DEENDAYAL PORT AUTHORITY

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No. EL/WK/2877 **Dated 10.04.2025**

To,
M/s.

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"EXPRESSION OF INTERSET (EOI)"

Sub. : "Providing Power supply to Container Scanner inside cargo jetty area."

Sir,

Expression of Interest (EOI) are invited to carry out the subject work as per the Technical Specifications, Terms & Conditions, stipulated below.

The Expression of Interest (EOI) along with Schedule-B should reach the office of undersigned on or before 25/04/2025 at 14.00 Hrs. or scanned copy of the offer will also be accepted through e-mail xenedpa@gmail.com/ deepak.hazra@deendayalport.gov.in which shall be opened on the same day.

Yours faithfully,

Sd/-
Executive Engineer (E)
Deendayal Port Authority

SCOPE OF WORK

The Deendayal Port Authority (earlier known as Kandla Port Authority) is one of the ISO: 9001-2008 & ISO: 14001 - 2004 certified Major Port Authority's in India, under Ministry of Shipping, Govt. of India. It is situated in the Western Coast of India on a Creek and is 90 KM away from the Gulf of Kutch connected to the Arabian Sea.

DPA intend to provide power supply to Container scanner(Road) will be installed at inside cargo jetty area. The details of work are mentioned in Schedule-B & below giving brief detail of work. Though detailed work may not be explained but the firm will complete the perfectly, precisely & accurately entire satisfaction of EIC.

Supply, Installation, Testing & commissioning at various rating gas Insulated application, Ring Main unit (RMU) as per Technical Specification.

Before dispatching the RMU panel, contractor shall take dispatch clearance from EIC; in this regard KPT official will come at factory site to inspect the Panel.

Contractor shall take prior approval regarding the drawing from EIC.

Earthing shall be carried out as per IS.

The electrical installation shall conform to all currently applicable ISI specification such as IS: 732, IS: 3043, IS: 2309, IS: 3045 etc. with up to date amendments including relevant IEC regulation and Indian Electricity rules 1956 with up to date amendment.

Before quote the rate contractor should visit the site at their own cost to get familiar with the site condition.

After successful completion of whole work in all respect, to carry out testing and commissioning of the complete work is to be carried out to the entire satisfaction of EIC.

After Completion of all work successfully, contractor shall submit the four sets project compendium in hard copy & soft copy, which shall contain, the complete single line Drawing, Schematic, All Test Report, operation & Maintenance manual of RMU Module panel etc to EIC..

Technical Specification No. 01

Supply of Outdoor Mounted Compact Substation of 11 KV/0.433 Volts, equipped with 500 KVA Cast Resin Transformer of 3 star rating, 3 way 11 KV Ring Main Unit consisting of 2 Nos. of 630 A at 11 KV fault making load breaking switch with one no tee-off as SF-6 Circuit Breaker for the primary side controls provided with ABB/SIEMENS latest Relay & with MV 800 A Air Circuit Breaker as secondary side control as detailed below.

The Outdoor Package

- Single integrated metal housing, comprising three compartments accommodating:

MV switchgear (Protection degree of this compartment: IP-54)
Transformer (Protection degree of this compartment: IP-31)
LV switchgear (Protection degree of this compartment: IP-54)
Enclosure of Compact Substation :

The Outdoor enclosure of compact Substation shall be fabricated from Galvanized sheet steel 2 mm. thick build on heavy channel skid frame tropicalized to local weather conditions complying of relevant Ingress Protection as directed.

Four Nos. of Lifting lugs to be provided on top to enable lifting total package unit without any problem for site handling/lifting by crane. The metal base shall ensure rigidly for easy transport and installation to withstand the weight of the Transformer, MV & LV component.
Ventilation openings shall be so arranged or shielded that same degree of specified for enclosure is obtained to reduce the equipment ambient temperature and prevent heating through the roof due to sun radiation the roof is to be made of double layer with foam insulation in between.

The roof should of the CSS should be Removable canopy type made from 2 mm. thick Galvanized sheet metal with 10 degree.
Separation between RMU & transformer compartment and Separation between Transformer compartment & L.V compartment should be made from 2 mm. thick sheet steel.
The covers and door are the part of the enclosures when they are closed they shall provide the degree of the protection specified for the enclosure. All cover, doors or roof shall be providing with locking facility. The doors shall open outward at an angle of at least 90° and to be equipped with a device able to maintain them in an open position.
Gland plate for RMU compartment should be made from 3 mm. thick MS plate suitable for 3C X 70 Sq. mm. XLPE cable 2 Nos. The gland pate should be Split type.
Gland Plate for LV Compartment should be be made from 3 mm. thick MS plate suitable for 8 Nos./6 Nos. outgoing cable. The gland pate should be Split type
The space between Transformer, MV component and LT component shall be provided in accordance with IEC recommendations standard. The enclosure shall be made in such a way that the above components shall be accommodated and the accommodation of components shall be maintained as per IEC recommendation. The enclosure shall be tested by OEM as per Type Test and submit the relevant documents.

a. 11 KV Ring Main Unit (RMU):
Ring main unit configuration shall NON extensible Compact Switchgear consist of two load break switch (LBS) + one transformer circuit breaker (TCB) both + one out going feeder LBS shall be electrically operated.
Each Load Break switch, Circuit breaker & earth switch in RMU panel all shall be non-draw out type in fixed position.
Breakers and load switches shall be SF-6 gas or Vacuum type (with disconnector & earth Switch).

RMU Construction.
RMU panel construction shall be metal enclosed framed compartmentalized panel construction. Consisting of 4 Nos. lifting lugs & cable entry from bottom. The cable gland plate shall be made form 3 mm. metallic removable type & split type in two parts.
The bus bar rating 630 Amps. (Copper), PVC sleeved/powder coated with color code supported by insulator made from SMC/DMC resin type. The earth bus bar shall be of copper suitable for rated fault duty for 3 sec and earth bus internal connection to all non-current metal parts by 2.5 Sq. mm. copper flexible wire.
Hardware's should be used of Stainless steel except termination nut-bolts which should be brass / tinned copper.

Load Break Switch (ISOLATER)

a)	Type	Load braking and fault making in SF-6 tank
b)	Ratted Current	630 Amps
c)	Rated Breaking Capacity	630 Amps
d)	Fault making Capacity	52.5 KA Peak
e)	Short time current for 3 sec	21 KA
f)	No. of poles	3
g)	Operating Mechanism	Operating handle with ON, OFF, Earth Position with arrangement for padlock in each position

a)	Type	Three pole operated simultaneously by a common shaft
b)	No of phase	3
c)	Arc interruption in dielectric medium	SF-6
d)	Type of Charging, Mechanism:	Manual (spring assisted) as well as motorized with 230 VAC operated motor
e)	Continuous Rating	630 Amp at ambient design 40°C
f)	Short Ckt. Withstand	21 KA for 3 Sec
g)	Fault making Capacity	52.5 KA
h)	Fault Breaking Capacity	21 KA minimum
i)	Current transformer	3 Nos. epoxy cast Current Transformers with 15 VA burden STR of 21 KA for 3 second metering accuracy Class 0.5 and protection accuracy 10P10 and having of CTR 150/75/5A.
j)	Potential Transformer	3-phase draw out type PT of Ratio 11000/110 Volts of 50 VA burden to meet with auxiliary requirement with Class 0.5 accuracy including HT fuses on both incomer end.
k)	Protection Relay	Numeric type or updated version (Make: SCHNEIDER/ABB/SIEMENS) with the protection of inverse, definite time, short circuit, over current, instantaneous and earth fault, master trip and trip supervision.
l)	Metering Compartment	Multi-Function meter having digital type (single) with voltage, current, PF, frequency, KW and KWH (Make – ENCRON/L&T / Conzerv)
m)	Accessories	2 sets of operating handle, spring charging handle, spanner set and other required accessories.
n)	Optional	One no. shunt trip and tripping coil

		operating on 12 V DC. 2 Nos. of space heater with ON/ OFF switch and thermostat in each side of panel & Cable chamber

The 2 Nos. of isolators unit are for receiving of 2 Nos. Incoming 11 KV 3C X 70 Sq. mm. XLPE cable from 7th Berth Sub-station and also mechanical & Electrical interlocking so that one incomer may be taken on load.

Transformer Circuit Breaker.

The SF-6 breaker shall be completed with necessary interconnection with fine wiring, ferruled properly including foundation bolts, earthling etc. The layout drawing, dimensional drawings and electrical wiring diagram and operation & maintenance manuals shall be supplied with SF-6 Breaker. The SF-6 breaker shall be supplied in conformity with relevant ISS i.e. with up to date amendments along with manufacturers test certificate.

Transformer :

The transformer shall be fully tested for routine tests, as per BIS-1985. The contractor shall furnish date regarding adequacy DIN of Transformer capacity.

a)	Transformer capacity	500 KVA (DRY TYPE)
b)	Primary voltage	11 KV +/- 10%
c)	Frequency	50 Hz.
d)	No. of Phases	3
e)	Insulation Class	'F'
f)	Cooling	Natural Air
g)	Temperature	Max 115°C by RTD
h)	Percentage Rise	As per IS
i)	In winding	90°C
j)	Winding connection	Star/Delta
k)	Impedance	As per IS/BIS/DIN
l)	Vector Group	Dyn 11
m)	Neutral Grounding	HV ungrounded LV Solidly Grounded
n)	Winding material	Copper
o)	Noise Level	As per IEEE 141
p)	Vibration Level	3 G (min.)
q)	Painting	632 Shed of IS:5 or BIS/DIN Standard
r)	Tapping Range	+/- 5%
s)	Losses	Maintain as per IS/BIS/DIN
t)	Make	Siemens/Crompton/BHEL/Schneider

LV Switchgear.

The LV side should be designed to equip the following :

a) Low voltage Bus bar system

The equipment shall have all the following features -

a)	LV bus bar	From transformer LV bushing to ACB and from ACB to MCCBs

b)	Bus bar size for phase & neutral	Tinned copper busbar, size shall be as per manufacturer design. All the phases and neutral busbar shall be same rating / size. Bus bar size for phase & neutral Suitable spreader to be provided at outgoing side of MCCB to connect 150 Sq. mm. cable through aluminium lug.
c)	Bus bar support	insulators 1 KV voltage class, SMC epoxy
d)	Bus bar sleeve	insulation Colour coded, for 1 KV
e)	Bus bar rated current	Suitable for 800 A continuous current rating within the 10 K class enclosure @ 400°C ambient temp
f)	Bus bar short circuit	withstand 50 KA for 1 sec

b. Low voltage switchgear, ACB.

The equipment shall have all the following features -

a)	Rated operational voltage (V) at 50 Hz.	440 V
b)	Rated frequency (Hz)	50 Hz.
c)	Current rating Amps (rms)	800 Amps
d)	Rated insulation voltage (V) at 50 Hz.	1000
e)	Number of poles	4
f)	Rated impulse withstand voltage (KV)	8
g)	Rated Ultimate Short circuit breaking capacity at 415 V, 50 Hz. (KA rms) Icu	50
h)	Rated Service Short circuit breaking capacity at 415 V, 50 Hz. (KA rms), Ics	50
i)	Rated short circuit making capacity at 50 Hz. (KA peak), expressed as multiples of Icu	105
j)	Rated short time withstand current for1 sec at 50 Hz. (KA rms), Icw, expressed as percentage of Icu	50
k)	Category of utilization	B
l)	Shutters on 'Trip' & 'Close' push button	Yes

	with sealing facility	
m)	Accessory mounting	Accessories shall be front accessible plug in type. Accessories namely motor shunt trip & closing coil, UVT etc. should be common for the entire range & shall be suitable for both AC & DC voltages.
n)	Operating mechanism	Spring charging stored energy type , manual & Automatic
o)	Mechanical life (Operating cycles)	20000
p)	Indications	Breaker shall have following mechanical indications: 1. ON, 2. OFF, 3. TRIP 4. SPRING CHARGE STATUS
q)	Sensing	True RMS based
r)	Type	Microprocessor based
s)	Control Terminal	Should be front accessible and minimum NO/NC contacts shall be provided for electrical interlocking.
t)	Protection	Overload protection Pick up 0.4 to 1.0 Time delay 0.2 to 40 sec Short Circuit Pick up 2 to 10 Time delay 20 to 400 μ sec Instantaneous Over current Pick up 4 to 16 & OFF Earth Fault Pick up 0.2 to 0.6 & OFF Time delay 100 to 400 msec
u)	Metering required	Multi-Function Meter for measuring 3 Ph current 3 Ph Voltage KWH KVAH Power Factor Max Demand (KVA) Fault History of Minimum Events
v)	Indication	Release shall give individual indication for

		each type of fault

c. Low voltage switchgear, MCCB.

a)	a) For 250 Amps. b) for 100 Amps. c) For 63 Amps d) for 32 Amps MCB	Outgoing feeders – 2 Nos. Outgoing feeders – 2 Nos. Outgoing feeders – 4 Nos. Outgoing feeders – 4 Nos.
b)	MCCB rated voltage & Rated frequency (Hz.)	415 V +/- 10% at 50 Hz.
c)	Number of poles	4
d)	Current rating Amps (rms)	250/100/63/32 Amps
e)	MCCB rated 3 phase short circuit breaking capacity Ics = Icu Rated impulse withstand voltage(kV)	25/16 KV minimum at 415 V and 50 Hz.
f)	MCCB rated 3 phase short circuit withstand capacity, Icw	10 KA/10 KA /6 for 1sec
g)	Rated insulation voltage (V) at 50 Hz.	1000
	MCCB mechanical & electrical Endurance	As per IS 13947 / IEC
h)	MCCB category of duty	B as per IS / IEC 947
i)	MCCB indications	ON, OFF & TRIP
j)	MCCB protection	Adjustable / front accessible thermal and magnetic setting. (Thermal setting for overload adjustable from 70 % - 100 % of the rated current & magnetic setting for short circuit adjustable 4-10 times / 5-10 times).

5. Safety Devices:

Rubber Mates, Fire Extinguisher & First Aid Box

The rate should be exclusive of GST & inclusive of all taxes, levies, loading at manufacturers depot, transportation and unloading at the site of work etc.

Technical Specification for Item No. 2

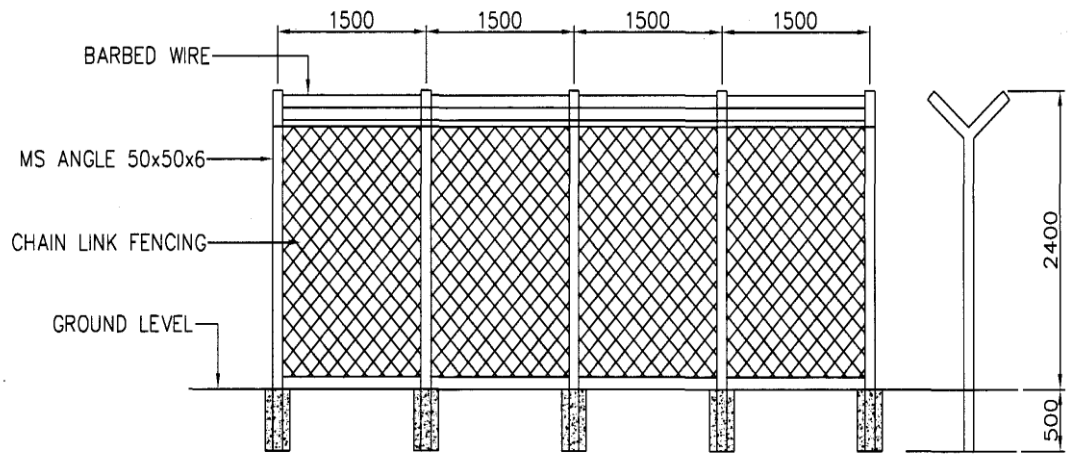
This includes Installation, testing & Commissioning of Compact S/S with 11/0.433 KV Transformer including Battery Charger, Safety Devices as per IS/BIS/DIN standard which includes outdoor type SF6 filled, with combinations of load break isolators & breakers. (including earthing- Erection of earthing by using GI strip (minimum 50mm 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, 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. Also, for CSS overhead shed shall be made by the contractor to protect rain water, sun raise etc. or as directed by engineer in-charge. The Cable termination kits, cable laying is in bidder scope.

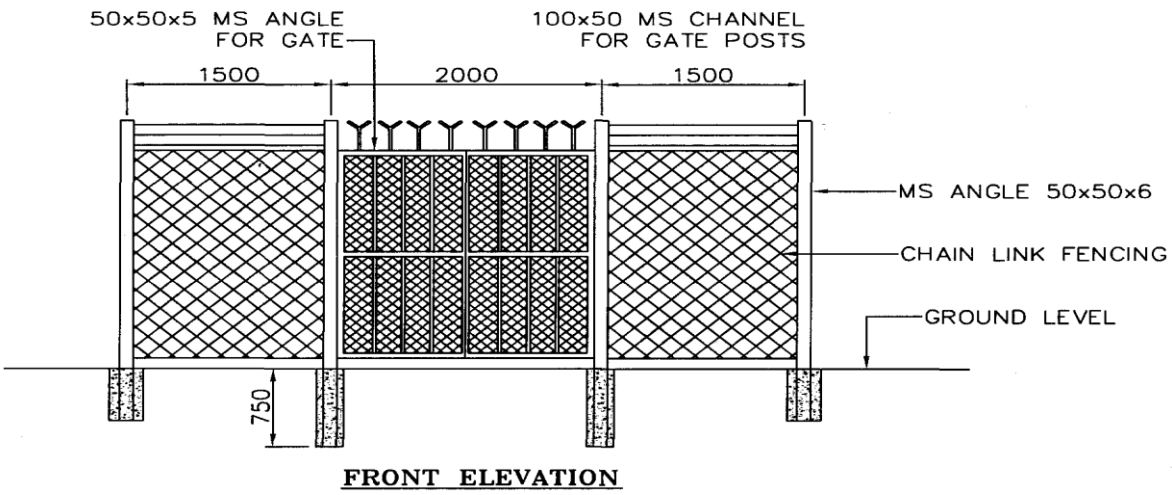
The Compact S/S shall be erected by using suitable size of MS channel (to be supplied & erected by contractor, as per each module approved foundation drawing) foundation bolts including grouting of the bolts of each unit in the panel. Each unit in the panel shall be connected with 2 separate and distinct earthing system the transformer neutral shall be properly earthed by Copper earthing rods the earthing should be chemical earthing. After installation of 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 System.

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.

The contractor shall provide the type & routine test certificates and also provides six sets of blue print layout drawings and manuals etc. The work includes all labour and material as directed by Engineer-in-Charge. The work shall be carried out as per Indian Electricity Rules.



SIDE ELEVATION



FRONT ELEVATION

Technical Specification for Item No. 3

This includes Supply of HT SF-6 GAS insulated RMU panels at various substation as directed by EIC.

The broad details of each item & Technical Specification of the work are shown in the Schedule "B" attached herewith.

The Gas insulated RMU switchgear shall comply with the requirement stated in the following standard & specification amended up to date.

Metal Enclosed Switchgear	IEC 62271-200/ IEC20 298/IS 12729:1988
Medium Voltage Switch	IEC 265
Alternation Current Dis-connector (Load Break Isolator & Earthing switch)	IEC 60129/ IEC 62271 - 102/ IS 9921
Specification of Alternation Current Breakers	IEC 62271-100/IEC/60056/IS:13118:1991
Panel Design , SF-6 Circuit Breakers	IEC 62271-1/IEC 60694
Current Transformer	IEC 60044-1/IEC 60185/IS 2705:1992
HV switches	IEC 60265/IS 19920:1981
Filling of SF-6 in RMU	IEC 376
Pressure of SF6 gas	1.4 bars at 20°C
Cable bushings	DIN 47636
Temperature class	-25°C to +40°C Indoor
Degree of Protection: - SF6 tank: IP 67 - Front cover: IP 2X - Cable cover:	IEC 60273/IS 13947 (P-1) IP 67 IP 2X IP 3X
Bus bars	240 mm.^{2} Cu

Earth bar (external):	120 mm.² Cu - Bolt dimension: M10
Colour Front Cover Side & Cable Cover	 RAL 7035 RAL 7035

- **General Requirement:**

The Ring Main Unit shall be installed at existing 7th Berth 11 KV Substation inside Cargo Jetty area. The RMU shall be extensible. The main tank using SF-6 gas as insulating and vacuum as arc quenching medium or SF6 gas as both insulating and arc quenching medium. The main tank shall be stainless steel sheet of 2 mm. thickness and robotically welded with a pressure relief arrangement. Incomer as well as Outgoing feeder shall be provided with Energy Meters of suitable make & accuracy class, as directed.

The cable entry shall be from bottom and the end terminations shall be done on front side.

Inner enclosure (Main tank)

The tank shall be robotically welded stainless steel sheet of 2 mm. thickness. The tank shall be sealed and no handling of gas should be required throughout the 25 years of service life. However, the SF-6 gas pressure inside the tank shall be constantly monitored by a temperature compensating gas pressure indicator offering a simple go, no-go indication. The gas pressure indicator shall be provided with green pressure and red pressure zones. There shall be one Non - return valve to fill up the gas. The manufacturer shall give guarantee for maximum leakage rate of SF6 gas will be lower than 0.1 % per Year. An absorption material such as activated alumina in the tank shall be provided to absorb the moisture from the SF6 gas to regenerate the SF6 gas following arc interruption. The degree of protection of the inner enclosure shall be IP-67.

The compact RMU Unit shall be provided with a suitable pedestal made up of MS Angle to mount the unit. The height of the bottom of cable box shall be minimum 310 mm. to provide the turning radius for the HT cable termination.

- **BUS BARS:**

Three nos. of continuous Bus bars made up of EC grade electrolytic copper of rating current 630 A shall be provided. The Short time rating current shall be 20 KA for 3 seconds for 11 KV. The Bus bar connections shall Anti - oxide greased.

Electrical Data :

- 12 KV – 28 KV - 1min
- Nominal voltage: 11 KV
- Rated frequency: 50 Hz.
- Rated current bus bars: 630 A
- Rated current cable switch dis-connector : 630 A
- Short time withstands current :
  - Cable switch dis-connector with interface C (400-bolt) bushing: 21 KA RMS 3 Seconds
  - Vacuum circuit breaker with interface C (400-bolt) bushing: 21 KA RMS 3 Seconds
- Rated current for transformer T-off: 630 A

- Impulse withstands voltage: To earth and between phases: 95 KV
- Insulation level: - Power frequency 1 min: 28 KV.

Relay & Protection Scheme:

Numerical Relay with Control Supply 24V DC, 50 Hz. Phase current input Relay shall be suitable for 1 A and % A CT secondary (selectable at site). Relay shall be suitable for protection core CT connection. Metering core shall be connected to measuring instruments separately. Ground current input Relay shall be suitable for residually connected CT input. The relay shall have provision for digital inputs, speed switch inputs. The Communication System of the relay shall be equipped with RS-485 for remote communication or for connection to DCS, SCADA or PLC. The relay shall be suitable for Port for connection to Laptop & PC preferably of front side. Relay shall support Modbus Protocol. Relay shall be ABB REF-615 / Siemens 7SR or latest as directed.

- **Front Plate :**

The front shall include a clear mimic diagram which indicates different functions. The position indicators shall give a true reflection of the position of the main contacts and shall be clearly visible to the operator. The lever operating direction shall be clearly indicated in the mimic diagram. The manufacturer's plate shall include the switchboard's main electrical characteristics.

- **Danger Board :**

The danger Board plate as per relevant IS shall be riveted on the front plate of the RMU in Languages viz. Gujarati, Hindi, English.

TYPE and ROUTINE TESTS:

Type tests:

The equipment offered in the tender should have been successfully type tested at NABL Laboratories in India or ERDA or equivalent international laboratories for the tests in line with the relevant standard and technical specification and manufacture to submit the valid type test certificates.

Following Type Test must have been carried out:

- Short time current withstand test and peak current withstand test.
- Lightening Impulse voltage withstand test.
- Temperature rise test.
- Short Circuit current making and breaking tests.
- Power frequency voltage withstand test (dry).
- Mechanical operation test.
- Checking of degree of protection of main tank and outer enclosure.
- Checking of partial discharge on complete unit.

- **Acceptance & Routine Tests :**

All acceptance and routine tests as stipulated in the respective applicable standards amended up to date for all the equipment shall be carried out by the contractor in the presence of DPA representative & TPIA without any extra cost to DPA before dispatch.

The routine tests are as follows:

1) Conformity with drawings and diagrams,
2) Measurement of closing and opening speeds,
3) Measurement of operating torque,

4) Checking of filling pressure,
5) Checking of gas-tightness,
6) Dielectric testing and main circuit resistance measurement,
7) Power frequency voltage,
8) Resistance test for the circuit,
9) Mechanical operation tests.

The contractor, in the presence of representative of DPA & TPIA, shall carry out all above acceptance and routine tests. The contractor shall give at least 15 days' advance intimation to DPA to enable to depute representative for witnessing the tests.

The DPA reserves the right for carrying out any other tests of a reasonable nature at the works of the contractor/laboratory or at any other recognized laboratory/research institute in addition to the above mentioned type, acceptance and routine tests at the cost of the DPA to satisfy that the material complies with the intent of this specification.

- **Drawings :**

All drawings shall conform to relevant IEC Standards Specification. All drawings shall be in ink.

The Contractor shall submit dimensional general arrangement drawings of the equipment, illustrative and descriptive literature in triplicate for various items in the RMUs, which are all essentially required for future automation.

i) Schematic diagram of the RMU panel
ii) Instruction manuals
iii) Catalogues of spares recommended with drawing to indicate each items of spares
iv) List of spares and special tools recommended by the contractor.
v) Copies of Type Test Certificates as per latest IS/IEC.
vi) Drawings of equipment, relays, control wiring circuit, etc.
vii) Foundation drawings of RMU.
viii) Dimensional drawings of each material used for item (vi).
ix) Actual single line diagram of RMU with or without extra combinations shall be made displayed on the front portion of the RMU so as to carry out the operations easily.

The following should be supplied by contractor:

Copies in triplicate of printed volumes of operation, maintenance and erection manuals in English along with the copies of approved drawings and type test reports etc. sets of the manuals as above shall be supplied to the Engineer-in-Charge along with a soft copy of the all Technical and Drawing.

- **Name Plate :**

Each RMU and its associated equipment shall be provided with a nameplate legible and indelibly marked with at least the following information.

- Name of manufacturer
- Type
- Serial number
- Voltage Current
- Frequency
- Symmetrical breaking capacity
- Making capacity
- Short time current and its duration

- Purchase Order number and date
- Month and Year of supply

Training :

The contractor shall provide training to Operational Staff and Engineers of DPA. In case of training at manufacturer's works is required, necessary expenses towards boarding, lodging & traveling for the deputed Engineers of DPA shall be borne by DPA.

- **Performance Guarantee :**

All equipment supplied against this specification shall be guaranteed for a period 12 months from the date of commissioning. However, any engineering error, omission, wrong provision, etc. which do not have any effect on the time period, shall be attended to as and when observed/pointed out without any financial implication on DPA.

The contractor shall supply at site 11 KV, 630 Amp, Indoor Compact Switchgear (Gas Insulated), Extensible on One Side, Motor Driven Spring Charging having 6 nos. Circuit Breaker Modules mentioned as under:
Module No. 1 & 2 as 11 KV Incomer along with PT, Module No. 3, 4 as Circuit Breaker Module suitable for Distribution Transformer and Module No. 5,6 as spare 11 KV outgoing feeder.
The Circuit breaker modules shall be supplied with three position isolator/earthing switch, bus bars, interlocking, earth bar and stored spring energy mechanism.

Qty. for each module	Details of Module No. 1 & 2
1	Stored energy mech. For manual and Motor Driven Spring Charged operation
1	PT for incomer for metering purpose 11 KV/110 V, Class 0.5
1	Multifunction Energy Meter with RS-485
1	Circuit breaker 12 KV, 630 A
1	Control voltage, trip coil 24 V DC
1	Protection system : Relay must be Numeric type with following features: a) Self-Powered OC+EF Protection Relay b) Control voltage, 24 V DC c) Interference RS-485, RS-232 Port d) Equivalent to CAG 37 for Instantaneous Over Current e) Equivalent to CTUM 15 for short Circuit protection, Inst. Earth fault f) Instantaneous definite time & inverse type protection of over current.
1	Set of three ring core metering & protection CTs : CTs of 300-200/1-1A, 5P10, 2.5 VA for protection and 300-200/1-1A CL 0.5, 2.5 VA for metering (considering the cable size 3C X 300 Sq. mm. HT XLPE cable)
1	Breaker ON(red)/OFF(green)/TRIP(amber) LED Indication
1	Capacitive voltage indication fixed type
1	Suitable Power Pack for Auxiliary DC Power supply for Relays

Qty. for each module	Details of Module No. 3, 4, 5, 6
1	Stored energy mech. for manual and Motor Driven Spring Charged operation
1	Multifunction Energy Meter with RS-485
1	Circuit breaker 12 KV, 630 A
1	Control voltage, trip coil 24 V DC
1	Self-Powered OC+EF Protection Relay
1	Set of three ring core metering & protection CTs: CTs of 150-100/1-1A, 5P10, 2.5 VA for protection and 150-100/1-1A CL 0.5, 2.5 VA for metering (considering the cable size 3C X 300 sq. mm. HT XLPE cable)
1	Set of Transformer Protection Annunciation Scheme comprising of: 1 No. Master Trip Relay (24 V DC) 6 No. Aux. Relays (24 V DC) 1 No. 8-Window Annunciator & Hotter Suitable for providing facility for Buchholz/OTI/WTI Alarm/Trip Indication,
1	Breaker ON(red)/OFF(green)/TRIP(amber) LED Indication
1	Capacitive voltage indication fixed type
1	Suitable Power Pack for Auxiliary DC Power supply for Electro-Mechanical Aux Relays and Master Trip Relays

In addition to above following material shall be supplied by Contractor for each panel.

Qty.	Material to be supplied by Contractor with each panel
3	Set of Terminal Protector boots for covering cable-termination.
1	Manometer installed on RMU for Gas Pressure indication.
2	Operating handle

Note: The contractor shall provide 5 Years warranty against the low pressure of pre-filled SF-6 gas in the RMU from the date of commissioning of RMU.

The rate shall be inclusive of all taxes (excluding GST), packing, forwarding, insurance, transportation, and unloading at site of work.

Technical specification No. 4

This item includes installation, testing and commissioning of supplied RMU panel at exiting 7th Berth Substation at inside Cargo Jetty area. The scope of works include RMU relay Co-Ordinate & Set the relay data with existing system. Necessary secondary injection and testing of GIS relay is in the contractor scope.
The RMU Panel shall be erected by using suitable size of MS 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. The RMU panel shall be connected with two separate and distinct earthing system. After installation of RMU panel, necessary test and trial shall 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 scope includes required multiple core screened / control cable & its laying in

150 mm. wide perforated tray (supply & erection 600 Mtr.) is in the scope of contractor. The complete work shall be carried out as directed by Engineer in-Charge. The work includes required labour & material for installations, testing and commissioning of RMU as directed by Engineer-in-Charge.

Technical specification No. 5

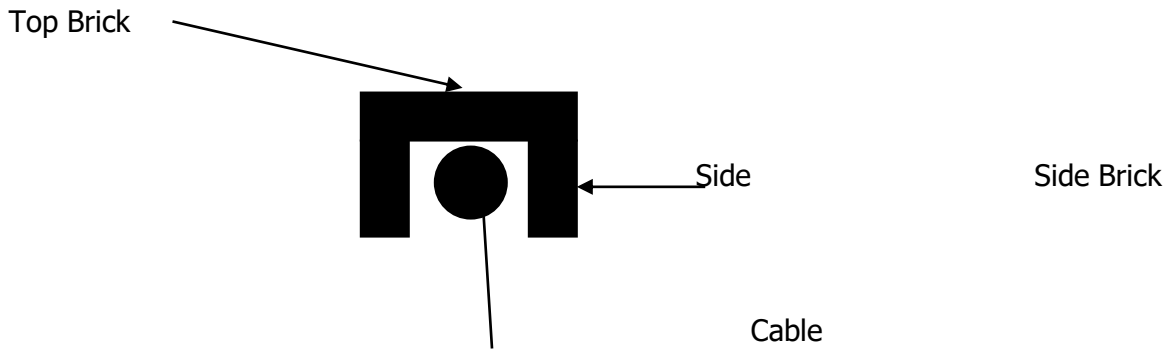
This includes supply at site HT, 11 KV XLPE (E) armoured cable with aluminum conductor of size 3 C X 150 Sq. mm. with ISI mark confirming to IS:7098 (Part-II) 1985 with up-to-date amendments and of approved make.
Cables is to be supplied in single length and cable with joint shall not be accepted. The price quoted by the contractor shall be inclusive of all taxes, VAT, excise duty, 0ctori 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 No. 6

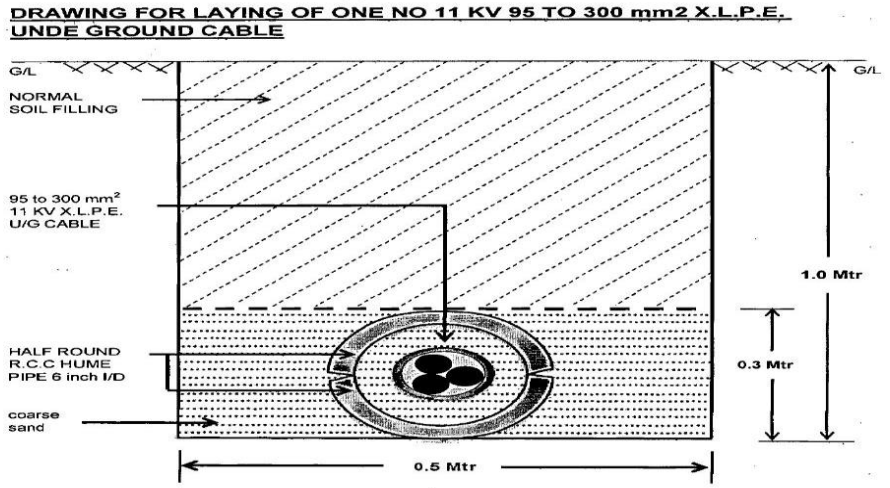
The item includes laying of double length cable of size 3 Core, 150 Sq. mm (E) XLPE Insulated aluminum conductor XLPE insulated armoured cable of 11 KV grade in the existing substation cable trench. The cable shall be laid after opening of trench by removing the MS chequered plates. If any unwanted cable or waste is available in the trench the contractor should clean the trench before laying the new cable and obtaing clearance in writing from Engineer-in- charge. After laying of the cable, cable trench shall be properly covered with existing chequered plates as per original. The item includes required material and labour as directed by Engineer in charge.

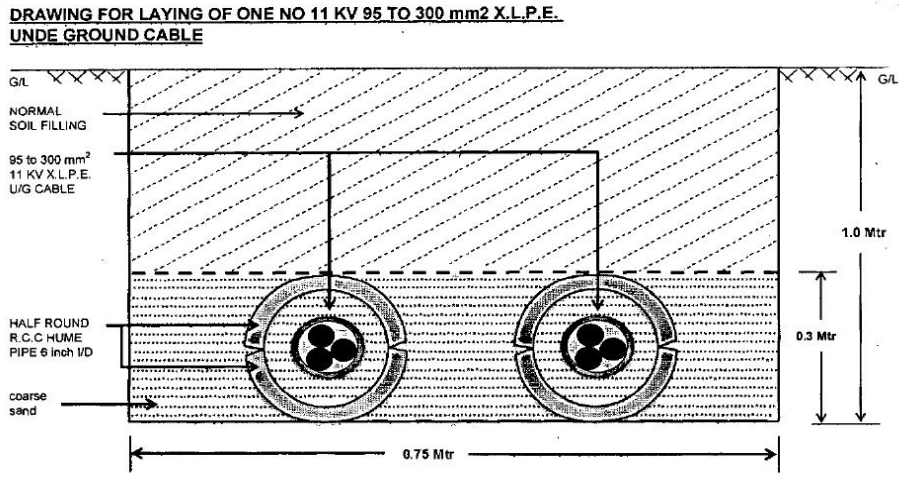
(a) The item includes laying of Double length cable of size 3 Core, 150 Sq. mm. (E) XLPE Insulated aluminum conductor XLPE insulated armoured cable of 11 KV grade through excavation in hard/soft soil. The trench to be excavated of 300 mm. width & 1.5 Meter depth. The bed of 50 mm. of river sand shall be provided in the bottom of the excavated trench. The cable shall be laid over the bed of river sand. The cable shall be protected as per Sketch shown below by providing and laying bricks both the sides lengthwise parallel to the cable & the gaps shall be filled with river sand. The cable shall be covered by keeping two bricks over the side bricks shown in the sketch. The filling of the trench shall be done with the excavated stuff & should be watered and rammed properly to its original position. The excess excavated stuff shall be disposed of from the Site of work and spreaded in low laying area as directed. The item includes required material and labour as directed by Engineer in charge.

Sketch



(b) Excavation of trench 0.5Mtr. Wide and 1 Mtr. Deep for laying of HT/LT underground cable of size up to 300 Sq. mm. PILC or XLPE. (The cable should be laid on bed of sand and to cover cable with half round RCC pipe 6" internal Dia. and length of one meter along with each bottom and top.) The entire trench thereafter should be refilled with earth dully rammed up to ground level as per drawing below.





(c) The item includes laying of double length cable of size 3 Core, 150 Sq. mm (U/E) XLPE Insulated aluminum conductor XLPE insulated armoured cable of 11kV grade in the existing NP2 Pipe Trench. The cable shall be passed through the existing NP2 pipe after opening & removing RCC trench manhole cover. After laying of the cable, the manhole shall be properly covered with existing removed RCC covers as per its original position. At every approximately 30m length of NP2 Pipe, a suitable size of manhole exists. The item includes required material and labour as directed by Engineer in charge.

(d) RCC platform /RCC Jetty: -

Cable shall be laid through RCC Jetty / Platform cutting with providing & laying Suitable size Heavy duty HDPE pipe for passing 150 Sq. mm. 3C XPLE Cable, the trench to be provided as per the size of the HDPE pipe keeping suitable top clearance by using RCC cutter machine. if crossing length more than length of standard length of HDPE pipe, then firm shall joint by putting by coupling both the end with nut & bolts between two pipe & then lay across Jetty / platform, the single cable shall be passed through one pipe, the excavated stuff shall be disposed of from the Site of work and speeded in low laying area. After that re-filling with sand cushioning of required quantity CC/RMC work to be done with proper curing to look like original position. This includes all labour and material as directed by Engineer-in-Charge.

(e) 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 3C X 150 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 HDPE 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. 7

This includes preparation of earth station with chemical treated back filled compound 80 mm. dia. Pipe GI Type 3 Mtr. Depth, Maintenance free including all accessories & Masonry work Enclosure with cover plate.

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. 8

This includes preparation of earth station complete supply of material and execution of copper plate earthing with Brass bolt and nuts and brazing. Copper Plate Earthing size of 600mm X 600 mm with a thickness of 3mm. This shall be installed in a pit of size 900mm X 900mm and backfilled with homogenous mixture of charcoal and Salt. Earth pit construction shall be as per IS 3043:2018 and Joining through brass nut bolt and brazing with connect through copper strip to copper plate or as directed by EIC.

Technical Specification No. 9

This includes supply, Laying & connecting, Hot Dip G.I. strip of size 50 X 6 mm. Coating having minimum 80 Micron galvanized coating on Strip earthing system, connected to two separate and distinct main earth as directed and shall be clamped suitably on wall /floor or buried in the ground/pucca trench as directed. The pieces of GI strips shall be connected using GI nut bolts rigidly and the GI strip shall be laid either on RCC with proper clamping or in the ground minimum 300 mm. below the ground level as the case may & as directed & shall be buried properly or as directed by EIC.

Technical Specification No. 10

This includes supply, Laying & connecting, Copper strip of size 50 X 6 mm. on Strip earthing system, connected to two separate and distinct main earth as directed and shall be clamped suitably on wall /floor or buried in the ground/pucca trench as directed. The pieces of copper strips shall be connected using brass nut bolts rigidly and the copper strip shall be laid either on RCC with proper clamping or in the ground minimum 300 mm. below the ground level as the case may & as directed & shall be buried properly or as directed by EIC.

Technical Specification No.11

This includes supply of following type End termination HT XLPE jointing kit to various size. 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.12

This include making/fixing of following type End termination HT XLPE indoor kit HT. 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.13

This includes providing of heat shrinkable straight through joint kit suitable for HT XLPE power cable jointing kit to various size. The supply of cable joint kits as per approved make like 3M/Raychem/ASCON/YAMUNA DENSON.

Technical Specification No.14:

This includes fixing of heat shrinkable straight through joint suitable for jointing kit to various size. 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.

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

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Schedule –B

Sub. : - "Providing power supply to Container Scanner inside cargo jetty area."

Sr. No.	Description Of item	Qty.	Unit	Rate (Rs.) In Fig.	Amount
1	Supply at Site 11/0.433 KV Compact Substation having Dry type Transformer of 500 KVA and as per Tech. Specification No.1	1	No.		
2	Installation, testing & Commissioning of 11/0.433 KV Compact Substation and as per Tech. Specification No.2	1	No.		
3	Supply, of 11 KV Outdoor type of gas Insulated, Ring Main Unit (RMU) with fixing in floor HT Rubber Mat Describe as below as per Technical Specification No. 3 a) 6 Way, 11 KV RMU Outdoor type;	1	No.		
4	Installation, Testing & commissioning at 11 KV Outdoor type of gas Insulated, Ring Main unit (RMU) with fixing in floor HT Rubber Mat Describe as below as per Technical Specification No. 4 a) 6 Way, 11 KV RMU Outdoor type;	1	No.		
5	Supply at site 3 Core, 150 Sq. mm. (E) HT armoured aluminium conductor XLPE cable of 11 KV grade as per IS: 7098 (Part - II) 1988 & as per Technical Specification No. 5	1500	Mtr.		
6	Laying, Testing & Commissioning of 3C X 150 Sq. mm. HT XLPE cable through following and as per Technical Specification No 6. Laying of Cable	1500			
	a) Through RCC Cable Trench as per technical Specification no 6(a)	800	Mtr.		
	b) Laying of cable through exaction in all type of Soil as per technical specification no 6(b)	100	Mtr.		
	c) Laying of cable in half round RCC pipe of 6" internal Dia as per technical specification no 6(C).				
	d) Laying of cable through RCC Jetty / RCC surface excavation through RCC cutter	100	Mtr.		

	/pneumatic breaker with HDPE / GI pipe of suitable for laying 3c x 150Sqmm XLPE cable as per technical Specification no 6(D) e) Laying of Cable through horizontal boring (150 Sq. mm.) in RCC Road /Rail/Jetty/RCC surface by providing HDPE pipe of suitable size as per technical Specification no 6(e)	500	Mtr.		
7	Preparation earthing station, chemical treated back filled compound earthing system with Pipe-In-Pipe 80 mm. Dia. Hot dip GI type 3 Mtr. Depth, Maintenance free as per Technical Specification No. 7	06	Nos.		
8	Preparation earthing station of Copper Plate Earthing size of 600mm X 600 mm with a thickness of 3mm as per Technical Specification No.8.	03	Nos.		
9	Hot Dip G. I. Strip for Earthing Supply, laying, fixing including termination / connection of following type and size of GI earth strips 50 X 6 mm. GI earth strips and as per technical specification no. 9	50	Mtr.		
10	Supply, laying, fixing including termination / connection of following type and size of Copper earth strips 50 X 6 mm. and as per technical specification no. 10	30	Mtr.		
11	Supply of Heat shrink long sleeve & boat, suitable for RMU End termination kit (Indoor Type) for 11 KV 3C X 150 Sq. mm. H.T XLPE cable as per Technical Specification No. 11	06	Nos.		
12	Fixing of Heat shrink long sleeve & boat, suitable for RMU End termination kit (Indoor Type) for 11 KV 3C X 150 Sq. mm. H.T XLPE cable as per Technical Specification No. 12	06	Nos.		
13	Supply of Heat shrink straight through Joint kit for 11 KV, HT XLPE cable as per Technical Specification No. 13 a) 3C X 150 Sq. mm.	10	Nos.		
14	Fixing the Heat Shrink Straight	06	Nos.		

	through Joint kit for 11 KV HT XLPE cable as per Technical Specification No. 14 a) 3C X 150 Sq. mm.				
				Total Rs.	

Net Amount in words_____
(The rates should be inclusive of all taxes, duties, fees, cess etc. and all incidental charges; but exclusive of GST).

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority

Terms & Conditions

1. The rates quoted must be inclusive of all taxes and levies (Excluding GST), No claims of contractor shall be entertained on account of any other taxes levied by central / state government or any authorities paid by him.
2. The contractor shall study the local working conditions at the site of work before tendering and no claim what-so-ever shall be entertained.
3. The work shall be carried out in accordance with the best standards of workmanship and to the entire satisfaction of the Engineer-in-Charge.
4. 1st & Final Bill shall be paid after satisfactory completion of the work.
5. CME reserves the right to cancel the quotation without assigning any reasons and also increase/decrease the quantum of work.
6. The contractor shall execute the work in such a way that not to cause inconvenience to the public or staff or nearby offices and not to cause hindrance to traffic. Necessary barricading shall be done by the contractor at his own cost if required.
7. All tools, plants, scaffolding ladder etc. and other machinery etc. required temporary for the purpose of execution of work will have to be arranged by the contractor at his own cost and storing of such tools, plants etc. will have to be made by him.
8. All the materials should be got approved from Engineer-in-Charge before put into use.
9. The contractor has to arrange Gate Passes for entry/exit of labours and equipment's / vehicles inside/outside Cargo Jetty area at his own cost from CISF.
10. All the rules & regulations governing DPA will be applicable.
11. The Contractor shall ensure not to cause any damage to the port properties in the vicinity of work site during execution of work. If any damage occurs due to workmen/machinery of the contractor, the contractor has to make good the loss/damage at his cost.
12. Taxes & Duties: GST Extra @ 18% Income Tax & GST will be deducted at applicable rates.

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 /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
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ NICCO/ RALLISON/PRIMECAB/ HAVELLS/ UNIVERSAL/ UNISTAR/AVOCAB
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
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
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
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	RR KABEL/KEI/POLYCAB/MILEX/GUJCAB/ STANDARD/ FINOLEX/ANCHOR
24	FLUSH TYPE SWITCHES, SOCKETS, HOLDERS AND CEILING ROSES & ELECTRONIC REGULATORS	ANCHOR/MK/NORTHWEST/VINAY/PANAMA/ HAVELLS
25	DOOR BELLS/CALL BELLS	ANCHOR/LEGEND/MK/NORTHWEST
26	MODULAR SWITCHES, SOCKETS, PLATES & BOXES	ANCHOR / MK / NORTHWEST / LEGRAND /HAVELLS/INDOASIANSIEMENS
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
31a	LED Luminaries	Philips /Bajaj/Wipro/CG/Surya/Pyrotech/Syska/Nessa having surge Protection ≥10KV for fittings & internal Surge rotection for Driver of≥4KV, LED Chip only OSRAM/CREE/Philips Lumileds/Citizen/Nicia with LM-79,80 CERTIFICATION
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	DG SETS A) ENGINE B) ALTERNATOR	 CUMMINS/GREAVES/KIRLOSKAR/ CATERPILLAR/ ASHOK LEYLAND/VOLVO 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	HT/LT Heat Shrinkable Joint Kit	3M/Raychem/Yamuna Denson /Compaq
46	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO

Signature & Seal of Contractor

Executive Engineer (E)
Deendayal Port Authority