hereof such extension of the delivery period as is reasonable having regard to all the circumstances of the case.
- 7.3. If a fixed time for delivery is provided for in the contract and the Vendor fails to deliver within such time or any extension thereof granted under paragraph 2 hereof, the purchaser shall be entitled, on giving to the Vendor within a reasonable time notice in writing, to

**Claim a deduction of the price payable under the contract. Such**

**deduction shall be calculated at the rate of one half of one percent (0.5%) of that part of the price payable under the contract which is properly attributable to such portion of the plant as cannot in consequence of the said failure be put to the use intended for each complete week of delay commencing on the due date of delivery, but shall not exceed a maximum percentage deduction of ten percent.** Such deduction shall be allowed when a payment becomes due on or after delivery. Save as provided in paragraph 5 hereof, such deduction of price shall be to the exclusion of any other remedy of the purchaser in respect of the Vendor's failure to deliver as aforesaid.

- 7.4. If the time for delivery mentioned in the contract is an estimate only, either party may after the expiration of two thirds of such estimated time require the other party in writing to agree a fixed time. Where no time for delivery is mentioned in the contract, this course shall be open to either party after the expiration of six months from the formation of the contract. If in either case the parties fail to agree, either party may have recourse to arbitration, in accordance with the provisions of clause 13, to determine a reasonable time for delivery and the time so determined shall be deemed to be the fixed time for delivery provided for in the contract and paragraph 3 hereof shall apply accordingly.
- 7.5. If any portion of material in respect of which the purchaser has become entitled to the maximum deduction provided for by paragraph 3 hereof, or in respect of which he would have been so entitled had he given the notice referred to therein, remains undelivered, the purchaser may by notice in writing to the Vendor require him to deliver and by such last mentioned notice fix a final time for delivery which shall be reasonable taking into account such delay as has already occurred.
- 7.6. If for any reason whatever the Vendor fails within such time to do everything that he must do to effect delivery, the purchaser shall be entitled by notice in writing to the Vendor, and without requiring the consent of any court, to terminate the contract in respect of such portion of the material and thereupon to recover from the Vendor any amount not exceeding that part of the price payable under the Contract which is properly attributable to such portion of the material as could not in

consequence of the Vendor's failure be put to the use intended.

- 7.7. If the purchaser fails to accept delivery on due date, he shall nevertheless make any payment conditional on delivery as if the material had been delivered. The Vendor shall arrange for the storage of the material at the risk and cost of the purchaser. If required by the purchaser, the Vendor shall insure the material at the cost of the purchaser. Provided that if the delay in accepting delivery is due to one of the circumstances mentioned in clause 10 and the Vendor is in a position to store it in his premises without prejudice to his business, the cost of storing the material shall not be borne by the purchaser.
- 7.8. Unless the failure of the purchaser is due to any of the circumstances mentioned in clause 10, the Vendor may require the purchaser by notice in writing to accept delivery within reasonable time. If the purchaser fails for any reason whatever to do so within such time, the Vendor shall be entitled by notice in writing to the purchaser, and without requiring the consent of any court, to terminate the contract in respect of such portion of the material as is by reason of the failure of the purchaser aforesaid not delivered and thereupon to recover from the purchaser any loss, suffered by reason of such failure up to an amount not exceeding the value of the material, the delivery of which has not been accepted.
- 7.9. If the winner contractor in the tender, refrained from supplying the material or execution of works which were awarded for him or failed to execute the contract on the limited time, or failed to replace the rejected material or works in another applying materials on his account, the tender committee which takes its previous design to award the tender for this supplier has the right to confiscate the bid bond or the performance bond or part of them as commensurate with the material & works value.
- 7.10. If a refrained bidder to comply with his offer or did not complete the necessary contract and signing of the purchase order and did not submit the performance bond within 15 days from the date of the order, the tender committee has the right to confiscate the bid bond.

## **Force Majeure**

- Notwithstanding the provisions of clauses 7, the supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the contract is the result of an event of Force Majeure.
- For purposes of this clause, "Force Majeure" means an event beyond the control the supplier not involving the supplier's fault or negligence. Such events may include, but are not restricted to, acts to the purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and fright embargoes.
- If a Force Majeure situation arises, the supplier shall promptly notify the purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall all reasonable alternative means for performance not prevented by the Force Majeure event.



## 8. Payment:

### 8.1. **Terms of Payment:**

Subject to any deduction which the purchaser may be authorized to make under the contract or subject to any additions or deductions provided for under clause 2-3 above, The Company (EDCO) prefers to deal with the supplier on an **open account basis**, and the payment to be made as the following:

a. (10%) of the CFR contract value (as shown by the supplier's invoice/contractor invoice) on receipt of the following **legalized shipping** documents by EDCO:

- (Original Invoice + five copies)
- (Certificate of origin + five copies)
- (Bill of lading 3-negotiable + 5 non-negotiable)
- (Test certificate (where applicable) + 6 copies).
- 

**The original shipping documents must arrive to EDCO or to our bank before (5) days at least prior the materials arrival.**

b. (80%) of the invoice value to be paid within 60 days of Receipt of EDCO's certificate of acceptance, Receipt of goods at EDCO stores.

c. (10%) of the contract value within 60 days from expiration of the guarantee period.

If the bidder insists on L/C (letter of credit) as a method of payment, all L/C charges will be on his own expense, in all respects all banking charges are at vendor account, the terms will be as follows:

a. The L/C will be confirmed and irrevocable but has to be **acceptance** L/C, and the supplier has to send the following **legalized shipping** documents:

- (Original Invoice + five copies),
- (Certificate of origin + five copies),
- (Bill of lading 3-negotiable + 5 non-negotiable),
- (Test certificate (where applicable) + 6 copies).
- (Release of shipment (where applicable) – fax copy is accepted).

b. Payment will be released after submitting EDCO's certificate of acceptance to the bank within (30) days after receipt of goods at EDCO's stores.

In the case of a Jordanian Supplier (materials are delivered from local companies), payment will be made through presentation of the invoice as following:

- a. (90%) of the contract value to be paid within 30 days from date of receipt and acceptance of the materials at our EDCO stores.
- b. (10%) of the contract value within 30 days from expiration of the guarantee period (one year from the date of receipt and acceptance of the materials at EDCO stores)

**NOTE:**

- In case the supplier has better terms of payment than those mentioned above the purchaser will discuss such terms.
- Any deviation on the payment methods mentioned above, will negatively affect the evaluation of tenderer's offer.
- In case the payment by acceptance L/C, The performance bond should be valid for a period expiring at least one year after receipt of the last consignment in EDCO stores.
- EDCO has the right to request an additional bank guarantee equal to (5%) five percent to cover the guarantee period.

**Currency of Payment:** The contract price will normally be paid in the currency or currencies in which the price has been stated. The purchaser, however, reserves the right to make payments in the currencies of the countries of origin of goods and services at the exchange rates applicable at the time of payment of the contract price.

**Shipping documents shall comprise the following documents: -**

- 1) **Invoices** – one original, five copies.
- 2) **Shipping specification (packing list)** – six copies.
- 3) **Certificate of origin** – one original, five copies.
- 4) **Bill of lading** – 3 three negotiable, five non-negotiable.
- 5) **Test certificates (where applicable)** – six copies.
- 6) **Release of shipment (where applicable)** – fax copy is accepted.
- 7) **EDCO's Certificate of Acceptance** - fax copy is accepted

- 8.2. Any advance payments made by the Purchaser are payments on account and do not constitute a deposit, the abandonment of which would entitle either party to terminate the Contract.
- 8.3. If delivery has been made before payment of the whole sum payable under the Contract, plant delivered shall, to the extent permitted by the law of the country where the plant is situated after delivery, remain the property of the Vendor until such payment has been effected. If such law does not permit the Vendor to retain the property in the plant, the Vendor shall be entitled to the benefit of such other rights in respect thereof as such law permits him to retain. The Purchaser shall give the Vendor every assistance in taking any measures required to protect the Vendor's right of property or such other rights as aforesaid.
- 8.4. A payment conditional on the fulfillment of an obligation by the Vendor shall not be due until such obligation has been fulfilled, unless the failure of the Vendor is due to an act or omission of the Purchaser.
- 8.5. If the Purchaser delays in making any payment, the Vendor may postpone the fulfillment of his own obligations until such payment is made, unless the failure of the Purchaser is due to an act or omission of the Vendor.
- 8.6. If delay by the Purchaser in making any payment is due to one of the circumstances mentioned in clause 10, the Vendor shall not be entitled to any interest on the sum due.
- 8.7. Save as aforesaid, if the Purchaser delays in making any payment, the Vendor shall on giving to the Purchaser within a reasonable time notice in writing be entitled, and without requiring the consent of any Court, to terminate the Contract and thereupon to recover from the Purchaser the amount of his loss up to the value of the plant, the payment for which has been unreasonably delayed.

## 9. **Guarantee:**

- 9.1. Subject as hereinafter set out; the Vendor undertakes to remedy any defect resulting from faulty design, materials or workmanship.
- 9.2. This liability is limited to defects which appear during the period (Hereinafter called the Guarantee Period) of **fifteen** months from date of dispatch ex-works or twelve months from the date of accepting the Materials at EDCO stores whichever shall be later.

Or in case of turn key projects eighteen months from the date of setting to work.

- 9.3. In fixing this period due account has been taken of the time normally required for transport as contemplated in the contract.
- 9.4. In respect of such parts (whether of the Vendor's own manufacture or not) of the material as are expressly mentioned in the contract, the Guarantee Period shall be such other period (if any) as is specified in respect of each of such parts.
- 9.5. The Guarantee period is based on the continuous use of the plant in services for 24 hours every day.
- 9.6. A fresh Guarantee Period equal to that stated in paragraph 2 hereof shall apply, under the same terms and conditions as those applicable to the original material, to parts supplied in replacement of defective parts or to parts renewed in pursuance of this clause. This provision shall not apply to the remaining parts of material, the Guarantee Period of which shall be extended only by a period equal to the period during which the material is out of action as result of a defect covered by this clause.
- 9.7. In order to be able to avail himself of his rights under this clause the purchaser shall notify the Vendor in writing without delay of any defects that have appeared and shall give him every opportunity of inspecting and remedying them.
- 9.8. On receipt of such notification the Vendor shall remedy the defect forthwith and at his own expense. Save where the nature of the defect is such that it is appropriate to effect repairs on site, the purchaser shall return to the Vendor any part in which a defect covered by this clause has appeared, for repair or replacement by the Vendor, and in such case the delivery to the purchaser of such part properly repaired or a part in replacement thereof shall be deemed to be a fulfillment by the Vendor of his obligations under this paragraph in respect of such defective part.
- 9.9. The Vendor shall bear all the costs and risks of the transport of defective parts or equipment's and their replacements.
- 9.10. Where, in pursuance of paragraph 9 hereof, repairs are required to be

effected on site, the conditions covering the attendance of the Vendor's representatives on site shall be such as may be specially agreed between the parties.

- 9.11. Defective parts replaced according to this clause shall be placed at the disposal of the Vendor.
- 9.12. If the Vendor refuses to fulfill his obligations under this clause or fails to proceed with due diligence after being required so to do, the purchaser may proceed to do the necessary work at the Vendor's risk and expense, provided that he does so in a reasonable manner.
- 9.13. The Vendor's liability does not apply to defects arising out of materials provided, or out of a design stipulated, by the purchaser.
- 9.14. The Vendor's liability shall apply only to defect that appears under the conditions of operation provided for by the contract and under proper use. It does not cover defects due to causes arising after the risk in the material has passed in accordance with clause 6. In particular it does not cover defects arising from the purchaser's faulty maintenance or erection, or from alterations carried out without the Vendor's consent in writing, or from repairs carried out improperly by the purchaser, nor does it cover normal deterioration.
- 9.15. Save as in this clause expresses, the Vendor shall be under no liability in respect of defects after the risk in the material has passed in accordance with clause 6, even if such defects are due to causes existing before the risk so passed. It is expressly agreed that the purchaser shall have no claim in respect of personal injury or of damage to property not the subject matter of the contract or of loss of profit unless it is shown from the circumstances of the case that the Vendor has been guilty of gross misconduct.

**9.16.** All defective and/ or not complying materials shall be

Evacuated from

EDCO stores within a maximum of one month by the vender from the date of notifying him. All costs and expenses of transportation shall be borne by the vendor. Unless otherwise agreed.

Otherwise; EDCO has the right to deal with the defective materials in a proper way.

**9.17.** Gross misconduct "does not comprise any and every lack of proper care or skill, but means an act or omission on the part of the Vendor implying either a failure to pay due regard to serious consequences which a conscientious contractor would normally foresee as likely to ensue, or a deliberate disregard of any consequences of such act or omission.

## **10. Relief**

**10.1.** The following shall be considered as cases of relief if they intervene after the formation of the contract and impede its performance: industrial disputes, and any other circumstances (e.g. fire, mobilization, requisition, embargo, currency restrictions, insurrection, shortage of transport, general shortage of materials and restrictions in the use of power) when such other circumstances are beyond the control of the parties.

**10.2.** The party wishing to claim relief by reason of any of the said circumstances shall notify the other party in writing without delay on the intervention and on the cessation thereof.

**10.3.** The effects of the said circumstances so far as they affect the timely performance of their obligation by the parties, are defined in clauses 7 and 8. Save as provided in paragraph 7.5, 7.7, and 8.7, if by reason of any of the said circumstances, the performance of the contract within a reasonable time becomes impossible, either party shall be entitled to terminate the contract by notice in writing to the other part without requiring the consent of any court.

**10.4.** If the contract is terminated in accordance with paragraph 3 hereof, the division of the expenses incurred in respect of the contract shall be determined by agreement between the parties.

**10.5.** In default of agreement it shall be determined by the arbitrator which

party has been prevented from performing his obligations and that party shall bear the whole of the said expenses.

Where the purchaser is required to bear the whole of the expenses and has before termination of the contract paid to the Vendor more than the amount of the Vendor's expenses, the purchaser shall be entitled to recover the excess. If the arbitrator determines that both parties have been prevented from performing their obligation, he shall apportion the said expenses between the parties in such manner as to him seems fair and reasonable, having regard to all the circumstances of the case.

- 10.6. For the purposes of this clause "expenses" means actual out of pocket expenses reasonably incurred, after both parties shall have mitigated their losses as far as possible. Provided that as respects material delivered to the purchaser the Vendor's expenses shall be deemed to be that part of the price payable under the contract which is properly attributable thereto.

#### **11. Limitation of Damages:**

- 11.1. Where either party is liable in damages to the other these shall not exceed the damage which the party in default could reasonably have foreseen at the time of the formation of the contract.
- 11.2. The party who sets up a breach of the contract shall be under a duty to take all necessary measures to mitigate the loss which has occurred provided that he can do so without unreasonable inconvenience or cost. Should he fail to do so, the party guilty of the breach may claim a reduction in the damages.

#### **12. Rights at Termination:**

Termination of the contract from whatever cause arising shall be without prejudice to the rights of the parties accrued under the contract up to the time of termination.

#### **Arbitration and Law Applicable:**

- 13.1. If Any dispute, question or controversy shall arise between the purchaser and the contractor concerning this contract the matter in dispute shall be referred to an arbitration committee composed of three (3) arbitrators

- 13.2.** One arbitrator shall be nominated by the purchaser and one by the contractor, and the third arbitrator shall be appointed by both parties.
- 13.3.** If either party fails to appoint his arbitrator within one month of the appointment of the arbitrator by the other party, or if the two parties fail to agree on the third arbitrator within two months of the date of the request to refer the dispute to arbitration, such arbitrator shall be appointed by the president of the highest court in Jordan at the request of either or both parties.
- 13.4.** The decision of the arbitrators shall be final and binding on both the purchaser and the contractor. Any such reference shall conform to the statutory enactment or regulation governing arbitration as may be in force in Jordan at the time. The assessment of costs incidental to the reference and award respectively shall be at the discretion of the arbitration committee.



## **TENDERING INSTRUCTIONS**

1. The Tender shall be made in one copy of the accompanying form; however, all blanks and schedules shall be filled up in ink, and signed without alteration to the form of tender. If any such alteration were made, or if these Instructions were not fully complied with, the tender may be rejected. The tenderer; however, is at liberty to add any further details that he may deem desirable and, in the event of his so doing, shall print or type such details and annex the added matter to the tender submitted by him. Such additional details shall not be binding upon the purchaser unless they shall be subsequently incorporated in the contract.
2. One copy of the tender, and its accompanying documents, filled up as directed, together with the drawings, catalogs, and relevant documents called for, must be enclosed in a secure envelope endorsed **(Tender for Contract No. (13/2024))**.
3. All correspondences in connection with this tender and all matters accompanying the tender that are relevant to its examination shall be in English language and expressed in metric units.
4. The tender is to be held open for acceptance or rejection for a validity period of (90) days from the time fixed for opening the tenders.
5. Tenders received prior to the time fixed for opening of tenders will be securely kept, unopened. Tenders received after that time will be rejected. The purchaser bears no responsibility for premature opening of tenders not properly addressed or identified.
6. Tenders may be withdrawn by formal request received in writing from the tenderer prior to the time fixed for opening. If for any reason the tender should be withdrawn after the time fixed for opening and before expiry of the said validity period, the purchaser has the right to retain the full value of the tender bond.
7. The successful tenderer shall abide by the commercial and professional regulations as required by the Ministry of Industry & Trade, Engineering Association and other relevant Institutions in Jordan.

8. Tenderers attention is drawn to the action of customs officers in the discharge of their duties. Whereby air parcels are frequently opened In their own interests and in order to preserve the confidential nature of the tender price, tenderers are urged to pay attention to the:
  - a. To dispatch the completed tender document and any covering letter only by Air Mail which should be endorsed and labeled in the manner laid down in paragraph 10 of the Instructions to Tendering.
  - b. Technical literature and the like may reasonably be sent by Air Parcel or Air Freight but since this would then be separated from the actual Tender, each parcel should contain specific evidence identifying the Tender to which the contents refer.
  - c. The purchaser will not consider late or incompletely delivered tenders or literature supporting tenders due to the action of any customs officer.
9. In the event that the intending signatory does not manufacture one or more of the main sections of equipment and materials, then the tender submitted should give evidence to show that all the obligations imposed by the documents on the intending signatory have been fully understood and accepted, where applicable, by the manufacturer(s) to whom it would be intended to sub-contract one or more of the main sections of the equipment and materials.
10. For overseas transport of the contractor and his Sub-contractors, suppliers and manufactures must give priority to Jordan shipping national lines, and to Arab shipping companies and their subsidiaries for the shipping of goods, materials provided such companies ships call at the port of export. The contractor shall also give priority to the Royal Jordanian Airlines for air freight shipment and transport of personnel.
11. Tenderer must submit country of origin and name of manufacturer for the offered goods.
12. The foreign bidders who participate in this tender must submit their bids through a registered local agent or through their registered office in Jordan.
13. For all manufacturers from inside Jordan it is quite essential that they have JQM for their products and the purchaser will have the right to accept or reject their offer if they did not submitted the JQM certificate with their offer.

14. If samples were not re-claimed by the tenderer within one month from date of order all samples shall remain the property of the purchaser.
15. The purchaser will not be responsible for, nor to pay for, any expenses or losses which may be incurred by a tenderer in the preparation of his tender.
16. If the tenderer has any doubt about the meaning of any portion of the General Conditions, Specifications, Drawings, he shall clarify such doubts before submitting his tender, or in case of any further information can be obtained by an application in writing to the director general.
17. Tenderers are particularly directed that the amount entered on the form of tender shall be a fixed price for performing the contract strictly in accordance with the bound document, and shall be the sum total of all the amounts printed into and entered by the tenderer upon the schedule of prices.
18. Tender price shall include all incidental and contingent expenses.
19. The tender shall be accompanied by a tender bond in the form of a Bank Guarantee valid for at least 90 days from the time fixed for opening the tenders or certified check in favor of and payable to the purchaser for a sum of **5% Of Your Offer** \_\_\_\_\_ as a guarantee of good faith. This bond is to be issued by any approved bank in Jordan. The bond will be returned to the unsuccessful tenderer within (90) days from the time fixed for opening the tenders or at such earlier time as a tender shall have been accepted by the purchaser. In the case of the successful tenderer, the bond will, subject to the conditions of contract, be returned as soon as a formal contract agreement and a performance bond have been entered into.
20. The successful tenderer has to submit a performance bond equal to (10%) ten percent of the total amount of the order within (15) days from date of receipt of the order. Any delay will be subject to delay penalty.

If the successful tenderer fails for any reason to submit the required performance bond within (15) days, the purchaser will confiscate the bid bond and the awarding letter will be cancelled too.
21. The performance bond should be valid for a period; expiring at least one month after receipt of the last consignment in EDCO stores.

22. The tenderer shall state in his tender the name or names of the sureties, insurance company, or bank proposed for guaranteeing the performance of the contract.
23. Prices are highly recommended to be on the basis of C&F EDCO STORES. However CFR Aqaba port or Amman customs are also accepted. All prices offered shall be exempted from custom duties, sales taxes, import license fees and any other tariffs.
24. The tenderer may state the tender price in Jordanian Dinars. If however, a portion of the tenderer's expenditure under the contract is expected to be made in countries other than Jordan he may state a corresponding foreign currency portion of the tender price in the currencies of those other countries.
25. Stamp duty and award fees are payable on Jordanian contracts according to Jordanian laws and, after the placing of a contract, it is the contractor's responsibility to purchase legal stamps to the requisite amount depending on the contract value.
26. If after receipt of tenders, the purchaser finds any difference between prices shown on the form of tender in writing and in numerals, then the price shown in writing shall be considered correct by the purchaser and the tenderer. If any discrepancies are found between the total in the price schedule and the total obtained by adding the products of each quantity and its particular rate then, whether the price shown on the form of tender in numerals or in writing corresponds or not, the total obtained by adding the products of the quantities and their particular rates shall be considered by the purchaser and the tenderer as the tender price.
27. Tender evaluation will be consistent with the terms and conditions set forth in the tender document. In addition to the tender price adjusted to correct arithmetical errors, other relevant factors such as the time of completion of delivery or construction, operating costs where applicable, or the efficiency and compatibility of the equipment, the availability of service and spare parts, and reliability of construction methods proposed will be taken into consideration, to the extent and in the manner specified in the tender documents, in determining the evaluated tender most advantageous to the purchaser. For comparison of all tenders, the currency or currencies of the tender price for each tender will be valued in terms of Jordanian Dinars. The

rates of exchange to be used in such valuation will be the selling rates published by the CENTRAL BANK OF JORDAN and applicable to similar transactions, on the day tenders are opened unless there should be a change in the value of the currencies before the award is made. In the latter case, the exchange rates prevailing at the time of the decision to notify the award to the successful tenderer may be used.

28. The purchaser does not bind himself to accept the lowest offers of any tender, nor to assign any reason for the rejection of any tender, nor to purchase the whole of the equipment and materials specified. The purchaser has the right to purchase part of the tender, even if it is only one item from the schedule of rates and prices.
29. The tenderer shall submit with his tender in order of the relevant clauses, a statement of any departures from specifications, or he can fill in the related schedule attached herewith. Notwithstanding any description, drawings, or literature which may be submitted, all details other than those in the statement of departures shall be assumed to be in accordance with the specification.
30. Although IEC standards for workmanship, equipment and materials, have been selected in this specification as a basis of reference, standards and specifications of other countries and recommendations of other international standard organizations will be acceptable provided that they are substantially equivalent to the designated standards and provided

Further that the tenderer submits for approval detailed specification which he proposes to use.

31. References to brand names or catalog numbers, if any, in this specification have been made only for that equipment for which it has been determined that a degree of standardization is necessary to maintain certain essential features. In certain instances such references have also been made for purpose of convenience to specify the requirements. In either case offers of alternative goods which have similar characteristics and provide performance and quality at least equal to those specified are acceptable.
32. Where compliance with a specific standard specification is called for the standard specification used shall be that in force at the time of tender.
33. The Tenderer should submit a type test certificate from independent testing laboratory similar to the Tender materials as an evidence of his capability to

manufacture such materials also to submit a reference list showing his past supply and he should prove that he supplied similar materials to more than one firm and operated for more than 3 years without problems otherwise his offer will not be considered.

34. A nonrefundable fee of (50) JD will be charged for each set comprising one copy of the Tender Documents.

### **TENDER AGREEMENT SUMMARY**

**Tender No. (13/2024)**

**Dear Sir;**

1. Having examined the conditions of Contract, specification and schedule for the above Works, the undersigned, offer to manufacture, supply, work, test, and deliver the said works described in the specification and schedules and in accordance with the said conditions of contract, for the sum of \_\_\_\_\_ or such other sum as may be ascertained in accordance with the said conditions.
2. We agree that this tender shall be held open for acceptance or rejection for the validity period of **(90) days** from the date fixed for opening tenders and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
3. Unless and until a formal agreement is prepared and executed, this tender, together with your written acceptance thereof, shall constitute a binding contract between us.
4. If our tender is accepted, we will deliver to **ELECTRICITY DISTRIBUTION COMPANY**. Within **(15) days** of being called upon to do so a performance bond by bank or insurance company (to be approved in either case by the purchaser) to be jointly and severally bound with us in a sum equal to **10%** of the value of the contract. The form of the performance bond will be as attached hereto. We propose the following Bank or insurance company as surety (or sureties) in this respect:-.....

5. We undertake if our tender is accepted and on receipt of your acceptance to commence and manufacture, works test, and complete for delivery **ex-works** the whole of the Works offered within (——) weeks calculated from the date of **Order Letter Awarding**, and to deliver on the dock at (—— port) - Jordan the whole of the works offered within a further (—— weeks, or to **EDCO stores** within a further (——) weeks.
6. We undertake to insure the materials against all risks from the time they leave the works until they are placed on board ship. We understand that marine insurance will be affected by **ELECTRICITY DISTRIBUTION COMPANY**. And we will provide details of the materials to be shipped in good time for **ELECTRICITY DISTRIBUTION COMPANY** to arrange for the said marine insurance.
7. A guarantee Period will apply to each section of the works of 15 months from the date of dispatch ex-works or 12 months from the date of setting to work whichever shall be later.
8. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this ——— day of / / 2024.

Signature——— in the capacity of———

Duly authorized to sign Tender for and on behalf of ——

ADDRESS —— OCCUPATION ——

**ELECTRICITY DISTRIBUTION COMPANY.**

**Form of Bid Bond**

**Tender No. (13/2024)**

**Dear Sir,**

We are pleased to inform you that we guarantee  
M/S \_\_\_\_\_for the amount  
of \_\_\_\_\_in order to allow them to submit an offer  
for the due performance of the undertaking and obligation as specified in their  
Tender for Contract No. \_\_\_\_\_This Guarantee shall remain valid for a  
period of **(90)** days from the time fixed for opening the Tenders by  
**ELECTRICITY DISTRIBUTION COMPANY.**

This Guarantee shall be free from any interest and will be extended or paid in  
cash upon your first request in any or required, without the need for natural  
warning or judicial proceedings and without any rights to delay, oppose, or stop  
payment on our part, or on the part of the Tenderer or any of his  
representatives whomever.

This Guarantee shall be deemed valid until the submittal of a duly executed  
Performance Bond.

***Signed*** \_\_\_\_\_ ***Bank (Surety)***



**ELECTRICITY DISTRIBUTION COMPANY.**

**Form of Performance Bond**

**Tender No. (13/2024)**

**Dear Sirs,**

At the request of \_\_\_\_\_ bank (the Foreign Bank)  
and on behalf of M/S \_\_\_\_\_  
(Contractor's Name and Address), we \_\_\_\_\_ Bank (the  
Local Bank) issue in your favor our irrevocable and unconditional Performance  
Bond No. \_\_\_\_\_ in the amount of \_\_\_\_\_  
\_\_\_\_\_(In \_\_\_\_\_ words), in this connection we  
\_\_\_\_\_ Bank (the Local Bank) hereby consider  
ourselves responsible forth unconditional payment to you or to your authorized  
representatives of the above sum on your first written demand in whole or in  
part notwithstanding any objections on the part of the above named contractor  
and without any need for natural warning or judicial proceedings.

This Bond will expire on \_\_\_\_\_ and shall be renewed automatically for  
a period of \_\_\_\_\_ months and for consecutive similar periods until it is  
returned by you to us.

***Signed \_\_\_\_\_ Bank (Surety)***

**ELECTRICITY DISTRIBUTION COMPANY.**

**Form of Maintenance Bond**

**Tender No. (13/2024)**

**M/S. ELECTRICITY DISTRIBUTION CO. (EDCO)  
Amman – Jordan**

At the request of \_\_\_\_\_ Bank ( the foreign bank ) and on behalf of M/S : \_\_\_\_\_ ( The Contractor name and address ), we \_\_\_\_\_ Bank (the local bank) issue in your favor our irrevocable and unconditional maintenance bond No.(\_\_\_\_\_ ) in the amount of \_\_\_\_\_ (In words) valid until \_\_\_\_\_ covering \_\_\_\_\_ PCT value of the \_\_\_\_\_ (Contract No. Name), in this connection we the \_\_\_\_\_ Bank (local bank ), hereby consider ourselves responsible for the unconditional payment to you or your authorized representatives of the above sum on your first written demand in whole or in part notwithstanding any objections on the part of the above named Contractor and without any need for notarial warning or judicial proceedings.

This bond will expire on \_\_\_\_\_and shall be renewed automatically for a period of (\_\_\_\_\_) months and for consecutive similar periods until it is returned by you to us.

***Signed \_\_\_\_\_ Bank (Surety)***

# **TECHNICAL SPECIFICATION**

## **1- GENERAL REQUIREMENTS**

### **A- PACKAGE SUBSTATIONS GENERAL**

The package substation shall be designed for operation where continuity of supply is the first consideration. Facilities shall be provided to assist inspection, maintenance, testing, cleaning, and repairs.

Package substation shall include voltage transformer and current transformer as specified below in RMU specs for metering purposes.

All apparatus shall be of the continuous maximum rating designed to ensure satisfactory operation under all climatic and atmospheric conditions prevailing at sight. The apparatus shall operate satisfactorily under such variations of load, voltage, and short circuits, within its assigned rating, as may be met with under working conditions of the system.

All conductors, connections and contacts shall be of ample section and surface area for carrying continuously the specified full load currents and for carrying the specified short circuit current for sufficient time to enable the supply fuse or circuit breaker to clear the fault.

All cable terminals shall be of adequate size to ensure that no overheating takes place at rated current.

Pinch screws acting directly on cable cores shall not be employed. A brass sweating ferrules shall be supplied for terminating the cable and the ferrule clamped in the pinch screw socket if the use of pinch screws cannot be avoided.

The design and construction of the package substation and ancillary equipment shall be to the EDCO approval and comply in all respects with EDCO specifications (as predominant) and the appropriate IEC recommendations or equivalent standard.

The switchgear, transformers and equipment shall be of robust construction and the design shall incorporate every reasonable precaution and provision for the safety of all those concerned in the operation and maintenance of the Contract works and of associated works supplied under other Contracts.

Cast iron shall not be used for chambers of oil filled apparatus nor for any part of the equipment which may be subject to mechanical stress.

All mechanisms shall, when necessary be constructed of stainless steel, brass or gunmetal to prevent sticking due to rust or corrosion.

All metal jointing surfaces, moving, rubbing wearing surfaces shall be machined or ground.

All apparatus shall be designed to prevent risks of short circuits due to entry of animals, birds and vermin.

All metal enclosed enclosures shall be fitted with an earth terminal which shall be subject to approval. All units shall be efficiently bonded together and connected to a common earth point where a brass stud, not smaller than 12 mm diameter and with an approved thread shall be provided, together with brass lock-nuts.

Common earthing network inside substation shall be made of copper wires or busbars with an effective cross-sectional area 70 sq.mm (minimum).

In no part of the equipment, including busbars, connections, isolators, fuses, contacts, cable boxes and terminations and connections shall the temperature rise exceed the values specified in the relevant IEC publication or equivalent standard.

The substation shall be easily lifted by means of suitable slings through lifting eyes. If lifting eyes are located on the floor frame of the substation, then a suitable lifting beam, to which the slings shall be attached, must be supplied in order to keep the slings away from the substation side to prevent scratching.

## **B- PREFABRICATED HOUSING**

The prefabricated housing for the package substations shall be weatherproof and dust proof of coated steel, thickness of the steel not less than 2mm, and thickness of coating not less than 86 micro. The internal color and finish of the housing shall be approved by the Engineer, while the external color shall be RAL 7038.

The IP degree for the LV and MV cubicals should be of IP 54, while the transformer cubical should be of IP 32.

External doors of the substation shall be equipped with suitable stoppers to keep doors open in a fixed position during operation and maintenance.

The housing shall have enough space to allow easy access around the equipment. It should also have doors for transformers, L.V. cubicle and MV ring main unit with the necessary framework to carry the whole equipment.

The substation housing shall be made of three separate compartments: for transformer, MV metal enclosed RMU and LV panel.

The housing shall be adequately ventilated and yet shall be so designed that birds, lizards and small rodents etc., cannot gain access to the equipment. Steel meshes behind louvers should be used for this purpose.

Compact Ring Main unit with LV board both directly coupled to the transformer could be accepted if the Tenderer proves suitability for outdoor use without the need of housing. He should offer in addition a separate unit price for the housing, for EDCO choice.

Clear and comprehensive construction drawings and instructions (in English) together with material schedules shall accompany each package of housing materials. All the main items are to be suitably worked and/or numbered so that they can be easily identifiable on the assembled drawings.

All doors shall be padlockable and provided with suitable padlocks and their master keys. All substations shall be operated with one master key for LV side, MV side (RMU and Transformer).

Each package substation unit shall be provided with three master keys.

A lighting fixture, operated by means of a door switch and protected in the LV board by proper fuse, shall be provided inside each substation door for night hours works.

## **C- WIRING**

All auxiliary wiring shall consist of multi-stranded copper conductor of not less than 2.5 mm<sup>2</sup> area and PVC insulated.

Panel wiring shall unless otherwise approved conform to the following standard color codes.

- RED, YELLOW and BLUE First, second and third phase connections respectively. In current and voltage transformer circuits only.
- GREEN Connections to earth.
- BLACK A.C. neutral connections earthed or unearthed either directly connected to the primary circuit or connected to the secondary circuit of current or voltage transformer, AC connections other than those above and connections in the AC/DC circuit.
- GREY Connections in DC circuits.

The complete wiring shall be subjected to a pressure test of 2 kV for 1 minute on completion.

All wiring shall be provided with numbered ferrules at each terminal and the numbering shall be in accordance with an approved system shown on the diagrams.

Ferrules shall be of insulating material, and they shall be durably marked and shall not be affected by damp or oil.

#### **D- TOOLS**

A complete set of any special tools or devices which are required for effecting adjustments or maintaining the equipment shall be supplied.

Such equipment shall be mounted in a suitable cabinet with locks for each substation.

The tenderer shall submit a full list of these tools which shall be included in the prices of the Contract.

Additionally, all operating handles and fuse extracting tools for MV and LV switchgear shall be supplied with each substation without extra

charge. These tools shall be located in suitable places inside the substation.

## **2- MV RMU**

### **A- TYPE OF SWITCHGEAR**

GIS Switchgear shall be metal enclosed; SF6 insulated or vacuumed insulated and shall be motorized and comply with the relevant IEC recommendations or equivalent standards.

### **B- Circuit breaker with Self-power relay**

Each C.B shall be capable of making and breaking short circuit faults in accordance with the quantities, factors and service requirements specified in the relevant IEC recommendation or equivalent standard. and shall be capable of making and breaking full load currents.

The Contractor shall carry out in the presence of EDCO the making and breaking tests specified in these specifications. EDCO may agree to omission these tests if the Contractor submits for approval satisfactory details of independently witnessed tests which have been carried out on this type of equipment under identical conditions as stated in these specifications-

### **C- OPERATING MECHANISMS**

#### **(a) General:**

The operating mechanisms of all switchgear units shall be of the 'Independent Manual' and electrical type with a quick make and break feature, such that the operating speeds are independent of the operator. If springs are used for this purpose provision shall be made so that in the event of a spring breakage the mechanism can still be safely opened even if the quick break feature is lost. Spring breakage shall not prevent the mechanism from closing sufficiently to carry the rated current without overheating.

With SF6 insulated switchgear the operating mechanisms, where practicable, shall be mounted outside the SF6 tank.

Integral earthing arrangements shall be a feature of both fuse switch and switch disconnectors.

Earth switch ratings shall be as follows:

	Making current	Breaking current	Short time current (1 second)
L.B. S	40 KA	630 A	16 KA
C.B	40 KA	16KA	16KA
Switch disconnector	-	-	16KA

The operating mechanism shall be constructed so that it is not possible to change from the "ON" position to "EARTH" position without first moving to the "OFF" position and operating a mechanical interlock.

All operating handles shall be arranged for operation from the front of the ring main unit at a suitable height, and all indicators and instruction labels shall also be visible from the front of the unit.

(b) Circuit breaker with self-power relay

The CB panel shall have vacuum CB with self-power relay along with disconnector and earth -switch.

The necessary interlocking for safe operation between CB, ES and disconnectors shall be utilized.

(c) Load break switch.

Each load break switch shall have three positions "ON", "OFF" and "EARTH". The integral earth switch shall have fully rated making capacity and interlocked cable testing facilities shall be provided for the ring cables, and they shall be motorized (operated with 48 V DC)

(d) Indicators

Approved direct driven mechanically operated indicators (mimic diagram) shall be provided on all switchgear operating mechanisms to show whether the unit is in the "ON", "OFF" or



"EARTH" positions. also the switchgear shall be provided with one set of voltage indication lamps (capacitive voltage divider).to show the voltage energized existence.

#### **D Interlocking Gear**

Maintenance and safety interlocks shall be of the mechanical or key operated type and shall be provided to prevent the following operation:-

- Isolation or selection of a circuit when a switch is closed. Attempted isolation or selection shall not trip the switch.
- The closing of switches without the interlocking selectors correctly positioned for the proposed operation.
- Access to circuit test connections without the circuit first being isolated and earthed.

When key interlocking is employed, any attempt to remove the trapped key shall not cause closing or opening of the associated equipment.

Where switchgear is fitted with means for mechanical or electrical operation, interlocks shall be provided so that it is impossible for the electrical and mechanical devices to operate simultaneously.

The earthing devices shall be provided with interlocks to ensure correct operation. Padlocking facilities shall be provided for the purpose of preventing inadvertent earthing.

#### **E Testing Facilities**

L.B.S shall be provided with facilities to enable applied high voltage tests to be carried out on the units and associated H.V cabling.

To facilitate high voltage testing where access to busbar or circuit terminations is restricted, device shall be provided to extend the termination points to a readily accessible position.

### 3 Busbars

Unless otherwise approved, shall be of electrolytic copper in the form of circular section rod or rectangular section strip. All conductors shall be kept as short and straight as possible and be adequately supported so as to prevent deflection, under rated short circuit conditions.

Each phase conductor of the primary busbars, including all through joint and tapping connections shall be spaced at such intervals to give the necessary clearance for the voltage rating.

Primary busbars, connections and their supports shall be of an approved type and shall be capable of carrying the short-time current associated with their short-circuit ratings for a period of (1) second.

Where busbar supports etc., use insulation of moulded or resin bonded material it shall have a durable anti-hygroscopic surface finish with high anti-tracking properties.

The connections from busbars in individual units shall a continuous current rating of not less than that of the equipment comprising the unit.

At all points where connections or joints occur, the busbars and connecting pieces shall be tinned or silver-plated. The resistance of any length of conductor containing a joint shall not be greater than that of an equal length of conductor without a joint. Clamps, where used, shall be of high tensile steel.

Primary busbars and connections shall be clearly marked and shall be displaced for standard phase sequence Red (R), Yellow (Y), and Blue (B) or equivalent counting from front to rear, top to bottom or left to right as viewed from the switching device operating mechanism side. Busbars shall be readily extensible and on duplicate busbar equipment without shut-down of the complete switchboard or without taking existing circuits out of service.

The general construction and layout of the busbars, connections and supports shall be to Engineers' approval.

#### 4 Padlocking

If required by the Engineer, padlocking facilities, including padlocks with 8 mm hasps, shall be provided for fuse switches and switch disconnectors for locking the operating handles in the "ON", "OFF" or the "EARTH" positions.

Padlocking facilities shall also be made available on all selector and trip mechanisms and cubicle access doors.

Once locked-off, the unit shall be inoperable or accessible where cubicle access doors are installed.

#### 5 Insulation and Shrouding

Where busbar and live connections are contained in the same compartment as terminals for outgoing cable connections, the busbars and live connections shall be shrouded or insulated so as prevent accidental contact with live metal during cabling operations with equipment alive.

All switchgear unit shall have their live terminals fully shrouded so that where access is required as part of the normal operation of the switchgear accidental.

Contact with live metal is prevented. Typically, this shall be for H.V. fuse replacement or cable testing.

All insulation used in the switchgear construction shall be of approved grade and manufacture and be as stated in Schedule A.

For tropical use, suitable material shall be used and treated after all machining has been carried out, to exclude moisture and mould growth.

#### 6 Cable Boxes

Cable boxes where specified, shall be in accordance with BS 2562, or equivalent, be of approved design and fitted with glands suitable to receive the cables

All cable termination boxes shall be of the dry type. The cable termination boxes shall be of an approved design and shall be suitable for satisfactory termination of 150 to 300 mm<sup>2</sup> Copper or Aluminum SWA XLPE or equivalent.

One set of compression tinned copper lugs suitable for the specified cables shall be supplied with each box.

Provision shall be made for earthing the body of each cable box. The terminals shall be marked in a clear and permanent manner.

The minimum clearances to earth and between phases shall be according to IEC.

All precautions necessary to permit the termination of XLPE or equivalent cables etc, to the offered cable box at the clearances specified in IEC e.g. heat shrink terminations, bushing boots, glands etc., shall be stated in the Tender return.

Cable box bushings shall be complete with tinned copper or brass cable termination sockets of the seated type suitable for receiving the cable conductors.

An approved termination shall be provided for earthing the body of the cable box.

Cooling tubes or radiators shall not be fixed to the side of the transformer on which the terminals are fitted unless approved by the Engineer.

For cable connections, the incoming/outgoing and transformer feeders must be connected from bottom-front of the RUM.

## 7 Cable Glands

Unless otherwise specified cable glands shall be in accordance with BS 6121 and shall be provided as follows:

## - 33 KV Cable glands

Each cable box shall have universal glands secured to the cable box by bolts, preferably four in number. Gland fixings are also to be suitable to accept standard glands for use with XLPE or equivalent.

The minimum clearance between gland and floor level shall be 460 mm to facilitate cable terminations.

## 8 Terminals:

### 8.1 General

All cable terminals shall be of adequate size to ensure that no overheating takes place at the rated current. Pinch screw acting directly on cable cores shall not be employed. A brass sweating ferrule shall be supplied for terminating the cable and the ferrule clamped in the pinch screw socket if the use of the pinch screws cannot be avoided.

### 8.2 H.V. Terminal Arrangements

H.V. terminals for cable connections or direct switchgear mounted transformers shall be positioned in a horizontal plane on the side of the transformer. The phase markings shall be c.b.a.n. – A.B.C. left to right when facing the terminals. The flange entry to be generally in accordance with BS 2562 or equivalent.

### 8.3 Terminal Bushing Insulators

Cast resin bushing assemblies when approved by the Engineer shall be in accordance with BS 3816 and be designed to withstand short circuits no less onerous than those specified for the associated equipment. The bushing assemblies shall not be affected by continuous immersion in transformer liquid at 105 deg. C

The total creepage distance and the protected creepage distance over the external surface of bushings and insulators shall not be

less than the minimum values specified IEC. The protected creepage distance refers to that part of the insulator which is protected against rain at right angles to the axis of the bushing. For post insulators comprising standard units, the above requirements shall, unless otherwise specified, be met by the addition of an approved number of additional units to the normal assembly.

For rated voltage below 36kV the filling medium of bushing insulators shall be subject to the approval of the Engineer.

Any stress shield shall be considered an integral part of the bushing assembly.

Bushing flanges shall not be of a shape which may trap air. Outdoor busing insulators and fittings and their mounting arrangements shall be designed so as to avoid pockets in which water can collect.

All neutral bushings shall be identical to the associated phase bushings.

All bushings connected to the H.V. winding shall have a voltage rating equivalent to the highest voltage ratio of the transformer and be suitable for carrying the specified current rating under the prevailing site condition.

Stresses due to expansion and contraction in any part of the insulator, or connected conductors, or equipment, shall not lead to the development of defects in the bushings.

Porcelain insulators shall be sound, free from defects and thoroughly vitrified so that the glaze is not depended upon for insulation. The glaze shall be smooth, hard, of uniform shade and shall completely cover exposed parts of the insulator. The insulators shall be unaffected by the atmospheric conditions due to weather, proximity to the coast, fumes, ozone, acids, dust or rapid changes of temperature between – 6 deg. C and plus 55 deg. Under working conditions.

The porcelain shall engage directly with hard metal, and where necessary, an approved resilient material shall be interposed between the porcelain and the fittings. All porcelain clamping surfaces in contact with gaskets shall be accurately ground and free from glaze. All fixing material used shall be of approved

quantity and applied in an approved manner, and shall not enter chemical action with the metal parts of cause fracture by expansion in service. Where cement is used as fixing medium, cement thickness shall be as small and even as possible, and proper care shall be taken to center and locate the individual parts correctly during cementing.

Resin bonded paper insulators shall be in accordance with BS Standards, of approved design and method of manufacture, and shall retain their insulating characteristics in service. Special precautions shall be taken to exclude moisture from paper insulation during manufacture and assembly. The surfaces of all paper insulators shall be finished with approved non-hygroscopic varnish which can cost be easily damaged.

Toughened glass shall be sound and free from defects or blemishes which might adversely affect the life of the insulator. All exposed glass parts shall have a smooth surface.

## **9** Instrumentation

Instruments shall comply with the relevant IEC or equivalent national standard. The scales shall be clearly marked over the full range of the instrument.

## **10** Earthing

All switchgear units shall have a main earth extended across the full length of the complete unit assemble.

All metal parts other than those forming part of an electrical circuit shall be connected in an approved manner to a hard drawn, high conductivity copper earth busbar which shall run the full length, and be bolted to the main frame, of the switchgear. At the position where joints occur, the earth busbar shall be tinned copper. The earth busbar shall be rated to carry currents equal in magnitude and duration to that associated with the short-circuit rating of the equipment.

The design and construction of the equipment shall be such that all metal parts, other than current carrying parts are earthed before the primary connections are made.

Where earthing is effected through a circuit-breaker, it is preferred that the facilities shall be integral in the design and construction of the switchgear.

## 11 SCADA

Each RMU shall be equipped with equipment and wiring to be suitable for connecting for SCADA system

Signals for RMU as the following :

Indication		
	Signal name	Type
LBS panel	L.B.S ON/OFF	DPI
	Earth switch position indicator	DPI
	Local/remote	DPI
	SF6 GAS LOW	SPI
	Motor DC supply fail	SPI
CB with self-powered relay Transformer feeder	CB ON/OFF	DPI
	Earth switch position indicator	DPI
	Local/remote	DPI
	SF6 GAS LOW	DPI
	Motor DC supply fail	SPI
	Relay protection Trip	SPI

DPI: Double point indicator, SPI: Single point indicator

Measurments		
Incoming LBS panel	Active Power	-  At least these signals shall be transmitted through energy analyzer by Modbus RTU to RTU.  -All engineering works (RTU &energy analyzer configuration ) and wiring connection between energy analyzer and RTU is a supplier responsibility.
	Reactive power	
	Voltage	
	Current Ia	
	Current Ib	
	Current Ic	
	Energy forward (K.W.H)	
	Energy Reverse (K.W.H)	
	Power factor	
Commands		
	Command name	Type
LBS panel	LBS control(OPEN & CLOSE)	DCO
CB with self-powered relay Transformer feeder	CB CONTROL (OPEN/CLOSE)	DCO



## MV RMU Description

Item No.	Description
A.	<p style="text-align: center;"><b><u>LBS (L) for Incoming and outgoing feeder</u></b></p> <p>The LBS feeder shall be provided with equipment as detailed below: -</p> <ul style="list-style-type: none"> <li>• One set of GIS 630A, 3-Phase busbar.</li> <li>• 3-Phase, 630A Vacuum/SF6 Motorized load break switch complete with operating mechanism, auxiliary switches, interlocks, locking facilities and locks.</li> <li>• Mimic diagram with position indicators to indicate the positions of the load break switch &amp; grounding switch.</li> <li>• Set of voltage indication lamps (capacitive voltage divider).</li> <li>• Earthing Switch.</li> <li>• One set of Current transformers or current sensors. For measuring and fault indicator purposes</li> <li>• The voltage readings for IED devices is required in a way that is compatible with the manufacturer design..</li> <li>• IED for both fault passage indicator function and energy Analyzer function with readiness of connecting to RTU; adequate with the above to read the following: <ul style="list-style-type: none"> <li>- Fault Passage Indicator (OC/EF)</li> <li>- Current (Present and max. values) at each phase.</li> <li>- Voltage (Phase to Phase).</li> <li>- Power Factor (Total and Per phase).</li> <li>- Active, Reactive, Apparent power (Total and Per phase).</li> <li>- Active, Reactive, Apparent power (Present and max. values).</li> <li>- Active, Reactive, Apparent energy:-</li> </ul> </li> <li>• Auxiliary contacts to show switches status. (2 NO 52a + 2 NC 52b).</li> <li>• One set of interposing relays &amp; Local / Remote selector switch for SCADA system.</li> <li>• Availability of one terminal block to combine all required signals for controlling and monitoring purposes in each panel.</li> </ul>

Item No.	Description
A.	<p style="text-align: center;"><b><u>TR feeder (T)</u></b></p> <p>The panel shall be provided with equipment as detailed below: -</p> <ul style="list-style-type: none"> <li>• One set of GIS 630A, 3-Phase busbar.</li> <li>• One 3-Phase, 630 A motorized C.B with self-power relay; complete with operating mechanism, auxiliary switches, interlocks, locking facilities and locks.</li> <li>• One set of ring Current transformer SRCT for metering where, burden and class will be calculated by design.</li> <li>• Provision for meter (metering box) of (L:40 ,W:40,D:20) cm Dimension .</li> <li>• One set of cast resin voltage transformer– at primary side on cable with Ratio <math>(33/\sqrt{3})/ (0.11/\sqrt{3})</math> kV, VT secondary circuit should be protected by MCB where, burden and class will be calculated by design.</li> <li>• Mimic diagram with position indicators to indicate the positions of the disconnect switch &amp; grounding switch.</li> <li>• One set of voltage indication lamps (capacitive voltage divider).</li> <li>• Earthing Switch.</li> <li>• Auxiliary contacts to show switches status. (2 NO 52a + 2 NC 52b).</li> <li>• One set of interposing relays &amp; Local / Remote selector switch for SCADA system.</li> <li>• Availability of one terminal block to combine all required signals for controlling and monitoring purposes in each panel.</li> </ul>

**Important notes:**

1. Rated auxiliary voltage should be 48V- DC (for control circuit, protection, etc).
2. Internal ARC classification shall be AFL minimum according to IEC62217-200
3. The voltage reading requirements for the equipped IED devices are required either through a set of VT's or sensors or from bushings (like CVI) more over the most preferable option is what more fits with the manufacturer design.

## **15- LOW VOLTAGE DISTRIBUTION BOARD**

The low voltage board shall be indoor and closed type, has it is own covers and front doors, supplied completely mounted and ready for connection of the incoming and outgoing cables. The connection between transformer and L.V. board shall be made by single core copper conductor PVC cables of relevant sizes.

### **THE 1500 KVA TRANSFORMER L.V DISTRIBUTION BOARD SHALL BE EQUIPPED WITH THE FOLLOWING:-**

#### **A- CUBICLE**

One galvanized mild steel frame, three-phase, 415 V, 2500 A, 50 Hz, to be used for indoor / outdoor fully enclosed dust proof type distribution fuse board (cubicle) for floor mounting equipped with the remaining following items : -

#### **B- Street light**

To be of one fabricated sheet steel plate suitably enameled and including the following: -

<b>Qty</b>	<b>Description</b>
1.	Provision for meter including all required wiring needed for Class 1, (15-100) A three-phase direct meter rated 3*230/400 volt, for metering the street lighting loads. Without the meter itself.
1	100A Neutral link fitted with link extracting tool.
1	Three-phase 100 A contactor for street lighting.
1	100A three phase MCCB for use with street lighting circuit
3	63A single pole M.C. B's. for use with the street lighting circuits
1	Time switch and photoelectric cell (in series) for street lighting.
1	Light fixture 100W rechargeable type with door switch.
1	Time switch for operation of the double tariff kWh meter (if needed).

#### **C- INCOMING TRANSFORMER UNIT**

<b>Qty</b>	<b>Description</b>
One	2500A, Three-phase, 4-wire, incoming transformer unit consisting of: -
1	Molded case circuit breaker 2500 A with over-current

	and short-circuit release, and under voltage relay, hand operated. A thermometer relay shall be provided with CB. This relay shall be capable of tripping the CB in case the transformer oil temperature exceeds a certain adjustable limit. A facial alarm (C.B temp. Tripped) shall be provided in the L.V panel.
1	Neutral link 1250A fitted with link extracting tool.
1	All required wiring and provision (40x25) cm needed for Class1 3-phase, 4-wire, 415 Volts, 50 Hz, 5A Double Tariff kWh meter. (without the meter itself)
1	(13-way) terminal test blocks for testing substation meter and associated wiring.
1	Set of cable glands mounted on a steel sheet for bottom entry suitable for single core copper conductor cables from the transformer (cable shall reach the bottom end of circuit breaker i.e. no copper rods are required).
1	sets of three ring current transformers for use with CT meter fitted in run of phase busbars, ratio. 2500-1250/5A, 10VA, class 0.5, in accordance with the IEC60044-1 or equivalent standards. - CTs secondary neutral terminals shall be earthed separately.

#### **D- OUTGOING DISTRIBUTION UNITS**

<b>Qty</b>	<b>Description</b>
1	Set of MCCB's with relative current as mentioned in Schedule (D-3).
1	Neutral link fitted with link extracting tool. Shall be one per each feeder
1	Galvanized bracket and clips for holding the outgoing cables from the bottom.

#### **E other components are required in the LV panel**

<b>Qty</b>	<b>Description</b>
1	100W condensation heater
1	3-pin 15 A socket outlet with fuse/MCB protection.
2	15 A, 230 V cut-outs for substation lighting and auxiliaries.

The units to be complete with 3000A copper phase busbars, 1500A copper neutral busbar, 1500A copper earthing busbar and fully insulated street lighting busbars in three sections combining two outgoing units and supplied by a separate phase from the street lighting contactors, all internal wiring. Accessories to include phase separating barriers, cable shoes, link extracting handle, circuit label, holders, etc.

THE L.V CUBICLES FOR 1500kVA & 1000 kVA, PACKAGE SUBSTATIONS SHALL BE IDENTICAL TO THE ABOVE AS MENTIONED IN SCHEDULE D.

#### **14- CURRENT TRANSFORMERS, METERING AND INSTRUMENTATION.**

##### **A- GENERAL REQUIREMENTS**

The metering and instrumentation equipment complete with current transformers shall be mounted in the 415V distribution board. The transformer metering equipment will normally be required to measure the total output from the transformer 415-volt windings. On several of the units it will be required to adjust the transformer fixed and load losses (i.e. as if the current and voltage signals were derived from the transformer MV connections). The metering equipment must therefore incorporate adequate adjustment facilities for this type of duty.

##### **B- DOUBLE RATIO CURRENT TRANSFORMERS.**

All current transformers shall comply with the relevant IEC recommendation or equivalent standard. The terminals shall be clearly marked by the letters P1, P2 and S1, S2, S3 for primary and secondary terminals respectively, terminal P1 being connected toward the busbar.

The design characteristics and construction of current transformers used for protective gear circuits shall be to the Engineers approval.

All metering current transformers shall be mounted with the P2 terminals remote from the busbars. The S1 terminals shall be earthed through links at the switchgear.

When double wound secondary windings are specified, a reversible label shall be provided on the outside of the current transformer chamber to indicate which ratio is in use.

All metering current transformers for Tariff meters shall be used exclusively for operating the meters and shall conform in all respects to the highest grade of accuracy. They shall be provided with a secondary current rating of 5A and be designed to carry a burden of not less than 10VA at full load. Current transformer accuracy class should be 0.5.

## 16. TRANSFORMERS

### A- GENERAL

The package substation transformers shall be three-phase oil immersed transformers, self-cooled, ground mounted inside housing with the following technical data:-

-Rated power on continuous operation in KVA:1500,1000,630,400,250 and 100

-No load voltage ratio 36 / 0.415KV and 12/0.415KV

-Rated high voltage 36 KV and 12KV

-Off - load tap changer with taps for  $\pm 5\%$  ( 5 steps 2.5% each)

-Rated low voltage 415 V

-Vector group Dyn 11

-With outdoor bushings.

-With skids.

-With conservator tank and dehydrating breather.

-With pressure relief device.

-With complete oil filling.

-With contact thermometer range (0-120) °C

-With oil level gauge (unbreakable ).

-With lifting and pulling lugs.

-LV neutral point solidly earthed .

-Temperature rise of windings at C.M.R. 55° C\*

-Temperature rise top oil at C.M.R. 50° C\*

(\*)-These values shall be guaranteed with transformers inside substation housing.

**With an MCCB directly connected to cables coming out from the LV side.**

### B. TANKS

Each transformer shall be enclosed in a suitable stiffened welded steel tank such that the transformer can be lifted and transported without permanent deformation or oil leakage. The construction shall employ weldable steel of an approved grade.

The transformer tank shall be vacuum-proof and suitable for outdoor installation

Hermetically sealed transformers are accepted.

The tank shall be equipped with standard accessories as follows-:

- Oil drain valve fitted at the lowest point of the tank at one of the narrow sides.
- Oil filter valve located near to the top of the tank.
- Oil sampling valve near to the bottom of tank.
- 2 earthing screws.
- suitable number of lifting lugs for the cover plates of the active part.
- suitable no of pulling lugs.
- 1 thermometer pocket.
- Rating plate and connection diagram.
- One dial thermometer for oil temperature indication with maximum temperature indicator.

The tank and cover shall be designed in such a manner as to leave no external pockets in which water can lodge, no internal pockets in which oil can remain when draining the tank or in which air can be trapped when filling the tank and to provide easy access to all external surfaces for painting.

Each tank cover shall be of adequate strength, shall not distort when lifted and shall be provided with suitable flanges having sufficient and properly spaced bolts.

The gasket of the cover plates shall be at least 2mm thick, and shall be of two fold construction and of such type that its further use shall be possible after the tank has been opened. A solid earth connection between cover and tank shall be ensured.

Connection of an oil purifying set shall be considered. The transformer tank shall be equipped with four bi-directional transport rollers of the flat type for longitudinal and transversal movement of the transformer. Fixing devices (shackles) shall be provided for each roller.

### **C. OIL CONSERVATOR TANKS AND BREATHERS**

Conservator tanks shall be formed of substantial steel plates and arranged above the highest point of the oil circulating system. Connections into the main tank shall be at the highest point to prevent the trapping of air or gas under the main tank cover. The oil conservator shall be detachable and arranged at the narrow side of

the transformer tank. The capacity of each conservator tank shall be adequate for the expansion and contraction of oil in the whole system under the specified operation conditions. Conservator tanks shall be provided with cleaning door, filling cap, drain valve with captive cap. An oil level indicator consisting of unbreakable material shall be installed at one end of the oil conservator tank. A dehydrating breather with silica gel filling shall be fitted to the air inlet pipe.

#### **D. JOINTS AND GASKETS**

All joints faces shall be machined or ground and arranged to prevent the ingress of water or leakage of oil with a minimum of gasket surface exposed to the action of oil or air.

Oil resisting synthetic rubber gaskets is not permissible except where the synthetic rubber is used as a bonding medium for cork or similar material or where metal inserts are provided to limit compression.

#### **E. PRESSURE RELIEF DEVICE**

An approved pressure relief device of sufficient size for the rapid release of any pressure that may be generated in the tank and designed to operate at a static pressure lower than the hydraulic test pressure shall be provided.

If a diaphragm is used, it shall be of approved design and material and located above the maximum oil level. A pressure-equalizing pipe shall be provided between the pressure relief device and the oil conservator.

#### **F. MAGNETIC CIRCUITS**

The design of the magnetic circuit shall be such as to avoid static discharges, development of short circuit paths internally or to the earthed clamping structure and the production of flux components normal to the plans or the laminations. Each lamination shall be insulated with a material stable under the action of pressure and hot oil.

The winding structure and major insulation shall be designed to permit an unobstructed flow of cooling oil through core cooling ducts to ensure efficient core cooling

The magnetic circuit shall be insulated from all structural parts, and shall be capable of withstanding a test voltage to core bolts and to the frame of 2000 volts r.m.s. for one minute.



Cores shall be constructed from cold rolled grain oriented steel sheets. The flux density under the most onerous conditions in any part of the magnetic circuit shall not exceed 19000 lines per square centimeter (i.e. 1.9 tesla).

The top main core clamping structure shall be connected to the tank body by a copper strap and the bottom main core clamping structure shall be earthed.

The magnetic circuit shall be earthed to the clamping structure at one point only beneath an inspection opening in the tank cover and which, by disconnection will enable the insulation between the core and clamping plates, etc. to be tested at voltages up to 2.5 kV for the purpose of checking deterioration during service. The connection to the link shall be on the same side of the core as the main earth connection.

Magnetic circuits having an insulated sectional construction shall be provided with a separate link for each individual section. Where oil ducts or insulated barriers parallel to the plane of the laminations divide the magnetic circuit into two or more electrically separate parts, the ducts and insulating barriers which have a thickness greater than 0.25 mm are to be bridged with tinned copper strips so inserted as to maintain electrical continuity.

## **G. WINDINGS**

The windings shall be completely short-circuit proof.

The H.V winding shall be subdivided into a suitable number of single coils and shall be composed of individual discs. Design of the windings must provide unrestricted cooling ducts ensuring free circulation of oil, proper heat dissipation and preventing accumulation of heat.

Tapped coils shall be placed at the center of the winding. The end windings shall be suitably insulated to withstand impulse voltages.

The windings and leads of all transformers shall be braced to withstand the shocks which may occur through rough handling and vibration during transport, switching and other transient service conditions.

The windings shall be thoroughly dried out and vacuum impregnated, during which time they shall be shrunk under pressure to eliminate shrinkage in service.

#### **H. OFF-LOAD TAP CHANGER**

Off-load tap changers shall be short, circuited proof. They shall be manually operated while the transformer is de-energized by means of a special spindle; while the same should be equipped with Five (5) Taps suitable for voltage changing from -5% to +5% of the rated voltage with a step of 2.5%.

The design shall ensure that the tap selectors on all three phases operate simultaneously. An external operating handle shall be located on the cover register plates clearly indicating tapping in use must be fixed to the external operating handle and provision shall be made for securing the switches in any working position to prevent operation by unauthorized persons.

#### **I. TRANSFORMER TERMINALS**

The transformer shall be provided with outdoor type bushing insulators for phase and neutral terminals. The bushings shall have a minimum creepage distance of 1152mm for 36 kV bushings and 384mm for 12kV bushings. All bushings shall meet the requirements of IEC 60137 or equivalent standards.

All porcelain shall be sound, free from defects and thoroughly vitrified. The glaze must not be depended upon for insulation. The glaze shall be smooth, and hard and shall cover completely all exposed parts of the insulator. Outdoor insulators and fittings shall be unaffected by atmospheric conditions. All porcelain insulators shall be of the antifog type, designed to facilitate cleaning. Each porcelain bushing or insulator shall have marked upon it the manufacturer's identification mark and to be marked to indicate the date of firing.

#### **J. OIL**

The insulating oil shall be one of the following types:

1. Uninhabited mineral Oil-Naphthenic Oil Base comply with IEC 60296 for mineral oil. (Paraffinic Oil Base not accepted).
2. Synthetic Ester Oil comply with IEC 61099
3. Renewable Natural Vegetable Ester comply with IEC 62770

The fundamental requirements of the insulating oil are:

- The oil shall be PCB free and this shall be clarify in your offer and the routine test certificate of transformers
- The oil must be clean, free from impurities such as suspended or solid matters, detrimental chemical compounds and water.

For mineral oil:

- The oil must be chemically stable, i.e. its deterioration due to heating caused by oxygen at the service temperatures must be as low as possible.
- The oil shall be uninhibited oil.

The chemical composition and the physical characteristics of the Insulating oil shall be as follows:

The oil shall be complied with the following characteristic:

<b>Natural easter oil (IEC62770)</b>	<b>Mineral oil (IEC 60296)</b>	<b>Synthetic easter oil (IEC 61099)</b>
renewable natural vegetable easter oil Base Type	Mineral Naphthanic Oil Base	Synthetic easter
Density at 20°C ≤ <b>1000 KG/M<sup>3</sup></b>	Density at 20°C ≤ <b>895 KG/M<sup>3</sup></b>	Density at 20°C ≤ 1000 KG/M <sup>3</sup>
Viscosity at 40 C°, ≤ <b>50</b>	Viscosity at 40 C°, ≤ <b>12</b>	Viscosity at 40 Co, ≤ 35
Viscosity at 0C° ≤ 500	Viscosity at -30 C° ≤ 1800	Viscosity at 20 Co, ≤ 3000
<b>Flash point ≥ 275 C°</b>	<b>Flash point ≥ 135 C°</b>	<b>Flash point ≥ 250 Co</b>
<b>Fire point ≥ 300 C°</b>	<b>Fire point ≥ 170 C°</b>	<b>Fire point ≥ 300 Co</b>
<b>Pour point ≤ -10</b>	<b>Pour point ≤ -40</b>	<b>Pour point ≤ -45</b>
Acidity Value Mgkoh /G ≤ <b>0.06</b>	Acidity Value Mgkoh /G ≤ <b>0.01</b>	Acidity Value Mgkoh /G ≤ 0.03
Dielectric dissipation factor at 90 C° ≤ <b>0.05</b>	Dielectric dissipation factor at 90 C° ≤ <b>0.005</b>	Dielectric dissipation factor at 90 Co ≤ 0.03
Dielectric Breakdown voltage 2.5 mm gap ≥ <b>35 kv</b>	Breakdown voltage ≥ 30 KV Before treatment & ≥ 70 KV after treatment	Breakdown voltage ≥ 45
Water content ≤ <b>200 mg/Kg</b>	Water content ≤ <b>30 mg/Kg</b>	Water content ≤ <b>200 mg/Kg</b>

The oil shall be supplied only from one of the following manufacturer:

<b>For mineral oil</b>
✓ TOTAL(Multi-brands)
✓ Shell Global
✓ Nynas
✓ British petroleum(Multi-brands)
✓ Eargon
<b>For synthetic or natural easters oil</b>
✓ Midel oil
✓ Cargill

-Three copies of certified test reports of oil shall be submitted.

#### **K. SURFACE TREATMENT**

Transformer and all metal parts shall be protected by one primary and two finishing coats of appropriate paint prior to delivery. The finishing coat shall be of aluminum color subject to the Employer Approval.

The color of the outer surface of the package shall be of RAL 7038.

The interior of the tank and the oil conservator shall be painted with two coats of varnish.

#### **L. LOSSES AND EVALUATION OF LOSSES**

The tenderer shall state in the Schedule of Particulars and Guarantees the guaranteed values for component losses (i.e., no-load loss, load loss at C.M.R. of the total loss which shall be as low as is consistent with transport restrictions, reliability and economic use of materials.

Tenderers will be assessed on the basis of the capital cost plus Present Worth of guaranteed losses as follows:

$$C = C_o + 6325 \text{ Fe} + 2040.66 \text{ Al}$$

Where: C is the cost of assessment in JD's.  
C<sub>o</sub> is the tender price of transformer in JD's.  
Fe; the no load loss expressed in kilowatts, as shown in the Schedule of Particulars.

Cu/Al; the full load copper/aluminum loss expressed in kilowatts, as shown in the Schedule of Particulars.

The transformer will be accepted after passing FAT related tests successfully; and the FAT losses actual results are governing transformers acceptance as follows:

- a) **(FAT actual losses are above tender value of the losses, then the transformer is rejected**
  - b) **FAT actual losses are equal or less than offered value, then the transformer is accepted.**
  - c) **FAT actual losses are equal or less than tender value but above offered value then the transformer is accepted with the following penalty (\*)**
    - $\Delta \text{Fe}$  component losses penalty in JoD =  $6325 * \Delta \text{Fe} * 3$
    - $\Delta \text{Cu/Al}$  component losses penalty in JoD =  $2040.66 * \Delta \text{Cu} * 3$
- $\Delta \text{Fe}$  &  $\Delta \text{Cu /AL}$  losses penalty are the summation of above two equations.

Where:

- $\Delta \text{Fe losses} > 0, \Delta \text{Cu losses} > 0$

- $\Delta$  Fe losses: the difference between the actual no-load losses value and no-load losses offered value (KW)
- $\Delta$  Cu/Al losses: the difference between the actual load losses value and load losses offered value (KW)

(\*): Transformer is accepted if and only if the component losses (Cu/AL, Fe) are less than or equal 15% of the guaranteed offered value **and** the total losses (Cu+Fe) are less than or equal 10%, according to IEC 60076.

**IMPORTANT NOTE: THE GUARANTEED TOTAL LOSSES SHALL NOT EXCEED THE FOLLOWING PERCENTAGES (MAX) OF ONAN RATING FOR BOTH 33&11KV TRANSFORMERS.( ACCORDING EDCO REQUIREMENTS )**

Rating (KVA)	Percentage of losses%	The permitted total losses(W)
50	1.2	600
100	1.2	1200
250	1	2500
400	0.8	3200
630	0.7	4410
1000	0.8	8000
1500	0.7	10500

In the event of transformers yielding component and total losses, which are either equal to or below the guaranteed values, the Tenderer will not be entitled to any premium in respect of reduction in losses below the guaranteed values.

## **17. INSPECTION AND TESTING**

### **A. GENERAL TEST REQUIREMENT**

The routine test and any other tests requested by the purchaser for substations and its main equipments must be witnessed by EDCO engineer on supplier's cost.

All transformers shall be subjected to inspection and testing in accordance with IEC 60076 or equivalent standard.

The Purchaser may attend these tests.

Adequate notice for not less than 21 days shall be given when the equipment and transformers are ready for inspection or test and every facility shall be provided by the supplier to enable the Purchaser to carry out the necessary inspections and tests.

Before the transformers and equipment are packed or dispatched all tests called for shall have been successfully carried out. No passing of plant or materials by the Engineers or EDCO representatives shall relieve the contractor from his responsibility. The contractor shall also be responsible for proper carrying out of all tests of work carried out or supplied by his sub-contractors.

If, due to the Contract works and for component of materials not complying with these specification further tests is necessary ,the Contractor shall pay all additional costs which may be incurred in re-testing.

All instruments used for the purpose of testing shall be approved and if required shall be calibrated at the expense of the contractor by such body as may be approved.

The tests shall be arranged to represent the working conditions as closely as possible.

Unless an alternative place of testing is agreed or specified the following tests shall be carried out at the manufacturer's works:-

#### **B. COMPLETE RING UNITS:**

##### **I. Routine Tests: -**

In accordance with the requirement of relevant IEC 62771 or equivalent, together with any tests carried out as normal routine by the manufacturer.

##### **II. Type tests: -**

In accordance with the requirement of IEC62771, or equivalent standards.

#### **C. CABLE BOXES ROUTINE TESTS (for cable box transformers): -**

All cables boxes shall be tested with oil with a viscosity not greater than that of the appropriate grade of insulating oil when at a temperature of 15 °C at pressure of 70 KN /m for 12 hours, during this time no leakage shall occur; neither shall there be any permanent set when the pressure is released.

Cable boxes shall withstand the following voltage for (15) minutes either between phases or between phase and earth 2E KV D.C. or 1.33E KV A.C. where e is the nominal rated system voltage between phases.

Gland insulation shall be tested to withstand a voltage of 2 KV to earth for one minute.

#### **D. CURRENT TRANSFORMERS:**

##### **I- Routine tests: -**

All current transformers shall withstand and satisfactorily comply with the routine tests specified in the relevant IEC recommendations

Each current transformers specified for an equipment where transformers of metering accuracy are also specified shall be treated for accuracy as follows:-

Tests for ratio and phase angle error shall be made at the following loading at unity power factor:-

<b>(5 VA secondary burden)</b>	<b>Each With 125%, 100%, 50%, 20%, 10% and 5% Of Rated Primary Current</b>
<b>(15 VA Secondary Burden)</b>	

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##### **II- Type tests - :**

One transformers of each type and ratio shall withstand and satisfactorily comply with the type tests specified in the relevant **IEC** recommendations.

One current transformers of each type and ratio shall be tested.

#### **F. INSTRUMENT AND SECONDARY WIRING**

All instruments shall withstand and satisfactorily comply with the tests specified in the appropriate IEC recommendation.

All secondary wiring including panel wiring and control circuits and all apparatus connected directly thereto shall withstand a high voltage test of 2 KV to earth for 1 minute.

#### **G. COMPLETE 400 VOLT DISTRIBUTION CUBICLE**

All electrical circuits and apparatus shall withstand a high voltage test of 2 kV. This test shall be applied for one minute.

All secondary wiring including panel wiring control circuit shall be tested at 2 KV for 1 minute.

#### **H.PREFABRICATED HOUSING**

The dimensional requirement of the panels shall be checked, the erection marker verified. Sample housing shall be erected and the doors and locking arrangement examined the stability and panel strength tested.

#### **IP CODING TEST for the enclosure should be submitted**

#### **I.TRANSFOMERS**

##### **TRANSFORMERS**

##### ***A) Routine Tests***

All transformers shall be subjected to the following Routine tests in accordance with IEC 60076:

- 1- Measurement of winding resistance.
- 2- Ratio, Polarity and phase relationships.
- 3- Impedance voltage.
- 4- Load loss
- 5- No load loss and no load current.
- 6- Induced over voltage withstand
- 7- Separate source voltage withstand.
- 8- leak testing.
- 9- check of core and frame insulation.
- 10- Check of the ratio and polarity of built-in current transformers.

##### ***B) Type Tests***

***The Tenderer should submit with his offer complete Type test certificates according to IEC standard from one of the STL group laboratories including ICEMET laboratory, for Transformers as evidence of its capability to manufacture such materials.***

***Note: the test certificate that is provided from laboratories that have the same manufacturer's laboratory – for the offered materials- is not accepted.***



**Temperature-Rise Test:** The test shall be in accordance with IEC 60076-2 and shall be carried out on one transformer of each rating. The transformer shall be selected randomly by EDCO.

Temperature-rise test shall be conducted on the tapping corresponding to the maximum losses.

Hot spot determination should be done on one transformer for the whole contract. The transformer shall be selected randomly by EDCO.

**Dielectric Type Test:**

These shall be made on one transformer of each rating. The transformer shall be selected randomly by EDCO, and shall include the following requirements:

The transformers shall have been subjected to the above routine tests prior to the impulse voltage tests and those transformers subjected to the temperature-rise test shall be impulse tested as soon as practicable thereafter.

The procedure shall be as required by IEC60076-3 the impulse test voltages being applied successively to each line terminal.

Negative polarity is to be used throughout the tests.

Oscillographic records of the applied voltage and neutral current and/or transferred voltage are to be taken and included in the records.

Films of the oscillographic records are to be made available to the engineer at the time of the tests for his examination.

Chopped impulse should be applied as per IEC 60076-3.

External flashover of the bushings during the chopped wave tests is not permitted.

**C) Special Tests**

**1. 9 asymmetrical shots and 3 seconds symmetrical shot short circuit test should be submitted according to IEC standard from one of the STL group laboratories including ICEMET laboratory as specified.**

**2. Dissipation factor. and shall be according to IEEE. (If applicable)**

**3. Insulation resistance.**

**4. Capacitance.**

**5. Zero phase sequence impedance measurement:**

This test shall be in accordance with IEC 60076 and tests numbered (2-5) above, shall be carried out on 10% of transformers quantity.

Note: For similar transformer type test certificate, the tenderer shall be filling compliance sheet to proof the similar design according to IEC.

EDCO will accept only the similar design of transformer for the same level voltage.

**- Voltage Control Equipment**

**a- Duty Cycle**

All of load switching apparatus when completely assembled shall be operated ten time in the normal manner through the full range when the transformer is live at normal volts on open circuit.

**b- Auxiliary Circuits**

All auxiliary circuits will be subjected to voltage tests of 2 kV without breakdown. The operation of all devices, relays, and indicating instruments will be checked for correct operation.

**Tests on General Equipment**

**Mechanical Tests**

Mechanical tests shall be carried out on any pieces of apparatus or material to prove that this apparatus or material is amply strong to withstand the mechanical stresses to which they may be subjected under all operating condition, particularly the electro- magnetic and explosive forces on short circuits.

**Material Tests**

**- Tests**

Samples selected by the engineers from materials used in the contract works shall be tested to prove compliance with the specification including the guarantees stated in schedule 'D'.

**- Galvanizing Tests:**

Samples selected by the engineers of all galvanized material shall be in accordance with the appropriate standard.

**- Switch Oil Tests:-**

Samples of oil from each consignment shall be tested and shall comply with the tests specified in the related IEC, before any oil is dispatched.

**- Compound**

Samples of compound selected by the engineer from the bulk shall be tested to prove compliance with the requirements of Standards for the appropriate grade of compound for the boxes.

**- Voltage Control Equipment**

The following tests shall be carried out in the order given on one voltage control equipment each size:

**a- Duty Cycle**

The switching apparatus when completely assembled shall be operated over its full range 500 times.

**b- Contact Heating**

Each switch on all contacts shall carry ten times full rated current five times in succession, the current being held for two seconds each time. During these tests no damage or injurious heating shall occur and switch contacts shall not showing of burning.

**c- High Voltage between Contacts**

Half normal service voltage across the terminals of the higher voltage transformer winding shall be applied for one-minute windings shall be applied for one minute between adjacent contact of the switching apparatus and between connections, while immersed in oil at 90°C and discounted from the transformers winding.

***For transformers***

***The tenderer should submit with his offer Type and/or Special Test Certificate/Reports according to IEC standards for transformers (including short-circuit tests for three seconds).***

***For RMU and/or Disconnectors:***

***The tenderer should submit with his offer type test from one of the STL group laboratories including ICEMET laboratory as specified as evidence of his capability to manufacture such materials.***

***Ratings of which tests do cover should be as mentioned in relative IEC standards.***

**18. DRAWING AND MAINTENANCE INSTRUCTION**

**A- GENERAL**

All drawings shall be to scale and fully detailed. All important dimensions shall be given and the material of which each part is to be constructed shall be indicated.

Drawings for approval shall be submitted in duplicate as paper prints and after having been approved the contractor shall supply six further copies, one being a reproduction on tracing cloth as specified in the specification.

### B-BIDDER'S DRAWINGS

The following is a list of the drawing, which shall be submitted by the tenderer with this offer:

a.	General arrangement and overall dimensions of each package substation.
b.	Outline dimensions of the transformers:
c.	General arrangement of MV metal enclosed RMU with details of transformers turnings, mounting arrangement and foundation plan, incoming and outgoing cable arrangement and details of cable trenches.
d.	General arrangement of 400 volt distribution cubicle with details of transformers trunking, busbars, feeder and instrument panel, mounting arrangement, foundation plan, outgoing cable arrangement and details of cable trenches.
e.	Details of ratio changing arrangements.
f.	Details of off-load tap changer.
g.	Details of the meter and instrument panel.
h.	
i.	General arrangement and dimensions of each prefabricated housing with particulars of the housing materials such as fiberglass steel sheet etc.
j.	Performance curves of the MV fuses in the MV metal enclosed.

### C- CONTRACT DRAWINGS

The following drawings are to be submitted by the contractor for approval within two weeks from the commencement date or within such other period as may be agreed with **EDCO** -:

a.	Drawing corresponding to all drawing submitted by the contractor with his tender.
b.	Drawing showing the contraction of the transformers, tank, tank-cover and terminal arrangements with details of all accessories.
c.	Diagram of connections of the transformers, showing the voltage ratio links and the polarity of the windings.
d.	Drawings of M.V. And L.V. Transformers terminations arrangement.
e.	Drawing of diagram and rating plate.
f.	Drawing of MV cable boxes.
g.	Schematic diagram of the MV metal enclosed.
h.	Diagram of connection of each 400-volt distribution board.
i.	Time / current characteristics of all H.R.C. and H.B.C. Fuses.

D- OPERATION AND MAINTENANCE INSTRUCTIONS:

Before the specified completion date of the contract works the contractor shall submit maintenance instructions, diagrams and record drawings for approval with the engineer and shall supply six further copies of the final approved form.

E- REPRODUCIBLE TRANSLUCENT DRAWINGS

The contract should submit the original reproducible translucent drawings for each approved drawing fitted with EDCO drawing title block.

## **SCHEDULES AND GUARANTEES**

<b><u>SCHEDULE NO.</u></b>	<b><u>DESCRIPTION</u></b>
A	SCHEDULES OF PRICES OF DEFINITE WORK.
B	SCHEDULES OF SUMMARY OF PRICES.
C	GUARANTEED DELIVERY PERIOD SCHEDULE.
D	GENERAL PARTICULARS OF DEFINITE WORK SCHEDULES.
E	TECHNICAL PARTICULARS AND GUARANTEES SCHEDULES.
F	LIST OF TYPE TEST CERTIFICATES.
G	SERVICE EXPERIENCE.
H	MANUFACTURER AND PLACES OF MANUFACTURE, TESTING AND INSPECTION SCHEDULE FOR METERS.
J	MANUFACTURER AND PLACES OF MANUFACTURE, TESTING AND INSPECTION SCHEDULE.
K	PRICE RATES FOR MAIN PLANT AND EQUIPMENT.
L	DEPARTURE FROM SPECIFICATIONS SCHEDULE.

**SCHEDULE (A)**  
**SCHEDULES OF PRICES OF DEFINITE WORK**

To complete each equipment detailed below the Contractor shall provide the necessary oil, compound, all auxiliary apparatus for control boards and their supporting steelwork, panel wiring, fuses interlocking gear, holding-down bolts, screen, guards, labels and all necessary sundries whether specified in detail or not.

ITEM NO.	DESCRIPTION	quantity
1.	<p>Supply and delivery of complete package substation comprising the following:</p> <ul style="list-style-type: none"> <li>-One 1500kVA 33/0.415 kV Dyn11Oil filled transformer as specified.</li> <li>-36kV RMU two on load break switch feeder and one transformer feeder (LLT ) complete as specified with the necessary cables and connections between the transformer and the H.V switchgear.</li> <li>-One 415V distribution board with 3000A busbars and circuit breaker complete as specified and equipped with all metering and instrumentation equipment and MCCB's as specified with the necessary cables and connections with the transformer.</li> <li>-One prefabricated housing for the substation as specified.</li> <li>-One 415V distribution board with 3000A busbars and circuit breaker complete as specified and equipped with all metering and instrumentation equipment and MCCB's as specified with the necessary cables and connections with the transformer.</li> <li>-One prefabricated housing for the substation as specified.</li> </ul>	sets
2.	Ditto but with 1000KVA transformer and appropriate rating for MV and LV switchgear.	sets

Note:

- **All connection between RMU and transformer and between the transformer and L.V panel shall be arranged inside a cable tranche or equivalent in the package and it is all a bidder responsibility.**
- EDCO has the right to modify the above estimated quantities, by increasing the quantities of some items or decrease the quantities of some items and have the right not to order some of the items.

**SCHEDULE (A1 copper winding)**  
**SCHEDULES OF PRICES OF DEFINITE WORK**

To complete each equipment detailed below the Contractor shall provide the necessary oil, compound, all auxiliary apparatus for control boards and their supporting steelwork, panel wiring, fuses interlocking gear, holding-down bolts, screen, guards, labels and all necessary sundries whether specified in detail or not.

ITEM NO.	DESCRIPTION	quantity	UNIT PRICE & CURRENCY .....		CF
			FOB	C & F AQABA	
1.	Supply and delivery of complete package substation comprising of 1500KVA <b>36/0.415</b> kV Dyn11 Oil filled transformer.	1 set			
2.	Ditto but with 1000KVA transformer and appropriate rating for MV and LV switchgear	1 set			

**SCHEDULE (A1 aluminum winding)**  
**SCHEDULES OF PRICES OF DEFINITE WORK**

To complete each equipment detailed below the Contractor shall provide the necessary oil, compound, all auxiliary apparatus for control boards and their supporting steelwork, panel wiring, fuses interlocking gear, holding-down bolts, screen, guards, labels and all necessary sundries whether specified in detail or not.



ITEM NO.	DESCRIPTION	quantity	UNIT PRICE & CURRENCY ..... ...		AF
			FOB	C & F AQAB A	
1.	Supply and delivery of complete package substation comprising of 1500KVA <b>36/0.415</b> kV Dyn11 Oil filled transformer.	1 set			
2.	Ditto but with 1000KVA transformer and appropriate rating for MV and LV switchgear	1 set			

### **PRICES:**

References shown are those under Schedule of Requirements schedule A.

The total prices entered in the prices schedules whether or not they are fully described, shall include everything necessary to provide the equipment complete and in working order in accordance with the provisions of the contract. A price must be entered for each individual item.

### **VARIATION PRICE**

	U.S. Dollar per Ton
Basic Prices for Cu on which the quoted prices are based (BLME) for Cu winding transformers	<b>8800</b>
Basic Prices for Al on which the quoted prices are based (BLME) for Al winding transformers	<b>2200</b>

Authorised source responsible for the publication of current market price is **London Metal Exchange (LME)**

### **LME PRICE ADJUSTMENT FORMULA:**

$$P_{\text{new}} = P_0 (1 + CF (CLME/BLME - 1)) + \text{FREIGHT COST.}$$

Where:

- **P<sub>0</sub>**: Quoted Price (FOB) per unit.
- **CLME**: Current Copper/Aluminum Price as Per London Metal Exchange Closing Price on the Fifth Working Day from the Date of Purchase Order (**Cash Seller**).
- **BLME**: The Copper/Aluminum Price Quoted In The Offer (Base LME)
- **CF**: Copper/Aluminum Factor (Copper/Aluminum value percentage of value).

**IMPORTANT NOTES:**

- (EDCO) HAS THE RIGHT TO ACCEPT PARTIAL OFFERS AND TO AWARD PART OF THE ITEMS OR QUANTITIES WITHOUT ANY LIMIT OR NOTICE.
- THE MINIMUM VALUE PER EACH CALL – OFF ORDER MUST DETERMINE BY BIDDER AND IT IS IMPORTANT FACTOR IN THE EVALUATION AND PRIORITY WILL BE GIVEN TO MINIMIZING THE VALUE.
- DELIVERY TIME IS IMPORTANT FACTOR IN THE EVALUATION AND PRIORITY WILL BE GIVEN TO SHORTER DELIVERY PERIOD OF LESS THAN (90) DAYS C&F AQABA PORT FROM THE DATE OF RECEIPT OF EDCO PURCHASING ORDER.

**SCHEDULE (A2)**  
**SCHEDULE OF PRICES OF SPARE PARTS**  
**RECOMMENDED SPARES FOR PACKAGE SUBSTATIONS**  
**(not required)**

Prices, quantities and description of spare parts are to be recommended by the Tenderer, for operation and maintenance of the package substations stated in Schedule of prices for a period of three years.

ITEM NO.	DESCRIPTION	QTY AND UNIT	UNIT PRICE & CURRENCY .....		TOTAL PRICE C&F AQABA - JORDAN
			FOB	C & F AQABA	
1.	Spares for transformers as recommended (as part of the Package Substation).				
2.	Spares for the M.V. switchgear as recommended (as part of the Package Substation).				
3.	Spares for the L.V. distribution board as recommended (as part of the Package Substation).				
	<b>TOTAL PRICE OF SPARE PARTS</b>				

**The Tenderer should submit full lists of spares with itemized prices for each of the above items in separate sheets.**

**SCHEDULE (A3)**  
**SCHEDULE OF PRICES OF REQUIRED ACCESSORIES AND OTHERS**

Prices of required cable connectors (terminations) are to be completed by Tenderer, suitable for external 36KV & 12KV three core, 240 sq.mm. and 150 sq.mm, Cu/Al conductor, XLPE, SWA cables that will be connected to the incoming/outgoing feeders in the RMU's.

The RMUs are to be controlled/monitored in a SCADA system in the near future, so prices of AC-driven motors for each RMU are to be mentioned.

ITEM NO.	DESCRIPTION		UNIT PRICE & CURRENCY		TOTAL PRICE C&F AQABA - JORDAN
			FOB	C & F AQABA	
1.	Termination For 19/33 (36) kV, 150-300 mm <sup>2</sup> Cu/Al., 3-Cores, copper wire and tape screened, XLPE cable. Armoured (galvanized SWA) for L.B.S feeder.	2 Set for a package			
2.	Termination For 19/33 (36) kV, 150-300 mm <sup>2</sup> Cu/Al., 3-Cores, copper wire and tape screened, XLPE cable. Armoured (galvanized SWA) for transformer feeder.	1 Set for a package			
<b>TOTAL PRICE OF ACCESSORIES</b>					

**Note:**

In the event that it is decided to take the voltage reading through voltage sensors, the tenderer must price a part of the above termination to be equipped with voltage sensors with the determination of the appropriate number for this purpose.

**SCHEDULE (B)**  
**SUMMARY OF PRICES**

Reference Schedule	Description	Total Price C&F Aqaba & Currency .....
A1. Copper winding	Total price of 36KV Package substations	
A1. aluminum winding	Total price of 36KV Package substations	
<b>TOTAL PRICE C&amp;F AQABA PORT for above items</b> <i>(must be appeared in tender agreement summary)</i>		
<b>Cost for one engineer from EDCO to attend factory acceptance test (FAT) for transformers for 4 days including travelling days. at the manufacturer place</b>		
<b>Cost for one engineer from EDCO to attend factory acceptance test (FAT) for RMU for 4 days including travelling days at the manufacturer place</b>		

**IMPORTANT NOTE:-**(EDCO) HAVE THE RIGHT TO ACCEPT PARTIAL OFFERS AND TO AWARD PART OF THE ITEMS OR QUANTITIES WITHOUT ANY LIMIT OR NOTICE.

**SCHEDULE (C)**  
**DELIVERY PERIODS IN DAYS**

This Schedule shall be completed by the Tenderer and the periods entered shall be binding on the Contractor

ITEM NO.	DESCRIPTION	DELIVERY PERIOD FOB PORT OF LOADING-SPECIFY PORT (in days)	DELIVERY PERIOD TO AQABA PORT-JORDAN (in days)
1.	- Complete Package Substation as mentioned previous:		
	- 36/0.415 kV, 1500 KVA		
2.	- Ditto but 1000 KVA		

**SCHEDULE (D-1)**  
**GENERAL PARTICULARS OF DEFINITE WORK**  
**FOR 36KV PACKAGE SUBSTATIONS**

DESCRIPTION	PARTICULARS
-Transformation ratio.....kV	33 / 0.415
-Continuous Maximum Rating.....KVA	1500, 1000
-Type	Outdoor
-Normal MAX voltage between phases.....kV	36
- Normal lower voltage between phases at full load (CMR) and 0.8 p.f. lagging.....kV	0.415
-Number of phase	3
-Frequency.....cycle /sec	50

-Type of transformation Ratio Control.	Off system H.V. winding reconnection
-Type of M.V. Control Gear	Ring main units
-Type of L.V Distribution Equipment	MCCB Distribution Board
-Location of main instruments and metering	In 415 V distribution Board
-Provision of street lighting circuits	requisite

**SCHEDULE (D-2)**  
**GENERAL PARTICULARS OF DEFINITE WORK**  
**RING MAIN UNITS AS PART OF 36KV PACKAGE SUBSTATION**

DESCRIPTION	PARTICULARS
-Highest System Voltage.....kV	36
Frequency.....HZ	50
-Short circuit rating for 1 second .....KA	16kA
-Busbar rating .....Amps	630
-Isolating Switch Rating.....Amps	630
-Method of Closing Isolators	Manual and motorized
-Method of Tripping Isolators	Manual and motorized
-Transformer feeder rating(CB).....Amps	630
-Method of Closing C.B	Manual and motorized
-Whether Earth Fault Indication is Required.....Sets	Yes
-Location of Units.....	inside package

-Padlocks required for all Switch Units and Compartments	Yes
Type of Busbar Insulation .....	(SF6)
Type of Isolating Switch Insulation .....	(Vacuum or SF6)

### **Technical data for load break switch**

No.	Description		(36kV)
1	(a) Type of Isolator (b) Class Designation (Catalogue ref. No.) (c) Mounting (d) Remote/Manual		
2	Number of phases		.....
3	Rated normal current at site	A	.....
4	Rated voltages	kV	.....
5	(a) Nominal system voltage	kV	.....
6	(b) Highest system voltage	kV	.....

7	Rated frequency	Hz	.....
8	Single capacitor bank breaking capacity	A	.....
9	Method of opening		.....
10	Type of Operating mechanism for closing		.....
11	Normal voltage for operation of closing mechanism	V	.....
12	Rated making capacity	kA peak	.....
13	Rated breaking capacity: (a) Symmetrical (b) Asymmetrical (c) Rated short time current (d) Rated duration of short circuit (e) X/R ratio	kA kA kA S	..... ..... ... ..... .... ..... ... ..... ...
14	Type of main contacts		..... ....
15	Voltage reading (sensors , CVI or VT)		
16	Type of arcing contacts		..... ....



16	Type of arc control device		..... ....
17	Type of Bushing?		..... ....
18	Material of Bushing?		..... ....
19	Insulation media		..... ...
20	Current rating of bushing		..... ....
21	Type of terminal and the applicable conductor size		..... ....
22	Is arcing horns provided		..... ....
23	Voltage drop across main contacts at normal current Contact resistance.	V Ohm	..... ...
24	Does magnetic effect of load current increase Contact pressure?		..... ....
25	Weight of whole Isolator equipment complete with all fittings as in service.	Kg	..... ....
No.	Description		(36kV)
26	Dynamic weight of whole Isolator equipment complete with all fittings as in service	Kg	.....

27	Minimum clearance in air :		
	(a) Between phases	mm	.....
	(b) Live parts to earth	mm	.....
28	Creepage Distance	mm	.....
29	Protected distance	mm	.....
30	Material of tank or container (For SF6 Load Break Switch Option)		.....
31	Thickness of Tank (For SF6 Load Break Switch Option)		.....
32	Thickness of tank or container:		
	(a) Walls.	mm	.....
	(b) Bottom.	mm	.....
33	Size of tank or container:		
	(a) Diameter or rectangular dimensions.	mm	.....
	(b) Length.	mm	.....
34	Material of top plate.		.....
35	Thickness of top plate.	mm	.....
36	Method of attaching top plate to main tank		.....
37	Volume of insulating medium SF6 gas option.		.....

No.	Description		
			(36kV)
38	Operating pressure of SF6 gas option	Bar	.....
39	Hermetically sealed for life	yes/no	.....
40	Impulse withstand voltage 1.2/50 micro second		
	(a) Between earth and terminals of switches (of same phase). (b) Across the terminals of open switches.	kV kV	..... .....
41	Power frequency withstand voltage wet (1min.)		
	(a) Between earth and terminals of switches (of same phase). (b) Across the terminals of open switches.	kV kV	..... .....
42	Temperature rise for		
	(a) Contact (b) Terminals	°C °C	..... .....
43	Dimensions of control cabinet	mm	.....
44	Weight of control cabinet	Kg	.....
45	Protection category (IP) of Control cabinet		
46	Connection between Control cabinet and Isolator		.....

No.	Description		36kV
47	Whether the following Test Certificates accordance with the applicable IEC standards furnished?	yes/no	.....
	(a) Withstand voltage tests	yes/no	.....
	(b) Continuous current tests	yes/no	.....
	(c) Switching tests	yes/no	.....
	(d) Short-time withstand current tests	yes/no	.....
	(e) Fault-making current tests	yes/no	.....
	(f) Condition of the Isolator after switching tests, short-time withstand current tests, and fault making current tests	yes/no	.....
	(g) Partial discharge tests	yes/no	.....
	(h) Radio influence voltage (RIV) tests	yes/no	.....
	(i) Operating duty tests		
	(j) Minimum actuating current tests		
48	Name and location of testing laboratories?		.....
49	Whether the Quality Assurance Certification conforming ISO 9001 furnished	yes/no	.....
50	Place of testing, if outside the place of manufacture		.....
51	Name of Manufacturer		.....
52	country of origin		.....
53	The manufacturer's years of experience for the same type of Isolator provided?		.....

## **VOLTAGE TRANSFORMER**

Item No.	Description	36kV
1	Manufacturer	
2	Type and class of insulation	
3	Number of phases per unit	
4	Standard rated output per phase for each secondary winding	VA
5	Rated voltage: a. primary b. secondary	
6	Standard accuracy classification	
7	Maximum error at rated burden and 5% normal primary voltage: a. voltage ratio b. voltage phase angle	% min
8	Maximum error at rated burden and primary voltage and 95% frequency: a. voltage ratio b. voltage phase angle	% min
9	Total quantity of oil per unit (if applicable)	Liter
10	Weight of complete transformer	Kg
11	Protection in the HV winding: a. type b. rating	

## **CURRENT TRANSFORMER**

Item No.	Description	36kV
1	Type of insulation	
2	Number of phases per unit	
3	Standard rated output: a. ratio for metering service b. output for metering	
	Primary/secondary amps VA	
4	Standard accuracy classification: a. for metering service	
5	Instrument security factor for metering Service	
6	Frequency range over which above accuracies apply: a. primary continuous thermal current rating b. rated short—time thermal current rating e. rated short-time dynamic current rating	
	Hz A A A	
7	Resistance of secondary winding at 75C°: a. for metering service	
	Ohm	

## **Voltage Sensor**

Item No.	Description	36kV
1	Manufacturer and Type	
2	Primary/secondary ratio	
3	Standard accuracy classification: 0.5 a. for metering service	
4	Operating Frequency :50 Hz	
5	Material	

### **Current Sensor**

Item No.	Description	36kV
1	Manufacturer and Type	
2	Primary/secondary ratio	
3	Standard accuracy classification: 0.5 a. for metering service	
4	Operating Frequency :50 Hz	

**SCHEDULE (D-3)**  
**GENERAL PARTICULARS OF DEFINITE WORK**  
**400 VOLT DISTRIBUTION BOARD**  
**AS PART OF THE PACKAGE SUBSTATIONS.**

DISCRIPTION	1500 KVA	1000 KVA
-Main Busbar: Phases.....Amps	3000	2000
-Earth or Neutral.....Amps	1500	1000
-Main incoming circuit breaker.....Amps	2500	2000
-Current transformer	2500- 1250/5	2000- 1000/5
-Short circuit rating.....M.V.A	25	25
-Minimum Clearance in air between phases.....mm	25.4	25.4
-Minimum Clearance in air phase to Earth .....mm	20	20
-Busbar Insulation	GIS	GIS
-Number of Outgoing Feeders	8	6
- Outgoing MCCB rating .....A	630	630
-Are street lighting sub distribution equipment required with main 60A isolator and 3 MCB SP ways	Yes	Yes



**SCHEDULE (E)**  
**TECHNICAL PARTICULARS AND GUARANTEES FOR DISTRIBUTION TRANSFORMERS**

The tenderer shall complete this schedule, and the particulars and guarantees will be binding on the contractor.

REQUIREMENTS	Unit	ITEM (1)	ITEM (2)
Maximum continuous site rating (ONAN)	KVA	1500	1000
Number of phases		3	3
Normal ratio of transformation	KV	36/0.415	36/0.415
Frequency	Hz	50	50
Type of cooling		ONAN	ONAN
Vector group reference IEC 76		Dyn11	Dyn11
Type of transformation ratio control.		OFF-LOAD	OFF-LOAD
Range of transformation ratio HV/LV	%	±5	±5
Size of transformation ratio steps.	%	2.5	2.5
<b><u>PARTICULARS AND GUARANTEES</u></b>			
Impedance at 75° C on principal tapping	%		
Maximum flux density in core at normal voltage and frequency	TESL A		
Type of core steel			
Thickness of laminations	mm.		
Insulation of laminations			
Type of paper insulation on conductors			
No load losses at normal ratio and 50 Hz	KW		
Load losses at CMR, 75° C and normal ratio	KW		
-Efficiency at :- Full load unity P.F.        % Full load 0.8 P.F.        % 3/4 Full load unity P.F    % 3/4 Full load 0.8 P.F.    % 1/2 Full load unity P.F    % 1/2 Full load 0.8 P.F.    %			

REQUIREMENTS	Unit	ITEM (1)	ITEM (2)
R.M.S. Exciting current at normal voltage on principal tap (H.V-side)	Amps		
-R.M.S Fundamental current	Amps		
-R.M.S 3rd harmonic current	Amps		
-R.M.S 5th harmonic current	Amps		
-R.M.S 7th harmonic current	Amps		
Maximum current density In windings at CMR on Normal tap :-			
(a) H.V windings	Amps/mm <sup>2</sup>		
(b) L.V windings	Amps/mm <sup>2</sup>		
Impedance voltage at 75°C (at CMR of lower voltage winding) between HV and LV winding.			
Temperature rise of windings at CMR above specified design ambient temp.	°C		
Temperature rise of top oil at CMR above specified design ambient	° C		
Temperature rise of core at CMR and rated voltage			
Impulse withstand voltage of complete transformer :-			
Phase connections			
(I) 1.2 /50 Microsecond full wave	kV (peak)		
(II) 1.2 /50 Microsecond chopped wave	kV (peak)		
-Thickness of Transformer tank :-			
A- Sides	mm.		
B- Bottom	mm.		
C- Cooling tubes	mm.		
Total oil required	Liters		
The offered transformer is similar to the type and special tested transformer in one of the STL group laboratory	Yes/N o		

REQUIREMENTS	Unit	ITEM (1)	ITEM (2)
Weight of complete transformer (including oil)	Kg		
<b><u>H.V. BUSHING INSULATORS</u></b>			
Make			
Type			
Voltage rating	KV		
Current rating	Amps		
Length of insulator (Overall)	mm.		
Weight of insulator	Kg		
Total creepage distance of bushing (min 32/mm/kV of rated system voltage)	mm.		
Protected creepage distance of bushing	mm.		
Dry withstand power frequency voltage without arcing horns	KV		
Routine power frequency test voltage (1 minute)	KV		
Impulse withstand voltage (1.2/50 microsecond full wave): (A) Positive (B) Negative			
Wet withstand power Frequency voltage without arcing horn	KV		
Maximum diameter of bushing when passing through tank top	mm.		
Penetration of bushing into tank measured from bottom of fixing flange	mm.		
Overall dimensions of complete transformer:-			
Length	mm.		
Width	mm.		
Height	mm.		
Manufacturer name and place			
Testing Authority name and Place			

**SCHEDULE (F)**  
**LIST OF TYPE TEST CERTIFICATES FOR THE COMPONENT OF  
THE PACKAGE SUBSTATION**

Tenderers shall provide the information required below for the type test certificates from the determined testing station covering the equipment offered (Package, RMU, Transformer & LV components) to IEC recommendations & shall be submitted with the tender.

Failure to provide copies of type test certificates/reports will result in rejection of the tender.

Type test made on identical designs of equipment to those offered	Certificate No.	Certificate Authority

**SCHEDULE (G-1)**  
**SERVICE EXPERIENCE OF COMPLETE PACKAGE SUBSTATIONS**

Tenderers shall provide the information required below for the service experience of the package substation.

<b><u>Customer</u></b>	<b>KVA Rated</b>	<b>Rated Voltage (KV)</b>	<b>No. of Packages</b>	<b>No. of years in service</b>

**SCHEDULE (G-2)**

**SERVICE EXPERIENCE OF TRANSFORMERS**

Tenderers shall provide the information required below for the service experience of the package substation .

<b><u>Customer</u></b>	<b>KVA Rated</b>	<b>Rated Voltage (KV)</b>	<b>No. of Transformers</b>	<b>No. of years in service</b>

**SCHEDULE (G-3)**

**SERVICE EXPERIENCE OF RING MAIN UNITS**

Tenderers shall provide the information required below for the service experience of the package substation.

<b><u>Customer</u></b>	<b>Rated Voltage (KV)</b>	<b>No. of RMU's</b>	<b>No. of years in service</b>

**SCHEDULE (G-4)**

**SERVICE EXPERIENCE OF LV PANELS**

Tenderers shall provide the information required below for the service experience of the package substation.

<b><u>Customer</u></b>	<b>No. of Panels</b>	<b>No. of years in service</b>



**SCHEDULE (J-1)**  
**MANUFACTURERS AND PLACES OF MANUFACTURE AND TESTING**

Item	Manufacturer	Place of Manufacturer	Place of Testing and Inspection
<u>1- HOUSINGS</u>			
<u>2- DISTRIBUTION TRANSFORMERS</u>			
Transformers			
HV Bushings			
LV Bushings			
Porcelain for insulators			
Insulating cylinders			
Insulating Paper			
Tap Changers			
Copper/aluminum			
Core plates			
Steel. Castings			
Tanks			
Oil			
Radiators			
Temperature Indicators			
Pressure relief			
De-hydrating breather			
Oil valves			

Oil piping Gaskets			
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SCHEDULE (J-2)  
MANUFACTURERS AND PLACES OF MANUFACTURE AND TESTING

Item	Manufacturer	Place of Manufacturer	Place of Testing and Inspection
<u>3- RING MAIN UNITS</u>  Complete RMU  C.B with self power relay  Voltage indicators  Current transformer  Voltage transformer  Current sensor  Voltage sensor  <u>4- LV PANELS</u>  Complete Panel  MCCB  Current Transformer  Terminal Test Block			

The Tenderer shall state the town and country where Manufacture, Testing and Inspection are to take place.

**SCHEDULE (K)**  
**PRICE RATES FOR MAIN PLANT AND EQUIPMENT**

The prices rates in this schedule shall be based on the unit rates used in compiling SCHEDULE A (where appropriate), and the unit rates in SCHEDULE A and K shall be used for any increase or decrease in the contract works in accordance with the conditions of contract.

<b><u>ITEM</u></b>	<b>CURRENCY .....</b>		
	<b>F.O.B Unit</b>	<b>FREIGHT Unit</b>	<b>TOTAL Price C&amp;F Aqaba</b>
<b><u>1. 36KV RMU</u></b>  One RMU One cable feeder unit One transformer feeder unit One C.B with self power relay			
<b><u>2. 36KV Transformer</u></b>  - 36/0.415 kV, 1500 KVA  - Ditto but 1000 KVA  -			

**SCHEDULE K (continued)**  
**PRICE RATES FOR MAIN PLANT AND EQUIPMENT**

<b><u>ITEM</u></b>	<b>CURRENCY .....</b>		
	<b>F.O.B Unit</b>	<b>FREIGHT Unit</b>	<b>TOTAL Price C&amp;F Aqaba</b>
3. Complete LV Distribution Board			
- For 1500 KVA			
- Ditto but 1000 KVA			

**SCHEDULE K (continued)**  
**PRICE RATES FOR MAIN PLANT AND EQUIPMENT**

<b><u>ITEM</u></b>	<b>CURRENCY .....</b>		
	<b>F.O.B Unit</b>	<b>FREIGHT Unit</b>	<b>TOTAL Price C&amp;F Aqaba</b>
<u>4. MCCB AS SPECIFIED</u>			
- 2500A			
- 2000A			
5. Housing			
- 36/0.415 kV, 1500 KVA			
- Ditto but 1000 KVA			

**SCHEDULE K (continued)**  
**Repeating Type and/or Special Tests of MV Switchgear**

Tenderes are to detail below the cost of repeating special and/or type tests of all types of RMU's, Disconnecter Switches and Transformers offered in their tender, together with any extension in completion date required to allow for this additional testing. Reference should be made to relevant clauses of the Technical specification regarding this.

If it is established that additional type tests are necessary to meet the specified requirements of the contract, then these shall be carried out at the contractor's expense, the contractor shall also bear the cost of any repeat type tests should the one of above materials fail the additional or repeat type tests the contractor will be required to supply alternative ones which does comply with the specification (from another manufacturer, if necessary). The cost of the alternative ones and any type tests necessary shall be to the contractor's account.

Tenderers are required to complete this price schedule irrespective of whether or not type tests certifications are available.

<b>Description of 36 KV Metal-Enclosed Tests as per related IEC</b>	<b>Contact extension required (months)</b>	<b>Cost of test (Currency.....)</b>

<b>Description of 36KV transformers Tests as per related IEC</b>	<b>Contact extension required (months)</b>	<b>Cost of test (Currency.....)</b>

**SCHEDULE (L)**  
**DEPARTURE FROM SPECIFICATION IF ANY**  
**TO BE COMPLETED BY THE TENDERER**

ITEM NO.	BREIF DESCRIPTION	DEPARTURE