



DEENDAYAL PORT AUTHORITY

ISO 9001:2008 | ISO 14001 | ISPS Compliant Port



Office of Superintending Engineer (Electrical),
Ground Floor, P & C Building, New Kandla, Kutch,
Pin Code 370210. Email: xenedpt@gmail.com

Date: 19/05/2023

EXPRESSION OF INTEREST [EOI] for “Design, Supply, Erection, Testing & Commissioning of 750 KVA Shore to Ship Power Supply”

(This EOI is issued to elicit Expression of Interest from the parties interested in the work and does not constitute any binding commitment from the Deendayal Port Authority to proceed with the work or invite any or all the parties in the subsequent bidding process. The Open Tenders will be issued subsequently.)

Superintending Engineer (Electrical), DPA invites Expression of Interest for the work of “Design, Supply, Erection, Testing & Commissioning of 750 KVA Shore to Ship Power Supply” from the reputed firms from those who have executed similar work in Government/public sectors and other leading private organizations. The Expression of Interest (EOI) documents containing details of Scope of Work and Technical Specifications are enclosed herewith.

The interested firms are requested to submit their expression of interest for the said work in BOQ format as enclosed at Annexure I. The completed EOI (Expression of Interest) shall be submitted to the office of the undersigned on or before 02/06/2023. A soft copy of EOI is also acceptable through e-mail Ids. xenedpt@gmail.com & lightingkandla@gmail.com

Superintending Engineer (E)
Deendayal Port Authority

ANNEXURE – I

Sr. No.	Description	Qty.	Unit	Rate	Amount
1	Supply at site 3 way, 11kV Gas Insulated RMU as per Technical Specification No. 1	1	Each		
2	Installation, testing & commissioning of 3 way, 11kV Gas Insulated RMU as per Technical Specification No. 2	1	Each		
3	Supply at site 3 core, 150 Sq. mm armoured aluminium conductor XLPE cable of 11kV grade as per IS: 7098 (Part - II) 1988 & as per Technical Specification No. 3	820	m		
4	Laying, Testing & Commissioning of 3 core, 150 Sq. mm HT XLPE cable through existing Substation Cable Trench as per Technical Specification No. 4	20	m		
5	Laying, Testing & Commissioning of 3 core, 150 Sq. mm HT XLPE cable through Existing NP2 Pipe as per Technical Specification No. 5	800	m		
6	Supply at site Indoor type Heat shrink end termination kit for 3 core, 150 Sq. mm, 11kV XLPE aluminium cable as per Technical Specification No. 6	5	Each		
7	Fixing of Indoor type Heat shrink end termination kit for 3 core, 150 Sq. mm, 11kV XLPE aluminium cable as per Technical Specification No. 7	5	Each		
8	Supply at site 800 kVA, 11/0.480 kV Stepdown AN Type Transformer as per Technical Specification No. 8	1	Each		
9	Installation, Testing & Commissioning of 800 kVA, 11/0.480 kV Stepdown AN Type Transformer as per Technical Specification No. 9	1	Each		

10	Supply at site 4 Core, 400 Sq.mm, 1.1kV grade armoured aluminium conductor XLPE cable as per Technical Specification No. 10	100	m		
11	Laying of 4 Core, 400 Sq.mm, 1.1kV grade armoured aluminium conductor XLPE cable through Existing Substation Trench as per Technical Specification No. 11	100	m		
12	Supply at site 750kVA Static Frequency Converter as per Technical Specification No. 12	1	Each		
13	Installation, Testing & Commissioning of 750kVA Static Frequency Converter as per Technical Specification No. 13	1	Each		
14	Supply at site 800kVA Isolation Transformer as per Technical Specification No. 14	1	Each		
15	Installation, Testing & Commissioning of 800kVA Isolation Transformer as per Technical Specification No. 15	1	Each		
16	Supply at site LT panel as per Technical Specification No. 16	1	Each		
17	Installation, Testing & Commissioning of LT panel as per Technical Specification No. 17	1	Each		
18	Supply at site 3.5 Core, 400 Sq.mm, 1.1kV grade armoured Copper Conductor XLPE cable as per Technical Specification No. 18	280	m		
19	Laying of 3.5 Core, 400 Sq.mm, 1.1kV grade armoured Copper Conductor XLPE cable through Existing Substation Trench as per Technical Specification No. 19	20	m		
20	Laying of 3.5 Core, 400 Sq.mm, 1.1kV grade armoured Copper Conductor XLPE cable through Existing Pipe between Substation to	240	m		

	Power Unit as per Technical Specification No. 20				
21	Design, supply, installation, testing & commissioning of SCADA system as per Technical Specification No. 21	Lump Sum	Complete Job		
22	Providing portable fire extinguisher at Unit Substation as per Technical Specification No. 22	Lump Sum	Complete Job		
23	Design, supply, installation & testing of Power Unit and Cable Management System as per Technical Specification No. 23	Lump Sum	Complete Job		
24	Commissioning of Power Unit and Cable Management System as per Technical Specification No. 24	Lump Sum	Complete Job		
Total					
(In words Rupees _____ only) (NOTE: The rates should be inclusive of all taxes, duties, fees, cess etc. and all incidental charges; but exclusive of GST). <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div>Signature & Seal of Contractor</div> <div>Superintending Engineer (E) Deendayal Port Authority</div> </div>					

SCOPE OF WORK

The Scope of work envisages the pilot project of giving power supply from shore to ship as per IEC 80005-3, considering all safety parameters and operational aspects to meet the green energy initiative under Maritime Vision 2030. It is decided to install the shore to ship power supply system between cargo berth no. 8 & 9 of DPA.

TECHNICAL SPECIFICATION

Technical Specification No. 1:

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 - +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 new Unit Substation inside Cargo Jetty area. The RMU shall be extensible. Two Circuit Breakers for incoming & outgoing cables and one Circuit breaker for outgoing feeder, shall be enclosed in the main tank using SF6 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 minimum 3mm thickness and robotically welded with a pressure relief arrangement.

The cable entry shall be from bottom and the end terminations shall be done on front side. The separate CBCT shall be provided in the entry of each phase.

Inner enclosure (Main tank)

The tank shall be robotically welded stainless steel sheet of minimum 3mm thickness. The tank shall be sealed and no handling of gas should be required throughout the 25 years of service life. However, the SF6 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 M.S. 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 tinned copper of rating current 630A shall be provided. The Short time rating current shall be 20kA for 3 seconds for 11kV. The Bus bar connections shall Anti - oxide greased.

ELECTRICAL DATA:

- 12 kV - 28kV - 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, 50Hz. Phase current input Relay shall be suitable for 1A and %A CT secondary (selectable at site) Relay shall be suitable for 2CT as well as 3CT connection. Ground current input Relay shall be suitable for residually connected CT input and also for CBCT input. The relay shall have provision for digital inputs, speed switch inputs. The Communication System of the relay shall be equipped with RS485 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. The relay shall support multiple/universal protocols for communication with any type of DCS/ SCADA. Make of Relay must be Areva, Siemens, ABB, Alstom, Schneider only.

➤ **FAULT PASSAGE INDICATORS / Earth Fault Indicators (FPI/EFI):**

These shall facilitate quick detection of faulty section of line. The fault indication may be on the basis of monitoring fault current flow through the device. The unit should be self-contained requiring no auxiliary power supply. The FPI shall be integral part of RMU.

➤ **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 not older than 5 years from the date of issue of work order.

Following Type Test must have been carried out:

- Short time current withstand test and peak current withstand test.
- Lightning Impulse voltage withstand test.
- Temperature rise test.
- Short Circuit current making and breaking tests.
- Power frequency voltage withstand test (dry).
- Capacitive current switching test confirming to IEC.
- Mechanical operation test.
- Measurement of the resistance of the main circuit.
- 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 supplier/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 supplier.
- 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 equipments 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.

- (a) The contractor shall supply at site 11 kV, 630 Amp, Indoor Compact Switchgear (Gas Insulated), Extensible on One Side, Motor Driven Spring Charging having 3 nos. Circuit Breaker Modules mentioned as under:

Module No. 1 & 2 as 11 kV Incomer along with PT, Module 3 as Circuit Breaker Module suitable for Distribution Transformer.

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 0.2s
1	Multifunction Energy Meter with RS485
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, RS232 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 03 nos. Ring Core Protection CTs having ratio 300-200/1-1 , 5VA, 5P10 (considering the cable size 3Cx 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
1	Stored energy mech. for manual and Motor Driven Spring Charged operation

1	Multifunction Energy Meter with RS485
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 03 nos. Ring Core Protection CTs having ratio 150-100/1-1, 5VA, 5P10 (considering the cable size 3Cx 300 sq. mm HT XLPE cable)
1	Set of Transformer Protection Annunciation Scheme comprising of: 1 no. Master Trip Relay (24VDC) 6 no. Aux. Relays (24VDC) 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 to 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 has to supply one SF₆ Gas filling kits with cylinder suitable for supplied RMU panels.

Technical Specification No. 2:

This item includes installation, testing and commissioning of supplied RMU panel at Unit Substation inside Cargo Jetty area.

The RMU Panel 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. 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 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. 3:

This item includes supply at site 3 Core, 150 Sq. mm (E), 11kV grade aluminium conductor XLPE insulated armoured cable confirming to IS: 7098 (Part-II) 1988 with latest amendments with ISI mark. The cable shall have marking/embossing at an interval of every meter showing its progressive length. The contractor shall submit type test certificate at the time of supply of Cable at site. The type test certificate shall not be more than 3 years old. The rate shall be inclusive of all taxes (excluding GST), packing, forwarding, insurance, transportation, and unloading at site of work.

Technical Specification No. 4:

The item includes laying of single length cable of size 3 Core, 150 Sq. mm XLPE Insulated aluminium conductor armoured cable of 11kV grade in the existing Substation cable trench. The cable shall be laid after opening of trench by removing the MS chequered plates. After laying of the cable, cable trench shall be properly covered with the existing chequered plates as per original. The item includes required material and labour as directed by Engineer in charge. The item work includes required labour, tools & tackles.

Technical Specification No. 5:

The item includes laying of single length cable of size 3 Core, 150 Sq. mm 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 will exist. The item includes required material and labour as directed by Engineer in charge.

Technical Specification No. 6:

This item includes supply at site indoor type heat shrink end termination kit for 3 core, 150 Sq. mm HT armored aluminium conductor XLPE Cable of 11 kV grade as per the approved make list.

Technical Specification No. 7:

This item includes fixing of Indoor type heat shrink end termination kit of 3 Core, 150 Sq. mm size for HT armored aluminum conductor XLPE Cable of 11 kV grade. The joint shall make in such a way that joined section can be reeled without sagging and the joint shall be electrically and mechanically permanent. This includes all required material, tools & tackles and labour as directed by Engineer in charge.

Technical Specification No. 8:

The item includes supply at site 800 kVA, Stepdown AN Type Transformer. The Technical Specifications of the Stepdown Transformer is as below:

Rating (Continuous): 800kVA

No. of Phase: Three

Input Voltage: 11000 V, +/- 5%.

Input Frequency: 50 Hz +/- 3%.

Output Voltage: 480V, +/- 5%.

Output Frequency: 50 Hz +/- 3 %

Type of Cooling: Forced Natural Air Cooled

Construction: CRGO Mitered core joints with four blade system

HV Winding Connection: Delta

LV Winding Connection: Star

Vector Group: Dyn11

Direction of Power Flow: HV to LV

Primary Connection: Delta

Secondary Connection: Star

Service: Indoor

Other Service Conditions: As per IS 11171/2026

Class of Insulation: Minimum Class F

Allowable maximum temperature rise of winding: 90 °C

Tapping: +5% to - 5% in step of 2.5%

No-load losses (w): 1100

Load losses at 75°C (w): 6960

Impedance at rated current and 75°C at principal tap: 6.25 % (+10% to -10% TOL.)

Terminal arrangement: HV & LV Termination shall be cable box.

The contractor shall submit general arrangement drawing of the transformer. The contractor shall submit the type test certificate of the transformer from any NABL accredited laboratory which shall not be older than 5 years from the date of issue of work order.

Technical Specification No. 9:

This item includes installation, testing and commissioning of 800 kVA, Stepdown AN Type Transformer at unit substation inside cargo jetty area. The transformer shall be installed on pedestal of suitable size to be prepared by contractor in the substation. The work includes end termination, connection of cables laid including earth connection. Before charging the transformer all the tests shall be carried out as per relevant IS specifications and IE Rules 1956. The transformer shall be properly leveled on foundation. This includes all material, labour, tools & tackles as directed by Engineer-In-charge.

Technical Specification No. 10:

This item includes supply at site 1.1 kV grade, 4 Core, 400 Sq.mm aluminium conductor XLPE insulated armoured cable confirming to IS: 7098 (Part-I) 1985 with up to date amendments, having ISI mark and of approved make. The cable shall have marking/embossing at the interval of every meter showing its progressive length. The contractor shall submit type test certificate at the time of supply of Cable at site. The type test certificate shall not be more than 3 years old. The rate shall be inclusive of all taxes (excluding GST), packing, forwarding, insurance, transportation, and unloading at site of work.

Technical Specification No. 11:

The item includes laying of cable of size 4 Core, 400 Sq.mm XLPE Insulated aluminium conductor armoured cable of 1.1kV grade in the existing Substation cable trench. The cable shall be laid after opening of trench by removing the MS chequered plates. After laying of the cable, cable trench shall be properly covered with the existing chequered plates as per original. The item includes required material and labour as directed by Engineer in charge. The item work includes required labour, tools & tackles.

Technical Specification No. 12:

Static Frequency Converter:

The Static Frequency Converter (SFC) shall allow connection of 60Hz powered equipment to 50 Hz supply network. The system shall function by converting the input AC power through sine wave rectifier to DC link and then through an AC sine wave inverter to produce clean, full sine wave output at the new frequency and voltage.

A) GENERAL:

- Rating: 750 kVA
- Efficiency: 95%
- Enclosure: IP rating IP 20
- Pollution degree: Rating 2
- Operating Temperature: 0°C to 40°C
- Cooling: Forced Air
- Humidity: < 95% non-condensing
- Noise: 75-85 dBA typical
- Electromagnetic Compatibility: CISPR 11 class A
- Enclosure Materials: Electro-galvanized steel

- Panel Thickness: Sides & Rear Panels (1.5mm, 2mm)
- Enclosure Access: Hinged doors with key lock.

B) INPUT:

- Type: IGBT Based low harmonic
- Voltage Range: 480 V \pm 10%
- Power System: 3-phase TN
- Frequency: 50 Hz
- Frequency Range: \pm 5 Hz
- Max. Continuous Voltage: 110%
- Overload capacity: 150% for 30 seconds
- Over voltage: Category III
- Efficiency: 95%
- Current Harmonics: < 3% THDi (at rated load)
- Power Factor: Unity (adjustable).

C) OUTPUT:

- Capacity Rating: 800kVA at 480V
- Voltage: 480 V
- Frequency: 60 Hz
- Voltage Harmonics: < 2.5% THDv (linear load)
- Over load capability: 120% for 10 min & 150% for 30 s
- Short circuit limit: 200% for 2 s
- Voltage Accuracy: +/- 1%
- Frequency Accuracy: +/- 0.1%.

D) STANDARDS:

- ISO 90001 Quality Assurance System
- IEC62103 / EN 50178
- CE Mark.

Sr. No.	Particulars	Standards
1	Insulation Coordination for equipment within Low Voltage systems	IEC 60664
2	Semiconductor Converters	IEC / EN 60146
3	Noise Immunity	EN 61000-6-2
4	Radiated & Conducted Emissions	CISPR11 ed 6.0 2016 06 Class A Group 1
5	Quality Management System	ISO 9001:2015
6	Environmental Management System	ISO 14001:2015
7	Marking	CE
8	Safety of Electrical Installations	IEC 62477-1
9	Electronic equipment for use in power installations	IEC 62103
10	Recommended practice & requirements for harmonic control in electric power systems	IEEE519-2014

Lightning Arresters

Lightning arresters are required to be installed in Static Frequency Converter unit. The lightning arresters shall be single phase, station type gapless construction, outdoor type. Suitable mounting structure shall be provided for lightning arresters. KA rating – 10 KA, Creepage distance: 30mm/kV.

List of recommended make: ABB/Siemens/Schneider Electric/Fuji Electric.

Technical Specification No. 13:

This item includes installation, testing and commissioning of 750kVA Static Frequency Converter along with providing necessary air conditioning system in unit substation inside cargo jetty area. The work includes end termination, connection of cables laid including earth connection. This includes necessary mounting hardware for bolting/welding down the base frame to the foundation. All alignment, leveling, grouting, anchoring adjustments shall be carried out in accordance with manufacturer's instruction or as directed by Engineer in charge. The contractor shall provide necessary air conditioning system for the Static Frequency Converter system. The contractor shall carry out required aluminium partition in the existing unit substation. The contractor shall provide required length of electrical rubber mat as per the standard. After installation of the Static Frequency Converter, testing and commissioning shall be done. This includes all material, labour, tools & tackles as directed by Engineer in charge.

Technical Specification No. 14:

Isolation Transformer

- Capacity: 800kVA
- Type of Cooling: Forced Natural Air Cooled
- Construction: CRGO Mitred core joints with four blade system
- Phases: 3 Phase
- Input Voltage: 480V, +/- 5%
- Input Frequency: 60 Hz +/- 3%
- Output Voltage: 440V for 800kVA
- Output Frequency: 60 Hz +/- 3 %
- IR value: > 200 m
- Di-Electric Strength: 4 kV per 120 Seconds
- Impedance Voltage: 4-5%
- Regulation: 4-5%
- Max. Ambient Temp.: 50 deg. C
- Efficiency: >98%
- Linear harmonics attenuation: 100%
- Duty: continuous
- Class of Insulation: Class 'H'
- Services: Indoor Application
- Method of Winding: Multiple parallel to reduce skin effect
- Degree of IP: IP-20
- Standard IS: 2026 Part-I, Part-II & Part-III & IS: 11171.

Following general requirements shall be ensured for the transformer.

- All fasteners and bolts etc. shall be galvanized or zinc passivated.
- All surfaces to be painted shall be thoroughly cleaned, de-scaled, made free from rust and given a priming coat of rust resisting paint followed by two finishing coats of approved shade.
- Paint shall be suitable to withstand specified atmospheric conditions.

Technical Specification No. 15:

This item includes installation, testing and commissioning of 800kVA Isolation Transformer at unit substation inside cargo jetty area. The transformer shall be installed on pedestal of suitable size to be prepared by contractor in the substation. The work includes end termination, connection of cables laid including earth connection. Before charging the transformer all the tests shall be carried out as per relevant IS specifications and IE Rules 1956. The transformer shall be properly leveled on foundation. This includes all material, labour, tools & tackles as directed by Engineer-In-charge.

Technical Specification No. 16:

This item includes supply at Site LT Panel with energy meter.

LT Panel:

Enclosure: (Height 2200mm X Width 5000mm X Depth: 900mm Approx.)

Enclosure Material: CRCA Sheet 1.6mm thickness

Bus Bar Material: Copper

Ingress Protection: IP42

Switchgear: ACB WITH MICROPROCESSOR BASED O/L, S/C, E/F RELEASE, 1250A, 3P, 50kA, MDO type, 480V AC, 60HZ.

Indication Lamp: RYB Phase Indication, ON/OFF/TRIP Indication, Trip circuit healthy Indication.

CT: 800/5A

Digital Multifunction Energy Meter (Class 0.2)

Panel Color: RAL 7035.

Technical Specification of 3-Phase Energy Meter (-/5A):

Sr. No.	Description	Specifications
1	Type of meter i) Basic current (A) ii) Maximum current	LT CT Meter Ib: 5 Amps. through CT Imax: 10 Amps.
2	Standards to which the meter conform	IS 14697 (1999) IEC 62053-11 IEC 62053-21 PFC Spec IS 9000 CBIP report No: 325 IS 12346 IS 2705 (Part I&II) IS 15959: 2011
3	Overload capacity	200% of Ib

4	Dynamic range	0.1% to 200% of Ib
5	Power supply variation i) Specified operational range ii) Limit range of operation iii) Frequency	0.7 to 1.2 V ref. 0.7 to 1.2 V ref. 50 HZ \pm 5%
6	Accuracy class	Class 0.5s
7	P.F. Range	Zero lag – Unity – Zero lead
8	Variation of voltage at which meter functions normally	+20% to –30% of Vref
9	Power Consumption per phase i) Voltage circuit ii) Current circuit	IS-14697:1999 / IEC (latest amendment)
10	Minimum starting current of the meter (% Ib)	0.1% of Ib
11	Impulse voltage	10 kV
12	Display parameters	<p>(Mode 1): Parameters of this mode should display on auto scrolling as well as manually up & down scrolling using push button. Display Check, Meter Sr. No., CT Ratio, RTC – Date and Time, Phase sequence: Voltage & Current, R-Phase Voltage, Y-Phase Voltage, B-Phase Voltage, R-Phase Current, Y-Phase Current, B-Phase Current, Inst. Average PF with Lag/Lead legend, Frequency, Inst. load KW, Rising demand in KW with elapse time, Maximum Demand of current month in KW, Cumm. MD in KW, No. of reset counts, Total Forward Peak Hours KWH, Total Forward Night Hours KWH, Total Forward Off Peak Hours KWH, Cumulative Fundamental KWH.</p> <p>(Mode 2): Parameters of this mode should display manually up & down scrolling using push button Anomaly, Voltage failure count phase wise, Current failure count phase wise, Voltage unbalance count, Current unbalance count, Current reversal count- phase wise, Total magnet tamper count, Over voltage count, Low voltage count, Neutral disturbance count, Total tamper count, Cumm. KWH for Peak hours (Zone 1), Cumm KWH for Night hours (Zone 2), Cumm KWH for Rest hours (Zone 3), Cumm KWH for Off Peak hours (Zone 4), Cumm. KVARH-lag for Peak hours (Zone 1), Cumm KVARH-lag for Night hours (Zone 2), Cumm KVARH-lag for Rest hours (Zone 3), Cumm KVARH-lag for Off Peak hours (Zone 4), Cumm. KVAH for Peak hours (Zone 1), Cumm KVAH for Night hours (Zone 2), Cumm KVAH for</p>

		<p>Rest hours (Zone 3), Cumm KVAH for Off Peak hours (Zone 4), Maximum Demand of previous month in KVA, Maximum Demand of current month in KVA, MD KW after last billing – Peak Hours (Zone-1), MD KW after last billing – Night Hours (Zone-2), MD KW after last billing – Rest hours (Zone 3), MD KW after last billing – Off Peak hours (Zone 4), MD KW between last two resets – Peak Hours (Zone-1), MD KW between last two resets – Night Hours (Zone-2), MD KW between last two resets – Rest hours (Zone 3), MD KW between last two resets – Off Peak hours (Zone 4), MD KVA after last billing – Peak Hours (Zone-1), MD KVA after last billing – Night Hours (Zone-2), MD KVA after last billing – Rest hours (Zone 3), MD KVA after last billing – Off Peak hours (Zone 4), MD KVA between last two resets – Peak Hours (Zone-1), MD KVA between last two resets – Night Hours (Zone-2), MD KVA between last two resets – Rest hours (Zone 3), MD KVA between last two resets – Off Peak hours (Zone 4), Fundamental KWH</p> <p>(Mode 3): Parameters of this mode should display manually up & down scrolling using push button. High Resolution display for KWH, High Resolution display for KVARH-Lag, High Resolution display for KVAH, High Resolution display Fundamental KWH</p>
13	Operational Indication LED	To be provided
14	<p>(a) Material for base/terminal block</p> <p>(b) Material for meter cover/terminal cover</p>	<p>10% glass filled non-transparent poly carbonate – LEXAN-503R</p> <p>Transparent poly carbonate – LEXAN-943A</p>
15	<p>(a) Meter terminal block having sealable extended terminal cover</p> <p>(b) No. of seals to be Provided</p> <p>(c) Connection diagram inside the terminal cover</p> <p>(d) Maximum safe current the terminals and screws shall carry</p>	<p>Yes</p> <p>2 nos. on meter body, 2 nos. on terminal cover, 1 no on optical port, 1 no on MD reset button.</p> <p>Yes</p> <p>150% of I_{max} for 2 hours</p>
16	Communication ports	<p>Two (Optical Port & RS 232 Port)</p> <p>As per IS: 15959 (including amendment 2) and IEC-62056-21</p>

17	Real Time Clock with back up battery Life of battery	To be provided 10 Years (minimum)
18	Non volatile memory retention time in absence of power	The data shall be stored in non-volatile memory (NVM). The NVM shall retain data for a period of not less than 10 years under unpowered condition.
19	Memory capacity (kB)	Suitable size
20	Tamper and fraud provisions	(a) Missing Potential (b) Current Open (c) Voltage Unbalance (d) Current Unbalance (e) Current Reversal (f) Magnetic Influence (g) Neutral Disturbance (h) Low voltage (i) High Voltage (j) Top Cover open
21	Salient features:	
	1) Meter shall have provision to read in the absence of power	
	2) Meter shall work accurately irrespective of phase sequence of the main supply.	
	3) Meter shall remain powered up and functional in presence of two wires	
	4) Meter shall record accurately even if neutral is disconnected	
	5) Meter shall record correct energy in case of current reversal of one or more phases	
	6) Measurement by meter shall not get influenced by injection of AC voltage/chopped signal/DC signal & harmonics	
	7) Meter shall register accurate energy even if load is drawn partially or fully through local earth.	
	8) Meter should record and display MD in KW as well as KVA for 30 minute integration period	
	9) Meter should record and display TOD energy. However, TOD MD in MRI report should be available.	
22	MD reset	Auto as well as manual. (Separate /exclusive button to be provided for MD reset)
23	Self diagnostic feature	To be provided
24	Load Survey in graphical as well as in tabular form	Minimum RTC, KWH & KVAH parameters (energy and demand) for 90 days with 30 minute integration period in FIFO Manner.
25	Snap Shot Facility	Voltage, current, power factor, KWH with date & time of occurrence & restoration of tamper event.
26	No. of tamper events	Minimum 400

27	Routine tests	As per IS:14697 and specification
28	BIS license	To be submitted-BIS NO & date of validation to be mentioned
29	ISO 9001/9002	ISO No. & validity is to be specified.
30	Guarantee	5 Years from the date of commissioning.
31	RTC battery & the battery for display	a) In case of power failure, even for the period for six months display can be seen by push button and data can be retrieved through battery mode. b) Meter should have suitable arrangement to show at least "Cumulative Active Energy kWh" permanent or at an interval of 1 minute during power OFF condition of 18 hours without use of push button.

The test certificate shall be submitted along with supply of energy meter from the NABL accredited laboratory.

The LT Panel shall be provided with required CTs & required accessories. The cable entry and exit shall be from bottom of LT Panel. The LT Panel shall be tested as per the relevant IS standard. Before Manufacturing the LT Panel, the relevant test certificate in support of LT distribution panel manufacturing, along with design & drawing shall be submitted to DPA for approval and also all Electrical accessories shall be used as per approved Make List of DPA. The rates shall be inclusive of all the taxes (excluding GST), insurance, transportation, unloading at site as directed by Engineer in charge.

Technical Specification No. 17:

This item includes installation, testing and commissioning of LT Panel in unit substation inside cargo jetty area. The work includes end termination, connection of cables laid including earth connection. This includes necessary mounting hardware for bolting/welding down the base frame to the foundation. All alignment, leveling, grouting, anchoring adjustments shall be carried out in accordance with manufacturer's instruction or as directed by Engineer in charge. The work includes providing required length of electrical rubber mat as per the standard. After installation of the LT Panel, testing and commissioning shall be done. This includes all material, labour, tools & tackles as directed by Engineer in charge.

Technical Specification No. 18:

This item includes supply at site 1.1 kV grade, 3.5 Core, 400 Sq.mm Copper Conductor XLPE insulated armoured cable confirming to IS: 7098 (Part-I) 1985 with up to date amendments, having ISI mark and of approved make. The cable shall have marking/embossing at the interval of every meter showing its progressive length. The contractor shall submit type test certificate at the time of supply of Cable at site. The type test certificate shall not be more

than 5 years old. The rate shall be inclusive of all taxes (excluding GST), packing, forwarding, insurance, transportation, and unloading at site of work.

Technical Specification No. 19:

This item includes laying of cable of size 3.5 Core, 400 Sq. mm XLPE Insulated Copper Conductor XLPE insulated armoured cable of 1.1kV grade in the existing Substation cable trench. The cable shall be laid after opening of trench by removing the MS chequered plates. After laying of the cable, cable trench shall be properly covered with the existing chequered plates as per original. The item includes required material and labour as directed by Engineer in charge. The item work includes required labour, tools & tackles.

Technical Specification No. 20:

This item includes laying of cable of size 3.5 Core, 400 Sq. mm XLPE Insulated Copper Conductor XLPE insulated armoured cable of 1.1kV grade in the existing NP2 Pipe Trench provided between unit substation and power unit location. 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 50m length of NP2 Pipe, a suitable size of manhole will exist. The item includes required material and labour as directed by Engineer in charge.

Technical Specification No. 21:

This item includes design, supply, installation, testing & commissioning of SCADA system at Unit substation inside cargo jetty area.

SCADA requirements

The following equipment/ Sub Systems at Unit Substation shall be connected to the suitably designed Remote I/O Units (RIO) or Control and Monitoring units (CMU) for effective automatic control and monitoring from Supervisory Control and Data Acquisition (SCADA) system to be provided by contractor at Unit Substation:

- Energy Meters
- Numerical Relays
- Status of Breaker

RTU/ RIO/ CMU Panel:

The RTU/ RIO/ CMU of Shore Power Unit Substation System shall have the following features: The Stand-alone type RTU/ RIO/ CMU panel or other suitable panel shall be placed in Unit Substation. The chronological event list shall contain:

- 1) Position changes of Circuit Breakers
- 2) Indication of relay operations
- 3) Fault signals from the switch gear
- 4) Indication when measured values (i.e., voltage, frequency, PF, etc.) exceed upper and lower limits.

5) Loss of communication

The timing of each event shall be as per GPS based time synchronizing equipment to be supplied by the Contractor. All the necessary software for the RTU function and for downloading the data at Unit Substation shall be provided by the Contractor.

List of Recommended Make of SCADA: Honeywell/ABB/Siemens/Rockwell/GE/Schneider Electric.

Technical Specification No. 22:

Portable Fire Extinguishers

The contractor shall provide following types of portable fire extinguishers at the unit substation:

- a) 2 kg capacity dry chemical powder fire extinguisher
- b) 5 kg capacity dry chemical powder fire extinguisher
- c) 2 kg capacity CO2 type fire extinguisher
- d) 5 kg capacity CO2 type fire extinguisher

Technical Specification No. 23:

This item includes design, supply, installation & testing of Power Unit and Cable Management System as per the IEC 80005-3 with up to date amendments.

Power Unit at Wharf:

- The Power Unit shall be provided for power supply applications in tough environments prevailing in the Port where the need of protection is vital.
- Power Unit shall have Socket with integrated cover operated by the push & pull arms
- Socket housing material: LM6 grade aluminum
- Push & Pull arm material: Bronze
- Separate cable terminals allowing fast and easy exchange of contacts
- Contacts and cable terminal material: silver plated brass
- Standard insulator material: injection moulded PPO
- High quality gaskets and sealing with a minimum life span of 10 years
- Ingress Protection: IP 65
- Cabinet material: 2mm stainless steel sheet, 600x1500x400mm including 1 socket 3x630A+E+2P/440V, 240sqmm, push pull type mounted on lower module.
- ACB 1250A with Under voltage coil 440V/ 50-60Hz for control through pilot pins.
- Electric interlocking through under voltage trip unit connected to pilot circuits.
- 2 Nos. Cable glands on bottom for cables 2R x 3.5 x 400sqmm, XLPE Copper Cable.
- Suitable capacity of Plug Points (2 x 630A rating) to be mounted so as to cater power supply to ship through copper trailing cable.
- Connection terminal ground, copper bar mounted on the mounting plate.
- MCCB breaker and socket connected with single cable 400sqmm copper.
- Manual motor starter and under voltage coil connected with single cable 2.5 Sq.mm

Plug Units

- Ingress Protection: Minimum IP66 (when connected or with covers closed)
- Standard ambient temperature: -40 Deg C to +80 Deg C
- Socket & connector connection with integrated cover operated by the push & pull arms (Plug in straight or bent version)
- Standard finishes: Marine grade aluminium ISO 3522 – Hardware in stainless steel
- Push & Pull arm material: Bronze ISO 1338:1977
- Female contact, male pin and cable terminal: Silver plated brass
- Easy wiring with male and female insulators fully interchangeable made in PPO (polyphenylene Oxide)
- Interchangeable pins without dismantling the connector
- All Cable terminals suits for cable of Class 5, IEC 60228
- 3x630A+E+2P, push & pull, 300sqmm phase cable, crimp cable

Trailing Cable

1.1kV Grade, Trailing cable, Flexible Annealed Tinned Copper Conductor (Class 5 to IS:8130/84), EPR Type IE2 to IS:6380/84 Insulated, Core identification by coloured insulation/PC taped Cores Laid up together suitably and suitable binder taped, Inner Sheathed with PCP to IS:6380/1984), Reinforcement material shall be provided over inner sheath and Outer Sheathed with PCP to IS:6380/1984. Generally to IS:9968 (Part-1)/ 1988.

List of recommended make of Plug/Socket: Cavotec/Proconnect.

Cable Management System:

Cable Management System shall be skid-mounted cable reeling system for LV connection to provide moored ships with electrical power. It is considered that the System will be loaded in a ship after its mooring with the help of existing Cranes available with DPA.

The System shall make it possible to lay out offered quantity of multicore power and signal cables safely, lay them down from a ship with necessary guide arrangement for cables and establish connection to the electrical grid with Power Connector provided by the contractor on shore. The system shall maintain cable tension, preventing cables from slacking when vessels move due to displacement, waves, and tidal motion.

The System shall have following features to ensure safe operation:

- Audible and visual alarms to activate when last two turns of cable are available on the drum; cam limit switch for sensing drum full/empty contacts.
- Hydrodynamic slipping clutch integrated into gearbox; shall active CMS incorporating tide compensation function as defined by PAS/IEC 80005:3.
- Cable guide with multi-rollers allowing for proper bending radius of cables.
- Multi cable System equipped with dedicated connector holders to reel-out only the cable needed by the specific vessel.
- The system shall operate by suitable Radio Remote Control (RRC) units, which shall be robust, lightweight, compact, and highly ergonomic push-button RRCs.
- Emergency stop.

The System shall have following additional features:

- Separate pre-wired plugs to provide auxiliary power to the System and for connecting all status monitoring shore side.

- Rapid connection of cables to ships' electrical supply with the push-pull connectors that can also be integrated with fibre optics
- Alarm and signalling on the System enabling remote supervision, including reeling in and out, auto mode, emergency stop, last two turns of cable, last turn of cable.
- Anti-corrosion coatings.
- Portable structure with roof that allows the system to be lifted by crane or forklift.

Technical Specification of Cable Management System:

Active Cable Length: minimum 50 meter with two dead lays.

Operating Voltage: Up to 690V, 50Hz/60Hz as per standard.

Current: Up to 350A per cable as per standard.

Power connector: PAS/IEC 80005:3-compliant, 4 pilot pins.

Cable: 185sqmm phase PAS/IEC 80005:3-compliant, 4 pilot pins.

Rotating collector (slip-rings): Multiple three-phases 1kV (separate ring for phase for each cable), earth ring, pilot rings.

IP rating: IP65 collector, LV junction box and reel control panel.

Control panel: AISI 304 or 316 painted.

Heater systems: Anti-condensation heater system in reel control panel and in LV junction box.

Structure: Galvanised and painted steel, basement for fixed or portable versions (included corner blocks).

Type of drum: Monospiral, up to 3 cables.

Aux power consumption: ≤ 8kW at 400V.

List of recommended make of Cable Management System: Cavotec, Igus, Shorelink.

Technical Specification No. 24:

This item includes commissioning of the Power Unit and the Cable Management System for Shore Power System.

Performance Tests and Final Acceptance:

Following are few typical performance tests/ procedures envisaged for Shore Power System. Based on the Field Quality Plan (FQP) submitted by the equipment and system suppliers, the contractor shall finalize all sequences, tests and commissioning protocol to be followed at site.

- The Frequency converter shall be energized up to LT panel and all functional test parameters like output voltage range, frequency range, tap changer functions, trip functions, indications, etc. shall be checked and recorded.
- Power Connector Panel shall be energized and output power parameters at the ship end connector plug shall be measured and recorded.

- On installation of Cable Management System, required test shall be conducted as per test standards. Cable Management System shall be powered and checking of all functions shall be performed and recorded.
- Shore Power supply to minimum five different vessels shall be performed by the contractor in coordination with Engineer In-Charge to ensure the supplied system is trouble free, to correct any parameter which cause disturbance during shore power supply to vessel and to train Engineers of DPA in handling the shore power system for establishing required protocols.

Signature & Seal of Contractor

Superintending Engineer (E)
Deendayal Port Authority

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/ GLOSTER/ UNISTAR
6	LT XLPE CABLES	POLYCAB/TORRENT/RPG ASIAN/ RALLISON/PRIMECAB/ HAVELLS/ UNISTAR/AVOCAB/ALLCAB/AD CAB
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	RRKABEL/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/ INDOASIAN/ SIEMENS
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/Ness a having surge Protection $\geq 10KV$ for fittings & internal Surge protection for Driver of $\geq 4KV$, 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	EXHUAUST 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 (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	LUGS & CABLE GLANDS	DOWELLS / JAINSON / BRACO
46	STATIC FREQUENCY CONVERTER	ABB / SIEMENS / SCHNEIDER ELECTRIC/FUJI ELECTRIC
47	CABLE MANAGEMENT SYSTEM	CAVOTEC / IGUS / SHORELINK
48	SCADA	HONEYWELL / ABB / SIEMENS LTD. / ROCKWELL / GE / SCHNEIDER ELECTRIC
49	PLUG / SOCKETS	CAVOTEC / PROCONNECT

TERMS AND CONDITIONS

1. **Time Schedule:** The work shall be completed within 12 months from the date of issue of Work Order.
2. The bidder, at his own responsibility and risk is encouraged to visit and examine the site of work and its surroundings and obtain all information that may be necessary for preparing the Bid. The costs of visiting the site shall be at the Bidders' own expense.
3. DPA will award the work to the bidder whose bid has been evaluated to be techno – commercially responsive and the lowest evaluated amount bid.
4. Work shall be guaranteed for 12 months from the date of completion of the work.
5. The rates should be quoted in figures and words both. In case of difference in figure & words, the rate mentioned in words will be considered.
6. The contractor shall affix SEAL along with SIGNATURE in the Offer.
7. The work shall be carried out in accordance with the best standards of workmanship and to the entire satisfaction of the Engineer-in-Charge.
8. Security Deposit @ 5% recovered from the bill and the SD can be released only after successful completion of guarantee period.
9. Payments Terms: Stage wise payment shall be released against supply, installation, commissioning and handing over to Engineer in Charge, DPA.
All payments shall be made in Indian rupees unless specifically mentioned.
10. Payment will be made by RTGS only after satisfactory completion of work and submission of duly signed bill.
11. The contractor shall not deposit any materials at such a place that may cause inconvenience to the public or staff or nearby offices.
12. 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.
13. Income-tax and surcharge as applicable will be deducted from the bill while making payment to the contractor for carrying out the work and only net amount shall be paid to the contractor.
14. 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.
15. All the materials should be got approved from Engineer-in-Charge before put into use.
16. Correction if any should be signed / initialed by the contractor. White ink correction will not be allowed and lead to rejection of quotation.
17. All the rules and regulations governing DPA will be applicable.
18. After completion of the work, the site should be neatly cleaned by the contractor.
19. The contractor shall ensure not to cause any damages 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.

20. For Entry & exist of material and contractor personnel, pass shall be arranged by contractor.
21. The contractor shall quote the price exclusive of GST. The contractor shall quote prevailing GST rate separately, which shall be reimbursed by DPA after ascertaining necessary compliance as per Goods & Service Tax, 2017. All other duties, taxes, cesses applicable if any, shall be borne by the contractor.

Income-Tax deductions and surcharge as applicable thereon shall be made good while making payments due to the contractor for carrying out the work and only net amount shall be paid as directed by the Central Board of Direct Taxes, Ministry of Finance, Government of India.

The rates quoted by the contractor shall be deemed to be inclusive of the taxes, duties etc. which the contractor will have to pay for the performance of this contract, except GST. The employer will perform such duties in regard to the deduction of such taxes at sources as per applicable law.

22. All the work shall be carried out to the entire satisfaction of Engineer in Charge.

Signature & Seal of Contractor

Superintending Engineer (E)
Deendayal Port Authority