



**FIJI ELECTRICITY AUTHORITY**

# **BIDDING DOCUMENT**

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**Deuba, Wailekutu and Sawani Substations**

**Supply of outdoor 36kV Single break  
disconnectors, Earth Switches and Electrical  
Accessories**

**TENDER NO: MR 100 /2016**

## INVITATION FOR BIDS

**Date:** 17<sup>th</sup> September, 2016  
**Tender No:** MR 100/2016

The Fiji Electricity Authority ("The Employer") invites sealed bids from reputable and suitable Manufacturers and Suppliers for the Supply of 36kV Outdoor disconnectors/earth switch, steel structures and Accessories for the Deuba, Wailekutu and Sawani Substations.

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

Supply of Outdoor 36kV disconnectors, earth switch and Accessories for the Deuba, Wailekutu and Sawani Substations.

Fiji Electricity Authority  
The Secretary Tender Committee  
2 Marlow Street, Suva, FIJI.  
Suva

The deadline for submission of bids shall be 1600hrs (local time) on Wednesday, 19th October, 2016.

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

- |  |           |   |
|--|-----------|---|
|  | <b>A.</b> | <b>General</b>  |
| <b>1. Scope of Bid</b>                               | 1.1       | The Fiji Electricity Authority (hereinafter referred to as "the Employer"), wishes to receive bids for the Supply 36kV disconnectors/earth switch, steel structures and 36kV Accessories and 33kV for the Deuba, Wailekutu and Sawani Substations, as defined in these bidding documents (hereinafter referred to as "the Works").  |
| <b>2. Eligible Bidders</b>                           | 2.1       | This invitation is open to all Bidders who have sound Financial Background, and have previous experience in handling such projects.   |
| <b>3. Eligible Materials, Equipment and Services</b> | 3.1       | The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies as specified by FEA and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Upon request, bidders may be required to provide evidence of the origin of materials, equipment, and services.  |
| <b>4. Qualification of the Bidder</b>                | 4.1       | To be qualified for award of Contract, bidders shall: <ul style="list-style-type: none"> <li>(a) submit a written power of attorney authorizing the signatory of the bid to commit the bidder; and</li> </ul>   |
| <b>5. One Bid per Bidder</b>                         | 5.1       | Each bidder shall submit only one bid either by itself, or as a partner in a joint venture. A bidder who submits or participates in more than one bid will cause all those bids to be rejected.   |
| <b>6. Cost of Bidding</b>                            | 6.1       | 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.  |
| <b>8. Clarification of Bidding Documents</b>         | 8.1       | A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing by fax (hereinafter the term "fax" is deemed to include electronic transmission such as facsimile, cable and telex), or email at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any request for clarification which it receives earlier than 10 days prior to the deadline for submission of bids. Copies of the Employer's response, including a description of the inquiry, will be forwarded to all purchasers of the bidding documents. |
| <b>9. Amendment of Bidding Documents</b>             | 9.1       | At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing addenda.   |

- 9.2 Any addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause 9.1, and shall be communicated in writing or by fax to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by email and fax to the Employer.
- 10. Language of Bid** 10.1 The bid, and all correspondence and documents related to the bid, exchanged between the bidder and the Employer shall be written in the English language.
- 11. Bid Form and Price Schedules** 11.1 The Bidder shall complete the Bid Form and the appropriate Price Schedules furnished in the bidding documents in the manner and detail indicated therein, following the requirements of Clauses 15 and 16.
- 12. Bid Prices** 12.1 Bidders shall give a breakdown of the prices in the manner and detail called for in the Schedules of Prices.
- 13. Bid Currencies** 13.1 Prices shall be quoted in the following currencies:
- (a) The prices shall be quoted in the Fijian currency and either in the currency of the bidder's home country.
- 14. Bid Validity** 14.1 Bids shall remain valid for a period of **60 days** from the date of Deadline for Submission of Bids specified in Sub-Clause 21.1.
- 15. Format and Signing of Bid** 15.1 The bidder shall prepare one original and two (2) copies of the technical proposal and the financial proposal, clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 - TECHNICAL & PRICE PROPOSAL", etc. as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.
- 15.2 The inner and outer envelopes shall
- (a) be addressed to the Employer at the following address:
- The Secretary Tender Committee  
2 Marlow Street, Suva, FIJI.  
Phone: 679 3224 185  
Suva
- and
- (b) bear the following identification:
- Bid for: Supply of Outdoor 36kV disconnectors, earth switch and Accessories for the Deuba, Wailekutu and Sawani Substations.
  - Bid Tender Number: MR 100/2016
  - DO NOT OPEN BEFORE 1600Hrs 20<sup>th</sup> October, 2016

**Mandatory Soft Copy Lodgement**

To register your interest and tender a response, view 'Current Tenders' at: <https://www.tenderlink.com/fea>

For further information contact The Secretary Tender Committee, by e-mail [TDelairewa@fea.com.fj](mailto:TDelairewa@fea.com.fj)

- 15.3 If the outer envelope is not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the bid.
- 16. Deadline for Submission of Bids**
- 16.1 Bids must be received by the Employer at the address specified above no later than **1600 hours (local time) Wednesday, 19<sup>th</sup> October, 2016**
- 16.2 The Employer may, at its discretion, extend the deadline for submission of bids by issuing an addendum in accordance with Clause 11, 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.
- 17. Late Bids**
- 17.1 Any bid received by the Employer after the deadline for submission of bids will be rejected and returned unopened to the bidder.
- 17.2 No bid may be modified by the bidder after the deadline for submission of bids.

# **Section 2**

**Employer's Requirements – Part I**

**Scope of Works**

**Wailekutu, Sawani and Deuba**

**Supply of outdoor 36kV Single break disconnectors,  
Earth Switch, Steel Structures and Electrical  
Accessories**

# 1. General Specifications

## 1.1 Scope of Work

The scope of works for contract is for the manufacture, testing at manufacturer's work, packing, shipping (CIF to Suva Port) of the following:

No.	Quantity	Description	Supplier	Unit Rate	Total
1	15	Disconnecter Auxiliary Switch			
3	10	Remotely operated 33kV Disconnecter			
4	5	Remotely Operated 33kV Disconnecter earth switch			
5	5	Earth Switch Auxiliary Contact			
6	15	Mounting plate			
7	15	SIBA VT Expulsion Dropout Fuse & Link			
8	15	33kV Surge Arrestors			
9	15	Disconnecter Support Structure with supplier design at 100m/s cyclone rated (Min Height = 2.4m)			
10	1 Lot	Factory Acceptance Testing at Manufacturers Location			

The Contractor is to manufacture the items mentioned above as per the design drawings and specifications provided by FEA, and the Standards mentioned herein.

## 1.2 System Particulars

	132kV	33kV	11kV
Normal system voltage	132kV	33kV	11kV
System Highest voltage	145kV	36kV	12kV
Frequency	50Hz	50Hz	50Hz
Earthing of Neutral point	Directly Earthed	Earthed through Neutral Earthing Resistor	Directly Earthed
Design Symmetrical fault level	4500MVA	1125MVA	250MVA
Standard kA rated	(31.5kA)	(31.5kA)	(31.5kA)

## 1.3 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 Employer's Representative.

## 1.4 Standards

IEC, IEEE and AS/NZS Standards are to be adopted in general. Any other national or international standard may be used if such standards are not less exacting than corresponding IEC Standard. In such an instance a copy of the relevant standard should be forwarded. The works shall be in accordance with the following standards:

STANDARD	TITLE
AS/NZS 62271.102	High Voltage switchgear and control gear – Part 102: Alternating current disconnectors and earthing switches
AS 1214	Hot – dip galvanising 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

## 1.5 Service Conditions

The disconnectors will be exposed to the following environmental conditions:

Daily average ambient temperature	32°C
Max. Ambient Temperatures	45°C
Annual average ambient temperature	30°C
Altitude	20m
Humidity	95%
Seismic Level – open ended Richter scale	7 on the open ended Richter Scale
Average Rainfall per year	2663mm
Isokeraunic Level	50

## 1.6 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.

## 1.7 Packing

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.

## 1.8 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 FEA 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.

## 1.9 Programme and Progress of Work

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

## 1.10 Ratings

The disconnectors and earth switches shall have the following ratings:

Rated Voltage	(kV)	36
Rated Frequency	(Hz)	50
Continuous Operating Current	(A)	800
Short time withstand current (1sec)	(kA)	40kA
Rated Peak withstand current	(kA)	31.5kA
Insulation Level (BIL)		
(I) To earth and between poles (peak)	(kV)	170
(II) Across isolating distances (peak)	(kV)	230

## 1.11 Inspection and Testing

### 1.11.1 Factory Acceptance Testing

- a. Dielectric Tests
- b. Temperature Rise Tests
- c. Short time withstand current and peak withstand current tests
- d. Mechanical endurance test
- e. Routine Test Certificates shall be supplied with each batch delivery in accordance to AS 62271.102.

# **Section 3**

## **Form of Proposals and Appendices**

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  - 2.2 *PAYMENTS TERMS*.....7

## 1 NOTES ON SCHEDULES

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 contact the data in the required format will be treated as non-responsive.**

## 2 SCHEDULE OF PRICES & CONDITIONS OF PAYMENT

### 2.1 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 labour, materials, plant, supervision required to complete the Contract Works, overheads and profit, subject only such adjustment as is provided for the Contract.

### 2.2 PAYMENTS TERMS

1. All payments shall be due and payable by the Employer in accordance with the payments terms detailed below.
2. The payments shall be made on completion of milestones as identified and agreed by both the Employer's Representative and the Contractor.
3. The payments will be made based on the following schedule:

	<i>Particulars</i>	<i>Milestone</i>	<i>Payment (% of contract price)</i>
1	Advance payment		NIL
2	Supply	Upon delivery to Fiji Supply of 36kV Single break disconnectors and Structures and Accessories to Fiji	90%
3	Retention	12 months after issuing of performance certificate	10%

## **1 OTHER DOCUMENTS & DRAWINGS TO BE SUBMITTED WITH BID**

As a minimum, the following documents & drawings shall be submitted with the Bid.

1. Evidence of Bidder's experience in works similar to this
2. **List of IEC and ASNZ standards**

## GUARANTEED TECHNICAL PARTICULARS OF 33kV DISCONNECTORS & EARTH SWITCHES

Sr. No	Description	
1.	Type/Installation	
2.	Manufacturer's Name & Country of Manufacture	
3.	Standards according to which the Disconnectors 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 (Amps.)	
	Under the conditions (Amps.)	
9.	Rate short time current (kvp)	
	i. For 3 seconds (kA rms)	
	ii. For 1 seconds (KA rms)	
	iii. Rate peak short time current (kvp)	
10.	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	
	Isolating distance	
	ii. Power frequency withstand voltage (kV rms)	
	Phase to earth	
	Isolating distance	
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	
	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	

Sr. No	Description	
	a) Material and Grade	
	b) Cross sectional area	
	vi. Contract 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 50°C ambient (deg.C)	
	c) Type of washers used	
	d) Bolts and nuts size Alloy composition	
	e) Weight of each type of clamps (kg.)	

	Criteria for Evaluation	Weighting	Score Range		
			10 – 8	7 - 4	3 - 0
1	Manufacturer's years of experience in production of 33kV Disconnectors	5.00	Manufacturer has more than 30 years' experience	Manufacturer has less than 30 years' experience	Manufacturer has less than 10 years' experience
2	Manufacturer's/Bidders experience in Similar projects – Design, Build, Supply and Install	5.00	Company has done more than 20 projects of similar nature	Company has done 20 - 10 projects of similar nature	Company has done less than 10 projects of similar nature
3	Number of years the offered model has been in production and in the market	2.50	Model has been in the market for more than 10 years	Model has been in the market for 5 – 10 years	Model has been in the market for 5 – 1 years
4	Number of units of offered model sold in Pacific – Fiji/NZ/Australia	2.50	More than 30	Less than 20	Less than 10
5	Number of years of experience of key personnel to be involved in project	2.50	More than 10 years for most of the key personnel	Less than 10 years for most of the key personnel	Less than 5 years for most of the key personnel
6	Manufacturer's Warranty on Disconnectors	2.50	More than 4 years	2 – 4 years	Less than 1 year
7	Type test reports on Disconnectors	2.50	Results meet and exceed the requirements as per IEC 67221-102 standards	Results do not meet minimum specifications	Type test reports not submitted or not as per IEC standards
8	Conformance to acceptable values for routine tests as specified in tender	2.50	Submits evidence that Disconnectors will conform & exceed requirements	Submits evidence that Disconnectors will conform to most requirements	No evidence of conformance to test requirements
9	Compliance to Electrical Endurance E2 as per IEC 62271-102	10.00	Electrical Endurance E2	Electrical Endurance E1	Electrical Endurance E0
10	Compliance to Mechanical Endurance M2 as per IEC 62271-102	10.00	Mechanical Endurance M2	Mechanical Endurance M1	Mechanical Endurance M0



11	Comprehensiveness of proposed design	2.50	All the design details are addressed as that would be expected in an ideal proposal.	Relevant design details are addressed in terms of design as that compared to an ideal proposal.	Extent of consideration placed into design is significantly less than that expected in a reasonable proposal. Most of the items stated in specifications are not met.
12	Nominal Disconnectors parameters	15.00	Disconnectors parameters exceed the nominal required performance ratings	Circuit breaker parameters are equal to the nominal required performance ratings	Circuit breaker parameters are below the nominal required performance ratings
13	Disconnectors Panel Evaluation	5.00	Meets all the technical requirements as in the specification. All technical details match with design requirements	Meets only the basic requirements of the specification. Proposed technical data is acceptable but does not match with specification	Meets only the mandatory requirements of the specification
14	Maintenance Requirements for Disconnectors	2.50	Needs maintenance every 3 years or more or after 1,000 operations	Needs Maintenance every 2 - 3 years	Needs Maintenance every 1 - 2 year
15	Safety Requirements for Disconnectors	5.00	Meets and exceeds the safety requirements of the Disconnectors	Meets most of the safety requirements for the Disconnectors	Does not meet the level of safety features for the Disconnectors
16	Innovation in Design	5.00	High degree of innovation incorporated into design	Evidence of some innovation incorporated into design	No evidence showing any innovation in design
17	Delivery period and timeline	10.00	Delivery period is within 16 weeks	Delivery period is within 16 - 24 weeks	Delivery period would exceed 24 weeks
18	Quality Control	2.50	Manufacturer has quality system in accordance with international standards and produced evidence of regular third party audits	Manufacturer appears to have a quality system in place.	Manufacturer has a record of providing reasonable quality material but provides no evidence of a quality system
	<b>Total</b>	<b>100%</b>			

# Section 4

## WORK PROGRAM

# 1 Work Plan

The Contractor is required to state the commencement and completion dates for different components of the project schedule given below. The Contractor is required to also submit a Gantt chart showing the timelines.

<b>Component or Work</b>	<b>Commencement Date</b>	<b>Completion Date</b>
1. Receipt of Official Purchase Order		
2. Submit marked up Design Drawings		
3. Procurement of Materials		
4. Build of Equipment		
5. Factory Testing		
6. Packaging		
7. Shipping		

# Section 5

## PRICING

# 1 PRICE AND PAYMENT SCHEDULE

The prices below are to be inclusive of shipping, CIF to Suva Port.

Currency of Tendered Price: .....

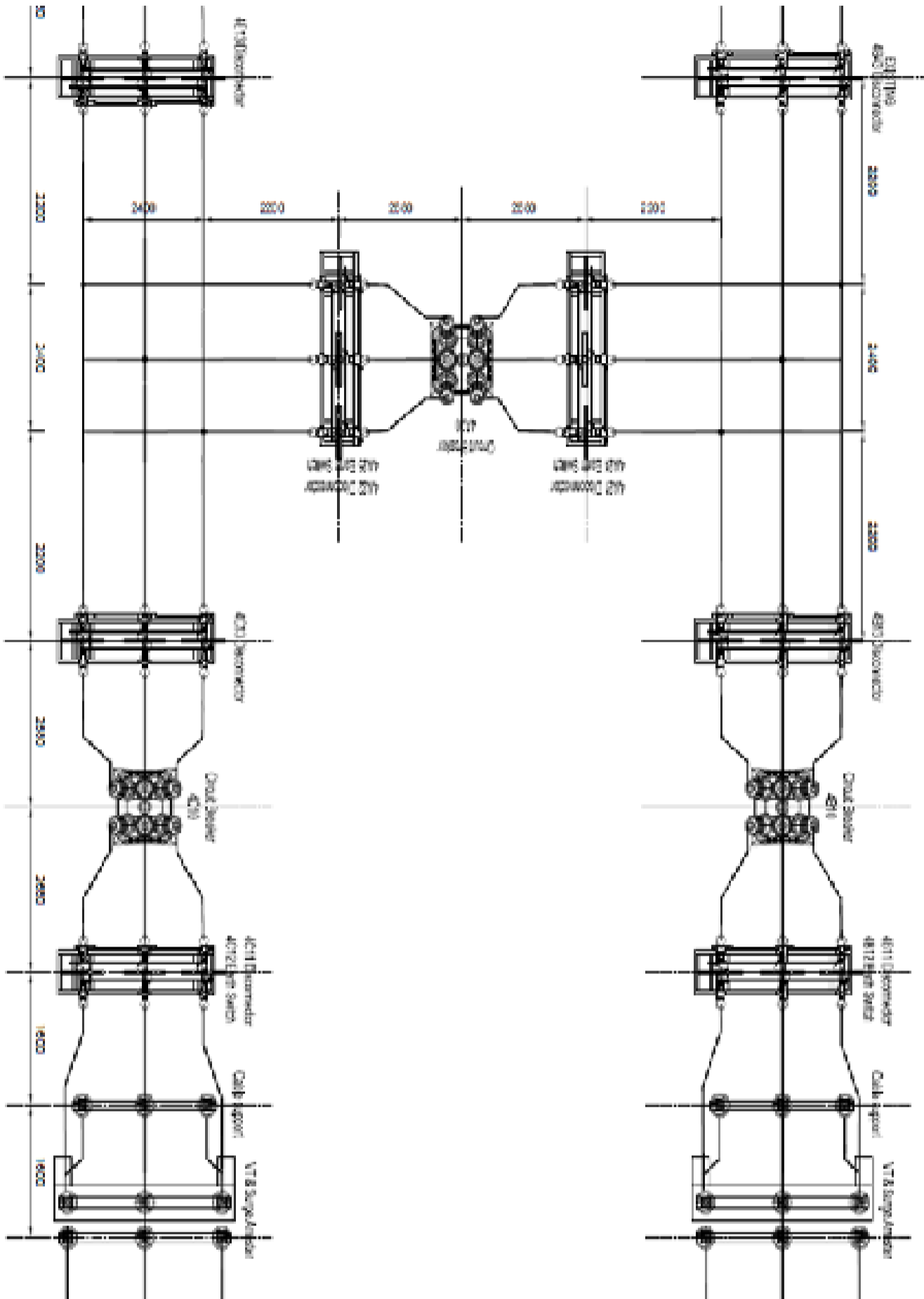
<b>Component</b>	<b>Quantity</b>	<b>Price</b>
Disconnecter Auxiliary Switch	15	
Remotely operated 33kV Disconnecter	10	
Remotely Operated 33kV Disconnecter earth switch	5	
Earth Switch Auxiliary Contact	5	
Mounting plate	15	
SIBA VT Expulsion Dropout Fuse & Link	15	
33kV Surge Arrestors	15	
Disconnecter Support Structure with supplier design at 100m/s cyclone rated (Min Height = 2.4m)	15	
<b>Total</b>		

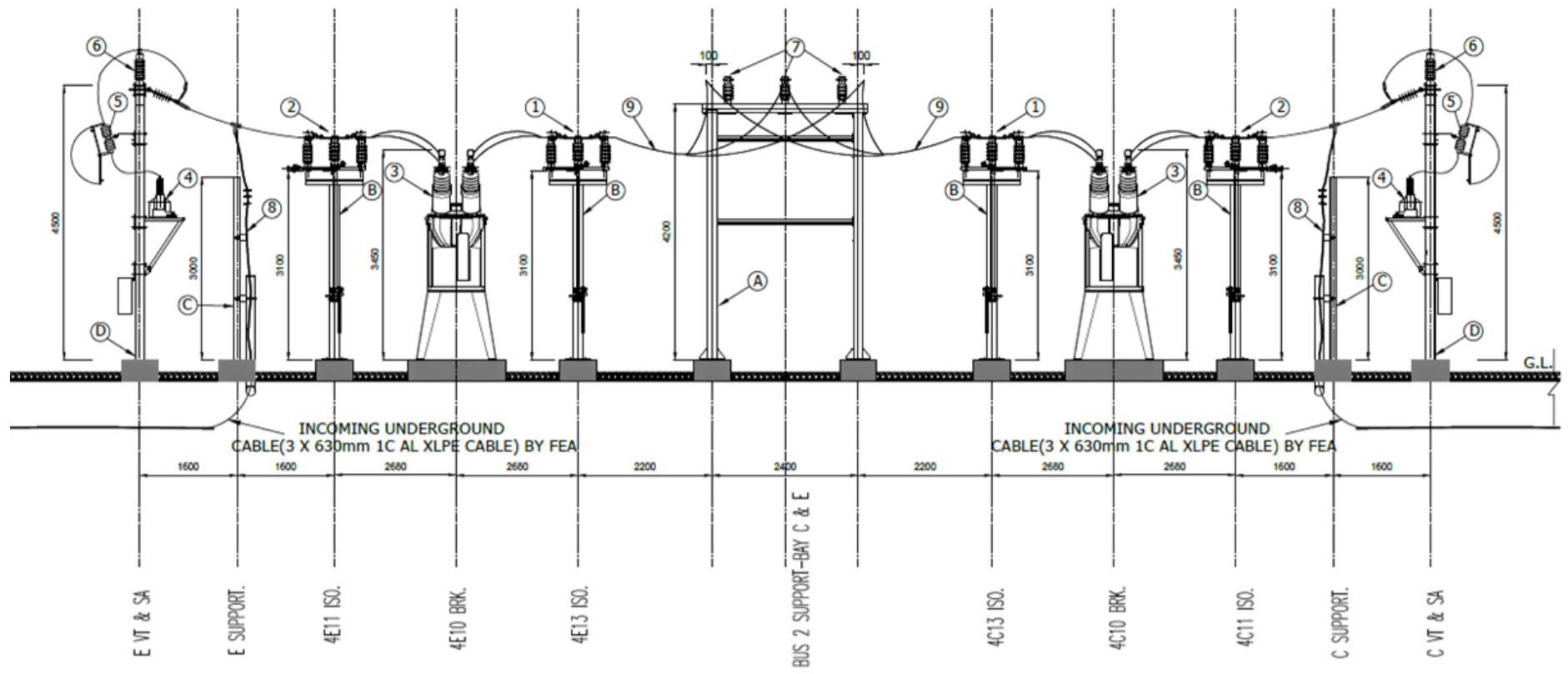
# Section 6

## DRAWINGS

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## Nabou Green Substation Outdoor Layout – New Site Layout





ITEM	DESCRIPTION
	<b>PRIMARY EQUIPMENT</b>
1	33kV RDB DISCONNECTOR
2	33kV RDB DISCONNECTOR WITH E/S
3	33kV CIRCUIT BREAKER WITH CTs
4	33kV VOLTAGE TRANSFORMERS
5	VT DROPOUT FUSE
6	SURGE ARRESTER
7	33kV ALUMINIUM TUBULAR BUSBARS
B	33kV 1C 630MM <sup>2</sup> XLPE U/G CABLE
9	33kV AAC TRITON CONDUCTOR
A	BUSBAR SUPPORT STRUCTURE
B	DISCONNECTOR SUPPORT STRUCTURE
C	CABLE SUPPORT STRUCTURE
D	VT & SURGE ARRESTER SUPPORT STRUC



## SPECIFICATION

This specification provides for design, engineering, manufacture, stage testing, inspection and testing before dispatch, packing, forwarding and delivery at site of 36 kV class Disconnectors and line-cum-earth switch complete with all fittings, accessories and associated auxiliary equipment mandatory which are required for efficient and trouble free operation as specified hereunder.

It is not the intent to specify completely herein all details of the design and construction of equipment's. However, the equipment shall conform in all respects to IEC standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation up to the Bidder's guarantee acceptable to the IEC. The equipment offered shall be complete with all components necessary for its effective and trouble free operation along with associated equipment, interlocks, protection schemes etc., Such components shall be deemed to be within the scope of supply, irrespective of whether those are specially brought out in this specification and/or commercially ordered or not. All similar parts particularly movable ones shall be interchangeable.

## SERVICE CONDITIONS:

Equipment to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions:-

i.	Location	Fiji
ii.	Max. ambient air temp (°C)	50
iii.	Min. ambient air temp (°C)	15
iv.	Max. Relative humidity %	100
v.	Min. Relative humidity %	65
vi.	Average annual rainfall (mm)	1200
vii.	Max. wind pressure (kg./Sq.m)	1 95
viii.	Max. altitude above mean sea level (meters)	less than 1200
ix.	Isocerannic level (days/years)	75
x.	Seismic level (horizontal acceleration)	0.3g
xi.	Average no. of dust storm days/annum	35

**Note:** Moderately hot and tropical climate conducive to rust (salane) and fungus growth. The climatic conditions are also prone to variations in ambient conditions.. Heavy lightening also occurs during November to March.

## AUXILIARY POWER SUPPLY:

The equipment offered under this specification shall be suitable for the following auxiliary power supplies.

- |    |  |   |
|----|--|---|
| a) | Power Devices (like drive motors)                                    | 415 V, 3 phase, 4 wire, 50 Hz, neutral grounded AC supply.      |
| b) | AC control and protective devices, lighting fixtures, space heaters. | 240 V, single phase, 2 wire, 50 HZ, neutral grounded AC supply. |
| c) | DC alarm, control and protective devices                             | 110 V, DC 2-wire  |

**PRINCIPAL PARAMETERS:**

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

Technical Parameter	36kV
Rated Frequency (Hz)	----- 50 -----
System Neutral Earthing	----- Solidly Earthed -----
No. of Phases (Poles)	----- 3 -----
Temperature Rise	----- As per relevant IS/IEC ---
Safe Duration of overload	
150% of rated current	----- 5 minutes -----
120% of rated current	----- 30 minutes -----
Rated voltage /Highest system voltage (kV rms)	33/36
Type of disconnect (AB)	DB
Rated normal current (Amp rms)	1,600
Rated short time withstand current (kA rms) of MS & EB for 1 sec duration	37.5k A
Rated dynamic withstand current (kA)	80kA
Rated short circuit making current of EB (kA peak)	100k A
Basic insulation level: 1.2/50 micro-sec lightning impulse withstand voltage (+ ve or - ve polarity)	
To earth (kVp)	170
Across isolating distance One terminal subjected to lightning impulse (kVp) and opposite terminal subjected to power frequency (kV rms) voltage (as per IS)	195
Rated 1 minute power frequency withstand voltage ( kV rms )	
Across isolating distance	100
To earth and between poles	70
Min. creepage distance of support and rotating insulator (mm)	900
Phase to Phase spacing for installation (mm)	1220
Minimum clearances:	
Phase to earth	320
Phase to Phase	350
Height of centre line of terminal pad above ground level (mm)	2800
Rating of auxiliary contacts	10 A at 110V DC with breaking capacity of 2 A DC with time constant not less than 20 ms.
Seismic acceleration	..... 0.3 g horizontal.....
Operating time	----- 12 sec or less -----
Rated mechanical terminal load	As per relevant standards
Rated magnetizing/ capacitive current make/break (Amps/rms)	0.7
RIV at 1 MHz & 1.1 X rated phase to earth voltage (micro volts)	–

**GENERAL TECHNICAL REQUIREMENTS:**

The 36 kV shall be single break disconnectors as per drawings

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 Disconnector shall be of solid core type except for 33 kV 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 blow holes, cracks and such other defects.

All the ferrous metal parts shall be hot dip galvanised 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.

#### **OPERATING MECHANISM:**

Each 36 kV disconnectors shall be remote controlled 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 Disconnecter to permit its operation through local or remote push buttons..

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

**CONTROL CABINET:**

The control cabinet of the operating mechanism shall be made out of 12 SWG(2.64 mm thick) sheet steel duly hot dip galvanised or 10 mm thick aluminium 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 IP:65 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.

**MOTOR:**

The motor shall be suitable for three phase, 415 V, A.C. 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.

**GEAR:**

The disconnecter 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 aluminium 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.

**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.

**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.

**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.

**AUXILIARY SWITCH:**

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

**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 1100 V grade insulated 2.5 mm<sup>2</sup> copper wires.

**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)	:

**PADLOCKING DEVICE:**

All Disconnectors and Earthing switches shall be provided with 10mm 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.

**EARTHING:**

Flexible copper connections shall be provided between rotating earth blades and the frame which shall have a cross-section of at least 50 mm<sup>2</sup> 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.

**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 test.

**ROUTINE TESTS:**

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

**LIST OF DRAWINGS AND DOCUMENTS:**

The Bidder shall furnish two sets of following drawings along with his offer:

- a) General outline and assembly drawings of the dis-connector operating mechanism, structure, insulator and terminal connector.
- b) Sectional views and descriptive details of items such as moving blades, contacts, arms contact pressure, contact support bearing housing of bearings, balancing of heights, phase coupling pipes, base plate, operating shaft, guides.
- c) Name plate.
- d) Schematic drawing along with detailed write-up.
- e) Wiring diagram.
- f) Marked erection prints identifying the component parts of the dis-connector as shipped with assembly drawings.
- g) Detailed dimensions and description of all auxiliaries.
- h) Detailed views of the insulator stacks, metallic, operating mechanism, structure, interlocks, spare parts etc.,

## **Tender Submission - Instruction to bidders**

It is mandatory for Bidders to upload a copy of their bid in the **TENDER LINK Electronic Tender Box** no later than **4:00pm, on Wednesday 19<sup>th</sup> October, 2016.**

To register your interest and tender a response, view 'Current Tenders' at:  
<https://www.tenderlink.com/fea>

For further information contact The Secretary Tender Committee, by e-mail  
[TDelairewa@fea.com.fj](mailto:TDelairewa@fea.com.fj)

In additional, hard copies of the tender, one original and one copy must be deposited in the tender box located at the FEA Head Office, 2 Marlow Street, Suva, Fiji no later than **4:00pm, on Wednesday 19<sup>th</sup> October, 2016**- Addressed as:

**Tender – MR 100/2016 – Supply of Outdoor 36kV Single Break Disconnectors, Earth Switches and Electrical Accessories for Deuba, Wailekutu and Sawani**

**The Secretary Tender Committee  
Fiji Electricity Authority  
Head Office  
Suva  
Fiji**

- **Hard copies of the Tender bid will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.**

Tenders received after **4:00pm** on the closing date of **Wednesday 19<sup>th</sup> October, 2016.**

- Will not be considered.
- Lowest bid will not necessarily be accepted as successful bid.
- **It is the responsibility of the bidder to pay courier chargers and all other cost associated with the delivery of the hard copy of the Tender submission.**