



ENERGY FIJI LIMITED

BIDDING DOCUMENT

**Design, Manufacture & Supply Outdoor Motorized
36kV Double Break Disconnectors, Earth Switches and
Associated Electrical Accessories & Structures for 33kV
Outdoor Bay Upgrade Works at EFL's Vuda 33kV Substation,
Lautoka.**

TENDER NO: MR 104/2026

INVITATION FOR BIDS

Date: 29th August, 2026
Tender No: MR 104/2026

The ENERGY FIJI LIMITED ("The Employer") invites electronic bids from reputable and suitable Bidders for the Design, Manufacture and Supply Outdoor Motorized 36kV Double Break Disconnectors, Earth Switches and Associated Electrical Accessories & Structures for 33kV Outdoor Bay Upgrade Works at EFL's Vuda 33kV Substation, Lautoka.

All bids for the contract shall be submitted on the appropriate forms provided and shall include the completed price schedule, technical schedule and schedules of experience etc. The bid shall be on the basis of a lump sum contract based on firm prices.

Bidders may obtain further information from, and inspect and acquire the bidding documents, at

Design, Manufacture and Supply Outdoor Motorized 36kV Double Break Disconnectors, Earth Switches and Associated Electrical Accessories & Structures for 33kV Outdoor Bay Upgrade Works at EFL's Vuda 33kV Substation, Lautoka.

The Secretary Tender Committee
Energy Fiji Limited
2 Marlow Street, Suva, FIJI.
Suva

The deadline for submission of bids shall be **1600hrs (local time) on Wednesday 30th September, 2026**

During evaluation of bids, the Authority may invite a bidder or bidders for discussions, presentations and any necessary clarification before awarding the contract price proposal.

Section 1 - Instructions to Bidders

- 1. Scope of Bid** ***The ENERGY FIJI LIMITED (hereinafter referred to as "the Employer"), wishes to receive bids for the Design, Manufacture and Supply Outdoor Motorized 36kV Double Break Disconnectors, Earth Switches and Associated Electrical Accessories & Structures for 33kV Outdoor Bay Upgrade Works at EFL's Vuda 33kV Substation, as defined in these bidding documents (hereinafter referred to as "the Works").***
- The successful bidder will be expected to complete the Supply Works within **8 months** from the date of issue of purchase order.
- 2. Eligible Bidders** This Invitation to Bid is open to bidders who have sound financial background and have previous experience in handling such electrical projects.
- Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer as the Employer shall reasonably request.
- Bidders shall not be under a declaration of ineligibility for corrupt or fraudulent.
- 3. Eligible Materials, Equipment and Services** The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. At the Employer's request, bidders may be required to provide evidence of the origin of materials, equipment, and services.
- 4. Qualification of the Bidder** To be qualified for award of Contract, bidders shall **submit proposals regarding work methods, scheduling and resourcing which shall be, provided in sufficient detail to confirm the bidder's capability to complete the works** in accordance with the specifications and the time for completion.
- 5. Cost of Bidding** The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs.
- 6. Site Visit** No site visit is required for this Supply tender. However, should the bidder wish to familiarize themselves with the site conditions than they will be required to
- 7. Sealing and Marking of Bids** Bidders are requested to upload electronic copies via Tender Link by registering their interest at: <https://www.tenderlink.com/efl>
- 8. Deadline for Submission of Bids** Bids must be received by the Employer at the address specified above no later than **1600 hours (Fiji Time) Wednesday 30th September, 2026.**
- The Employer may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.
- 9. Late Bids** Any bid received by the Employer after the deadline for submission of bids will not be accepted.

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| 10. Modification and Withdrawal of Bids | <p>The bidder may modify or withdraw its bid after bid submission on the Tender link by editing submission.</p> <p>No bid may be modified by the bidder after the deadline for submission of bids.</p> |
| 11. Employer's Right to Accept any Bid and to Reject any or all Bids | <p>Notwithstanding, the Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders of the grounds for the Employer's action.</p> |
| 12. Notification of Award | <p>Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder via email confirmed by registered letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").</p> <p>The notification of award will constitute the formation of the Contract. Upon the furnishing by the successful bidder of a performance security, the Employer will promptly notify the other bidders that their bids have been unsuccessful</p> |
| 13. Signing of Contract Agreement | <p>At the same time that he notifies the successful bidder that its bid has been accepted, the Employer will send the bidder the Form of Contract Agreement provided in the bidding documents, incorporating all agreements between the parties.</p> <p>Within 7 days of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to the Employer.</p> |
| 14. Corruptor Fraudulent Practices | <p>The Employer requires that the Contractor observe the highest standard of ethics during the procurement and execution of such contracts. In Pursuance of this policy, the Employer:</p> <p>(a) defines, for the purposes of this provision, the terms set forth below as follows:</p> <p style="margin-left: 40px;">(i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and</p> <p style="margin-left: 40px;">(ii) "fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition;</p> |

- (b) will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

Furthermore, bidders shall be aware of the provision stated in Sub-Clause 1.16 and Sub-Clause 15.5 of the Conditions of Contract, Part II - Conditions of Particular Application.

Section 2

Employer's Requirements Part I - Scope of Works

1 Part I - Scope of Works

The scope of works for this contract for the **Design Manufacture and Supply Outdoor Motorized 36kV Double Break Disconnectors, Earth Switches and Associated Electrical Accessories & Structures for 33kV Outdoor Bay Upgrade Works at EFL's Vuda 33kV Substation** are as follows:

Clause No.	Scope of Works
2.1	Design, Manufacture and Supply Outdoor Motorized 36kV Double Break Disconnectors and Earth Switch.
2.2	Design, Manufacture, and Supply Disconnector/Earth Switch Support Structures, Cable Support Structures, VT Structures, 36kV Voltage Transformers, Surge Arrestors, Conductors, palms, Lightning Mast etc.
2.3	Design & Supply of Electrical Accessories for Upgrade of 33kV Bus 2 and Bus 3 portion from High Bus to 2000A rated Bus.
2.4	Design, Manufacture, Supply and Install Protection and Control Panel for Transformer Bays.

2 Technical Requirement & Description

This section covers the detailed scope of work required to be carried prior installation of Transformers at Vuda 33kV Substation.

2.1 ***Design, Manufacture, Supply and Install Outdoor Motorized 36kV Double Break Disconnectors and Earth Switch***

The scope of work for this section includes Design, Manufacture, Test and Supply two (2) units of motorized Disconnector with earth switch and two (2) unit of Motorized Disconnector, its packaging and shipping (CFR to Lautoka Port).

EFL preferred supplier of motorized 36kV disconnector is NGK, Coelme, Hapam or equivalent.

The bill of materials for this section includes:

No.	Quantity	Description
1	2	Remotely Operated motorized 33kV Disconnector
2	2	Remotely Operated motorized 33kV Disconnector with Earth Switch
3	4 Sets	Mounting plate/Frame
4	1 Lot	Mandatory Spares (Complete Mandatory Manufacturer's Spares List to be provided to EFL) Additionally, bidder is required to supply the following: 1 x Control box for Disconnector 1 x Control box for Earth switch 3 x Insulators
5	1 Lot	Factory Acceptance Testing at Manufacturers Location for Two EFL Staffs

The principal parameters covered in this specification shall meet the technical requirement listed below:

2.1.1 36kV Disconnect and Earth switch requirement

Technical Parameters	EFL Requirement
System Voltage	33kV
System Highest Voltage	36kV
Rated Frequency (Hz)	50Hz
System Neutral Earthing	Solidly Earthed
No. of Phases (Poles)	3
Temperature Rise	As per relevant IEC Standard
Safe Duration of overload	150% of rated current - 5 minutes
	120% of rated current – 30 minutes
Type of Disconnect (Air Break)	Double Break
Rated normal current (Amp rms)	>1600A
Rated short time withstand current (kA rms) of MS & EB for 1 sec duration	31.5kA
Rated dynamic withstand current (kA)	80kA
Rated short circuit making current of EB (kA peak)	100kA
Basic insulation level:	
1.2/50 micro-sec lightning impulse withstand voltage(+ ve or - ve polarity)	170kV
Across isolating distance One terminal subjected to lightning impulse (kVp) and opposite terminal subjected to power frequency (kV rms) voltage (as per IS) Rated 1 minute power frequency withstand voltage (kV rms)	195kV
Across isolating distance	100kV
To earth and between poles	70kV
Min. creepage distance of support and rotating insulator (mm)	900mm
Phase to Phase spacing for installation (mm)	1220mm
Minimum clearances:	
Phase to earth	320mm
Phase to Phase	350mm
Height of centre line of terminal pad above ground level (mm)	2800mm
Rating of auxiliary contacts	10A at 110V DC with breaking capacity of 2A DC with time constant not less than 20 ms.
Seismic acceleration horizontal	0.3g
Operating time	12 second or less
Rated mechanical terminal load	as per relevant standards
Rated magnetizing/ capacitive current make/break (Amps/rms)	
RIV at 1 MHz & 1.1 X rated phase to earth voltage (micro volts)	

Note, a detailed technical specification of this equipment is provided in Section 3, clause 3.1.

2.2 Design, Manufacture and Supply Disconnecter/Earth Switch Support Structures, Cable Support Structures, VT Structures, 36kV Voltage Transformers, Surge Arrestors, Conductors, palms, Lightning Mast etc.

The scope of work for this section includes Design, Manufacture and Supply Disconnecter/Earth Switch Support Structures, Cable Support Structures, VT Structures, 36kV Voltage Transformers, Surge Arrestors, Conductors, palms, Lightning Mast, etc.

The bidder is required to supply all electrical equipment and structure as per relevant IEC, IEEE and EFL standards.

The contractor has to carry out the following:

- i. Supply all associated structures, voltage transformers, Surge Arrestors, marshalling box and electrical accessories for two new 33kV outdoor complete bays.
- ii. Supply all HV termination and connections from VT up to 33kV Busbars. Bidder to supply all required hardware and conductors as per list below.
- iii. Supply all earthing materials such as Copper Flatbars, Copper wires, CABAC lugs, CADWELD connections, etc. on all support structures, disconnectors and equipment.
- iv. Supply 2 x 9m Lightning arrestor Mast with associated earthing accessories.
- v. Any other accessories required to complete new 33kV Bays.

The bill of materials for this section includes but not limited to:

No.	Quantity	Description
1	2 sets	Bus side Disconnector Support Structure SHS Tubing 200mm x 200mm x 8mm, Base plate 500mm x 500mm x 20mm, All Structures for mounting Disconnector "C" Channel 150mm x 75mm x 8mm, design at 100m/s cyclone rated (min height = 2.4m) and Marshalling box support.
2	2 sets	Line side Disconnector Support Structure SHS Tubing 200mm x 200mm x 8mm, Base plate 500mm x 500mm x 20mm, All Structures for mounting Disconnector "C" Channel 150mm x 75mm x 8mm, design at 100m/s cyclone rated (min height = 2.4m) and Marshalling box support.
3	2 Sets	Cable Support Structure SHS Tubing 200mm x 200mm x 8mm, Base plate 500mm x 500mm x 20mm, , "C" Channel Structures for mounting cable glands 150mm x 50mm x 8mm, design at 100m/s cyclone rated (min height = 2.4m) and cable clamp.
4	2 Sets	VT Support Structure SHS Tubing 200mm x 200mm x 8mm, Base plate 500mm x 500mm x 20mm, , All Structures for mounting Voltage transformer, Surge Arrestor, dropout fuse, strain insulator, VT Marshalling box and Surge counter. Design at 100m/s cyclone rated (min height = 2.4m).
5	2 Sets	3 x 36kV Voltage Transformer (Preferred brands are Zelisko or Ritz)
6	2 Sets	3 x 36kV Surge Arrestors (Preferred brands are Tri-Delta) with Counter
7	2 Sets	2 x Aluminum Marshalling Box for VT 400mm x 200mm x 500mm with all electrical accessories
8	2 Sets	9 x 89mm Dutch Cable Clamp (Preferred brands are Luka or Cabac) Suitable for 45-80mm Power Cable
9	2 Sets	3 x NGK 36kV Dropout holder and fuse set (Preferred brands are NGK or ABB)
10	2 Sets	3 x 36kV Strain Composite Insulator. (Preferred brands are Electropar, PLP)
11	2 Sets	21 x Straight AL Compression Palms (Preferred Brands are Lorunser Italy) AAC Triton (D-26.3mm), 100mm x 100mm terminal, CC-50mm, 4 x 14mm holes
12	2 Sets	6 x Tee AL Compression connector (Preferred Brands are Lorunser Italy) AAC Triton (D-26.3mm), 100mm x 100mm terminal, CC-50mm, 4 x 14mm holes

13	2 Sets	3 x AL Compression tee deadend (Preferred Brands are Lorunser Italy) AAC Triton (D-26.3mm), 100mm x 100mm terminal, CC-50mm, 4 x 14mm holes
14	1 Drum	500mtr Triton Conductor (Preferred brand is Nexus) in Steel Drum C23321, D-26.3mm
15	2 Sets	Earthing Materials (Preferred Brands CABAC and CADWELD) Bare copper (100mtrs), 10 x 50mm x 6mm earth bars, 20 T& 20 X Cadwelds, earth braids 100mm, etc. Earthing of structures and equipment to Substation earth grid
16	2 Set	Lightning Arrestor 9meter Mast
17	1 Set	Supply 500 pieces of M12 x 70mm Corona Free Bolts, Nuts and Washers.
18	4 Sets	Earth Mat for Disconnecter and Earth Switch Operations
19	1 Set	Spare equipment 3 x 36kV Voltage Transformer 3 x Surge Arrestors with counter 10 x Aluminum Jointing Compound
		<i>Bidder to specify any other items required to complete project in their bid documents.</i>

Note:

- All support structures supplied by the bidder should be hot dip galvanized and comply with all the standards outlines in the tender Document.
- All fasteners on the HV connections to be of stainless steel 316 Grade and all fasteners on Structures to be of galvanised 8.8 grade.
- All structure to have provision for earthing and mounting to hold 90mm – 185mm cable.
- Civil works and HV Power cable termination is not bidder's responsibility.

The principal parameters covered in this specification shall meet the technical requirement listed below:

2.2.1 36kV Voltage Transformer Requirement

Description	Required
Rated System Voltage KV (rms)	33kV
Highest System Voltage KV (rms)	36kV
System Frequency (Hz)	50 Hz
Technology	Cast epoxy resin
Insulation	Outdoor-resistant epoxy/Cycloaliphatic epoxy
System Neutral Earthing	Solidly Earthed
Primary neutral	Provided via an earthing terminal connected to mounting plate
Installation	Outdoor
Voltage Factor (primary)	1.9 times for 8 hrs, 1.2 continuous
1.2/50 microsecond impulse withstand outage KV (Peak)	170kV
1 Minute dry & wet power frequency withstand voltage primary (kV rms)	70kV
Power frequency over voltage withstand requirements for secondary winding.	3 KV
Creepage Distance (Heavily polluted atmosphere) Total (mm)	900

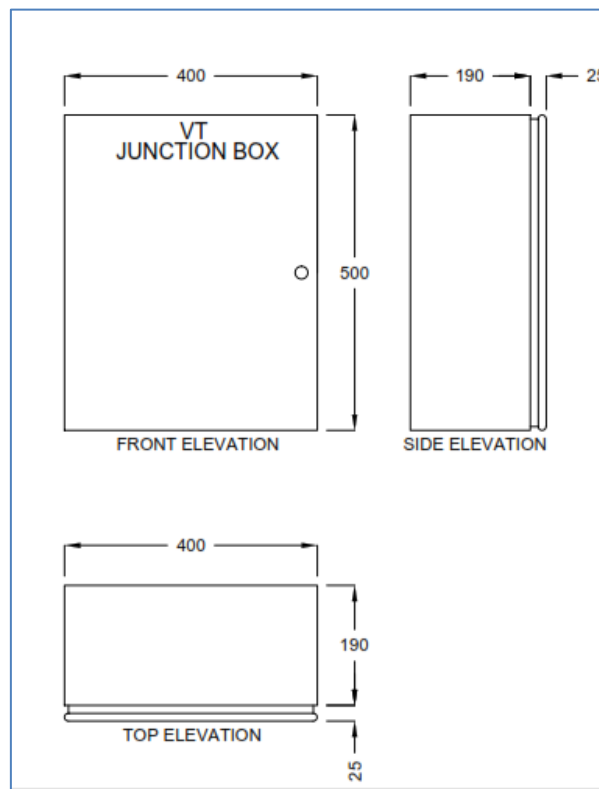
Creepage factor (Max.)	4.0
Accuracy metering, protection	0.5, 3P
Primary Side (KV) Ratio	$33/\sqrt{3}$
Secondary Side (V) Ratio	$110/\sqrt{3}$
No. of Core	2
Rated Burden	20VA/Ø
Max. temp rise over ambient 60° C	As per IEC Standards

2.2.2 Aluminum VT Marshalling Box Requirement

The marshalling box shall be designed and constructed using 3mm aluminum panel and coated with orange powder paint. The marshalling box shall be equipped with the following and not limited to:

1. 300mm Din Rail
2. 20 x Phoenix UK10 Terminal 2.5/4mm (Sliding Link Feature)
3. 2 x 4 Pole MCBs preferred Siemens and Schneider brand
4. Earthing Provision
5. Gland Plates and Glands
6. Locking Mechanism
7. Engraved Labels

Preferred dimension of the VT marshalling box is given below:



2.3 Design & Supply of Electrical Accessories for Upgrade of 33kV Bus 2 and Bus 3 portion from High Bus to 2000A rated Bus.

The scope of work for this section includes Design & Supply of Electrical Accessories for Upgrade of 33kV Bus 2 and Bus 3 portion from High Bus to 2000A rated Bus.

The bidder is required to supply and install all electrical equipment and structure, carry out HV termination works and earthing as per relevant IEC, IEEE and EFL standards.

The contractor has to carry out the following:

- i. Supply all associated structures, insulators, busbars and electrical accessories for High Bus to 2000A bus upgrade works.
- ii. Supply all earthing materials such as Copper Flat bars, Copper wires, CABAC lugs, CADWELD connections, etc. on all support structures, disconnectors and equipment.
- iii. Any other materials required to complete Busbar upgrade works.

The bill of materials for this section includes but not limited to:

No.	Quantity	Description
1	2 sets	Bus Support Structure <i>SHS Tubing 200mm x 200mm x 8mm, Base plate 500mm x 500mm x 20mm, All Structures for mounting busbar 150mm x 75mm x 8mm, design at 100m/s cyclone rated (min height = 2.4m).</i>
2	2 Sets	3 x 33kV Aluminum Tubular Bus bars 2000A rated (Preferred Brands are Dalian Tucheng International Co.Ltd, Electropar, PLP) <i>Approx 9m x 100mm diameter x 10mm thickness with end caps</i>
3	2 Sets	6 x Busbar 36kV Support Insulator (Preferred brands are NGK, Transnet, PLP)
4	2 Sets	Busbar Rigid Support Clamp – Single Busbar <i>100mm diameter</i>
5	1 Sets	24 x 30° AL Compression Palms (Preferred Brands are Lorunser Italy) <i>AAC Triton (D-26.3mm), 100mm x 100mm terminal, CC-50mm, 4 x 14mm holes</i>
6	1 Sets	24 x Busbar bolted AL Tee terminal connector (Preferred Brands are Lorunser Italy) <i>Suitable for 100mm busbar, 100mm x 100mm terminal, CC-50mm, 4 x 14mm holes</i>
7	1 Sets	24 x Busbar bolted AL Bus inline terminal connector (Preferred Brands are Lorunser Italy) <i>Suitable for 100mm busbar, 100mm x 100mm terminal, CC-50mm, 4 x 14mm holes</i>
8	2 Sets	6 x AL flexible Connector 2000A rated Type B (Preferred Brands are Lorunser Italy, PLP) <i>100mm x 100mm terminal, CC-50mm, 4 x 14mm holes</i>
9	2 Sets	6 x AL flexible Connector 2000A rated Type A (Preferred Brands are Lorunser Italy, PLP) <i>100mm x 100mm terminal, CC-50mm, 4 x 14mm holes</i>
10	2 Sets	Earthing Materials (Preferred Brands CABAC and CADWELD) <i>Bare copper, earth bars, Cad welds, earth braids, etc. Earthing of structures and equipment to Substation earth grid</i>
11	6 Sets	3 x 100mm Busbar Corona Dome Cap Bolt on
		<i>Bidder to specify any other items required to complete project in their bid documents.</i>

Note:

- All fasteners on the structures and HV connections to be of stainless steel 316 Grade. Bidder to familiarize themselves with the existing arrangement & proposed bays and submit design and methodology to execute scope of works.

2.4 ***Design, Manufacture and Supply Protection and Control Panel for Transformer Bays.***

The scope of work for this section includes Design, Manufacture and Supply Protection and Control Panel for two new Transformer Bays.

The bidder is required to design, supply Protection and Control Panel as per relevant IEC, IEEE and EFL standards.

The contractor has to carry out the following:

- i. Design and Supply 2 x Transformer Protection and Control Panel for Vuda Substation. The protection and control panels are to be of the **Rittal make** 800mm x 800mm as specified in the drawings, together with the required parts to form a complete panel. Bidder to carry out the following:
 - a. SEL387E SEL Relay wiring as per drawings
 - b. SEL351S SEL relay wiring as per drawings
 - c. Control Switches, indication lights, accessories as per drawing.
 - d. 36kV Disconnecter and earth switching wiring as per drawing.
 - e. Circuit Breaker wiring as per drawing.
 - f. VT wiring as per drawing.
- ii. Bidder to supply 2 units of BMP71 Brady ferrule machine or equivalent sleeve type machine. Bidder to supply sufficient spares such as label rolls, sleeves (2.5mm, 4mm) and ribbons.

Bidder to Note:

- SEL Relays SEL387E and SEL351S will be free issued or installed by EFL.

General Note:

All Applicable standards and relevant requirements have been presented in Section 3 of the document relating to Scope of Works presented in Section 2 of this tender specification.

Section 3

Employer's Requirements Part II – Technical Specification

3 Part II – Technical Specification

3.1 Specification of 36kV Disconnecter and Earth Switch

The Contractor is to manufacture the items mentioned above as per EFL's specifications, and the Standards mentioned herein.

Rated Voltage	kV	36
Rated Frequency	Hz	50
Continuous Operating Current	A	1600
Short time withstand current (1 sec)	kA	40
Rated peak withstand current	kA	31.5
Insulation Level (BIL) to earth and between poles (peak)	kV	170
Insulation Level (BIL) across isolating distances (peak)	kV	230

The 36 kV shall be double break disconnectors. Complete disconnectors with all the necessary items for successful operation shall be supplied including but not limited to the following:

- Disconnectors assembled with Disconnector blades (main and earth), complete base frame, linkages, operating mechanism complete etc.
- The three poles of the 36 kV Disconnector covered by this specification will be gang operated with one central cabinet for the required electrical devices mounted therein.
- Material of Earthing blades and contacts shall be same as those of main blades and contacts. Cross sectional area of Earthing blades and contacts shall not be less than 50% of cross-sectional area of main blades and contacts. The Earthing blades shall have the same short time current rating (thermal and dynamic) as that of main blades.
- The current density in the current carrying parts of the Disconnector shall in no case exceeds the following values:
 - For Copper : 2A/sq.mm
 - For Aluminium: 1A/sq.mm
- Support insulators for all types of Disconnectors shall be of solid core type except for 33kV Disconnectors where in post insulators shall be used.
- The insulator shall be made of homogeneous and vitreous porcelain of high mechanical and di-electric strength. Profile of the insulator shall also conform to IEC-815. Insulator shall have a minimum cantilever strength of 6 KN.
- The casting shall be free from blowholes, cracks and such other defects.
- All the ferrous metal parts shall be hot dip galvanized smoothly as per IEC (as amended up to date), The coating on the metal parts shall withstand minimum four one-minute dips in copper sulphate solution as per IEC-168.
- The mounting on the Disconnector where the palms will be connected shall have 4 (four) M12 holes drilled at 50mm CC.

3.1.1 OPERATING MECHANISM:

Each 36 kV disconnectors and earth switch shall be remote controlled motorized from the control room. Provision shall be made for local motor control also. Operating mechanism shall also be equipped with local manual operating device intended for emergency operation when motor operating mechanism becomes inoperative.

Additional electromagnetic type interlock shall be provided so as to prevent the operation of Disconnector manually or electrically when the corresponding circuit breaker is ON.

Manual operating mechanism through crank and reduction gear shall be provided for the earth switch which too will be gang operated. The operation of earth switch which too will be gang operated.

The operating mechanism shall provide quick, simple and effective operation. The motor operated type operating mechanism shall be suitable for remote operation of all three poles simultaneously as well as local manual operation through crank and reduction gear. The design of manual operation shall be such that one man shall be able to operate the Disconnector without undue effort with about 20 (twenty) revolutions of the crank. The operating mechanism shall be suitable to hold the dis-connector in CLOSE OR OPEN position and prevent operation by gravity, wind, short circuit forces, seismic forces, vibration, shock, accidental touching etc.,

Limit switches for control shall be fitted on the Disconnector shaft within the cabinet to sense the open and close positions of the Disconnector and earth switches.

It shall not be possible, after final adjustment has been made, for any part of the mechanism to be displaced at any point in the travel sufficient enough to cause improper functioning of the Disconnector when the Disconnector is opened or closed at any speed. All holes in cranks, linkage etc., having moving pins, shall be drilled to fit accurately so as to maintain the minimum amount of slack and lost-motion in the entire mechanism.

A "**local/remote**" selector switch and a set of **open/close push buttons** shall be provided on the control cabinet of the Disconnector to permit its operation through local or remote push buttons.

Each motor operated mechanism shall be subjected to blocked rotor test.

3.1.2 **CONTROL CABINET:**

The control cabinet of the operating mechanism shall be made out of 12 SWG (2.642 mm thick aluminum plate or casting). Hinged door shall be provided with pad locking arrangement. Sloping rain hood shall be provided to cover all sides. 15 mm thick neoprene or better type of gaskets shall be provided to ensure degree of protection of at least IP65 rating. The cabinet shall be suitable for mounting on support structure with adjustment for vertical alignment. Details of these arrangements shall be furnished along with the tender.

Note: The mounting of the control cabinet shall be supplied which can be either mounted on the concrete pad or the disconnector support structure.

3.1.3 **MOTOR:**

The motor shall be suitable for 110V DC Supply with variations as specified in this specification. It shall be totally enclosed type if mounted outside the control cabinet. The motor shall withstand without damage stalled torque for at least three times the duration of tripping device.

3.1.4 **GEAR:**

The Disconnector may be required to operate occasionally, with considerably long idle intervals. Special care shall be taken for selection of material for gear and lubrication of gears to meet this requirement. The gears shall be made out of aluminum bronze or any other better material and lubricated for life with graphite or better quality non draining and non-hardening type grease. Wherever necessary automatic relieving mechanism shall be provided. Complete details of components, material, grade, self-lubricating arrangement, grade of lubricants, details of jig, fixtures and devices used for quality check, shall be furnished by the Bidder in his offer.

3.1.5 LIMIT SWITCH:

Limit switches shall be of reputed make. Auxiliary switch shall not be used as limit switch. Details of make, rating and type of limit switch shall be furnished in the offer.

3.1.6 OVERLOAD AND SINGLE PHASING PREVENTER:

Suitable relay/device shall be provided to prevent overloading of the motor. Single phase preventer shall be provided to operate on open circuiting of any phase and shall trip off the motor. Complete details of the devices shall be furnished in the offer.

3.1.7 CONTACTOR:

The contractor shall be suitable for making and breaking stalled motor current. The contractor coil shall be suitable for 110 V D.C. Two numbers of contractors shall be provided for each motor for OPEN and CLOSE operation respectively. Make, type, rating and details of the contractor shall be furnished in the offer.

3.1.8 AUXILIARY SWITCH:

Each operating mechanism box shall be equipped with ten numbers of NC and ten numbers of NO auxiliary switches

3.1.9 TERMINAL BLOCK AND WIRING:

Each operating mechanism shall be provided with 1100 V grade stud type terminal block having washers, nuts & check nuts. All auxiliary switches, interlocks and other terminals shall be wired up to terminal block. The terminal block shall have at least 20% extra terminals. All wiring shall be carried out with 110 V grade insulated 2.5 mm² copper wires.

3.1.10 NAME PLATES:

Disconnectors and Earthing switches and their operating devices shall be provided with a name plate. The name plate shall be weather proof and corrosion proof. It shall be mounted in such a position that it shall be visible in the position of normal service and installation. It shall carry the following information duly engraved or punched on it.

Disconnectors Base:

Name of Manufacturer	:
Manufacturer's serial number	:
Rated voltage	:
Rated normal current	:
Rated short time current (rms)	:
And duration	:
Rated short time peak current (kAp):	:
Weight	:

Earthing Switch:

Name of Manufacturer	:
Type Designation	:
Manufacturer's serial number	:
Rated voltage	:
Rated short time current (rms)	:
And duration	:
Rated short time peak current (kAp):	:

3.1.11 PADLOCKING DEVICE:

All Disconnectors and Earthing switches shall be provided with 12mm holed padlocking device to permit locking of the Disconnector and Earthing switch in both fully open and fully closed positions. Power driven Disconnector and Earthing switch shall be arranged to be interlocked electrically also.

3.1.12 **EARTHING:**

Flexible braided copper connections shall be provided between rotating earth blades and the frame which shall have a cross-section of at least 150 mm² and shall be tinned or suitably treated against corrosion.

The frame of each disconnector and Earthing switch shall be provided with two reliable Earthing terminals for connection to the Earthing conductor/flat and also clamping screws suitable for carrying specified short time current. Flexible ground connections shall be provided for connecting operating handle to the Earthing flat. The diameter of clamping screw shall be at least 12 mm. The connecting point shall be marked with earth symbol.

3.1.13 **TYPE TESTS:**

The equipment offered should be type tested. Test reports should not more than seven years old reckoned from date of bid opening in respect of all the tests carried out in accredited laboratories (based on ISO/IEC) by a reputed accredited.

- Insulation level test
- Temperature rise test
- Rated peak withstand current and rated short time withstand current test
- Short circuit making capacity test of earthing switch.
- Operation and mechanical endurance

3.1.14 **ROUTINE TESTS:**

The following routine tests to be carried out on the equipments:

- As per quality assurance program (QAP).
- Power Frequency withstand voltage dry test of maincircuit.
- Voltage test on control auxiliary circuits.
- Measurement of resistance of maincircuit.
- Mechanical operating test.

3.2 Specification of Voltage Transformers

This part of the specification covers detailed technical requirement for Voltage Transformers.

3.2.1 Design

The design features and construction details shall be complete in all respects and shall conform to the modern practice of design and manufacture. The insulation of the instrument transformers shall be so that the internal insulation shall have higher electrical withstand capability than the external insulation. The designed dielectrics withstand values of external and internal insulations shall be clearly brought out in the guaranteed technical particulars. The dielectric withstand values specified in this specification are meant for fully assembled instrument transformer.

The outdoor post-type Single Phase Voltage Transformers shall be designed for the system highest voltage (Rated Voltage) as stipulated. It shall be suitable for operation under the service conditions without protection from sun, rain and dust. The withstand ability of the primary, the saturation of the magnetic core and the secondary characteristic shall not be less than that requested in the Minimum Technical Requirements.

The primary winding of voltage transformers will be connected phase to ground. All the fuses and the links shall be provided at the V.T terminal boxes with IP65 rated weather proof terminal box for easy access.

The design of PT shall be based on following requirements: -

- They must transmit sudden drops of primary voltages.
- They must have sufficiently low short circuit impedance as seen from secondary.

The temperature rise at 1.1 times rated primary voltages, rated frequency and rated burden, shall not exceed the following values over the above stated maximum ambient temperature.

a)	For winding with Class A Insulation immersed in oil (Measured by Resistance Method)	50 degC
b)	Oil at the top of the Tank (Measured by Thermometer)	40 degC
c)	With 1.5 times rated voltage for 30 seconds	100C more than above value after continuous application of 1.1 times rated voltage.
d)	Maximum ambient temp. To be considered.	50 degC

It shall be suitable for mounting on steel structures and necessary fixing bolts and nuts shall be supplied with the equipment. Its windings shall be housed either in a high impact resistance porcelain insulator where normal mineral transformer oil will be the insulating medium. Glazing of porcelain shall be of uniform brown or dark brown color with a smooth surface arranged to shed away rain water particles (fog). Details of attachment of metallic flanges to the porcelain shall be brought out in the offer.

3.2.2 Enclosure and Insulating Construction

The Voltage Transformer shall be of **dry-type, cast epoxy-resin insulated construction** and shall not contain insulating oil or other liquid insulation.

The active electrical components shall be completely encapsulated in high-quality, outdoor-grade epoxy resin to provide effective protection against:

- Moisture ingress;

- Dust and atmospheric contaminants;
- UV radiation;
- Tracking and erosion;
- Mechanical stresses; and
- Tropical environmental conditions.

The epoxy resin insulation system shall be suitable for continuous outdoor operation at the specified ambient temperature, humidity and pollution levels.

The Supplier shall provide details of the epoxy resin insulation system, including the type of resin, manufacturing process and environmental suitability.

The Voltage Transformer shall be maintenance-free or require only the routine inspection and cleaning normally associated with outdoor instrument transformers.

3.2.3 Surface Finish

The ferrous parts exposed to atmosphere shall be hot dip galvanized or shall be coated with at least two coats of zinc rich epoxy painting. All nuts, bolts and washer shall be made out of stainless steel.

3.2.4 Prevention of Moisture Ingress

The Supplier shall ensure that the sealing of instrument transformer is properly achieved. In this connection the arrangement provided by the Supplier at various locations including the following ones shall be described, supported by sectional drawings.

The Supplier shall ensure that the Voltage Transformer construction prevents the ingress of water, moisture, dust and other atmospheric contaminants into the electrical insulation and terminal arrangements.

Particular attention shall be given to:

- Interface between epoxy insulation and metallic components;
- Primary terminal emergence;
- Secondary terminal emergence;
- Secondary terminal box;
- Terminal-box cover;
- Cable entry points;
- Mounting/base interfaces; and
- Any other enclosure or insulation interface.

All sealing arrangements shall be suitable for long-term outdoor service.

The Supplier shall submit sectional drawings showing the sealing arrangements at the above locations.

3.2.5 Locations of emergence of primary and secondary terminals

The primary and secondary terminals shall be securely integrated with the epoxy-resin insulation system.

The terminal emergence arrangements shall be designed to prevent:

- Moisture ingress;
- Tracking;
- Partial discharge;
- Corona discharge;
- Insulation deterioration; and
- Mechanical damage.

The transition between the epoxy-resin body and any metallic enclosure, mounting arrangement or terminal shall be properly sealed.

Primary terminals shall be suitable for direct connection to the **33 kV outdoor busbar/conductor arrangement** specified.

3.2.6 **Gasketed joints.**

Wherever gaskets are required, Nitrile Butadiene Rubber (NBR) gaskets or an approved equivalent outdoor-grade sealing material shall be used. The gasket shall be fitted in properly machined groove with adequate space for accommodating the gasket under compression.

3.2.7 **Earthing**

Metal tank of the instrument transformer shall be provided with two separate earthing terminals for bolted connection to 50x8mm MS Flat to be provided by the Purchaser for connection to station earth-grid.

3.2.8 **Lift**

Instrument transformer shall be provided with suitable lifting arrangement to lift the entire unit. The lifting arrangement shall be clearly shown in the general arrangement drawings. Lifting arrangement (Lifting eye) shall be positioned in such a way so as to avoid any damage to the porcelain housing or the tanks during lifting for installation transport. String guides shall be offered which shall be of removable type.

3.2.9 **Core**

The core shall be high grade non-aging, silicon laminated steel of low hysteresis loss and high permeability to ensure high accuracy at both normal and over voltages conforming to IEC. The characteristics shall be such as to provide satisfactory performance for burdens ranging from at least 25% to 100% of rated burden over a range of at least 5% to 110% rated voltage in case of protective cores and a voltage range of 80% to 120% (0.8 pf lagging).

3.2.10 **Bushing**

Shaded dark chocolate porcelain substation class 3 bushing conforming to latest edition of IEC shall be used. Cast metal end caps for the bushings shall be of high strength, & made of brass. They shall have smooth surface to prevent discharge taking place between the metal parts and porcelain as a result of ionization. The insulation of bushing shall be coordinated with that of the potential transformer such that the flashover, if any will occur only external. Each of the bushing cap / head shall be complete with the following feature, Primary terminals suitable for connection through rigid Connectors for ACSR Conductors. All connectors shall be provided as part of the tender.

3.2.11 Terminal connectors

All castings of connectors shall be free from holes, surface blisters, cracks and cavities. All sharp edges or corners shall be rounded off. No part of the connectors shall be less than 10 mm. thick.

All ferrous parts shall be hot dip galvanised conforming to IEC and BS Bimetallic strips and sleeves, if required, shall be provided of about 2 mm. thickness as a part of connector. Rigid connectors shall be made from Aluminum Alloy. All current carrying parts of the connectors shall have minimum contact resistance.

Connectors shall conform to type test as well as to routine test as per IEC. Connectors shall be suitable for connection with ACSR “Chafer” and “Lime” to CT terminal along with suitable nuts bolts & washers.

3.2.12 Bolts and nuts

All steel bolts and nuts shall conform to BS 4190: 1957 the standard specified and the nuts and heads of all bolts to be hexagonal type. Nuts and bolts or screws used for fixation of the interfacing porcelain bushings for taking out terminal shall be provided on flanges cemented to the bushings and not on the porcelain. The Voltage Transformers shall be suitable for up right mounting on steel structures. Necessary flanges, bolts, clamps fittings etc. for base are within the scope of the supplier.

3.2.13 Galvanizing

Except where specified to the contrary all iron and steel parts shall be galvanized after sawing, shearing, drilling punching, filing, bending, and machining etc., are completed. Galvanizing shall be by the hot-dip process to comply with the BS 729.

3.2.14 Creepage Distance

The Voltage Transformer insulator creepage distance shall not be less than 900 mm and the protected creepage distance shall not be less than 315mm.

3.2.15 Painting (wherever applicable)

All exposed ferrous metallic parts of the Voltage Transformer, including mounting brackets, base frames, clamps, covers and other metallic components, shall be adequately protected against corrosion and shall be suitable for continuous outdoor service in tropical environmental conditions.

Steel surfaces to be painted shall be properly prepared by abrasive blasting, chemical cleaning or an equivalent approved surface-preparation process to remove mill scale, rust, grease, dirt and other contaminants and to provide a clean and suitably profiled surface for application of the protective coating system.

3.2.16 Nameplates and Markings

Labels written in English shall be provided for all instruments. In the case of instruments, switches and control switches where the function is indicated on the dial plate or on the switch escutcheon plate, no label is required. Instruction plates in English language showing the sequence diagrams or cautions for maintenance shall be fitted inside of the front door of the electrical switchboards.

Samples of label wording shall be submitted for EFL approval. The labels shall be traffolyte type with beveled edges and black lettering on white background.

3.3 Specification for Protection and Control Panel

3.3.1 General

This part of the specification covers detailed technical requirement for control and protection panels complete with all necessary instruments, meters, switches, relays and other miscellaneous equipment, accessories and auxiliaries. Where required in the drawings, the Tenderer shall also procure and install all protection relays as per schematics.

The various control and relay panels and other equipment specified under this section shall be complete in themselves, with all main and auxiliary relays, fuses, links, switches, instruments, meters, timers, annunciators, indicating lamps, illuminating lamps, test terminal blocks, space heater, MCBs, fuses, mimic diagrams, name plates and other devices completely wired and assembled as per the approved schematics including labels, terminal boards, earthing terminals, foundation bolts etc. It is the Tenderer's responsibility to mark up and submit any amendments to the As-built drawings in Auto Cad format and also hard copy marked up drawings to reflect modifications which have been implemented on the panels after approval from the EFL representative.

Materials and components not specifically stated in this specification, but which are necessary for satisfactory operation of the equipment, and accessories shall be deemed to have been included in the scope of specification unless specifically excluded.

The protection and control panels are to be of the **Rittal make** as specified in the drawings, together with the required parts to form a complete panel.

3.3.2 Construction of Cubicles and Panels

The cubicles shall be of the self-standing, floor-mounted type and shall be provided with adequate means for floor fixing in seismically active areas. They shall be supplied complete with their fixing and lifting frames and eye bolts. Equipment and terminals shall be readily accessible and shall require a minimum of disturbance of associated adjacent equipment for access.

The arrangement of panel wiring and multi-core cable terminal boards shall be in accordance with the relevant drawings. Enclosures shall provide for bottom entry of power and multi core cables via gland plates. Removable gland plates shall be located within the cubicles so as to provide adequate working clearance for terminating the cables. No equipment whatsoever shall be mounted on rear access doors.

Each protection relay panel shall be of the rack type including 19" frame and a front cover door equipped with a glass window and each control panel shall be of the enclosed type. Indoor cubicles and panels shall have minimum IP41 protection class, and all outdoor local control cubicles shall be of IP54 with sun/rain shades of adequate size.

Each door shall be equipped with suitable earth straps of at least 16mm² highly flexible stranded copper wire with insulation in green-yellow colour. Doors are to be arranged so that every individual door or frame can be opened without moving doors of adjacent cubicles. Doors shall be of 2 mm thick sheet steel, equipped with 120° concealed hinges, with foamed-in seal and shall be provided with a stable, bolted, rectangular tube frame, with pre-punched holes at 25 mm pitch for fixing channels, covers, cable harnesses, wiring plan pockets and etc. In each outdoor cubicle at least one door shall be equipped with a sheet steel wiring plan pocket. If required, cross rails shall be fixed additionally.

All cubicles shall have rear doors, for easy maintenance and repair of the main and auxiliary equipment accommodated in the interior. Flexible earthing straps for personnel safety shall be mounted on frames of the front and rear doors and shall not obstruct access when working on and inside panel. The Tenderer shall perform a calculation for the heat dissipation for enclosures with the maximum installed heat-losses and shall propose a suitable temperature control method which shall be subject to the approval of the Purchaser's Representative.

All enclosures and accessories shall be of stainless steel or corrosion protected by electrophoresis-dip- coat primers and final coats by an approved procedure as to suit the surrounding conditions at Site. The arrangement

and mounting of all indicating devices, control switches, relays and other apparatus shall be to the approval of the Purchaser's Representative. The exterior and interior finish and colour of all cubicles shall be to the approval of the Purchaser's Representative.

Components in the panel shall be arranged to be easily accessible for future mounting, wiring, maintenance and replacement. Easy access shall be provided without the danger of electric shock.

3.3.3 **Panel Wiring**

Panels shall be supplied complete with interconnecting wiring provided between all electrical devices mounted and wired in the panels and between the devices and terminal blocks for the devices to be connected to equipment outside the panels.

All internal panel wiring shall be carried out with 600V/1000V grade, single core, stranded copper conductor wires with PVC insulation and shall be Fire retardant. In selecting cable and wire sizes, due regard shall be paid to the appropriate de-rating factors in relation to the climatic conditions at site.

All cables and wires shall continuously carry their rated currents under the worst temperature conditions, and shall also withstand maximum fault currents without damage or deterioration. The minimum cross sections of the conductors are to be:

1. 2.5mm² for Current Transformer and Voltage Transformer Circuits and all power consumers such as motors, heaters, lighting, etc. up to 10A.
2. 2.5mm² for all instrumentation and control wiring, however, the maximum permissible voltage drop is 5% for the furthest point at load.
3. 4mm² for heavy power consumers up to 20A.

All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. The wiring shall be neatly run in PVC rigid base ducting. Both ends of every wire core and all secondary panel wiring (at the screwed terminal side for external connection as well as at the screwed device sides in the panel) shall be fitted with numbered slip-on ferrules of moisture and oil-resisting insulation material having a glossy finish, and with their identification numbers clearly engraved, each being the same as for the relevant terminal. Ferrules, of white color with black letters (printed on wire markers and placed inside plastic sleeves), shall be fitted in such a way that they cannot become detached when the wire is removed from the terminal. (i.e. end crimps shall be provided). All secondary wiring for external plant and interpanel wiring shall enter the terminal blocks at one side only.

The individual wires shall not be pulled tight at the termination as a small amount of slack wire shall be provided so that the termination can be relocated to an adjacent terminal, or so that the lug can be replaced, if required. The slack wire shall be accommodated neatly within the wiring duct.

Inline joints in any panel wiring are not permitted under any circumstances. All terminations shall be crimped with a tool designed specifically for this purpose. All crimped terminations shall comply with the tensile strength and contact resistance type test requirements of AS/NZS 4437.

The crimp jaw shall be suitable for both single and double grip lugs. The tool shall ensure that the correct crimping pressure has been achieved before the tool can be released from the crimp. The crimping tool must not cause any damage to the lug.

When crimping cables for the terminations, the cable ends shall be precisely stripped to suit the conducting and insulating parts of the terminals, as set out in the manufacturer's instructions. The two- stage pre-insulation, together with the bottom copper conducting material holding the cable end, shall be crimped firmly and correctly. Correct crimping tools shall be used at all times when making terminations.

3.3.4 **Terminal Blocks**

All internal wiring to be connected to the external equipment shall terminate on terminal blocks, preferably vertically mounted on the side of each panel, as indicated in the General arrangement drawings. Terminal blocks shall be numbered consecutively in both sides, preferably beginning with 1, from left to right or top to bottom. Terminal blocks shall consist of single "insertion" type terminals of non-tracking, non-inflammable synthetic plastic, or ceramic of an approved type, lined up in one row.

All terminals shall have two separate pressure clamping plates suitable for connection of incoming or outgoing stranded or solid conductors, respectively. However, only one wire per terminal will be accepted. Terminals with clamping screws in direct contact with the conductor are not acceptable. The standard terminals are to be of type Phoenix Contact UT6. The measuring disconnect terminals for CT, VT and Protection trip circuits are to be of type Weidmuller 6/1/STB.

Insulating barriers shall be provided between each group of power circuit terminals and between the terminal categories, the height and the spacing being such as to give adequate protection to the terminals. Control and relay circuits, current and voltage transformer secondary circuits, battery and auxiliary power supply wiring, supervisory, alarm and communication circuits shall be protected against conductive, electrostatic and electromagnetic influences. Terminals for 240V AC wiring shall be shrouded and marked by a warning label.

At least 20% spare terminals shall be provided on each panel and these spare terminals shall be uniformly distributed on all terminal blocks. There shall be minimum clearance of 250 mm between the first row of terminal blocks and the associated cable gland plate or panel side wall. Also, the clearance between two rows of terminal blocks shall be a minimum of 150 mm. Arrangement of the terminal block assemblies and the wiring channel within the enclosure shall be such that a row of terminal blocks is run in parallel and in close proximity along each side of the wiring duct to provide for convenient attachment of internal panel wiring.

The terminal assignments shall be as specified in the design drawings. However, the contractor is to review the terminal assignment and suggest improvements to the terminal assignments which would result in reduced wiring and complication.

3.3.5 **Equipment and Accessories**

3.3.5.1 Protection Relays

The protection relays shall be of SEL make, with designated part numbers and will be supplied by EFL. Where specified in the drawings, the relays shall be supplied by the bidder.

3.3.5.2 Test Blocks

The test blocks are to be of type Areva MMLG02. Rows of test blocks shall have nameplates as per the design drawings.

3.3.5.3 Miniature Circuit Breakers

The electrical control and protection circuits shall be protected by Miniature Circuit Breakers (MCBs) as per the design drawings. The MCBs shall have the C Curve tripping characteristic.

3.3.5.4 Control and Selector Switches

Control and instrument switches shall be rotary operated type preferably with silver to silver contacts of adequate making, carrying and breaking current ratings. They shall be provided with easily removable protective terminal covers and escutcheon plates clearly marked to show operating position and circuit designation plates and suitable for flush mounting with only switch front plate and operating handle projecting out. The control and selector switches shall be of type Kraus & Naimer as specified in the bill of materials.

3.3.5.5 Indication Lamps

Indicating lamps shall be cluster LED type suitable for panel mounting with rear terminal connections. Lamps shall be provided with series connected resistors preferably built in the lamp assembly. Lamps shall have translucent lamp cover to diffuse lights colored red, green, amber, clear white or blue as specified. The lamp cover shall be preferably of screwed type, unbreakable and molded from heat resisting material. The supply for these lamps shall be from DC station batteries unless stated otherwise. Lamps and lenses shall be interchangeable and easily replaceable from the front of the panel.

Tools, if required for replacing the Lamps and lenses shall also be included in the scope of supply. Lamps shall be furnished 20% in excess of the actual numbers required and caps shall be furnished 10% in excess of actual numbers used for each colour. The indication lamps shall be of types as specified, complete with pilot light heads and fixing collars.

3.3.5.6 Space Heaters

Space heaters of adequate capacity and suitable for connection to single phase, 240V, 50 Hz supply shall be provided inside each panel to prevent condensation of moisture on the wiring and panel mounted equipment. These shall not be mounted close to the wiring or any panel mounted equipment. Heaters shall be complete with thermostat and switch.

3.3.5.7 Interior Lighting

Each panel shall be provided with a LED light for the interior illumination of the panel during maintenance. The fittings shall be complete with switch-fuse unit and switching on the lighting shall be controlled by the respective panel door switch.

3.3.5.8 Plug Point

Any GPO required is shown in the detailed design drawing. Where required, the GPO shall be a 240 Volts, Single Phase, 50 Hz, AC of HPM type GPO socket with switch suitable to accept 10 Amps pin shall be provided in the interior of each cubicle with an ON-OFF switch.

3.3.5.9 Other Accessories

Any and all other accessories normally required for testing, operation and maintenance of these panels shall be furnished by the contractor. A document pocket shall be provided on the inside of the rear door for the storage of documentation.

3.3.6 **Earthing**

All panels shall be equipped with an earth bus securely fixed. Location of earth bus shall ensure no radio interference for effectively earthed systems under various switching conditions of isolators and breakers. The material and the sizes of the bus bar shall be at least 80mm² perforated copper with threaded holes at a gap of 50 mm with the provision of bolts and nuts for connection with cable armors and mounted equipment etc. for effective earthing.

All current free metallic parts of all mounted equipment (i.e. metallic cases of relays, instruments and other panel mounted equipment including gland plate and panel door top and bottom) shall be looped by PVC insulated 2.5mm² stranded copper wire and connected to the earth bus.

3.3.7 **Nameplates and Markings**

Labels written in English shall be provided for all instruments, relays, control switches, push-buttons, indication lights, breakers, etc. In the case of instruments, switches and control switches where the function is indicated on the dial plate or on the switch escutcheon plate, no label is required.

Relays shall be clearly labeled according to their function in the circuits, and to their related equipment, which shall be identical to the designations as used in the circuit manuals. For equipment that projects through the panel or

rack front, two labels shall be fitted one on the relay front and one on the rear of the equipment. Instruction plates in English language showing the sequence diagrams or cautions for maintenance shall be fitted inside of the front door of the electrical switchboards.

Samples of label wording shall be submitted for EFL approval. The labels shall be traffolyte type with beveled edges and black lettering on white background.

3.3.8 *Bill of Materials and Drawings*

The bill of materials is provided in the drawings as attached in Schedules of this specification.

3.3.9 *Quality of Materials and Workmanship*

All materials supplied and used by the contractor under this contract shall be new and of the high quality and class most suitable for working under the conditions specified and shall withstand the variations of temperature, atmospheric conditions arising under working conditions without distortion or deterioration or the setting up of undue stresses in any part and also without affecting the strength and suitability of the various parts of the work which they have to perform. All work shall be carried out and completed in a neat and professional manner to the approval of the Purchaser's Representative.

3.3.10 *Risk of Fire*

All apparatus, connections and cabling shall be designed and arranged to minimize the risk of fire and any damage, which might be caused in the event of fire. All cabling entry openings shall be covered with fire pillows or foam to prevent fire entry.

3.3.11 *Spares/ Loose Equipment*

The following equipment shall be supplied loose with the panel by the successful tenderer:

- 10 x illuminated pushbutton (Red)
- 10 x illuminated pushbutton (Green)
- 10 x illuminated indication lamps (Red)
- 10 x illuminated indication lamps (Green)
- 10 x illuminated indication lamps (White)

3.3.12 *Programme and Progress of Work*

The Tenderer shall provide a work program with its bid in the format as given in the Schedules of this specification. Within seven days of the receipt of the official EFL purchase order, the Tenderer shall submit a confirmed programme of work for the entire project upto the delivery. The programme is to conform to the timelines as stipulated in this tender.

3.3.13 *As –Built Drawings*

The Tenderer shall be required to submit marked-up as-built drawings of the panels, as it is shipped. Tenderer will be required to make modification to CAD drawings as well, EFL will issue CAD drawings to the successful tenderer at time of award. Tenderer shall ensure all changes, such change in wiring or quantities, are clearly marked.

3.3.14 Inspection and Testing

All wiring and testing work shall be undertaken by licenced electricians.

The panels shall be tested according to IEEE Std C37.21. The tests outlined below shall be performed as a minimum on each panel as part of the routine testing:

1. Control Wiring Insulation Test - A power frequency test voltage of 1000V for 1 min shall be applied after all circuit grounds have been disconnected.
2. Control Wiring Continuity – The correctness of the control wiring of the control panel shall be verified by both of the following methods:
 - a. Actual electrical operation of the component control devices
 - b. Individual circuit continuity checks by electrical circuit testers
3. Polarity and Phase Verification - Tests shall be made to ensure that connections to meters or relays, etc., are correctly made to the proper phase and with proper polarity.
4. General Mechanical Checks –
 - a. Cubicle is constructed as per the specifications.
 - b. Nameplates and Labels are correctly installed.
 - c. Earthing provisions and connections are as per the specifications.
 - d. All equipment has been installed correctly and neatly.
 - e. Panel wiring has been neatly arranged.
 - f. Wires have been crimped properly and all connections are tightened correctly.
 - g. MCBs are of the correct ratings.
 - h. Panel Heater and light is operational
 - i. Spares have been accounted for as per the list

Upon completion of the routine tests at factory the contractor is to submit the test certificates for EFL's review and approval. The Tenderer is to only commence with shipment of the goods once EFL provides approval of the routine test results.

The Tenderer shall submit a copy of Inspection and Test Plan (ITP) for the Equipment with its Bid.

3.3.15 Packing and Marking

Equipment shall be carefully packed for transport and shipment in such a manner that it is protected from all dust and climatic conditions during loading, transport, unloading and subsequent storage in the open.

Equipment shall be suitably packed and protected against vibration, movement and shock which may occur during loading and transport. Particular care in packing shall be taken when the apparatus is transported by road.

Instruments and fragile items shall be packed separately. All items, which include delicate equipment, shall be sealed in polythene sheeting and silica gel desiccant or vapour corrosion preventive shall be inserted within the polythene packing. Straw shall not be used as packing material.

Each functional section on the same panel (such as Protection 1 and Protection 2) shall be clearly segregated from any other section by means of a black line (typically 12mm wide) or a completely separate panel shall be installed. All exposed terminals shall be fully shrouded to prevent inadvertent shorting of a conductor by human or rodent activity. Each panel shall be self-supporting and shall not rely upon other panels to remain rigid.

3.3.16 Quality Requirements

Tenderers shall have a Quality Management System that complies with ISO/AS/NZS 9001, and shall submit evidence of certification.

Documentary evidence shall also be provided on the level of Quality System Certification associated with the supplier and or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

Tenderers shall be required to submit copies of ISO certification of the workshops or laboratories where the panels will be assembled.

All work undertaken shall be undertaken within the QMS framework.

3.4 ASSOCIATED PLANT DETAILS

The given particulars elsewhere in this document are those anticipated for plant being provided under other Contracts or already existing and should be used in the preparation of the Bid. They are, however, subject to confirmation and where they are considered to have an effect on the final design of equipment being provided under this Contract, the Contractor is to obtain figures from the Engineer before proceeding with designs.

3.5 ELECTRICAL DESIGN CRITERIA

3.5.1 System Conditions

System Particulars for 132kV, 33kV and 11kV system applicable in Fiji Islands are stated below:

	132kV	33 kV	11 kV
Normal system voltage	132kV	33 kV	11 kV
System Highest voltage	145kV	36 kV	12 kV
Frequency	50 Hz	50 Hz	50 Hz
Earthing of Neutral point	Directly earthed	Earthed through earthing Transformer	Directly earthed with or without resistor
Design Symmetrical fault level	31.5 kA	31.5 kA	31.5 kA

3.5.2 Service Conditions

The Service Conditions applicable in Fiji Islands, at the location of substation site are given below:

	Value	Unit
Altitude of site above sea level not exceeding	300	M
Maximum ambient air temperature	35.6	°C
Minimum ambient air temperature	22.0	°C
Average ambient air temperature over 24 hours	28.5	°C
Average yearly temperature	29.5	°C
Relative humidity (24 Hours)	95	%
Average annual rainfall	202	Mm
Maximum recorded rainfall for 24 hours	390	Mm
Maximum Wind Speed	70 m/sec	
Average isokeraunic level	175	

Note: Fiji is situated in a region where cyclones are experienced frequently. All plant and equipment shall be designed and constructed to withstand these extreme conditions.

All plant and equipment shall be rust proof, vermin proof and weather proof and designed to be suitable for a damp, tropical climate, which may be experienced simultaneously.

3.6 Power supply for electrical operation

1.0 Control /alarm /emergency	DC Voltage	110 V
2.0 Supply voltage of auxiliary equipment	AC Voltage	415/240V
3.0 Supply voltage for auxiliary equipment	DC Voltage	110V

3.7 QUALITY OF MATERIALS AND WORKMANSHIP

All materials used under this contract shall be new and of the quality and class most suitable for working under the conditions specified and shall withstand the variations of temperature, atmospheric conditions arising under

working conditions without distortion or deterioration or the setting up of undue stresses in any part and also without affecting the strength and suitability of the various parts of the work which they have to perform.

All work shall be carried out and completed in a neat and professional manner to the approval of the Employer's Representative.

3.8 STANDARDS

IEC, IEEE and AS/NZS Standards are to be adopted in general. British or Australian standards too may be applied wherever necessary. Any other national or international standard may be used if such standards are not less exacting than corresponding IEC Standard. In all instances a copy of the relevant standard adopted should be forwarded to the Engineer.

The following standards are applicable for this specification:

Standard	Title
AS/NZS 62271.102	High Voltage switchgear and control gear – Part 102: Alternating current disconnectors and earthing switches
AS 1214	Hot – dip galvanizing coatings on threaded fasteners
AS/NZS 60625	High Voltage Switches – Switches for rated voltages above 1kV and less than 52kV
AS 1856	Electroplated coatings – silver
AS 2650	Common specifications for high voltage AC Switchgear and control gear standards.
AS2837	Wrought Alloy Steels - Stainless steel bars and semi – finished products.
AS 4360	Risk Management
AS/NZS ISO 9001	Quality Management Systems – Requirements
AS/NZS 1170	Structural Design Actions
AS/NZS 1768	Lightning Protection
AS 60529	Degrees of protection provided by enclosures (IP Code)
AS 1559	Hot - Dip galvanized steel bolts with associated nuts and washers for tower construction
AS 1252	High strength steel bolts with associated nuts and washers for structural engineering
AS 1627	Metal Finishing – preparation and treatment of surfaces
AS 1796	Certification of welders and welding supervisors
AS 2214	Certification of welding supervisors – structural steel welding
AS 2312	Guide to the protection of structural steel against atmospheric corrosion by use of protective coating
AS 4100	Steel structures
AS 4860	Hot – dipped galvanised (zinc) coatings on fabricated ferrous articles
ASTM	Standard specification for zinc (Hot-Dip Galvanizing) Coatings on iron and steel products
Welding	5mm FILLET UNO
AS 1319	Safety Signs for the Occupational Environment
AS 2067	Substations and High Voltage Installations Exceeding 1kV AC
AS 2650	Common specifications for high-voltage switchgear and control gear standards
AS 2700	Colour Standards for General Purpose
AS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing

IEC 60352	Solderless Connections – Part 2; Crimped Connections – General Requirements, Test Methods and Practical Guidance
IEC 60529	Degrees of Protection provided by Enclosures (IP Code)
IEC 60947	Low Voltage switchgear and control gear assemblies
IEE C37.21	IEEE Standard for Control Switchboards
IEEE C37.2	IEEE Standard Electrical Power System Device Function Numbers and Contact Designations.
IEEE C37.90	IEEE Standard for Relays and Relay Systems Associated with Electric Power Apparatus
IEEE C37.90.1	IEEE Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.
IEEE C37.100	IEEE Standard Definitions for Power Switchgear.
IEEE C37.13.1	IEEE Standard for Definite-Purpose Switching Devices for Use in Metal-Enclosed Low- Voltage Power Circuit Breaker Switchgear
IEEE C37.13	IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
ISO 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing.

All works shall be carried out in accordance with the laws of Fiji and associated Acts and Regulations. These include:

The Electricity Act (Chapter 180) – 2017
Health and Safety at Work Act – 1996
Environment Management Act

In order to achieve Regulatory compliance under the Fiji Electricity Act, the Works shall comply with the Electricity Regulations and AS/NZS 3000:2018 “Wiring Rules”.

3.9 **Tools and Equipment**

The tenderer shall forward a list of tools and equipment required for safe operation and maintenance of the installation and includes the cost of supplying such tools and equipment as part of the tender submission.

3.10 **Packing**

Equipment shall be carefully packed for transportation and shipment in such a manner that it is protected from all dust and climatic conditions during loading, transportation, unloading and subsequent storage in the open.

Equipment shall be suitably packed and protected against vibration, movement and shock which may occur during loading and transport. Particular care in packing shall be taken when the apparatus is transported by road. Instruments and fragile items shall be packed separately. All items, which include delicate equipment, shall be sealed in polythene sheeting and silica gel desiccant or vapor corrosion preventive shall be inserted within the polythene packing. Straw shall not be used as packing material.

3.11 **Warranty**

The Contractor shall provide warranty for equipment installed, commissioned and workmanship including revised As Built drawing submitted for the Works for a Period of **Twenty Four [24] months** after delivery of the equipment. For all equipment supplied by third-parties, the contractor is to ensure that the warranties of these equipment are transferred to EFL as the beneficiary. The Contractor warrants to the Employer that all Works performed and completed in respect of the Warranted Works are in accordance with the standards and quality specified in the Contract or if not otherwise specified, the work is according to good trade practice expected in the energy industry.

3.12 **Programme and Progress of Work**

Within seven days of the receipt of the official EFL purchase order the contractor shall submit a programme of work for the entire project up to the delivery. The programme is to conform to the timelines as stipulated in this tender.

3.13 **INSPECTION AND TESTS**

The Authority's Engineer representative shall have the right to inspect the works and to confirm conformity to the contract specifications.

Should any inspected works fail to conform to the specifications, the Authority may reject them and the Contractor shall make all alterations necessary to meet the specification requirements.

Nothing in this clause shall in any way release the Contractor from any other obligations under this contract.

EFL will also require two (2) of its representative to inspect Disconnecter and Disconnecter with Earth Switch and carry out Factory Acceptance test the plant/equipment offered by the successful tenderer, before shipment, under this contract and to witness. The associated cost, including return airfare including domestic, accommodation, phone, meals, and transportation from the hotel to the factory test site and airports shall be included in the tender price in the appropriate section.

ALL of the type tests (if type test reports of the particular model are not provided, then they shall be carried out for the plant manufactured and supplied) including routine tests and test specified in the specification.

All commissioning tests shall be carried out in accordance with the relevant IEC or other standards and tender specification.

3.14 **SETTING OUT**

All tenderers shall inspect and examine the site, its surroundings, and shall satisfy himself before submitting his tender, as to the form and nature of the site, the nature and type of existing work, the quantities and natures of the work and materials necessary for the completion of the Works and the means of access to the site, the accommodation he may require, the availability, conditions and rates of pay of labour and in general shall himself obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect his tender.

The Contractor shall be responsible for the correct detailed setting out of the Works as indicated in the Tender Documents and shall, at his own cost, amend any errors during the progress of the Works arising from inaccurate setting out.

If a tenderer has any doubt as to the meaning of any portion of the Works, he shall when submitting his tender, include a statement of the interpretation upon which he relies and upon which his tender has been prepared and submitted.

3.15 **SITE CONDITIONS**

- i. The site is located at EFL Waqadra Substation. The Contractor shall be deemed to have visited the site of the works to satisfy him/her as to the accuracy of all information supplied to the Tenderers and to the feasibility of the works.
- ii. The proposed location is in a Substation equipped with therefore all necessary Safety Gear must be worn by the Contractor's Staff at all times.

- iii. The Contractor may only enter the site upon provision of access by an Authorized EFL representative. The Contractor is not to execute any work without direct supervision from the EFL representative. The times for work are 9am to 3.30pm Monday to Thursday, and 9am to 3pm on Fridays.

3.16 MATERIALS, WORKMANSHIP AND PLANT

- i. Materials in all trades shall be new and the best of their kinds specified and necessary complying with relevant standards (Fiji, Australia, New Zealand or USA) where applicable and subject to approval or rejection by the Engineer.
- ii. The Contractor shall at all times ensure that adequate protection is provided to finished work and materials to be used in the construction of the work. Where necessary, make good any damage to property.
- iii. The Contractor shall provide all workmen, both skilled and unskilled, plant, equipment and materials necessary for the expeditious completion of the work.

3.17 OCCUPATIONAL HEALTH AND SAFETY

- i. The Contractor shall comply with the Health and Safety at Work Act, 1996 and regulations and Amendments thereto and the Energy Fiji Limited HSE Policy.
- ii. All work shall be undertaken in workshops which have an Occupational Health and Safety certification issued by the local regulatory authority or Ministry of Labour. Bidders shall be required to provide a copy of this certificate.
- iii. In addition to this, tenderers are required to submit copies of certification to occupational health and safety management system, such as AS 4801 or to equivalent international standard (ISO 14001, ISO 45001). Such information is deemed mandatory bid submission and lack of it will result in disqualification of bid.
- iv. Bidders also need to submit health and safety plans implemented in workshops for assembling and testing protection and control panels, which will be used in this project.

3.18 MAINTENANCE AND DEFECTS

- i. Period of maintenance shall be 1 year (12) calendar months after practical completion of works. All defects during this period shall be made good by the Contractor, at his cost.

3.19 CLEANING UP

- i. On completion, remove all surplus materials from site and leave site in a clean and tidy condition.
- ii. The Contractor shall remove and cart away all rubbish and trade debris as it accumulates during the progress of the works.

3.20 INSURANCE

During the Works, and through to the Date of Completion, while any employees of the Contractor are present at the Site, the Contractor shall provide and maintain, through purchase or its standard insurance program, including provisions for self-retention, the insurance coverage listed below or its equivalent:

a) Accident Compensation Insurance

It is understood that under the Accident Compensation Act 2017 it is a no fault based system and as such these are the maximum amounts payable by the Accident Compensation Commission of Fiji (ACCF) for personal injuries and death arising out from Motor Vehicle Accidents are as follows:-

- Permanent Partial incapacity FJ\$75,000;
- Permanent Total Incapacity FJ\$150,000;
- Any other cases (other than the above) FJ\$75,000;
- Deaths FJ\$75,000.

It would be prudent that the Contractor have in place safe working and driving mechanisms to equip their employees with survival skills so as to avoid Personal Injuries at work or Motor Vehicle Accidents for that matter.

b) Contractors All Risk [CAR] –

CAR insurance, covering the Contractor and its employees, Equipment for all of the Contractor's operations hereunder, including all activities at the Site, including, but not limited to, bodily injury, property damage, premises operations, elevators, independent contractor, products, completed operations and blanket contractual coverage with limits of not less than **FJD\$1,000,000.00** combined single limit; and

c) Public Liability Insurance

covering Contractor, its employees and Third Party for all of Contractor's operations hereunder, including all activities at the Work Site, including, but not limited to, bodily injury, property damage, premises operations, elevators, products, completed operations and blanket contractual coverage with limits of not less than **FJD\$1,000,000.00** combined single limit.

d) Professional Indemnity ('PI') Cover

For the contracts with the various monetary amounts listed below signed with EFL, the Contractor is required to obtain their PI covers (as applicable to them for the contract amount) which are as follows:-

- For EFL Contracts up to FJD\$100K – \$250,000 PI Cover is required;
- For EFL Contracts > FJD\$100K up to \$500K – \$1.5M PI Cover is required;
- For EFL Contracts > \$500K up to \$1M – \$2.5M PI Cover is required; and
- For any EFL Contracts above \$1M and up to \$2M - \$5M PI Cover is required.

Prior to commencing the Works, the Contractor shall provide to EFL appropriate statements or certificates verifying that the above insurance covers are in place.

Section 4

Form of Proposals, Schedules and Appendices

4 PROPOSALS AND SCHEDULES

4.1 SCHEDULE OF PRICES & CONDITIONS OF PAYMENT

The Schedules are intended to provide the Employer with essential supplementary information in an organized format. Examples of more commonly used Schedules are given herein. Others may be devised and added in accordance with the requirements of the Instructions to Bidders.

All the Schedules are essential for bid evaluation and some in contract execution; they should all be incorporated in the Contract, and appropriate changes introduced with the approval of the Employer or its representative.

The schedules are to be completed and submitted as part of the Technical Proposal and Price Proposal in accordance with the Instructions to Bidders Clause 13, Documents Comprising the Bid. **Bidders whose Bids do not contain the data in the required format will be treated as non-responsive.**

4.1.1 CONTRACT PRICE

The Contract Price is comprehensive in that, in consideration of the Contractor meeting all obligations, conditions and liabilities under the Contract, including the Contractor's allowance for the cost of supply of all labor, materials, plant, supervision required to complete the Contract Works, overheads and profit, subject only such adjustment as is provided for the Contract.

The contractor shall fill in the table below for the pricing of the below scope of work.

ITEM NO.	DESCRIPTION	Quantity	Incoterm - ____ FIJI Currency - ____		Incoterm - ____ FIJI Currency - FJD	
			Unit Rate	Total Amount	Unit Rate	Total Amount
A	Design, Manufacture and Supply Outdoor Motorized 36kV Double Break Disconnectors and Earth Switch					
A.1	36kV Motorized Disconnector	2 Nos.				
A.2	36kV Motorized Disconnector & Earth Switch	2 Nos.				
A.3	Disconnector/Earth Switch Mounting Plate/Frame	4 Nos.				
A.4	Mandatory Spares	1 Nos.				
A.3	Factory Acceptance Witness testing - 2 EFL staff at the Factory	1 Nos				
TOTAL AMOUNT FOR PART A (Bidder to state incoterm and currency)						
B	Design, Manufacture and Supply Disconnector/Earth Switch Support Structures, Cable Support Structures, VT Structures, 36kV Voltage Transformers, Surge Arrestors, Conductors, palms, Lightning Mast etc.					
B.1	Support Structures (Disconnectors, Earth switches, VTs, Cables)	8 Nos.				
B.2	HV Plant equipments (36kV Voltage Transformers, Surge Arrestors, Dropout Assembly, Strain Insulator etc)					
B.3	Plant fixtures (Compression palms, connectors, conductors, earthing materials, etc)					
B.4	Lightning Arrestor Mast	2 Nos.				
B.5	Installation & Commission Works (Optional)					
B.6	Mandatory Spares	1 Nos.				
TOTAL AMOUNT FOR PART B (Bidder to state incoterm and currency)						

ITEM NO.	DESCRIPTION	Quantity	Incoterm - ____ FIJI Currency - ____		Incoterm - ____ FIJI Currency - FJD	
			Unit Rate	Total Amount	Unit Rate	Total Amount
C	Design & Supply of Electrical Accessories for Upgrade of 33kV Bus 2 and Bus 3 portion from High Bus to 2000A rated Bus					
C.1	Support Structures (Busbars)	2 Nos.				
C.2	HV Plant equipments (Busbars, support insulators, support clamps, etc)					
C.3	Plant fixtures (Compression palms, connectors, flexible braids, earthing materials, etc)					
C.4	Installation & Commission Works (Optional)					
TOTAL AMOUNT FOR PART C (Bidder to state incoterm and currency)						
D	Design, Manufacture and Supply Protection and Control Panel for Transformer Bays					
D.1	2 x Transformer Protection & Control Panel	2 Nos.				
D.2	Installation Works (Optional)					
TOTAL AMOUNT FOR PART D (Bidder to state incoterm and currency)						
TOTAL (PART A + PART B+ PART C+ PART D) (Bidder to state incoterm and currency)						

4.1.2 Submission of Work Completion Report

The contractor will be required to submit mandatory progress report on the works completed together with the invoices while requesting for either progressive or retention payment.

The work completion Report shall be on Contractors official letterhead and shall clearly state the Scope of Work, the Purchase Order number under which the work is being carried out, the milestone for which the payment is requested, and photos showing the work for which the payment is requested. The Contractor or his /her designated representative shall sign off the work completion report. The EFL Engineer supervising the work shall verify the Work Completion Report via site inspection, note his /her endorsement on the Work Completion Report, and sign the same. Failure to submit Work Completion Report will result in invoice to stay on hold until the work completion report is submitted.

4.1.3 Payment Terms

All payments shall be due and payable by the Employer in accordance with the payments terms detailed below.

The payments shall be made on completion of milestones as identified and agreed by both the Employer's Representative and the Contractor.

The payments will be made based on the following schedule:

	Particulars	Milestones	Payment (% of contract price)
1	Design review and approval	After Final Design Approval given by EFL	20%
2	Shipment	Upon completion of Manufacture and testing supported by bill of lading documents	30%

3	Delivery	Upon Delivery to Fiji. Supply of 36kV double break disconnectors and structures and accessories to Fiji	50%
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4.2 Technical Parameters

Bidders are required to fill the below technical parameters for the applicable equipment/device.

4.2.1 36kV Disconnectors with Earth Switch

The equipment covered in this specification shall meet the technical requirements listed below:

No	Description	Bidder's response
1.	Type/Installation	
2.	Manufacturer's Name & Country of Manufacture	
3.	Standards according to which the Disconnector are Manufactured	
4.	Maximum design voltage at which the Disconnector can operate (kV)	
5.	Frequency (Hz)	
6.	Rated Voltage (kV)	
7.	Maximum current that can be safely interrupted by the Disconnector	
	i. Inductive (A X % of PF)	
	ii. Capacitive (A X % of PF)	
8.	Continuous current rating nominal apps	
9.	Under the following conditions	
	Rate short time current (kvp)	
	i. For 3 seconds (kA rms)	
	ii. For 1 seconds (KA rms)	
10.	iii. Rate peak short time current (kvp)	
	Max. Temp. Rise of current carrying parts when carrying rated current continuously (deg.C)	
11.	Insulation levels	
	i. Impulse withstand voltage (kV Peak) Phase to earth	
	ii. Power frequency withstand voltage (kV rms) Phase to earth	
12.	Minimum creepage distance of support & rotating insulators	
13.	Minimum clearance in air	
	i. Between Poles (mm)	
	ii. Between live parts and earth (mm)	
	iii. Between live parts when switch is open a) On the same pole (mm)	
	b) Between adjacent poles (mm)	
14.	Current density at the minimum cross-section of	
	i) Moving blade (Amps/Sq.mm)	
	ii) Terminal Pad	
	iii) Contacts	
	iv) Terminal connector	
15.	Design and construction of	
	i. No. of Insulators as per pole	
	ii. No. of Breakers per pole	
	iii. Type of closing/operating mechanism (Horizontal/Vertical break straight etc.)	
	iv. Contacts	
	a) Material and Grade	
	b) Cross sectional area in Sq.mm	
	v. Moving Blades	
	a) Material and Grade	
	b) Cross sectional area in Sq.mm	

No	Description	Bidder's response
	vi. Contact support	
	a) Material and size of Channel/Block	
	b) Material and size of plate	
	vii. Turn and Twist mechanism	
	a) Material and size of clamps	
	b) Material and size of springs	
	c) Whether springs are encased	
	viii. Bearings	
	a) Material and size of housing	
	b) No. of bearings, location and size	
	ix. Type of interlock	
	x. Down pipe size and class	
	xi. Type of universal/swivel joint	
	a) Between bearing and down pipe	
	b) Between down pipe and operating mechanism	
	xiii. Terminal connectors	
	a) Clamp body Alloy compositions Area at min. cross - section	
	b) Temperature rise when carrying rated current at 500C ambient (deg.C)	
	c) Type of washers used	
	d) Bolts and nuts size Alloy composition	
	e) Weight of each type of clamps (kg.)	
	xiv. Origin and Manufacturer of the insulators	

4.2.1 36kV Voltage Transformer

The equipment covered in this specification shall meet the technical requirements listed below:

No.	Description	Bidders Response
	Manufacturer	
1	Address, Telephone and fax	
	Place of tendered item	
2	Type	
3	Type of Mounting	
4	Rated Primary voltage	
5	Rated Secondary Voltage	
6	Rated frequency	
7	Volt factor and duration	
8	Transformation ratio	
9	Rated burden	
10	Creepage distance of the insulator	
11	Temperature Rise	
11.1	With 1.2 times rated primary continuously	
11.2	By resistance method	
11.3	By thermocouple / thermometer	
12	Rated Insulation Level	

	1.2/50 micro sec. Impulse withstand voltage on primary side	
	1 min power frequency withstand voltage(dry)on primary side	
	1 min power frequency withstand voltage (wet) on primary side.	
	1 min power frequency withstand test voltage on secondary side.	
13	Ratio & Phase angle error.	
14	Accuracy class	
15	Voltage Ratio	
16	Voltage factor and rated time	
17	Service conditions for outdoor temperature conditions, altitude, humidity, suitability for exposure to steam, vapour, fumes, explosive gases, excessive dust, salt air etc. should be stated.	
18	Type of secondary	
19	Total Weight	
20	no. of phases	

4.2.2 **Manufacturer Details**

Provide Manufacturers detail for the equipment covered in this specification:

ITEM	RECOMMENDED MANUFACTURER	BIDDER'S PROPOSAL	
		MANUFACTURER	PLACE OF MANUFACTURE
36kV Motorized Disconnecter with Earth Switch	NGK, Coelme, HAPAM		
2000A Rated Busbars	Electropar, PLP		
Voltage Transformer	Zelisko or Ritz		
Surge Arrestors	Tri-Delta		
Dropout Assembly with Fuse	NGK, ABB		
Dutch Cable Clamps	CABAC or LUKA		
Strain Composite Insulator	Electropar		
Busbar Rigid Support Insulator	NGK, Transnet, PLP		
Busbar Rigid Support Clamp	NGK, Transnet, PLP		
Straight AL Compression Palms	Lorunser, PLP		
AL Compression deadends	Lorunser, PLP		
AL Tee Compression Connector	Lorunser, PLP		
Busbar bolted AL Tee terminal connector	Lorunser, PLP		
Busbar bolted AL Bus inline terminal connector	Lorunser, PLP		
AL flexible Connector 2000A rated Type B	Lorunser, PLP		
AL flexible Connector 2000A rated Type A	Lorunser, PLP		
Triton Conductor	Lorunser, PLP		
Busbar Corona Dome Cap	Lorunser, PLP		

ITEM	RECOMMENDED MANUFACTURER	BIDDER'S PROPOSAL	
		MANUFACTURER	PLACE OF MANUFACTURE
Earth Wire	Nexus or Dominion		
Earth Bar			
Earthing lug	CABAC		
Earthing Joint	CADWELD		
Corona Free Bolts			
Aluminum Jointing Compound			
Bus Side Disconnecter Support Structure			
Line Side Disconnecter/Earth Switch Support Structure			
Voltage Transformer Support Structure			
Cable Support Structure			
Busbar Support Structure			
Lightning Arrestor/Mast			
Aluminum Marshalling Box			
Protection & Control Panel	Rittal TS8		
Terminal Blocks	Phoenix UT6 & UK10		
Test Block	Areva MMLG02		
MCB	Schneider		
Lights & Pushbuttons	Schneider		
Selector Switches	Kraus & Naimer		

4.3 ***Departure from Specifications***

The Tenderer shall nominate the Clause or relevant section of the tender specification and describe the departure.

Tender Specification Reference	Departure

i The Tenderer shall refer to the specific clause of the tender specification.

Section 5

Drawings and Literature

5 Drawings

All applicable drawings to this tender specification are uploaded as Appendix with the tender specification.

1. Appendix 1 – Support Structures Typical Drawings
2. Appendix 2 – Proposed Protection & Control Drawing Schedule

5.1 Drawings and Documents to be submitted with the Bid Document:

Bidder is required to submit the following with the bid:

1. Support Structures Design & Dimensions
2. Datasheets, technical specifications and relevant drawings for the following:
 - i. 36kV Motorised Disconnectors
 - ii. 36kV Motorised Disconnectors with Earth Switch
 - iii. 36kV Voltage Transformers
 - iv. Surge Arrestors
 - v. Dropout Assembly & fuse
 - vi. All types of HV connections, palms and termination
 - vii. Cable Clamps
 - viii. Earthing Components
 - ix. 36kV 2000A rated Busbar
 - x. Busbar components
 - xi. Protection & Control Panel Equipment Schedule
3. Draft electrical drawings of Protection and Control Panel
4. Gantt Chart for supply of equipment and installation of equipment.

COMPLIANCE CHECKLIST

Compliance – the following documents are to be provided with the tender bid:

No.	Compliance	Check(√)
1	Valid FRCS tax compliance certificate.	
2	Valid FNPF certificate of Compliance.	
3	Previous list of similar work experience.	
4	Work procedure for working at site.	
5	Gantt chart.	
6	Business registration details.	
7	Insurance cover details.	
8	Details of nominated Electrical Engineer	
9	Manpower Capability to carry out this works.	
10	Contractor Capability statement to carry out this works.	

Bidder has to scope 100% Mandatory compliance for consideration.

6 Overall Evaluation Criteria

Tender Evaluation Criteria	
Category	Criteria
Bid Responsiveness	General responsiveness of bid, compliance to submission requirements and documentation
Health Safety and Environment	Assessment of Tenderer's compliance to health, safety and environmental requirements detailed within the technical specification Past performance of Tenderers
Quality Assurance	Tenderer has Quality Management systems in place that are acceptable to Energy Fiji Limited.
Technical Compliance	Does the Tender meet Energy Fiji Limited's minimum technical requirements as outlined in the Technical Specification? Will the bidder be able to deliver the service as per the requirement of EFL? Risk management plan and mitigation of foreseeable risks Past experience Ability to deliver on time / delivery timeframe
Commercial Compliance	Tenderer holds the required current insurance provisions and has provided evidence through valid insurance certificates of currencies. Assessment of the Tenderers operational risks including conflicts of interest. Tenderer must comply with statutory requirements, such as that enforced by FRCS, FNPF, FNU, etc. and provide evidence of compliance as required in the specifications.
Energy Fiji Limited Procedures	Tenderer must comply with all relevant Energy Fiji Limited Health , Safety and Environmental procedures. This is indicated by the Tenderer signing the Form of Tender Schedule, acknowledging all applicable procedures.
Financial Stability	Assessment of Tenderer's current financial stability and ability to remain financially stable.
Price Evaluation	Base tendered prices; Other value adding options.

TENDER CHECKLIST

The Bidders must ensure that the details and documentation mention below must be submitted as part of their tender Bid

Tender Number _____

Tender Name _____

1. Full Company / Business Name: _____

(Attach copy of Registration Certificate)

2. Director/Owner(s): _____

3. Postal Address: _____

4. Phone Contact: _____

5. Fax Number: _____

6. Email address: _____

7. Office Location: _____

8. TIN Number: _____

(Attach copy of the VAT/TIN Registration Certificate - Local Bidders Only (Mandatory))

9. FNPF Employer Registration Number: _____ **(For Local Bidders only) (Mandatory)**

10. **Provide a copy of Valid FNPF Compliance Certificate (Mandatory- Local Bidders only)**

11. **Provide a copy of Valid FRCS (Tax) Compliance Certificate (Mandatory Local Bidders only)**

12. **Provide a copy of Valid FNU Compliance Certificate (Mandatory Local Bidders only)**

13. Contact Person: _____

I declare that all the above information is correct.

Name: _____

Position: _____

Sign: _____

Date: _____

Tender Submission - Instruction to bidders

Bidders are requested to upload electronic copies via Tender Link by registering their interest at: <https://www.tenderlink.com/efl>

This tender closes at 4.00pm (1600hrs) on Wednesday 30th September, 2026

For further information or clarification please contact our Supply Chain Office on phone (+679) 3224360 or (+679) 9992400 or email us on tenders@efl.com.fj

The bidders must ensure that their bid is inclusive of all Taxes payable under Fiji Income Tax Act.

The lowest bid will not necessarily be accepted as the successful bid.

The Tender Bids particularly the “Price” must be typed and not hand written.

Any request for the extension of the closing date must be addressed to EFL in writing three (3) working days prior to the tender closing date.

Tender Submission via email or fax will not be accepted.