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No.: EL/WK/2830

Date: 02/05/2024

EXPRESSION OF INTEREST

To,

_____.

Sub: **"Removing, Shifting & Re-erection the Electrical Substation equipment's from 6th berth S/s to proposed location thereof inside cargo jetty area."**

Sir,

You are requested to submit the Expression of Interest for the work of **"Removing, Shifting & Re-erection the Electrical Substation equipment's from 6th berth S/S to proposed location thereof inside cargo jetty area"** as per schedule-B, Scope of Work and Terms & Conditions.

The Expression of Interest should reach to this office on or before 20/05/2024 and also scanned copy of EOI shall be accepted through e-mail address xenedpa@gmail.com which shall be opened on same day.

Yours faithfully

- Sd/-
Executive Engineer (E)
Deendayal Port Authority

Schedule-B

**Name of Work: Removing, Shifting & Re-erection the Electrical Substation equipment's
from 6th berth S/s to proposed location thereof in side cargo jetty area.**

Sr. No.	Description	Qty.	Unit	Rate	Amount
Part A : Electrical Item					
1	Removing & shifting of the following equipment's as per Tech Spec. No:- 1 a) 500 KVA Distributions Transformer. b) RMU of 12 KV, 630 Amps 21 KA Outdoor mounted RMU Unit. c) LT panel (Way-15)	1 1 1	No No No		
2	Re-Erection, Testing & commissioning of the following equipment's as per Tech. Spec. No. 2 a) 500 KVA Distributions Transformer. b) RMU of 12 KV, 630 Amps 21 KA Outdoor mounted RMU Unit	1 1	No. No		
3	Supply at site 3 Core armoured HT aluminium conductor XLPE cable of 11 KV grade, following rating of the as per Technical Specification No. 3 A). 3C X 150. Sq. mm.	500	Mtr		
4	Supply at site 4 Core armoured LT aluminium conductor XLPE cable of 1.1 KV grade, following rating of the as per Technical Specification No. 4 A) 4C X 95 Sq. mm. B) 4C X 50 Sq. mm. C) 4C X 35 Sq. mm.	300 300 300	Mtr. Mtr. Mtr.		

5	Laying HT/LT armoured aluminium conductor cable 3.5/4 Core up to 35 Sq. mm. to 150 Sq. mm. as per Technical Specification No. 5 a) Through HDD, with HDPE Heavy Duty Pipe. b) In Existing RCC Trench c) Hard & soft Soil	300 200 400	Mtr. Mtr. Mtr.		
6	Supply at site following way LT Distribution Panel (as per proven design) as per Technical Specification No. 6 15 Ways (2 I/C, 1 Bus Coupler, 12 O/G).	1	No.		
7	Installation, Testing & commissioning of LT Distribution Panel as per Technical Specification No. 7	1	No.		
8	Providing & connecting following type of earth wire from Earth Station to Equipment as per requirement as per Tech. Spec. No. 8 a) 25 X 3 mm. Copper Strip. b) 25 X 3 mm. Hot DIP GI Strip. c) 8 SWG GI Earthing Wire	25 80 50	Mtr. Mtr. Mtr.		
9	Supply & Preparation of Earthing Station, TFC, Chemical Treated back filled compound earthing system as per Technical Specification No. 9 a) Pipe-In-Pipe 50-60 mm. Dia. GI type 3 Mtr. depth, for Transformer body earth, Maintenance free.	12	Mtr.		
10	Supply of 3 Star rating 500 KVA 11/0.433 KV indoor type Distribution Transformer as per Technical Specification No. 10	1	No.		

11	Installation, testing & commissioning of 500 KVA 11/0.433 KV indoor type Distribution Transformer as per Technical Specification No. 11	1	No.		
12	Supply of TPN Double Door IP 42 DB 4 ways Distribution Board as per Technical Specification No. 12	1	No.		
13	Fixing of TPN Double Door IP 42 DB 4 ways Distribution Board as per Technical Specification No. 13	1	No.		
14	Supply of following type of MCB as per Technical Specification No. 14				
	a) 40A TPN MCB with 10kA Breaking Capacity	1	No.		
	b) 32A SP MCB with 10kA Breaking Capacity	3	No.		
15	Fixing of TPN/SP MCBs with 10 kA Breaking Capacity as per Technical Specification No. 15	4	No.		
16	Providing & fixing of surface wiring with 2 X 2.5 Sq. mm. copper conductor (single phase and neutral) for single phase sub-circuit from the DB/MCBs to the switch board as per Technical Specification No. 16	30	Mtr.		
17	Providing and fixing surface wiring with 1.5 Sq. mm. copper conductor for light /tube point with PVC insulated single core standard copper conductor wire as per Technical Specification No. 17	17	No.		
18	Providing and fixing surface wiring for 20A & 10A, 240 Volt, 50Hz Power point as per Technical Specification No. 18	1	No.		

19	Supply & Installation of surface mounted 20 Watt LED Tube light luminary complete with batten as per Technical Specification No. 19	12	No.		
20	Supply at site 300mm sweep exhaust fan as per Technical Specification No. 20	3	No.		
21	Fixing of 300mm sweep exhaust fan as per Technical Specification No. 21	3	No.		
22	Supply of Heat shrink straight through Joint kit for 11KV, 3C x 150 Sq.mm H.T XLPE cable as per Technical Specification No. 252	12	No.		
23	Fixing the Heat Shrink Straight through Joint kit for 11KV 3C x 150 Sq.mm H.T XLPE cable as per Technical Specification No.23	12	No.		
24	Supply of Heat shrink long sleeve & boat, suitable for RMU End termination kit (Indoor Type) for 11KV 3C x 150 Sq.mm H.T XLPE cable as per Technical Specification No. 24	8	No.		
25	Fixing of Heat shrink long sleeve & boat, suitable for RMU End termination kit (Indoor Type) for 11KV 3C x 150 Sq.mm H.T XLPE cable as per Technical Specification No. 25	6	No		
26	Supply of heat shrink straight through Joint kit of 1.1KV XLPE 4 Core Aluminium armoured cable of following sizes as per Technical Specification No.26 a) LT 4C x 35 Sq.mm cable b) LT 4C x 70 Sq.mm cable	10 10	No. No.		
27	Making of heat shrink straight through Joint Kit suitable for L.T. 1.1 KV XLPE 4 Core armoured cable of following size as per Technical specification No.27 a) LT 4C X 35 Sq. mm. cable	10	No.		

	b) LT 4C X 70 Sq. mm. cable	10	No.		
Total:					
<p>(In words Rupees _____ only)</p> <p>(Note : The rates should be inclusive of all taxes, duties, fees, cess etc. and all incidental charges; but exclusive of GST)</p> <p style="text-align: center;"> Signature & Seal of Contractor Executive Engineer (E) Deendayal Port Authority </p>					

Section V

TECHNICAL SPECIFICATIONS & SCOPE OF WORK

Name of work – Removing, Shifting & Re-erection the Electrical Substation equipment's from 6th berth S/s to proposed location thereof in side cargo jetty area.

1.0 GENERAL:

- 1.1 All equipment and material shall be designed manufactured and tested in accordance with the latest applicable IEC standard.
- 1.2 Equipment and material conforming to any other standard, which ensures equal or better quality, may be accepted. In such case copies of English version of the standard adopted shall be submitted.
- 1.3 The electrical installation shall meet the requirement of Indian Electricity Rules- 1956 as amended up to date; relevant IS code of practice and Indian Electricity Act-1910. In addition, other rules and regulations applicable to the work shall be followed. In case any discrepancy, the most stringent and restrictive one shall be binding.
- 1.4 The high-tension switchgear offered shall in general comply with the latest issues including amendments of the following standards but not restricted to them.

Technical specification 1 for Item No. 1

The work includes removal of old 500 KVA transformers, RMU shifting at proposed location. LT Panel and all the defective Equipment's deposited main store Kandla, from the respective substations with all handling equipment's, transportation, labour, loading unloading etc. as directed by EIC.

Technical specification 2 for Item No. 2

Re-Erection, Testing and Commissioning of supplied 500 KVA 11/0.433 KV indoor type distribution transformer at proposed site including transformer foundation and civil work. All cable termination in both HV & LV side including termination at LT panels as well as earthing of transformer as per IER. This includes Installation, testing & Commissioning of supplied RMU (Ring Main units) outdoor type SF6 filled, with various combinations of load break isolators & breakers. (including earthing- Erection of earthing by using GI strip (minimum 35mm strip) with earthing plate including cost of coal/salt to RMU). The Installation of 11KV Outdoor SF6 Insulated RMU covering erection, testing and commissioning with associated equipment including civil work, supply & laying of 11kv cable, cable jointing kit etc. of RMU. The permission of Electrical inspector for charging of RMUs is in bidder scope. RMU fencing as shown below is in the scope of bidder the length and width of the fencing before erection the drawing should be

approved by Engineer-in Charge. Cable termination kits, cable laying is in bidder scope.

All the RMU Panel application shall be erected by using suitable size of M.S. channel (to be supplied & erected by contractor, as per each module approved foundation drawing) foundation bolts including grouting of the bolts of each Module RMU panel. Each RMU panel shall be connected with 2 separate and distinct earthing system. After installation of RMU panel, necessary test and trial are to be carried out for proper functioning of safety, devices, relay etc. and before charging RMU Panel, all the tests required under relevant ISS and IEC – Rules 1956 shall be carried out and the result shall be in conformity with specifications and copies of test results shall be furnished to Engineer-in-Charge. The work includes supply & fixing of required length of insulated Rubber Mat having withstand capacity up to 22 kV, the Rubber Mat shall be laid in such a way, near the panel for operation of RMU.

The complete work shall be carried out as directed by Engineer-in-Charge. The side cable fix/adopter box wherever necessary/required shall be provided. If required, some alteration / modification is in the scope of contractor as per the instructions of Engineer-in-Charge. The work includes all labour & material required for installations, testing and commissioning of RMU as directed by Engineer-in-Charge.

Technical specification 3 for Item No. 3

This includes supply at site HT, 11 KV XLPE armoured cable with aluminum conductor of size 3 C X 150 sq.mm. With ISI mark confirming to IS:7098 (Part-II) 1985 with up-to-date amendments and of approved make.

Cables is to be supplied in single length and cable with joint shall not be accepted. The price quoted by the contractor shall be inclusive of all taxes, VAT, excise duty, Octori packing and forwarding, insurance, transportation and unloading at site of work. No escalation in the rate of cable shall be accepted at later stage, the rate quoted shall be per meter length of the cable. The quantities of cable shown in Schedule “B” are tentative and contractor is required to assess the actual requirements before procuring the cable. The cable shall have marking at an interval of every meter, showing its progressive length after every meter so as to facilitate the measurement of total length after laying of cable.

Technical specification 4 for Item No. 4

This includes supply at site 1.1 KV grade, 4 Core Cable various size cable as per schedule ‘B’ Aluminum conductor, XLPE insulated armored cable confirming to IS : 7098 (Part-I) 1985 with up to date amendments and of approved make with ISI mark. The cable shall have marking/embossing at the interval of every meter showing its progressive length. The contractor shall produce the routine test certificate during supply of cable at site. The rate shall inclusive of all

taxes (excluded GST), duties, packing, forwarding, insurance, and transportation and unloading at site of work etc.

Technical Specification No. 5 for item no 3,4

This includes laying of cable size up to size of cable up to various size 3.5/4.0 Core HT/LT armored aluminum Conductor XLPE Cable.

(a) In Rail Crossing/RCC Road Crossing through HDD: -

Cable shall be laid underneath by using {6" Boar Diameter} Horizontal Directional Drilling (HDD) method by putting suitable diameter HDPE (suitable for cable size up to HT 3CX 400 Sq.mm) HDPE pipe having strength 10Kg/sq.cm} shall in contractor scope), the contractor shall have arranged JCB Machine for excavation, water for drilling, de- watering pump, HDD equipment's at their own cost. The cable shall be pass through heavy duty HDPE pipe buried at nominal minimum depth 165 cm or according to construction of RCC Road/ Rail network or as per directed by EIC. For single cable individual DWC pipe shall be pass through a road /rail crossing, for separate cable; separate HDPE pipe shall pass through the Tunnel / trench. Lying of HDPE pipes coupled by HDPE socket only after standard length in excavated trench/tunnel and also sealing of HDPE pipe ends by suitable cap at every manhole. Back filling & dressing of excavated trenches as per specification. This includes all labour and material as directed by Engineer-in-Charge.

Technical specification no 6 for Item No. 6

This includes design, manufacture and supply at site Main LT Distribution Outdoor Panel suitable for 415 Volts, 3ph, 4 wire, 50 Hz. AC supply system including all switchgears and internal wiring. The panel shall be dust and vermin proof, single front type, indoor type, and fabricated from CRCA sheet steel of 2.0 mm. thickness. The panel shall be mounted on 75 mm. x 40 mm. "C" Channel. The panel shall be painted with SIEMENS grey paint. Before painting the panel, the surface treatment shall be carried out by 7-tank process. The panel shall be provided with metallic engraved/Radium film labels on front for identification of Incoming & Outgoing feeders as directed. The neoprene gaskets shall be provided on the periphery of the doors of all feeders. The sleeved electrolytic copper busbars with epoxy insulators with Bakelite support and separators shall be provided with colour code. The panel shall be complete in all respect with cable glands, lugs for incoming & outgoing cables and also shall be provided with 8 nos. of earthing terminals.

The panel shall be comprised with following accessories:

1. INCOMER FEEDERS

Main Incomer Feeders (2 nos.).

The Main Incomer Feeder shall be provided with 2 nos. 630 Amps. X 415 Volts Triple Pole – MDO (Draw out type) ACBs (Air Circuit Breaker) with Microprocessor released over current, Short circuit and Earth fault relay for each feeder. The Digital Multi-function Meter 1 No. for each feeder with LCD display shall be provided with parameters like KWH, MD, Voltages of each phase, Line current for each Phase, P.F of each Phase, P.F average, Instantaneous kW, Frequency & Date & Time.

The LED Indication lamps 6 nos. for R, Y, B, ON, OFF and trip indication shall be provided on each feeder. The 3 nos. CTs having ratio of 630/5 Amps shall be provided for metering on each feeder and 4 nos. control fuses / neutral links are to be provided with each incomer & the control wiring shall be done with copper wire. The Incomers shall be mechanically and Electrically interlocked.

2. OUTGOING FEEDERS

A) OUTGOING FEEDERS TYPE-1 (4 Nos.):

This type of Outgoing Feeders shall be provided with 4 nos. 250 Amps. X 415 Volts, 35/36kA Breaking Capacity Triple Pole MCCB (Moulded Case Circuit Breaker) for each feeder. The LED Indication lamp 1 no. for ON indication shall be provided on each feeder. The control wiring & power wiring shall be done properly and the power wiring shall be brought up to the Power terminal block of suitable ampere capacity.

A) OUTGOING FEEDERS TYPE-2 (4 Nos.):

This type of Outgoing Feeders shall be provided with 4 nos. 125 Amps. X 415 Volts, 35/36kA Breaking Capacity Triple Pole MCCB (Moulded Case Circuit Breaker) for each feeder. The LED Indication lamp 1 no. for ON indication shall be provided on each feeder. The control wiring & power wiring shall be done properly and the power wiring shall be brought up to the Power terminal block of suitable ampere capacity.

C) OUTGOING FEEDERS TYPE-3 (3 Nos.): This type of Outgoing Feeders shall be provided with 4 nos. 63 Amps. X 415 Volts, 35/36kA Breaking Capacity Triple Pole MCCB (Moulded Case Circuit Breaker) for each feeder.

The LED Indication lamp 1 no. for ON indication shall be provided on each feeder. The control wiring & power wiring shall be done properly and the power wiring shall be brought up to the Power terminal block of suitable ampere capacity.

The panel shall be designed, fabricated and supplied from manufacturers who are having type test certificate holders, i.e. CPRI/ERDA of similar capacity not less than 3 years. Before manufacturing the panel the drawing of panel shall be submitted for approval of KPT. The material shall be used from approved make list and got approved from Engineer-in-Charge.

Technical Specification No.7

This includes erection / Installation, testing and commissioning of 630 A x 415/500V 15 Way L.T distribution panel, dust and vermin proof, free standing, compartmentalized, fabricated from 2mm thick SWG CRCA sheet steel.

The cubical panel shall be firmly installed in proposed new substation at proposed location the trench line with proper size of foundation bolts on "C" channel of 75 x50 x 6 mm size after proper alignment of the panel. The channel shall be properly grouted on the floor / CC foundation using proper size of grouting bolts as desired by Engineer-in-charge.

This includes end terminations of Incoming and outgoing cables in all respect with cable glands, lugs for incoming & outgoing cables and also connections of earthing with 2 nos. of earthing terminals with supplied panel. The panel shall be commissioned as per relevant IS specification and IE rules-1956 with update amendments. The results of the test shall be confirming to the relevant IS specification and copies of the results shall be furnished to Engineer-in-charge by Contractor. The work includes all labour and material including necessary civil work as directed by Engineer-in-Charge.

Technical Specification No.8

This includes supply at site, laying, fixing and connecting of G.I strip of size 25x3 mm from earth station/existing earthing system to Transformer, H.T panel, H.T isolator, L.T panel etc as the case may be. This also includes laying and connecting of transformer neutral shall be earthed with two separate distinct copper flat of size 25x3mm. The copper strip shall be properly buried in the ground / flooring including the floor shall refill as per original. The strip shall be connected through copper nut, bolt and washer of size not less than 12mm etc.

The G.I strip also shall be laid from earth station to HT panel/LT Panels/Isolator etc. directly to two separate and distinct earths, buried in the ground / pucca trench / wall as the case may be and shall be clamped suitably wherever it is possible.

The work includes all material & labour required shall done as directed by Engineer-in-charge.

General:

- I) The earthing system shall conform to relevant provisions of code of practice under IS:3043 and shall be carried out in accordance with requirement of IE Rules 1956 as amended from time to time.
The following are practically applicable:
Rule No: 32,51,61,67,68,69 & 90.
- II) All medium voltage equipments shall be earthed by two separate & distinct connections with earth through earth electrode.
- III) In case of high voltage, the neutral point shall be earthed by not less than two separate & distinct connections with the earth having its own electrodes.
- IV) The metal conduit, trucking, cable sheath, switchgear, distribution board, feeder pillar, Armour of the cable shall be connected by two separate & distinct connections with the earth.
- V) The neutral point of distribution transformer shall be connected directly to the earth through copper flats having distinct earth points.

- VI) The value of the earth system resistance shall not be more than 5 Ω .
- VII) The earth electrode shall be designed to have a loading capacity adequate for the system for which it forms a part i.e. it should be capable of dissipating without failure of energy in the earth path at the point at which it is installed under any condition of operation of the system. The contractor shall prepare & submit six sets of drawing showing the main earth connection & earth electrodes.

Technical Specification No.9

- 1) This includes preparation of earth station with chemical treated back filled compound 50 mm dia Pipe In Pipe GI Type 2 Mtr Depth , Maintenance free including all accessories & Masonry work Enclosure with cover plate.
2. A cement concrete (ratio 1:4:8) chamber of at least 30 Cm. x 30 Cm. shall be provided just below the surface of ground over the funnel for watering and having RCC/CI cover of suitable size as directed. This also includes removal of extra-excavated earth from the site. The work shall be carried out to entire satisfaction of Engineer-in-charge. This work includes all labour and material as directed by Engineer-in-Charge. The works also include earthing value marking & painting on earth strips & earthing station by suitable paints (Green Color on Strips) and also mentioned the earth value on earth pits.

Technical Specification No. 10

Supply of 3 star rating 500 KVA 11/0.433 KV indoor type distribution transformer.

- | | |
|-------------------------------|--------------------------------------|
| 1. Rating | : 500 KVA |
| 2. Voltage Ratio | : 11/0.433 KV |
| 3. Vector Group | : Dyn-11 |
| 4. Tapping Range/steps | : - 5 % to 12.5 % in steps of 2.5 % |
| 5. Tap Changer | : Off Circuit |
| 6. Temperature Rise(Oil/wdg.) | : 40/45 Degree centigrade |
| 7. Terminations | |
| HV | : Cable Box |
| LV | : Cable Box |
| 8. Fittings | : As per enclosed list of Annexure-I |
| 9. Paint | : Epoxy Shade 632 |

Annexure - I

1. Rating and Diagram Plate
2. 2 Nos. Earthing Terminals
3. Lifting Lugs for main tank and for all items to be handled independently
4. Drain cum filter Valve with Plug at Bottom
5. Filter valve with plug at Top
6. 6" Dial type oil thermometer with 2 contacts
7. 6" Dial type winding thermometer with 2 contacts
8. Conservator with oil filling hole with cap and drain plug
9. Silica Gel Breather
10. Air release plug

11. Off Circuit externally operated tapping switch position indicator, handle and locking device for - 5% to 12.5% voltage variation in steps of 2.5%
12. 3 Nos. Thermometer pockets
13. Explosion vent with Double Diaphragm and oil sight Glass
14. Radiator bank mounted on tank complete with Air Release Plug Drain Plug and isolating valves at points of connection with tank
15. 4 Nos. Bidirectional flat rollers
16. Marshalling Box
17. 1 No. Buchholz relay with A/T contacts with shut off valve

TERMINATIONS:

HV: Cable box to receive 1 no. 3 core suitable size of 11 KV XLPE cable

LV: Cable box to receive suitable nos. and size of 1.1 KV grade armoured cables

Orientation: 180 Degree, H.V. cable box to L.V. cable box

Neutral terminal shall be brought out for solid earthing.

NOTES:

1. Lugs Glands termination kits are in your scope of supply.
2. PAINT: The transformers shall be painted as under:
 - a) Internally with oil resisting varnish paint
 - b) Externally with 1 coat zinc chromate followed by two coats of epoxy paint shade 632 if IS-5.
3. Following routing tests as per IS shall be carried out during inspection of transformer at your works.
 - Winding Resistance Measurement Test
 - No Load Loss Measurement Test
 - Full Load Loss Measurement Test
 - Separate Source Voltage Test
 - Insulation Resistance Test
 - Turns Ratio Test
 - Polarity Phase Relationship Test
 - Breakdown Value Test (Die Electric Strength test) of Transformer Oil.
 - Impedance Voltage of Transformer
 - Heat run test will be carried out for the transformer having higher Full Load losses.

Your scope of supply is limited to Design, Engineering Manufacture, Assembly, Testing, Packing and Forwarding and delivery of transformer complete with all fittings and accessories.

Technical Specification No. 11

Erection, Testing and Commissioning of supplied 500 KVA 11/0.433 KV indoor type distribution transformer at site including transformer foundation and civil work. All cable termination in both HV & LV side including termination at LT panels as well as earthing of transformer as per IER. If any alteration/modification required is in the scope of contractor. The work includes all material, tools, equipment and labour and as per direction of EIC.

Technical Specification No. 12

This item includes supply at site 4 Way double door TPN DB with IP42 degree of protection. The DB shall be made from special grade of CRCA sheet and powder coated. The DB shall be fitted with Bus bar, DIN Rail and neutral link. The rates shall be excluding the cost of MCBs.

Technical Specification No. 13

This item includes fixing & commissioning of supplied double door TPN DB on wall/ structure of Substation at 34 Hectare area as directed. The DB shall be fixed rigidly on wall through suitable size of nut bolts/anchor fasteners/cemented wooden gutties as directed. This includes necessary wiring, connections & earth linking with all material, labour tools & tackles as directed by Engineer-In-charge.

Technical Specification No. 14

- (a) This includes supply of DIN Rail mounted 'C' Series 40 Amp, 415 Volts, 50 Hz Triple Pole Neutral (TPN) MCB with 10kA Breaking Capacity. The supplied MCB shall conform to IS 8828 or IEC 60898-1.
- (b) This includes supply of DIN Rail mounted 'C' Series 32 Amp, 415 Volts, 50 Hz Single Pole (SP) MCB with 10kA Breaking Capacity. The supplied MCB shall conform to IS 8828 or IEC 60898-1.

Technical Specification No. 15

This includes fixing & commissioning of supplied TPN/SP MCB in existing TPN double door DB on wall / structure. The MCB shall be fixed on DIN Rail provided in existing DB. This includes necessary wiring, connections, distribution & earth linking of DB with all material, labour tools & tackles as directed by Engineer-In-charge.

Technical Specification No. 16

This item includes providing & fixing surface wiring for single phase sub-circuit from the Distribution Board/MCB to the switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire with IS: 694/1990 of size 2.5 sq. mm. for phase & neutral wire and 1.5 Sq.mm continuous stranded copper conductor wire for earth to be laid through PVC Oval Pipe with IS: 9537 (Part-III) of size 25 mm Diameter of Medium Mechanical Strength (MMS) type/oval shape PVC conduit pipe of 25mm and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make as directed by Engineer-in-Charge. The PVC oval conduit shall be fixed rigidly on wall/ceiling with suitable size heavy duty PVC saddle set with base, clamp & screw at the interval of 0.5 meter. Complete work consists of necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

Technical Specification No. 17

This item includes providing & fixing surface wiring for light/tube light point from switchboard with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire with IS 694: 1990 of size 1.5 sq. mm for phase & neutral wire and 1.0 Sq. mm continuous stranded copper conductor

wire for earth to be laid through PVC Round Pipe with IS 9537 (Part-III) of size 20 mm Diameter of Medium Mechanical Strength (MMS) type /20mm oval shape PVC conduit pipe of 20 mm and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make as directed by Engineer-in-Charge. The PVC round /oval conduit shall be fixed rigidly on wall /ceiling with suitable size heavy duty PVC saddle set with base, clamp & screw at the interval of 0.5 meter. The work consists of providing & fixing of Bell Push /Flush type SP switch 6A, 240V semi modular Anchor Nova type or equivalent with ISI mark and to meet specifications of IS 3854 & 3 plate Ceiling Rose /Angle Holder made from polycarbonate on suitable size of PVC box with cover. The PVC box shall be rigidly fixed with cemented wooden gutties on the wall and the switches shall be fixed on cover of the box. The complete work consists of necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

Technical Specification No. 18

The item includes providing & fixing surface wiring for Power point with Flame Retardant, 1100 Voltage grade, single core stranded copper conductor wire with IS 694: 1990 of size 2.5 Sq. mm for phase & neutral wire and 1 Sq. mm continuous stranded copper conductor wire for earth to be laid through PVC Round Pipe with IS 9537 (Part-III) of size 20 mm Diameter of Medium Mechanical Strength (MMS) type /20mm oval shape PVC conduit pipe and other accessories such as Tee, junction box, inspection bends, elbow etc. of approved make as directed by Engineer-in-Charge. The PVC round /oval conduit shall be fixed rigidly on wall /ceiling with suitable size heavy duty PVC saddle set with base, clamp & screw at the interval of 0.5 meter. The work consists providing & fixing of 20 A & 10 A, 5 in 1 combined Unit 240V, 50Hz with switch, socket, fuse & indicator with ISI mark. The Combined unit shall be rigidly fixed with cemented wooden gutties on the wall as directed. The complete work consists of necessary wiring connections and earth linking at both the ends with all materials and labour as directed by Engineer-in-charge.

Technical Specification No. 19

This item includes supply at site and installation of environmental friendly energy efficient 20W LED tube fixture complete with batten (T8). The fixture should be of low power consumption & having high efficiency. This includes fixing & commissioning of supplied 20 W LED tube fixture complete with batten on wall/ceiling at suitable height by screws, gutties & necessary connections with ceiling rose including all required material and labour as directed by Engineer-In-Charge.

Technical Specification for LED 20W tube fixture:

No.	Parameter	Specification
1	Power Consumption	20 Watt
2	Rated Voltage	220-240 VAC.

3	Rated Luminous flux	≥2000 Lm
4	Beam angle	> 120 degrees
5	Power Factor	≥0.90
6	IP	IP20
7	Tube Efficiency (Lm/w)	≥95
8	Power Factor	≥0.90
9	Life Expectancy	About 30,000 burning hours.
10	Input Frequency	50 Hz.
11	CRI	Minimum 85
12	CCT	4000-6500K
13	Certification preferred	LM 79/LM 80

Technical Specification No. 20

This item includes supply at site, exhaust fan of size 300 mm with capacitor start and run type motor, continuously rated, totally enclosed fitted with heavy duty grease filled double ball bearing that ensures noiseless performance and long lasting smoother life of fan suitable for single phase 230 Volt AC 50Hz. The impeller shall be used in an Exhaust Fan shall be of the propeller type & both hub and impeller shall be dynamically balanced, frames and arms mounted on rubber bushings, to avoid vibrations.

Technical Specification No. 21

This item includes fixing & commissioning of supplied 300mm sweep exhaust fan on existing exhaust hole so that discharge of exhaust air can be done easily. However, if exhaust hole is not provided, it is to be done by contractor. The grouting of the fan is to be done by suitable size of anchor fastener bolts, and by providing metallic mesh/louvers as directed to other side so that birds can be restricted in the passage. This includes connections with 3 core flexible copper cable from nearest source of supply & necessary connections & earth linking with all material and labour and as directed by Engineer-In-Charge.

Technical Specification No. 22

This includes providing of heat shrinkable straight through joint kit suitable for HT XLPE power cable jointing to HT 3 Core X 150 sq mm.

The supply of cable joint kits as per approved make like 3M/Raychem/ASCON/YAMUNA DENSON.

Technical Specification No. 23

This includes fixing of heat shrinkable straight through joint suitable for 3 Core X 150 sq mm grade. This including fixing of all required materials and by validated person work will be carried out. The joint shall be made in such a way that the joint shall be electrically and mechanically permanent. The work includes all labour, tools tackles, joint kit of approved make and as directed by Engineer-in-Charge.

Technical Specification No. 24

This includes supply of following type End termination HT XLPE 3C X 150 Sq.mm indoor kit as per approved make like 3M/Raychem/ASCON/YAMUNA DENSON. Any Major activity and query about work related to be discussed with Engineer-in-Charge and finalized as per his directions.

Technical Specification No. 25

This include making/fixing of following type End termination HT XLPE indoor kit HT 3CX 150 Sq.mm. This including fixing of all required materials. The joint shall be made in such a way that the joint shall be electrically and mechanically permanent. The work by validated person will be carried out includes all labour, tools tackles, joint kit of approved make and as directed by Engineer-in-Charge.

Technical Specification No. 26

- a) This includes supply of heat shrinkable straight through joint kit suitable for LT 1.1 KV XLPE power Aluminium armoured cable having size up to 4 Core X 35 sq. mm The cable joint kits shall be supplied as per approved make.
- b) This includes supply of heat shrinkable straight through joint kit suitable for LT 1.1 KV XLPE power Aluminium armoured cable having size up to 4 Core X 70 sq. mm The cable joint kits shall be supplied as per approved make.

Technical Specification No. 27

- a) This includes fixing of heat shrinkable Straight through joint suitable for LT 4 Core X 35 sq mm 1.1 KV, Aluminium armored cable. This including fixing of all required materials. The joint shall be made in such a way that joined section can be reeled without sagging and also joint shall be electrically and mechanically permanent. The work includes all labour, tools tackles, joint kit of approved make and as directed by Engineer-in-Charge.
- b) This includes fixing of heat shrinkable Straight through joint suitable for LT 4 Core X 70 sq mm 1.1 KV, Aluminium armored cable. This including fixing of all required materials. The joint shall be made in such a way that joined section can be reeled without sagging and also joint shall be electrically and mechanically permanent. The work includes all labour,

tools tackles, joint kit of approved make and as directed by by Engineer-in-Charge

Sd/-

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

Approved Make List for Electrical Items		
Sr. No.	Description	Recommended Makes
1	HV VCB	SIEMENS / CROMPTON GREAVES/ABB/Schneider
1(a)	HV Gas Insulated Breakers	SIEMENS /Schneider/ABB
2	POWER TRANSFORMERS	VOLTAMP/CROMPTON GREAVES /BHARAT BIJLEE/ BHEL/ SIEMENS/ABB/ Schneider/T&R
3	DISTRIBUTION TRANSFORMERS	EMCO/KIRLOSKAR/PATSON/VOLTAMP/ABB/Schneider/ T&R
4	RESIN CAST TRANSFORMERS	
	A) RESIN CAST IMPREGNATED	VOLTAMP / KIRLOSKAR / EMCO
	B) DRY CAST	VOLTAMP/KIRLOSKAR/EMCO
5	HT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/GLOSTER/ UNISTAR/ UNIVERSAL / RAVIN-PRIME CAB
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/ RALLISON/PRIMECAB/ HAVELLS/ UNIVERSAL/ UNISTAR/AVOCAB/ ADCAB /ATLAS
7	LT ACB	SIEMENS/L&T/SCHNEIDER/C&S
8	PROTECTION RELAYS	AREVA/L&T/SIEMENS/ABB/C&S
9	LT PANEL	CPRI APPROVED
10	CHANGE OVER SWITCH	SIEMENS/L&T/ABB/C&S/SCHNIDER/ LEGRAND / INDOASIAN
11	SFU FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/C&S
12	SFU FOR DISTRIBUTION PANELS & FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/HAVELLS
13	MCCB FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/L&T/ABB/C&S
14	MCCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNIDER/ LEGRAND/ INDOASIAN/HAVELLS
15	MCB/ELCB/RCCB/ RCCBO FOR MAIN LT DISTRIBUTION PANELS	SIEMENS/HAGER L&T/ABB/C&S
16	MCB FOR DISTRIBUTION PANELS AND FEEDER PILLERS	SIEMENS/L&T/ABB/C&S/ SCHNEIDER/ LEGRAND/ INDOASIAN/ HAVELLS/ STANDARD
17	MCB DISTRIBUTION BOARD	STANDARD / HENSEL/LEGRAND / INDOASIAN / HAVELLS / C&S
Sr. No.	Description	Recommended Makes

18	MULTI FUNCTION DIGITAL METER FOR MAIN LT DISTRIBUTION PANELS/DIGITAL KWH METERS	L&T/ENERCON/SECURE/L&G/ RISHABH
19	ANALOG VOLT/AMPARE METER FOR DISTRIBUTION PANELS AND FEEDER PILLERS	RISHABH/AE/ENERCON/L&T
20	SLECTOR SWITCH FOR VOLTMETER/AMPARE METER	L&T/SIEMENS/C&S
21	POWER CONTACTOR & OVER LOAD RELAYS	L&T/SIEMENS/ABB
22	QUARTZ TIME CLOCK SWITCH	L&T/INDOASIAN/SIEMENS
23	PVC WIRE WITH COPPER CONDUCTOR	POLYCAB/MILEX/GUJCAB/ STANDARD/ FINOLEX/ANCHOR
24	FLUSH TYPE SWITCHES, SOCKETS, HOLDERS AND CEILING ROSES & ELECTRONIC REGULATORS	ANCHOR/MK/NORTHWEST
25	DOOR BELLS/CALL BELLS	ANCHOR/LEGEND/MK/NORTHWEST
26	MODULAR SWITCHES, SOCKETS, PLATES & BOXES	ANCHOR / MK / NORTHWEST / LEGRAND /
27	PVC CONDUIT/OVAL CONDUIT & CASSING CAPPING AND ACCESSORIES	PRECISION/VULCAN/FINOLEX/ GARWARE/RESTOPLAST/SWASTIK/BPI
28	GLS LAMPS & FLUORESCENT LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
29	HPSV, HPMV & METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
30	IGNITORS FOR HPSV, METAL HELIDE LAMPS	PHILIPS / BAJAJ / WIPRO / CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE
31	LUMINARIES	PHILIPS/BAJAJ/WIPRO/CROMPTON GREAVES / OSRAM / SURYA ROSHNI /GE / C&S
31a	LED Luminaries	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska/Nessa/ C&S having surge Protection $\geq 10KV$ for fittings & internal Surge Protection for Driver of $\geq 4KV$, LED Chip only OSRAM/CREE/Philips Lumileds//Citizen/ with LM-79, 80 CERTIFICATION
Sr. No.	Description	Recommended Makes
32	CEILING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC

33	WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
34	EXHUAST FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
35	HEAVY DUTY INDUSTRIAL WALL MOUNTING FANS	BAJAJ/ORIENT/USHA/CROMPTON GREAVES / ALMONARD/GEC
36	WATER COOLER	VOLTAS/SHRIRAM USHA/BLUE STAR
37	AIR CONDITIONERS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/ONIDA
38	REFRIGERATORS	VOLTAS/CARRIER/BLUESTAR/USHA/ HITACHI/LG/ SAMSUNG/WHIRLPOOL
39	VOLTAGE STABILIZER	VEELINE / CAPRI
40	INVERTERS	SUKAM / MICROTEK
41	D.G. SETS	
	A) ENGINE	CUMMINS/GREAVES/KIRLOSKAR/ CATERPILLAR/ ASHOK LEYLAND/VOLVO
	B) ALTERNATOR	STAMFORD/CROMPTON GREAVES /JYOTI/ KIRLOSKAR ELECTRIC
42	ELECTRIC MOTOR	ALSTOM/CROMPTON GREAVES /SIEMENS/ KIRLOSKAR/ABB
43	WATER PUMPS	SWASTIK / KSB
44	WATER GEYSER	BAJAJ/USHA / CROMPTON GREAVES / SPHEREHOT / RACOLD
45	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO

Sd/-

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority