Reg No 2003/011612/30

CD 50/2023

MANUFACTURE, SUPPLY, DELIVERY AND REPAIR OF 36 kV VACUUM OUTDOOR METAL CLAD SWITCHGEARS, ASSOCIATED 36kV STATIONARY EQUIPMENT AND LINE EQUIPMENT

Table of Contents

1. STATEMENT OF INVITATION

CENTLEC (SOC) Ltd (Here after referred to as CENTLEC) a Municipal Entity distributing electricity in Mangaung, and other Municipalities invites suitable bidders to bid for the supply, delivery and repair of 36 kV vacuum outdoor metal clad switchgear and related associated equipment as per specifications detailed below for a period of thirty-six (36) months.

2. MINIMUM REQUIREMENTS

2.1 The service provider must supply valid letter of good standing with the Compensation Commissioner.

2.2 Supply municipal services (water, sanitation, rates, and electricity) clearance certificate or Lease Agreement with a current Bill and rates clearances, or Current Bill of Account not owing more than 90 days. In a case where the services are paid for by the Landlord, the lease agreement must be signed by the applicable stakeholders.

2.1.1 In an event that the Bidder utilizes prepaid services (e.g., water or electricity) a valid municipal clearance certificate(s) must still be provided.

2.2 Supply unique security personal identification number (PIN) from SARS for TAX compliant status and submit original valid Tax Clearance Certificate.

2.3 The bidder must be registered with the National Treasury Data Base of suppliers and proof thereof must be submitted.

2.4 Proof of ISO 9001 quality accreditation from the manufacturer of the goods (a certified copy of the accreditation will suffice)

2.5 CIDB rating of level 6 EP and above.

3. DEFINITIONS AND ABBREVIATIONS

3.1 A - Ampere
3.2 V - Voltage
3.3 kVA - Kilo Volt Ampere
3.4 LV - Low Voltage
3.5 Hz - Hertz
3.6 ISO - International Organization for Standardization
3.7 IEC - International Electro Technical Commission Standards
3.8 SANS - South Africa Nasional Standard
3.9 Ue – Operational voltage
3.10 Ui - Isolation voltage
3.11 VA - Volt Ampere
3.12 kA - Kilo Ampere
3.13 Ct - Current transformer
3.14 Pt - Potential transformer
3.15 NER - Neutral Earth Resistor
3.16 NERCT – Neutral Earth Compensator Resistor
3.17 CENTLEC – CENTLEC (SOC) Ltd
3.18 B.I.L. – Basic insulation level
3.19 MCOV -

4. SCOPE OF WORK

This bid specification calls for the manufacturing, supply, delivery, and repair of 36 kV vacuum outdoor metal clad switchgear and associated stationary equipment. The service provider will be responsible for “strip and quote” quotations on repairs of 36kV switchgear and related equipment. The transport from Bloemfontein to their premises and back must be included.

5. TECHNICAL SPECIFICATION

5.1 METEOROLOGICAL CONDITIONS

Meteorological conditions at CENTLEC supply area that must inform the design and manufacturing of the equipment on this bid are:

1. Outdoor temperatures in degrees Celsius	Annual mean – 24.4; Maximum = 40; Minimum = -10

2. Average relative humidity	At 8h00 = 76%; at 14h00 = 33%; at 20h00 = 48% Minimum = 7% and Maximum = 98%
3. Thunderstorm activity	Severe Thunderstorms

Table 1: Climatological Data

5.2 ELECTRICAL SYSTEMS

Electrical systems in CENTLEC supply area are as follows:

5.2.1 Voltage: 11 000 /400 Volt,132kV/33kV and 132kV/11kV

5.2.2 Phases: 3 (A-Red, B-Yellow, and C-Blue)

5.2.3 Frequency: 50 Hz

5.2.4 The neutral is earthed through a resistor to limit the maximum current to 300 A, 20Ω, on the 11 kV side at the 33/11 kV and 132kV/11kV distribution centres in Bloemfontein.

5.2.5 Phase rotation is non-standard (Red, Yellow, Blue) and must be labelled on the switchgear.

5.2.6 The load on the system consists mainly of lighting, heating, and inductive loads.

5.2.7 The three types of cable mainly used on the 36 kV network are 300 mm² Cu paper insulated lead or XLPE, 500mm² Al paper insulated lead or XLPE cable.

5.2.8 The insulation level for the voltage transformers must be according to SANS 780: 2009.

5.3 SPECIFICATIONS ON SWITCHGEAR:

When bidding on the outdoor circuit breaker, it must include the indoor ring type current transformers that are wired to the kiosk part of the circuit breaker “Dog box type”. When bidding on the vacuum type of outdoor circuit breaker the outdoor current transformers must be included with structures complete.

5.3.1 Busbar insulation: -

Busbars, incoming and outgoing terminals points, and all live metal shall be fully and suitably insulated. **Busbars which use air only as insulating medium is not acceptable**. Switchgear and busbar insulation shall be designed to prevent the risk of accidental short

circuit due to animals and vermin. Busbar connections must be tinted (Silver plated) and the connections must be fully insulated.

The degree of Ingress-Protection for the metal-clad switchgear shall conform to IP4X standard.

5.3.2 Rated insulation level: -

Switchgear must have a basic impulse insulation withstand level of 95 kV. The 36 kV circuit breakers must be 630A , 25 kA, 200 kV BIL.The steel for the enclosure cubicles must be 3CR12. Circuit breakers cubicles must be type tested to IEC 60056 standard, developed, and manufactured in the Republic of South Africa.

5.3.3 **Details of the outdoor circuit breaker**

Details for 800 Amp, 36kV VCB. (Vacuum Circuit Breakers must include the outdoor current transformers with the structures. Please specify each component separate and the total price per unit. **Note** that CENTLEC can order the breakers with **1Amp or 5Amp CT's**)

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	**UNITS**	**SPECIFIED REQUIREMENT**	**PARTICILARS OFFERED, BRAND NAME AND TYPE**
SWITCHGEAR GENERAL: Brand Name, Type.			
Kiosk Function		Circuit breaker	
Insulation Medium		vacuum	
System Voltage	kV	33	
Rated Voltage	kV	36	
Circuit Normal Rated Current	Amp	800	
Busbar Normal Rated Current	Amp	800	
Fault Level Capacity	MVA	350	
Impulse Withstand Voltage	kV	95	
Short Circuit Breaking Capacity	kA	20	
Duration of Short Circuit	s	3	
Peak Withstand Current	kA	95	
Mechanism Type		Manual and remote	
Trip Coil	V	110 VDC	
Spring Release Coil	V	110 VDC	
Indication for Trip/Close		YES	
Status Indication Lamps (open/close)	LED	LED and Manual (see technical spec 5.3.11 below)	
Circuit Earthing Facilities		Top entry through bushings	
System Earthing		NER 300 A Max 20Ω	

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
36kV Clamps		Yes (Palms with 4 x10mm holes) see technical spec 5.3.13 below.	
Completed stand		Legs, struts/straps, and bolts (galvanized)	
Circuit Earthing		Yes (Stand and kiosk earth studs) see technical spec 5.3.7 below.	
Interlocks		Yes	
Surge Arrestors (suppressors)		36kV to fit at secondary side of breaker. (Optional when ordered with arrestors).	
Remote Control Unit		Yes (open and close)	
DIMENSIONS (Estimated)			
Height	mm	Max 2100	
Depth	mm	Max 1200	
Width	mm	Max 1200	
Structure galvanized steel	mm	Must be 1200 high with earthing M12 studs on two of the four legs	
Doors	IP4X	The doors must be moister prove and provision must be made for pad lock locking.	
CURRENT TRANSFORMERS: 1A		**If CT"s is outside the CB enclosure.**	
Install CT's	Yes		
Purpose		Overcurrent and Earth Fault	
Ratio		300/400/500/1	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		300V (minimum)	
Ratio		300/400/500/1	
Class		PX	
Quantity		Three	
Insulation Level		0.66kV When inside CB enclosures.	

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
Insulation Level		40.5/95/200kV When outside CB enclosures	
CURRENT TRANSFORMERS: 5A			
Install CT's	Yes		
Purpose		Overcurrent and Earth Fault	
Ratio		300/400/500/5	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		300/400/500/5	
Class		PX	
Quantity		Three	
Insulation Level		0.66kV when inside CB enclosures.	
Insulation Level		40.5/95/200kV when outside CB enclosures.	

Table 2: 800Amp 36kV Breaker details

5.3.4 **Details of the outdoor circuit breaker**

Details for 1600 Amp, 36kV VCB. (Vacuum Circuit Breakers must include the outdoor current transformers with the structures. Please specify each component separate and the total price per unit. **Note** that CENTLEC can order the breakers with 1Amp or 5Amp CT's)

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
SWITCHGEAR GENERAL: Brand Name, Type.			
Kiosk Function		Circuit breaker	
Insulation Medium		.	
System Voltage	kV	33	
Rated Voltage	kV	36	
Circuit Normal Rated Current	Amp	1600	

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
Busbar Normal Rated Current	Amp	2000	
Fault Level Capacity	MVA	350	
Impulse Withstand Voltage	kV	95	
Short Circuit Breaking Capacity	kA	20	
Duration of Short Circuit	s	3	
Peak Withstand Current	kA	95	
Mechanism Type		Manual and remote	
Trip Coil	V	110 VDC	
Spring Release Coil	V	110 VDC	
Indication for Trip/Close		YES remote	
Status Indication Lamps (open/close)	LED	LED and Manual (see technical spec 5.3.11 below)	
Circuit Earthing Facilities		Top entry through bushings	
System Earthing		NER 300 A Max 20Ω	
36kV Clamps		Yes (Palms with 4 x10mm holes) see technical spec 5.3.13 below.	
Completed stand		Legs, struts/straps, and bolts (galvanized)	
Circuit Earthing		Yes (Stand and kiosk earth studs) see technical spec 5.3.7 below.	
Interlocks		Yes	
Surge Arrestors (suppressors)		36kV to fit at secondary side of breaker. (Optional when ordered with arrestors).	
Remote Control Unit		Yes (open and close)	
DIMENSIONS (Estimated)			
Height	mm	Max 2100	
Depth	mm	Max 1200	
Width	mm	Max 1200	
Structure galvanized steel	mm	Must be 1200 high with earthing M12 studs on two of the four legs	
Doors	IP4X	The doors must be moister prove and provision must be made for pad lock locking.	
CURRENT TRANSFORMERS: 1A			
Install CT's	Yes		
Purpose		Overcurrent and Earth Fault	
Ratio		1000/1400/1600/1	

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Insulation Level		0.66kV when inside CB enclosures.	
Insulation Level		40.5/95/200kV when outside CB enclosures.	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		1000/1400/1600/1	
Class		PX	
Quantity		Three	
CURRENT TRANSFORMERS: 5A			
Install CT's	Yes		
Purpose		Overcurrent and Earth Fault	
Ratio		1000/1400/1600/5	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		1000/1400/1600/5	
Class		PX	
Quantity		Three	
Insulation Level		0.66kV when inside CB enclosures.	
Insulation Level		40.5/95/200kV when outside CB enclosures.	

Table 3: 1600Amp 36kV Breaker details

5.3.5 **Details of the outdoor circuit breakers**

Details for 1250 Amp, 36kV VCB. (Vacuum Circuit Breakers must include the outdoor current transformers with the structures. Please specify each component separately and the total price per unit. **Note** that CENTLEC can order the breakers with 1Amp or 5Amp CT's)

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
SWITCHGEAR GENERAL: Brand Name, Type.			
Kiosk Function		Circuit breaker	
Insulation Medium		vacuum	
System Voltage	kV	33	
Rated Voltage	kV	36	
Circuit Normal Rated Current	Amp	1250	
Busbar Normal Rated Current	Amp	2000	
Fault Level Capacity	MVA	350	
Impulse Withstand Voltage	kV	95	
Short Circuit Breaking Capacity	kA	20	
Duration of Short Circuit	s	3	
Peak Withstand Current	kA	95	
Mechanism Type		Manual and remote	
Trip Coil	V	110 VDC	
Spring Release Coil	V	110 VDC	
Indication for Trip/Close		YES remote	
Status Indication Lamps (open/close)	LED	LED and Manual (see technical spec 5.3.11 below)	
Circuit Earthing Facilities		Top entry through bushings	
System Earthing		NER 300 A Max 20Ω	
36kV Clamps		Yes (Palms with 4 x10mm holes) see technical spec 5.3.13 below.	
Completed stand		Legs, struts/straps, and bolts (galvanized)	
Circuit Earthing		Yes (Stand and kiosk earth studs) see technical spec 5.3.7 below.	
Interlocks		Yes	
Surge Arrestors (suppressors)		36kV to fit at secondary side of breaker. (Optional when ordered with arrestors).	
Remote Control Unit		Yes (open and close)	
DIMENSIONS (Estimated)			
Height	mm	Max 2100	
Depth	mm	Max 1200	
Width	mm	Max 1200	
Structure galvanized steel	mm	Must be 1200 high with earthing M12 studs on two of the four legs	

DESCRIPTION OF PARTICULARS "OUTDOOR TYPE" 800AMP. LABEL: 36B1	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED, BRAND NAME AND TYPE
Doors	IP4X	The doors must be moister prove and provision must be made for pad lock locking.	
CURRENT TRANSFORMERS: 1A			
Install CT's	Yes		
Purpose		Overcurrent and Earth Fault	
Ratio		800/1000/1200/1	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Insulation Level		0.66kV when inside CB enclosures.	
Insulation Level		40.5/95/200kV when outside CB enclosures.	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		800/1000/1200/1	
Class		PX	
Quantity		Three	
CURRENT TRANSFORMERS: 5A			
Install CT's	Yes		
Purpose		Overcurrent and Earth Fault	
Ratio		800/1000/1200/5	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		800/1000/1200/5	
Class		PX	
Quantity		Three	
Insulation Level		0.66kV	

Table 4: 1250Amp 36kV Breaker details

5.3.6 **Protection and auxiliary equipment: -**

All Current transformers will be studded type and all small wiring will be terminated labeled and numbered. The small wiring must be wired to test blocks in the Circuit breaker kiosk. Gland plates for small cabling must be provided. The earth studs must be 6mm^2 brass with nuts and washers. Provide two main 13mm^2 brass earth studs that must connect to the main earth of the substations. (Opposite points on the steel enclosure).

5.3.7 Install a 220 Volt heater that must dry the air out in the switchgear compartments. Install a 220 Volt light (7W LED) inside the kiosk that must be energized when opening the kiosk door.

5.3.8 Auxiliary wiring between the circuit breaker and the kiosk shall be wrapped neatly by means of a wire harness.

5.3.9 Provision must be made for the circuit breaker status (“open” or “closed”) to be indicated in the kiosk mechanically and with LED type lamp indicators (110VDC).

5.3.10 Labels (All labels shall conform to SANS 1885: 2001 clause 4.17).

5.3.11 All circuit breakers must be supplied with flag clamps, that fit the stork of the bushings and the ampere ratings of the circuit breaker. The flag palm must have four 13mm2 holes.

5.4 Specification on 36kV Potential Transformers (PT) (Preferably the Dry Type).

5.4.1 Technical specification for 36kV, outdoor, structure mountable, 5 limp, 3 phase Potential Transformers (PT) complying with IEC60044-2.

Description	**Specification**	**Particulars Offered: Brand Name, Type.**
Equipment	36 kV, Outdoor, Three Phase**, Oil filled Potential Transformer**	
Reference Standard	IS: 3156	
Type	Dead tank	
System voltage	33 kV	
Rated voltage	36 kV	

Description	Specification	Particulars Offered: Brand Name, Type.
Power Frequency withstand (60_{s})	70kV	
Frequency	50 Hz.	
Lightning Impulse (BIL)	200kV	
Basic Insulation Level	Primary: 36 kV / 70 kV(p) Secondary: 3 kV for 1 minute	
Insulation Medium	Paper and Transformer oil (PCB Free and 80kV di-electric strength)	
Class of insulation	Class A	
Bushings creepage	Mm/kV 31 (Very high pollution)	
Creepage distance	900 mm (minimum)	
Ratio	33000/√3: 110/√3 – 110/√3 Volt	
Secondary Voltage	110 Voltage	
Class of accuracy	Core - I : 0.5, Core - II : 3P	
Burden	Core - I : 100 VA, Core - II : 100 VA	
Voltage factor	1.2 Continuous, 1.9 times for 30 Sec.	
Core identification	Core - I : Metering, Core - II : Protection	
Place of installation	Outdoor, Structure mounted	
Primary terminal connector	M20 thick x 60 mm long	
Fixing hole dimension	330 mm both X & Y direction	
Painting Paint	Battleship gray as per IS 5	
Paint thickness:	60 microns (minimum)	
Secondary terminal box	IP 55	
Suitability	Should be suitable for upright mounting on steel Structure	

Description	Specification	Particulars Offered: Brand Name, Type.
	in outdoor switch yard with standard base.	
Guarantee	5 (five) years from the date of last dispatch of any integral part of the equipment.	
Structure	Galvanized structure complete. The height of the structure including the power transformer must be 2.5m from ground level. The four legs of the structure must be able to bolt down onto the plimf with M12 bolts. M12 earthing studs, with nuts and washers, 150mm from the bottom on one leg.	
Steel cable rack	The cable rack must be fitted to on one side of the structure for small cabling to the power transformer.	

Table 5: Technical specifications for 36kV Potential Transformers (PT).

5.4.2 Submit type test reports and date of test with each unit on delivery:

A. High voltage Power frequency wet withstand voltage test.

B. Lightning impulse voltage withstand test.

C. Temperature Rise Test

5.4.3 The name plate must have all the necessary information on it and must be durable for the lifetime of the unit. Type, date of manufacturing, serial number, rated voltage, etc.

5.5 Specification for 36 kV Outdoor Current Transformers

5.5.1 Outdoor 36kV Current Transformers (The Dry Type or new technology).

Technical specification for 36kV, outdoor, structure mountable current transformer. **1Amp**.

Description	Specification	Particulars Offered: Brand Name, Type.
Type	Outdoor Head type Resin molded (Dry)	
Phase	Single phase	
Rated voltage	36kV	
Purpose	Overcurrent and Earth fault	
Ratio	300/400/500/1	
Accuracy Class	10P15	
Burden	Minimum 15 VA	
Rated Maximum Primary Current	500A	
Rated Secondary Current	1A	
Purpose	Differential	
Ratio	300/400/500/1	
Accuracy Class	PX	
Knee Point Voltage	Minimum 180V	
Rated Maximum Primary Current	500A	
Rated Secondary Current	1A	
Rated insulation level	36kV	
Standard	IEC60044-1	
Structure	Galvanized structure complete. The height of the structure including the current transformer must be 2.5m from ground level. The four legs of the structure must be able to bolt down onto the plinth with m12 bolts. M12 earthing studs, with nuts and washers, 150mm from the bottom on one leg.	
Clamps	Supply two flag clams per current transformer. The flag must fit the Current transformer Diameter of the stork. Flag palm must have 4 x 10mm holes. Flag palm must be 50mm x 80mm x 6mm.	

Description	Specification	Particulars Offered: Brand Name, Type.
Steel cable rack	The cable rack must be fitted to on one side of the structure for small cabling to the current transformer.	
Type	Outdoor Porcelain (oil) or Head type Resin molded (Dry)	
Phase	Single phase	
Rated voltage	36kV	
Ratio	Dual Ratio	
Accuracy Class	0.5	
Burden	100VA	
Rated Primary Current	5A to 1000A	
Rated Secondary Current	1A	
Rated insulation level	36 kV;	
Standard	IEC60044-1	
Structure	Galvanized structure complete. The height of the structure including the current transformer must be 2.5m from ground level. The four legs of the structure must be able to bolt down onto the plimf with m12 bolts. M12 earthing studs, with nuts and washers, 150mm from the bottom on one leg.	
Clamps	Supply two flag clams per current transformer. The flag must fit the Current transformer Diameter of the stork. Flag palm must have 4 x 10mm holes. Flag palm must be 50mm x 80mm x 6mm.	
Steel cable rack	The cable rack must be fitted to on one side of the structure for small cabling to the current transformer.	

Table 6: Outdoor 1Ampere Current Transformers (Preferably the Dry Type)

5.5.2 Outdoor Current Transformers (The Dry Type or new technology). Technical specification

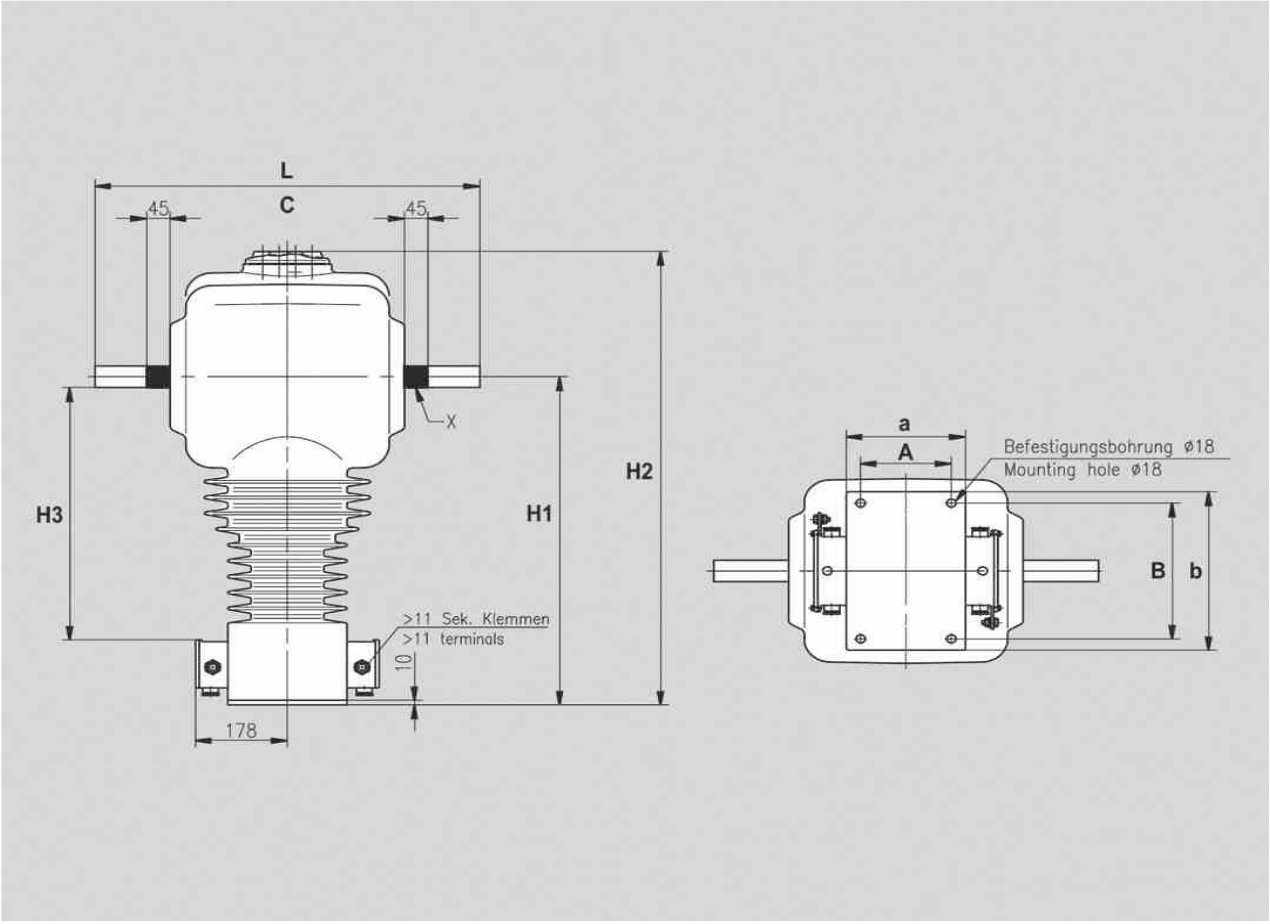
for 36kV, outdoor, structure mountable current transformer. 5 Amp.

Description	Specification	Particulars Offered: Brand Name, Type.
Type	Outdoor Head type Resin molded (Dry)	
Phase	Single phase	
Rated voltage	36kV	
Purpose	Overcurrent and Earth fault	
Ratio	300/400/500/5	
Accuracy Class	5P20	
Burden	Minimum 15 VA	
Rated Maximum Primary Current	500A	
Rated Secondary Current	1A	
Purpose	Differential	
Ratio	300/400/500/5	
Accuracy Class	PX	
Knee Point Voltage	Minimum 180V	
Rated Maximum Primary Current	500A	
Rated Secondary Current	5A	
Rated insulation level	36 kV	
Standard	IEC60044-1	
Structure	Galvanized structure complete. The height of the structure including the current transformer must be 2.5m from ground level. The four legs of the structure must be able to bolt down onto the plinth with m12 bolts. M12 earthing studs, with nuts and washers, 150mm from the bottom on one leg.	
Clamps	Supply flag clams per current transformer. The flag must fit the Current transformer Diameter of the stork. Flag palm must have 4 x 10mm	

Description	Specification	Particulars Offered: Brand Name, Type.
	holes. Flag palm must be 50mm x 80mm x 6mm.	
Steel cable rack	The cable rack must be fitted to on one side of the structure for small cabling to the current transformer.	

Table 7: Outdoor 5Ampere Current Transformers (Preferably the Dry Type)

Example drawing.



Drawing 1: 36kV Dry Head type outdoor current transformer. (New outdoor technology can be tendered on just include it properly on the pricing schedule)

5.5.3 The name plate must have all the necessary information on it and must be durable for the lifetime of the unit. Type, date of manufacturing, serial number, rated voltage, etc.

5.5.4 Submit type test reports and date of test with each unit on delivery:

A. High voltage Power frequency wet withstand voltage test.

B. Lightning impulse voltage withstand test.

C. Temperature rise, Test

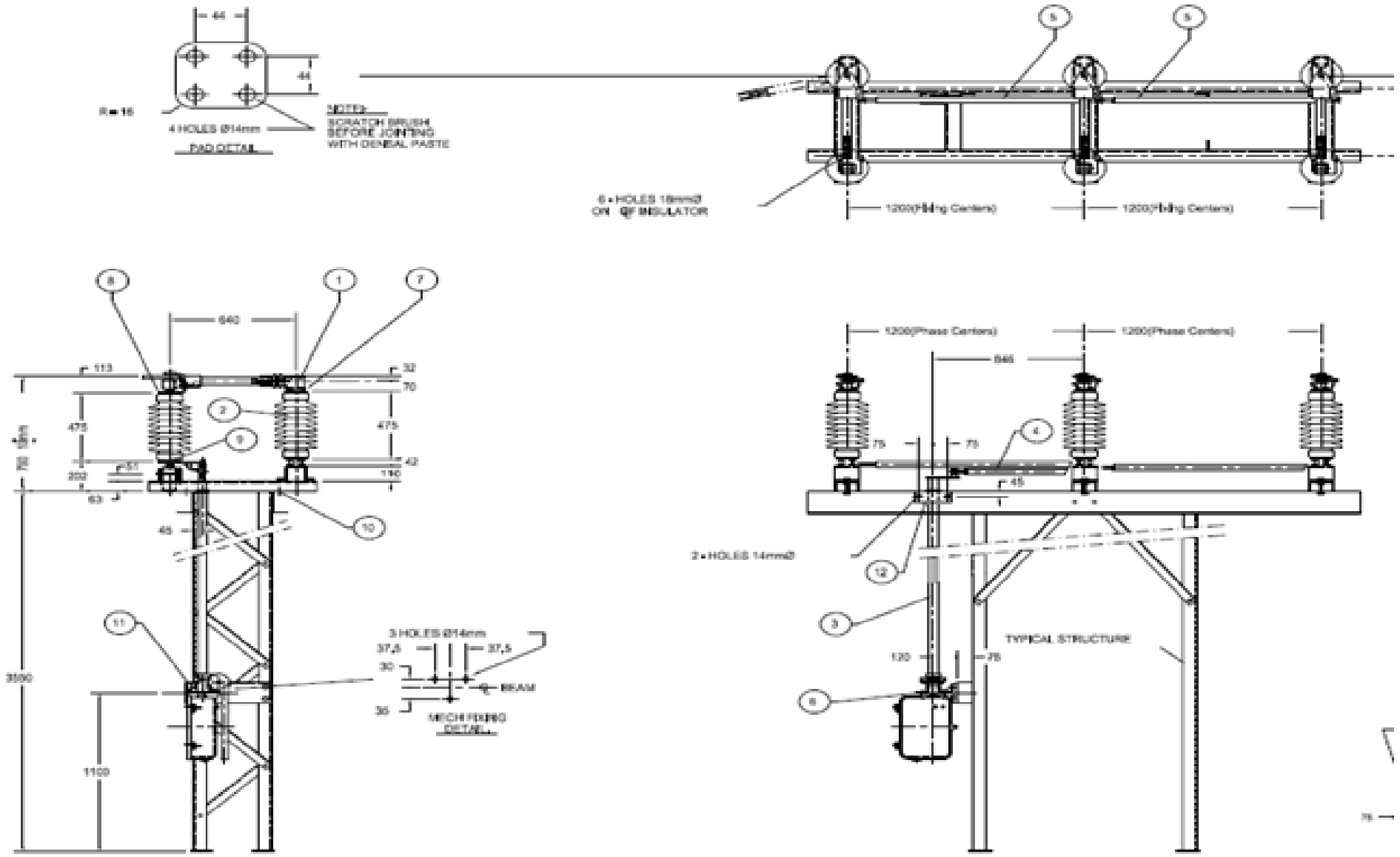
5.6 A. Specification for 3 Phase, 36kV, Outdoor Single Side Arm Break Disconnector Switches (Links) Type SSB36 or equivalent.

Rated current	Withstand test voltage				Short circuit rating R.M.S kA	Peak, withstand current kA	Creepage distance (mm)	Resistance terminal to terminal
	To earth & between poles		Across the isolating distance					
	B.I.L Impulse voltage	Power frequency (Wet)	B.I.L Impulse voltage	Power frequency (Dry)				
400	70	200	95	230	13.1	34	820	64uΩ
800	70	200	95	230	17.5	47	820	64uΩ
1200	70	200	95	230	17.5	47	820	64uΩ
1600	70	200	95	230	17.5	47	820	64uΩ

Table 8: 36kV Single Side Arm Disconnector Switches

Note: The following details:

1. Material: Insulator porcelain
   : Contacts tinted hard drawn copper.
   : Bases must be mild steel H.D.G.
2. Operating handles must be supplied with an auxiliary cable box.
3. Operating handles must make provision for pad lock. (Link permit locks.)
4. Supply operating arm from the auxiliary box to the switch of 5 meters. No 3 on drawing below.
5. Isolators must be supplied with terminal lugs that have four holes for M12 bolts.
6. 400-to-1600-amp isolator's terminal pad must have four holes for M12 bolts.
7. Name plates must be punched with the following details:
   : Serial number
   : Voltage rating
   : Current rating
   : Short circuit rating
   : Resistance terminal to terminal
8. The equipment shall be wrapped and transported in such a way that there is no damage to any part of the equipment.



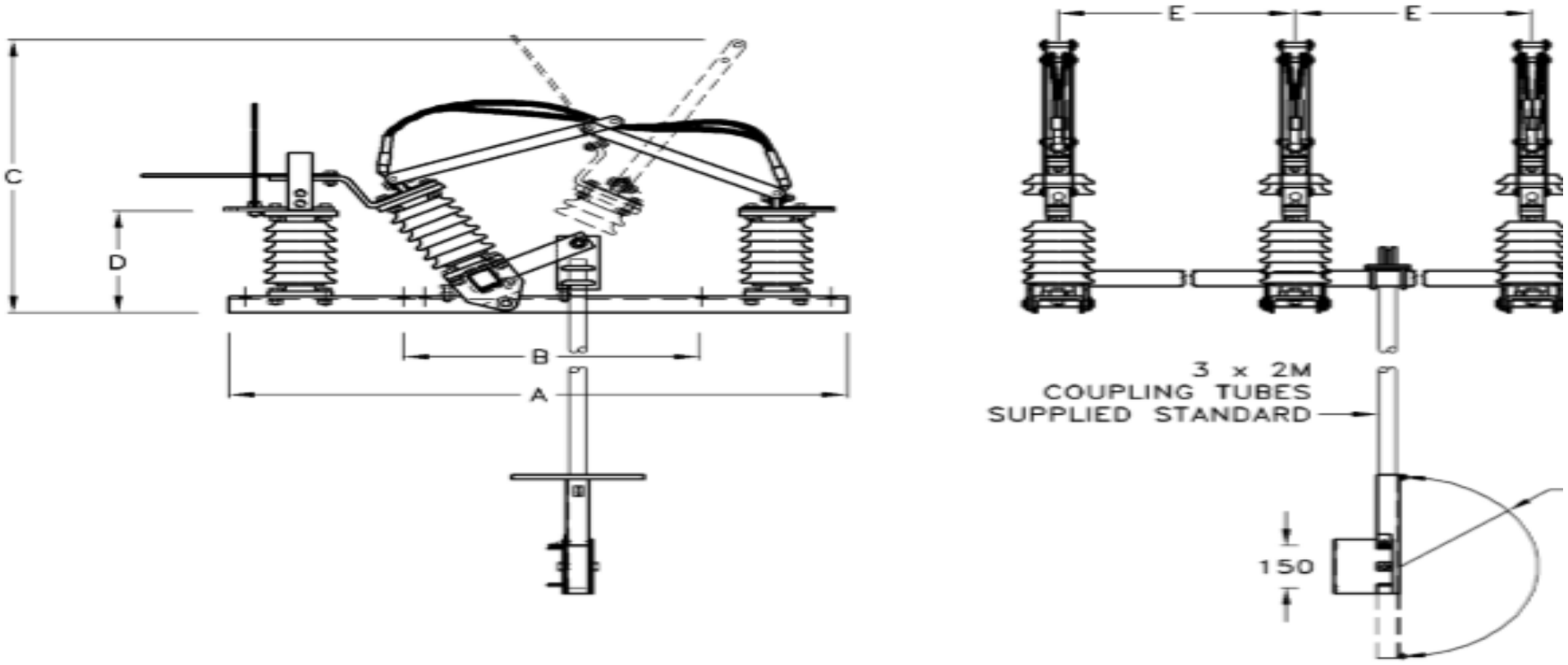
Drawing 2: Single Side Arm Break Disconnector Switches.

The following table is a detailed technical specification for the Single Side Arm Break Disconnector Switch in drawing 2 above.

Identification and parts list			
Drawing Item	**QTY Gp A**	**Description**	**Phasing**
1	3	Single phase assembly	Red, White and Blue
2	6	C4-200 Post Insulators	
3	1	Vertical operating tube and Torque bearing including fixing L-2500 mm Assembly.	
4	1	Horizontal drive tube assembly L-700mm	
5	2	Phase coupling tube L-1000mm	
8	1	Manual operating mechanism, Handle - 550mm	
7	12	Contact supports to insulator fixings M12 x 25 screw and spring washers.	
8	12	Hinge assembly to insulators fixings M12 x 25 screw and spring washers	
9	12	Insulator to bearing fixings M12 x 25 screw and spring washers	
10	6	Channel base to structure fixings M16 x 110 with bolts nut and spring washers	
11	3	Torque Mechanism to structure M12 x 50 with bolts nut and spring washers	
12	2	Torque Bearing to structure fixings M12 x 40 with bolts nut and spring washers	
12	2	Manual torque operating mechanism with provision for fitting lock out locks and installed a 14-pole auxiliary rotor switch (6 N/O contacts, 6 N/C contacts and 2 FL contacts.)	
	1	Small cable support (steel) underneath the operating mechanism 1m long.	

Table 9: Identification and parts list for drawing 2 above.

5.7 B. Specification for 3 Phase, 36kV, outdoor, Rocker Arm Disconnector switch or new technology type of disconnector switches. (Vertical and Horizontal mountable or tender on new technology)**. Still supply prices on the male-, female contacts and stand-off bushings for rocker arm and the new technology switches.**



Three Phase Rocking Isolator Standard Type

Drawing 3: Rocker Arm Disconnector Switch

B Rocker Arm Disconnector Switches details.

Rated Voltage kV	Rated Current Amps	Tests withstand voltage				Short circuit current kA	Peak current withstand, current kA	Creepage distance mm	Dimensions as per drawing above				
		To earth and between poles		Across the isolating distance									
		B.I.L impulse voltage withstand	Power frequency (wet)	B.I.L impulse voltage withstand	Power frequency (Dry)				A	B	C	D	E
11kV	800	28	37	95	110	17.5	47	340	950	425	670	267	600
36kV	1600	70	200	95	230	17.5	47	820	1170	458	985	368	1200

Table 10: B Rocker Arm Disconnector Switches identification parts for drawing 3 above.

5.8 Specification for outdoor 36kV Lightning Arrestors

The lightning arrestors must comply with the following technical specifications:

5.8.1 **36kV stationary (Porcelain/ Polymeric)** Type of lightning arrestors

Rated	36kV
Class	10kA
Frequency	50Hz
MCOV	29.0kV

Table 11: 36kV stationary (Porcelain) Type of lightning arrestors

5.8.2 **36kV Stationary (Silicone / Polymeric) Type of lightning arrestors**

YH 10 W	36/108
Rated	36kV
MCOV	29.0kV
Frequency	50Hz

Table 12: 36kV stationary (Silicone/Polymeric) Type of lightning arrestors.

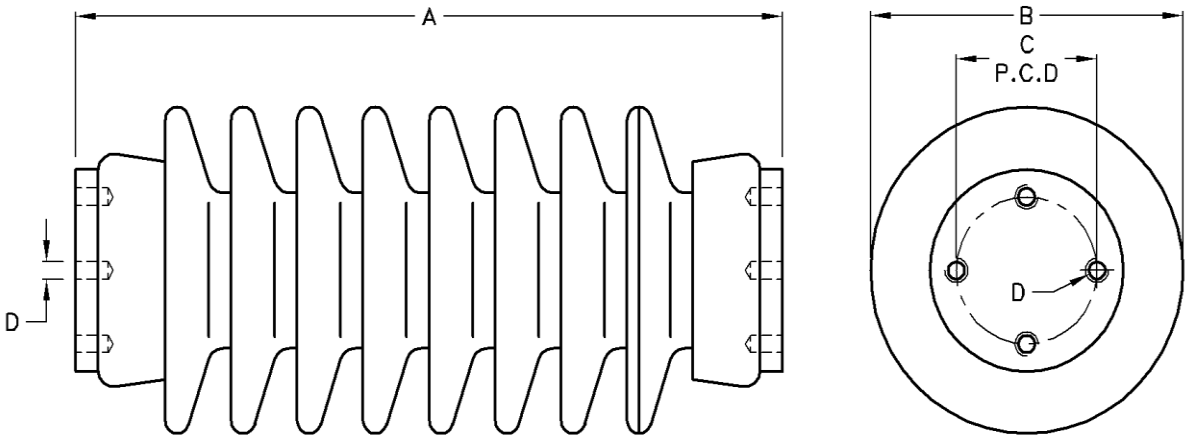
5.9 Specifications for outdoor 36 kV Stand-off Bushings:

Supply the following stand-off stationary post porcelain insulator 36kV to 132kV - 4kN: (type; C4-150/BME568-01/22kV, C4-200/BME814/33kV, C4-550/BME318-10/132kV)

A Length	B width	C Width of holes	D Size of holes	Creepage (mm)	Power frequency flashover voltage		Critical Impulse flashover voltage		B.I.L kV
					Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)	
355	18/4	76	M12	680	98	81	190	304	181
475	194	76	M12	1100	170	129	254	375	239
1220	218	127	M16	3050	369	331	667	828	634

Table 13: stand-off stationary post porcelain insulator 36kV to 132kV - 4kN:

Note: The holes must be plugged so that dirt does not enter before the bushings are installed.



Drawing 4: Standoff bushing

5.10 Outdoor pole mounted 36kV outdoor disconnector switch (LINK)

Specification for outdoor pole mounted 36kV, single phase, disconnector link switches, set of three, complete with mounting brackets: 36kV rated, 630 Amp, BIL 150kV, GW9 (or equivalent) type of outdoor disconnector switch (LINK) single phase, 50Hz and no-load break.

The link must be able to be operated with a link stick. The gap when open must be bigger than 530mm.

The voltage and amps must be clearly punched onto the link label plate. The switch (Link) must be quality constructed to ensure stable, high current capability, and with good mechanical integrity in the harshest environments. (Porcelain or Silicone / Polymeric).

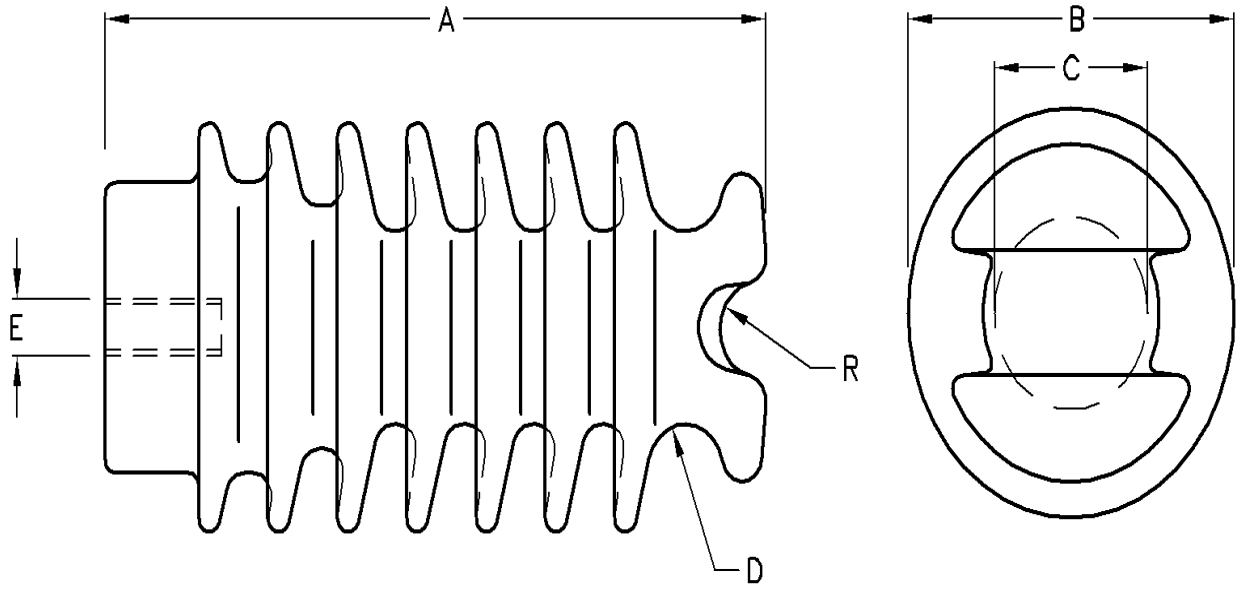
5.11 Specification for line post porcelain 36kV pin insulators complete.

36kV Pin Insulators, supplied with pin.

A Length	B Width	C Core width	D Skirt size	E Spindle size	R Tie top grove	Creepage (mm)	Power frequency flashover voltage		Critical Impulse flashover voltage		B.I.L kV
							Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)	
430	189	73	25	M20	25	1100	150	125	255	340	170

Table: 14: 36kV pin insulators complete

Note: 33kV Insulators must be supplied with spindles, two nuts, flat and spring washers. Length of spindle must be 300mm. (50mm thread into bushing (E) and 150mm tread at the end for nuts and washers)



Drawing 5: Line Post Insulator

5.12 Specification for outdoor pole mounted 36kV Drop out fuses complete with brackets.

Supply the following 36kV Drop out fuses:

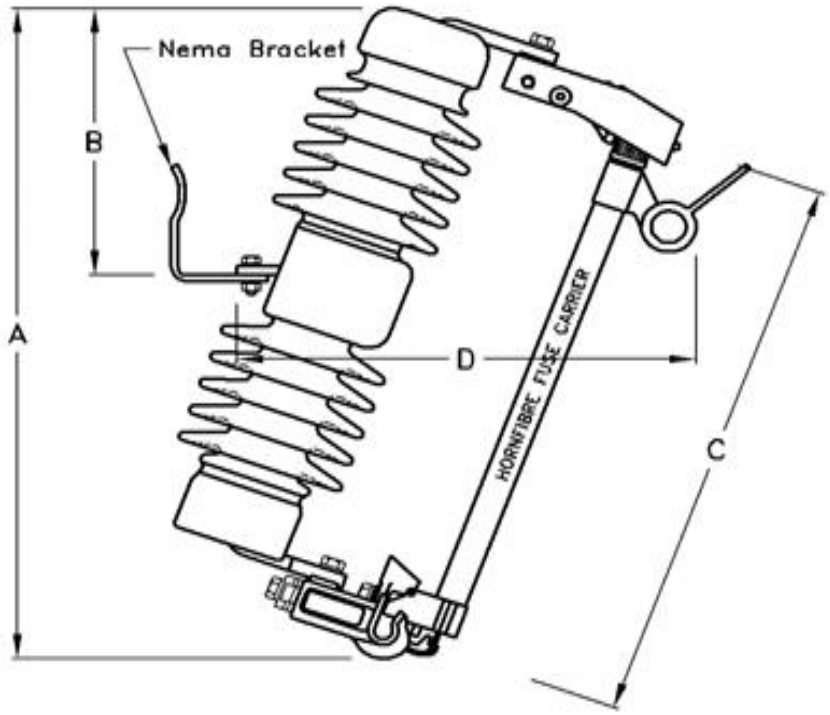
(All the fuse units must be supplied with Nema Brackets)

Rated current	Creepage (mm)	Nema Bracket	100A fuse carrier	200A solid brass link	A Length of assembly	B Nema bracket from top	C Length of fuse carrier	D Width of assembly
100	650	YES	YES	NO	616	245	526	420
200	650	YES	NO	YES	616	245	526	420
100	650	YES	NO	YES	616	245	526	420
200	650	YES	YES	NO	616	245	526	420

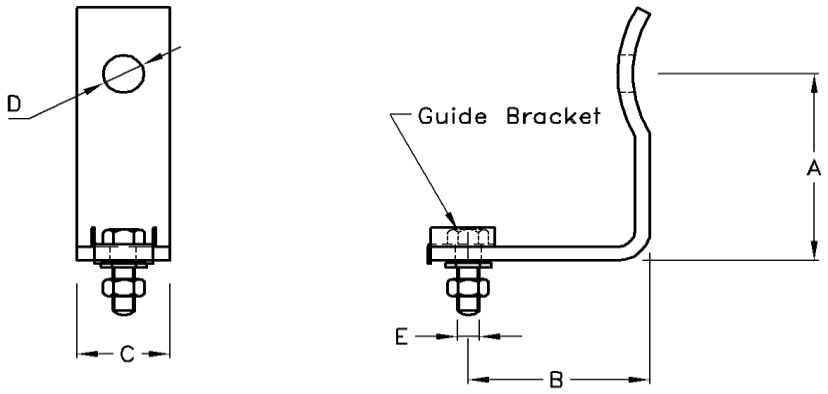
Table 16: 36kV Drop out fuses.

Note:

1. Material: Insulator porcelain (Silicone / Polymeric)
   : Contacts brass
   : Fuse tube horn-fiber
2. The Nema Bracket must be steel x-arm.



Drawing 6: Fuse assembly



Drawing 7: Nema Bracket and Fuse Assembly

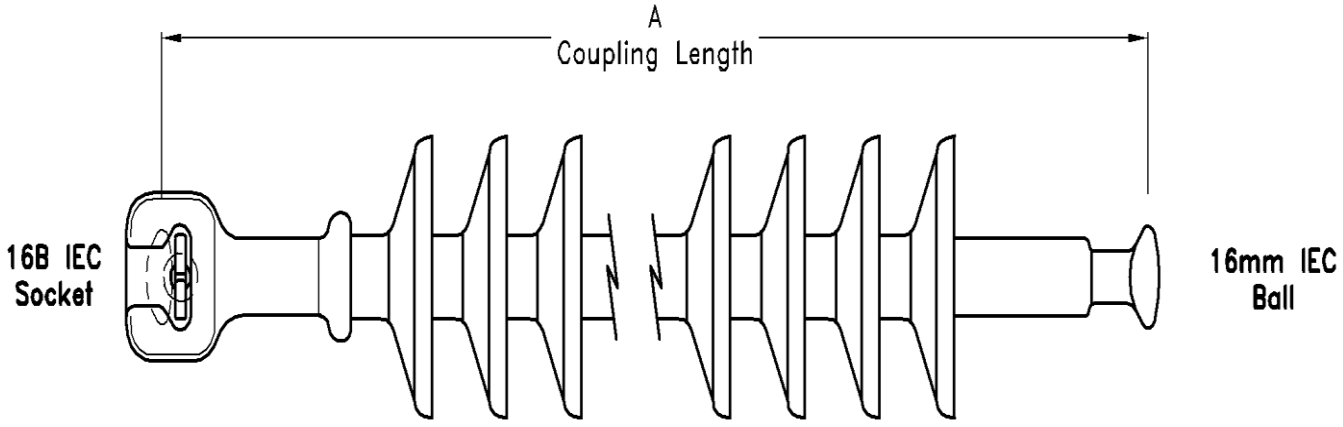
5.13 Specification for outdoor pole mounted 36/132 kV long rod strain insulators complete with brackets. (Composite suspension strain / insulator with Socket/ball.)

Volt kV	A	Number of sheds	Dry arc distance mm	Creepage distance mm	Power frequency flashover voltage		Critical impulse flashover voltage		B.I.L
					Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)	
33	572	12	452	1127	181	151	333	319	282
132	1740	35 / 4	1560	4510	604	582	988	993	894

Table 17: Long rod strain insulators complete

Notes:

1. 33kV, 70kN
2. 132kV,120kN, 20 mm ball



Drawing 8: Long Rod

5.14 Specification for bolted clamps.

Supply the following clamps as specified below:

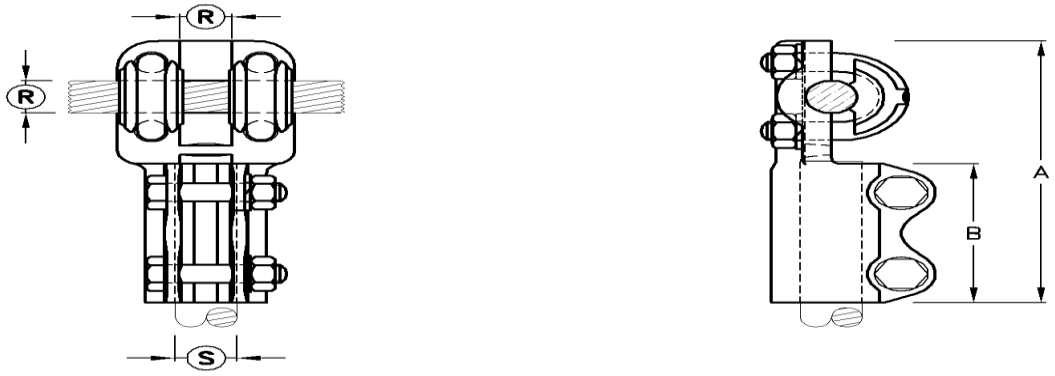
5.14.1 **Horizontal to vertical stud clamp for stranded to solid Conductor:**

Conductor (R)		**Stud (S)**		**A** **Length of Stranded clamp**	**B** **Length of solid clamp**	**Ampere rating**
MIN	MAX	MIN	MAX			
12	19	20	26	150	70	900
22	28	18	22	162	74	750
22	28	26	26	162	74	900
12	19	28	33	150	76	950
22	28	38	38	175	85	1350

Table: 17: Horizontal to vertical stud clamp for stranded to solid Conductor

Note:

1. Conductor surface areas must be cast to suit conductor sizes.
2. The busbar and stud surface areas must be smooth bore.
3. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
   : U-Bolts & Nuts steel H.D.G.
4. Voltage: 150 kV Max



Drawing 9: Horizontal to vertical stud clamp for stranded to solid Conductor.

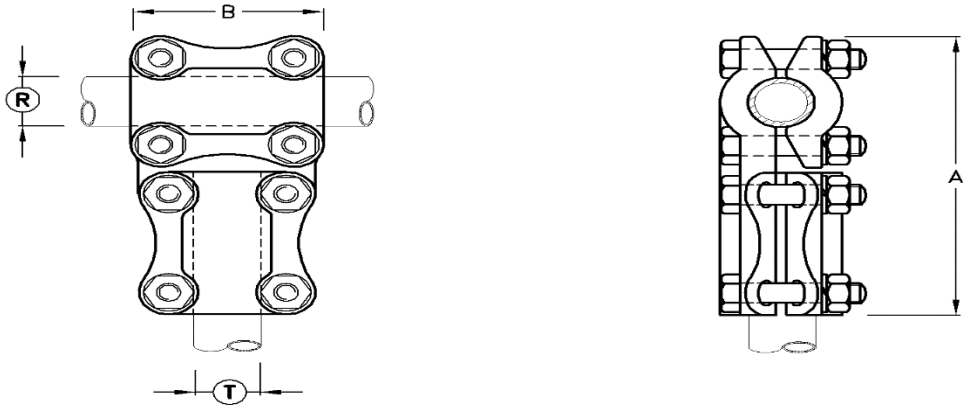
5.14.2 **Tee-clamp for tubular busbar**

Busbar (R)	**Busbar (T)**	**A** **Length of Stranded clamp**	**B** **Length of solid clamp**	**Ampere rating**
25	25	165	67	900
38	38	185	97	1300
50	20	185	102	1750
50	50	156	100	1750

Table 18: Tee-clamp for tubular busbar

Note:

1. The busbar and stud surface areas must be smooth bore.
2. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
3. Voltage: 150 kV Max



Drawing 10: Tee-clamp for tubular busbar

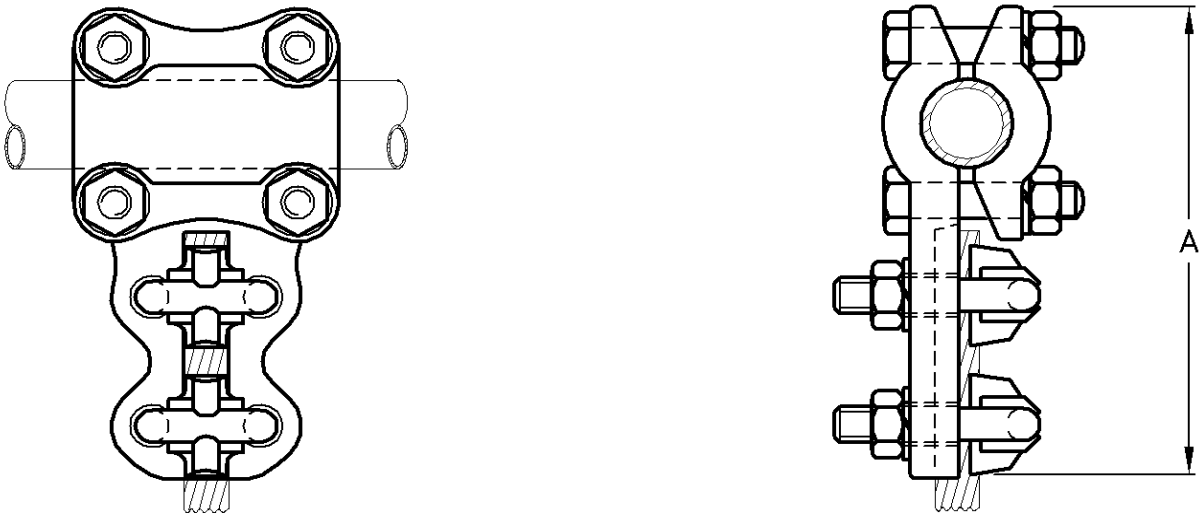
1.2.1 **Horizontal to vertical clamp for busbar to stranded conductor:**

Busbar (R)	**Conductor (T)**		**A**	**B**	**Ampere**
	MIN	MAX	**Length of Stranded clamp**	**Length of solid clamp**	**rating**
25	12	19	105	62	600
38	12	19	125	70	1300
38	24	32	135	70	1300
50	12	16	160	75	1750
50	38	38	160	75	1750

Table 19: Horizontal to vertical clamp for busbar to stranded conductor

Note:

1. Conductor surface areas must be cast to suit conductor sizes.
2. Busbar contact areas must be smooth bore.
3. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
   : U-Bolts & Nuts steel H.D.G.
4. Voltage: 150 kV Max



Drawing 11: Horizontal to vertical clamp for busbar to stranded conductor.

1.2.2 **Horizontal to vertical Terminal clamp for stranded conductor:**

Conductor (R)		**Conductor (T)**		**A Length of Stranded clamp**	**B Width of clamp**	**Ampere rating**
MIN	MAX	MIN	MAX			
12	19	6	11	130	70	750
12	19	12	19	120	60	750
22	28	12	19	150	75	1100
22	28	22	28	150	75	1100
12	19	22	28	150	75	1100

Table 20: Horizontal to vertical Terminal clamp for stranded conductor

Note:

1. Conductor contact surfaces must be cast to suit the conductors.
2. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
   : U-Bolts & Nuts steel H.D.G.
3. Voltage: 150 kV Max

Drawing 12: Horizontal to vertical Terminal clamp for stranded conductor

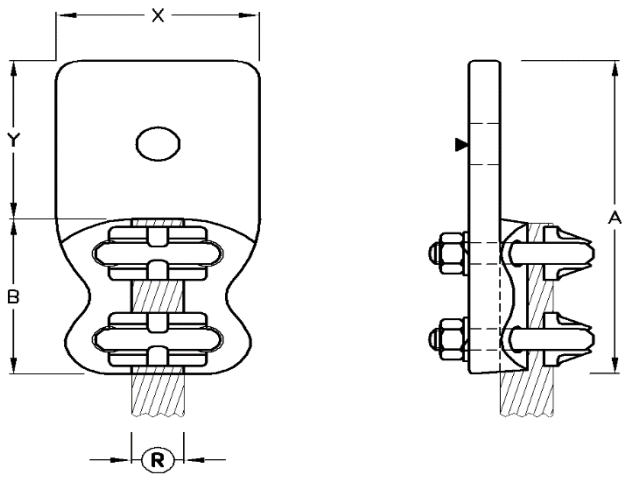
1.2.3 **Lug stranded conductor: (in-line)**

Conductor (R)		**Palm Size**		**A**	**B**	**Ampere**
MIN	MAX	Width X	Length Y	**Length of clamp**	**Length of Stranded clamp**	**rating**
8	13	50	75	90	65	450
12	19	75	85	90	70	750
22	28	75	85	95	75	1100
30	38	75	85	95	80	1350

Table 21: Lug stranded conductor

Note:

1. In-line clamps
2. Conductor surface areas must be cast to suit conductor sizes.
3. Palms must be undrilled.
4. Material: GM3, Hot tin Dipped
   : U-bolts & Nuts steel H.D.G.
5. Voltage: 150 kV Max



IN LINE

Drawing 13: Terminal lug stranded conductor: (in-line)

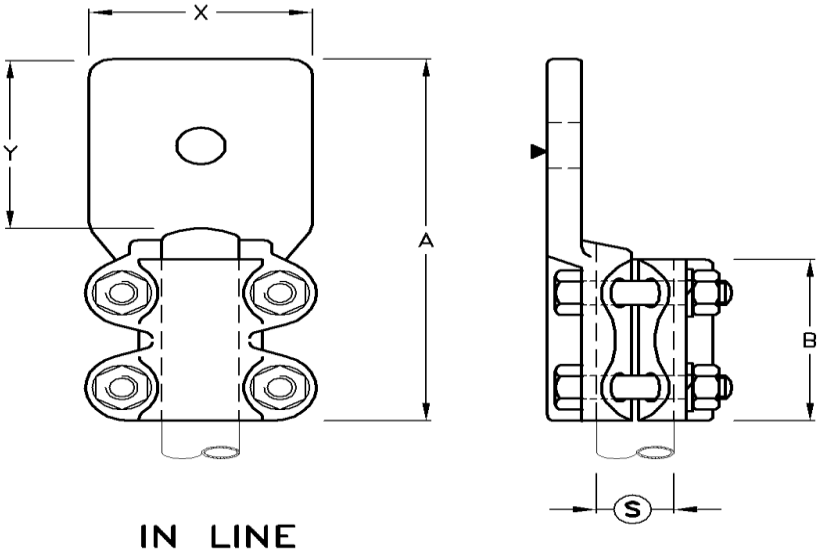
1.2.4 **Terminal lug for tubular busbar: (in-line**)

Busbar (S)	**Palm Size**		**A**	**B**	**Ampere**
	Width X	Length Y	**Length of clamp**	**Length of busbar clamp**	**rating**
20	50	85	90	60	700
25	75	85	90	60	900
32	75	85	90	60	1000
38	100	105	90	85	1300
38	75	85	90	85	1300
50	100	110	90	93	1750
64	100	110	125	95	2150

Table 22: Terminal lug for tubular busbar: (in-line)

Note:

1. In-line clamps
2. Clamps must be machined to busbars sizes.
3. Palms must be undrilled.
4. Material: GM3, Hot tin Dipped
5. Voltage: 150 kV Max



Drawing 14: Terminal lug for tubular busbar: (in-line)

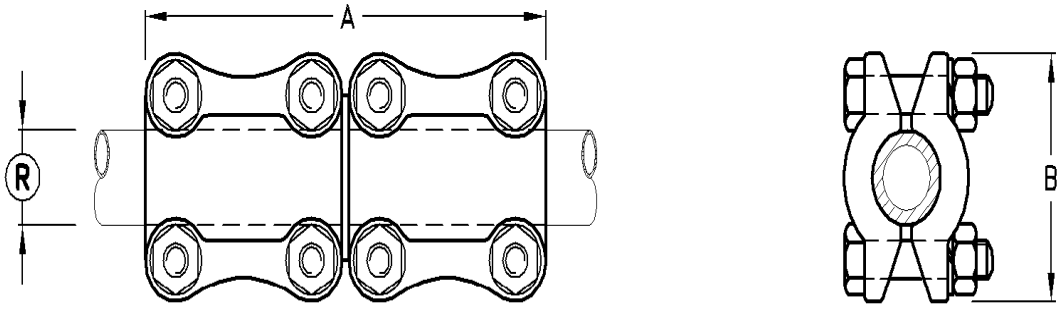
1.2.5 **In-line coupler clamp for tubular busbar:**

Busbar tube diameter	A Length of clamp	B Width of busbar clamp	Ampere rating
25	135	64	900
38	175	85	1300
50	195	95	1750
76	260	127	2500

Table 23: In-line coupler clamp for tubular busbar

Note:

1. In-line clamps
2. Clamps must be machined to busbars sizes.
3. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
4. Voltage: 150 kV Max



Drawing 15: In-line coupler clamp for tubular busbar

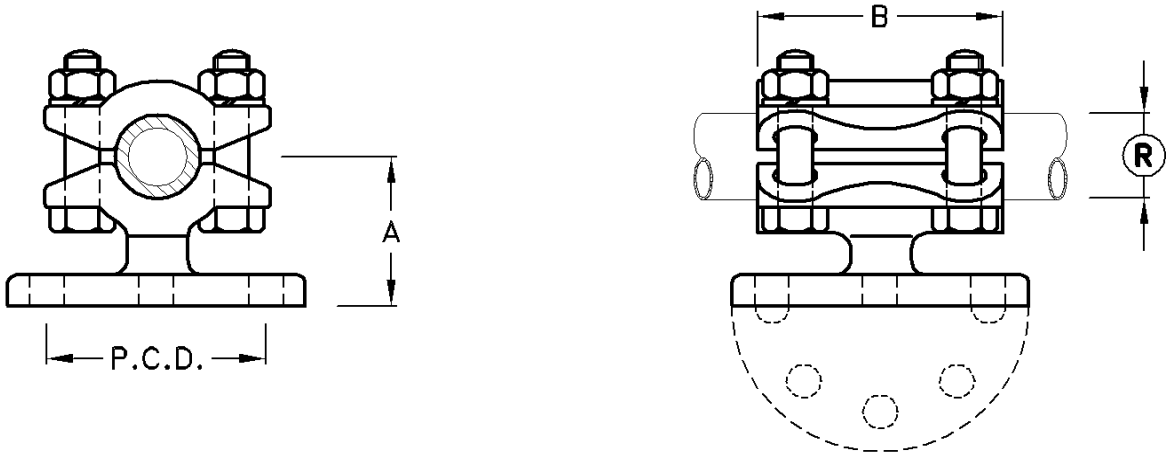
1.2.6 **Fix support clamp for tubular busbar:**

Busbar tube diameter	**A** **Height of clamp**	**B** **Width of busbar clamp**	**P.C.D.** **Base center**
25	50	64	76
38	50	64	76
50	50	64	76
76	50	76	76

Table 23: Fix support clamp for tubular busbar

Note:

1. Busbar contact areas must be smooth bore.
2. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
3. Voltage: 150 kV Max



Drawing 16: Fix support clamp for tubular busbar

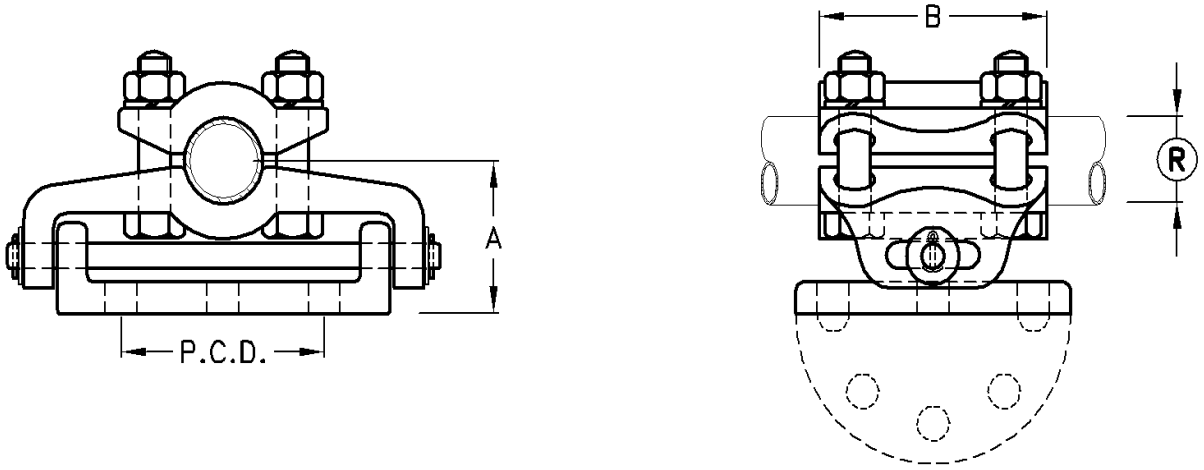
1.2.7 **Slider support clamp for tubular busbar:**

Busbar tube diameter	**A** **Height of clamp**	**B** **Width of busbar clamp**	**P.C.D.** **Base center**
38	75	64	76
50	75	64	76
76	75	76	76
76	75	76	76

Table 25: Slider support clamp for tubular busbar

Note:

1. Busbar contact areas must be smooth bore.
2. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
3. Voltage: 150 kV Max



Drawing 17: Slider support clamp for tubular busbar

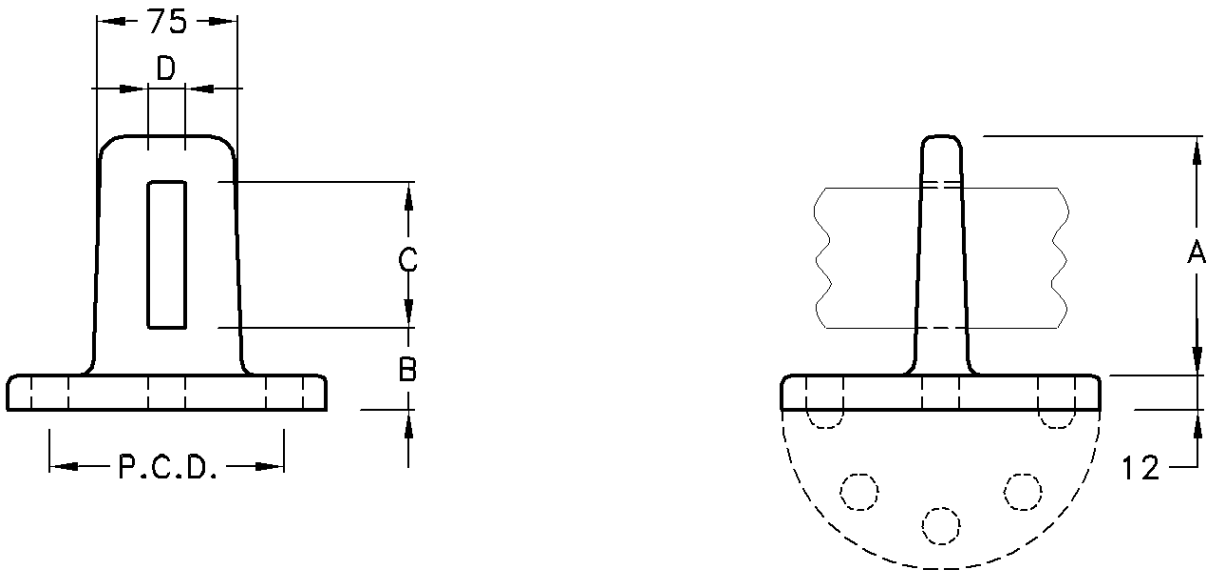
1.2.8 SCC-type slider clamp for busbar support:

A Height of slider	B Height from bottom of busbar	C Busbar size	D Busbar thickness	P.C.D.
150	40	100	12	76
200	40	150	15	76
250	40	200	15	76
250	50	100	12	127
300	50	150	12	127
350	50	200	12	127

Table 26: SCC-type slider clamp for busbar support

Note:

1. Busbar sizes to dimensions specified.
2. Material: GM3, Hot tin Dipped
   : Bolts & Nuts HT.8.8 H.D.G.
3. Voltage: 150 kV Max



Drawing 18: SCC-type slider clamp for busbar support

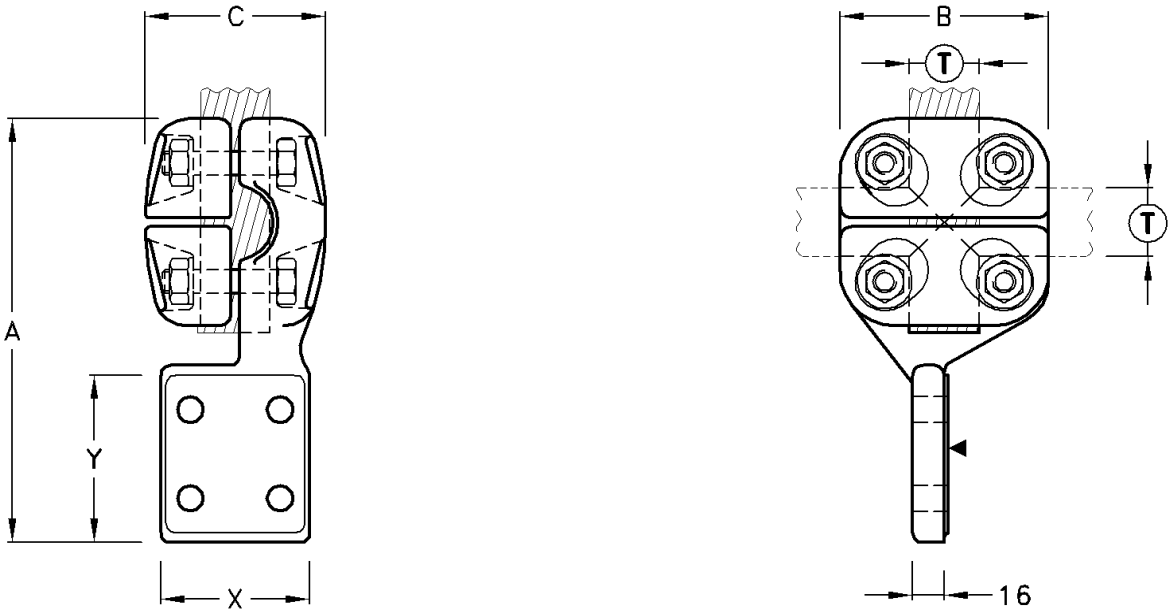
1.2.9 **STP- Type Palm Clamp (in line)**

Conductor size	**Palm Size (mm)**		**Max Amp Rating**	**A Length of clamp**	**B Length of Stranded clamp**	**C Width of clamp**	**D**
	Width X	Length Y					
Ø26mm	80	90	900A	208	95	82	12
Ø38mm	80	90	1350	215	105	88	15

Table 27: STP- Type Palm Clamp (in line)

Note:

1. Conductor surface area must be serrated.
2. Palm contact area must be machine serrated.
3. Palms must be supplied undrilled.
4. Material: Cast Aluminium
   : Bolts & Nuts – Steel HT8.8 H.D.G.
5. Voltage 500kV max



Drawing 19: STP- Type Palm Clamp (in line)

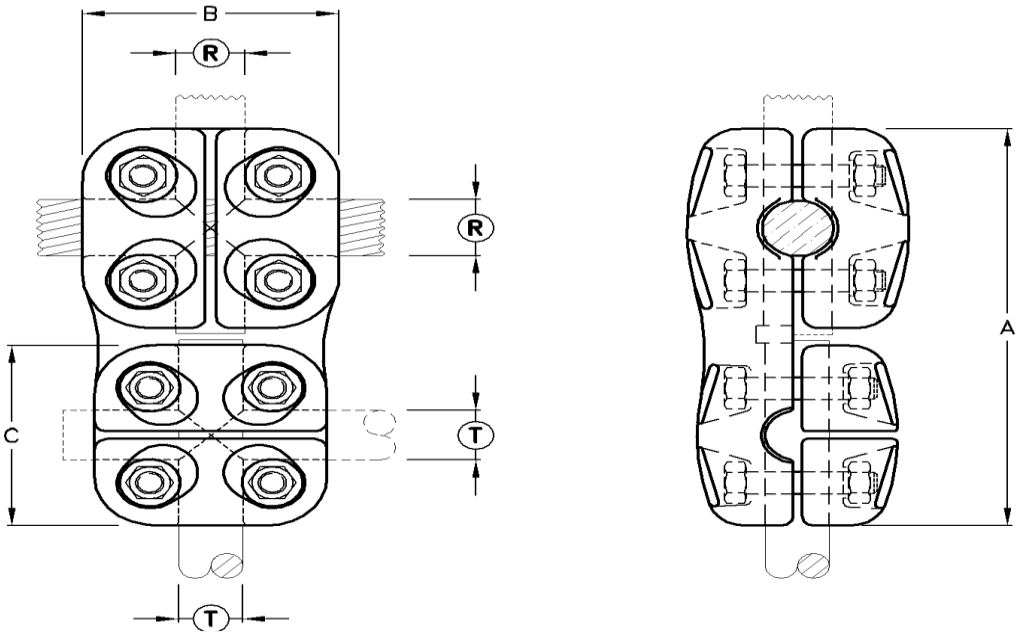
1.2.10 **K - Type Cross Clamp For stud to stranded Conductor:(mm)**

Conductor (R)	**Stud (T)**	**Max. Amp rating**	**A**	**B**	**C**
16.3	26	500	173	95	70
26.5	38	900	209	105	95
19	38	600	182	105	70
16	26	600	173	95	70
21	26	650	198	95	95
26.5	26	900	198	95	95

Table 28: K - Type Cross Clamp For stud to stranded Conductor.

Note:

1. Conductor contact surface areas must be serrated.
2. Stud contact surface areas must be smooth bored.
3. Material: Cast Aluminium
   : Bolts & Nuts – Steel HT .8.8 H.D.G.
4. Voltage 500kV Max



Drawing 20: K - Type Cross Clamp For stud to stranded Conductor.

1.2.11 SPC – Type Palm Clamp to Stranded Conductor (Crimping)

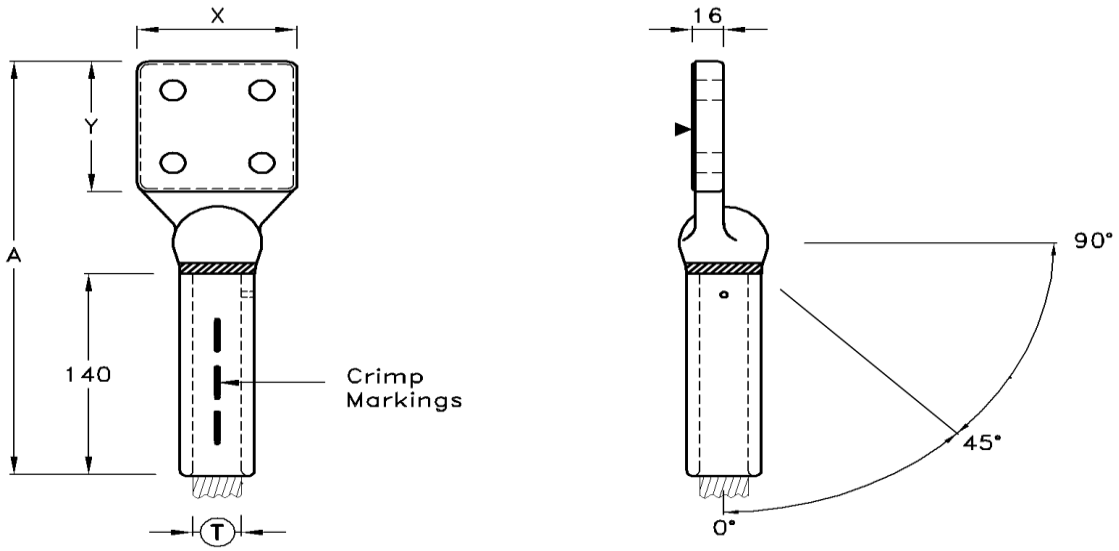
A (mm)	Palm Size (mm)		M10 Hole Centers (mm)	Conductor size (mm)	Max Amp Rating	T / O Angle	A/F
	Width X (mm)	Length Y (mm)					
250	80	90	50 X 50	8.380 Fox	400	45˚	13.5
250	80	90	50 X 50	8.380 Fox	400	0˚	13.5
250	80	90	50 X 50	14.16 Hare	400	45˚	25.4
250	80	90	50 X 50	14.16 Hare	400	0˚	25.4
250	80	90	50 X 50	18.13 Wolf	600	45˚	28.8
250	80	90	50 X 50	18.13 Wolf	600	0˚	28.8
250	80	90	50 X 50	18.87 Chickadee	600	45˚	28.2
250	80	90	50 X 50	18.87 Chickadee	600	0˚	28.2
250	80	90	50 X 50	26.49 Centipede	900	45˚	36.2
250	80	90	50 X 50	26.49 Centipede	900	0˚	36.2
250	80	90	50 X 50	38.30 Bull	1200	45˚	49.7
250	80	90	50 X 50	38.30 Bull	1200	0˚	49.7

Table 29: SPC – Type Palm Clamp to Stranded Conductor (Crimping)

Note:

1. Conductor contact surface areas must be serrated.
2. Palm contact surface areas must be machined serrated.
3. Palms holes must be drilled M10 holes.
4. Material: Cast Aluminium
   : Bolts & Nuts – M10

5. Compression tube must be marked showing the crimping positions and die sizes.
6. Voltage 300kV Max

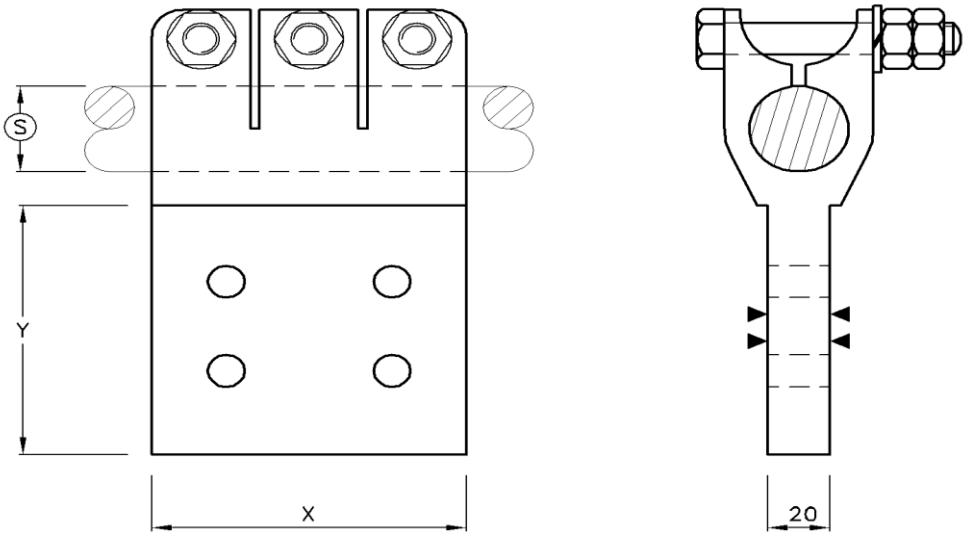


Drawing 21: SPC – Type Palm Clamp to Stranded Conductor (Crimping)

1.2.12 **Transformer Palm Terminal:**

Stud Size	**Palm Size**		**Hole sizes**
	X - Width of palm	**Y**- Length of palm	
Ø 13 to 38mm	100	85	4 X M10
Ø 38 to 60mm	100	85 to 120	4 X M12

Table 30: Transformer Palm Terminal



Drawing 22: Transformer Palm Terminal

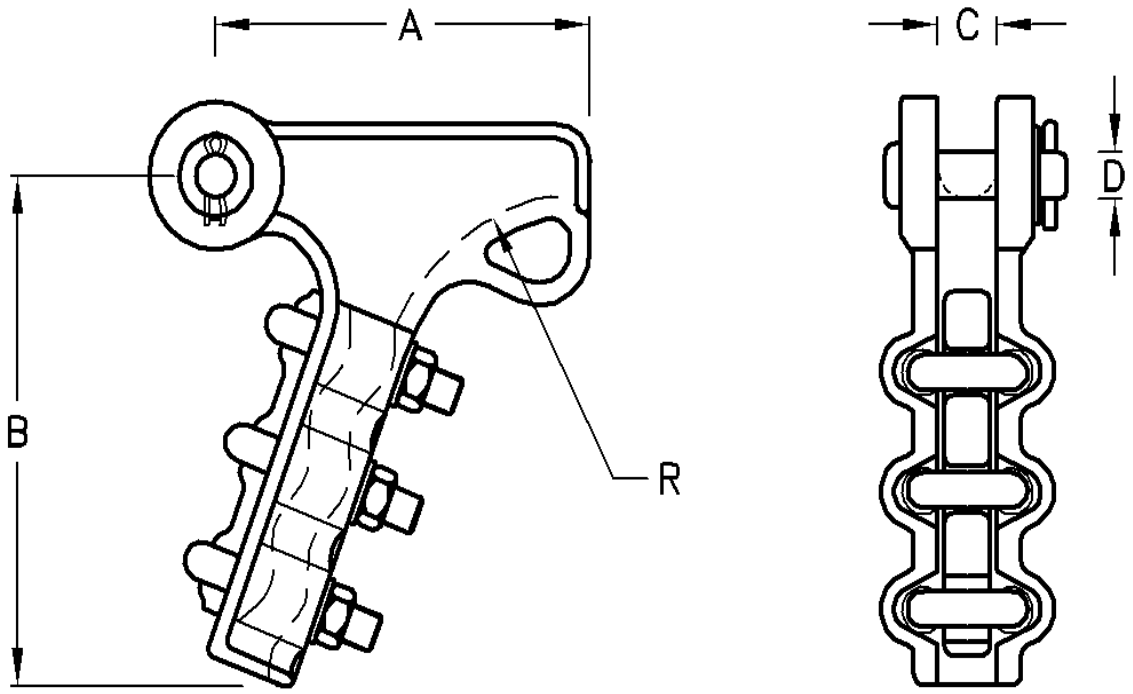
1.2.13 **Strain Clamp aluminium, 70kN, 3 – bolt, Pistol Type:**

Conductor min. - max.	A	B	C	D	R	Number of U-bolts	U.T.S (kN)
5 - 16	126	118	19	16	63	3 – M12	70
5 - 21	140	150	22	16	70	3 – M12	70
10 - 24	180	150	25	16	70	3 – M12	70
18 - 38	200	180	27	16	77	3 – M12	70

Table 31: Strain Clamp aluminium, 70kN, 3 – bolt, Pistol Type

Note:

1. Material: Cast aluminium
   : U-Bolts & Nuts M steel H.D.G.
   : Clevis Pin D.F. Steel H.D.G.



Drawing 23: Strain Clamp aluminium, 70kN, 3 – bolt, Pistol Type

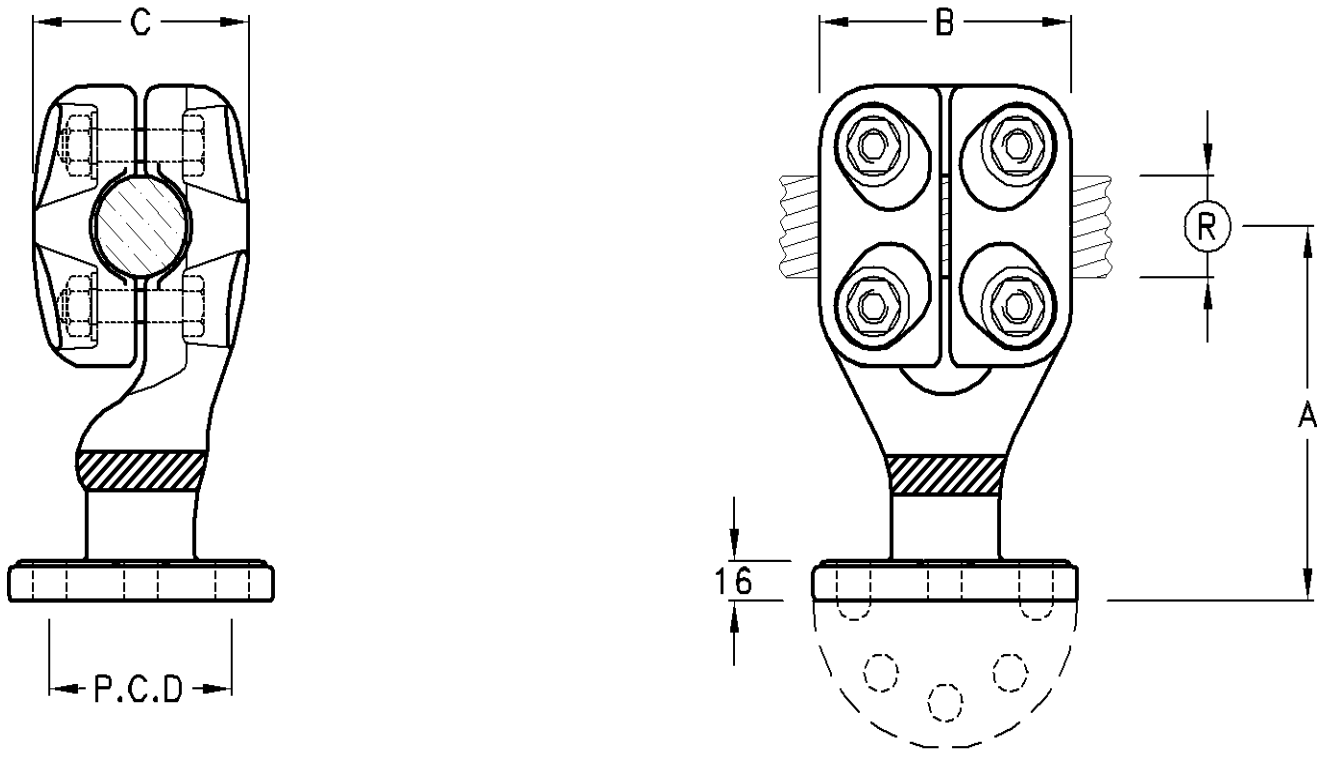
1.2.14 **KCP-type pedestal support:**

Conductor R	P.C.D.	A	B	C	Max. Rating Amps
14.5	76	130	95	82	600
14.5	127	130	95	82	600
26.5	76	130	95	82	900
26.5	127	130	95	82	900
38.3	76	140	105	90	1350
38.3	127	140	105	90	1350

Table 32: KCP-type pedestal support

Note:

1. Conductor surface areas must be serrated
2. Clamps must be supplied with: 14 Holes at 76 P.C.D.
   : 18 Holes at 127 P.C.D.



Drawing 24: KCP-type pedestal support

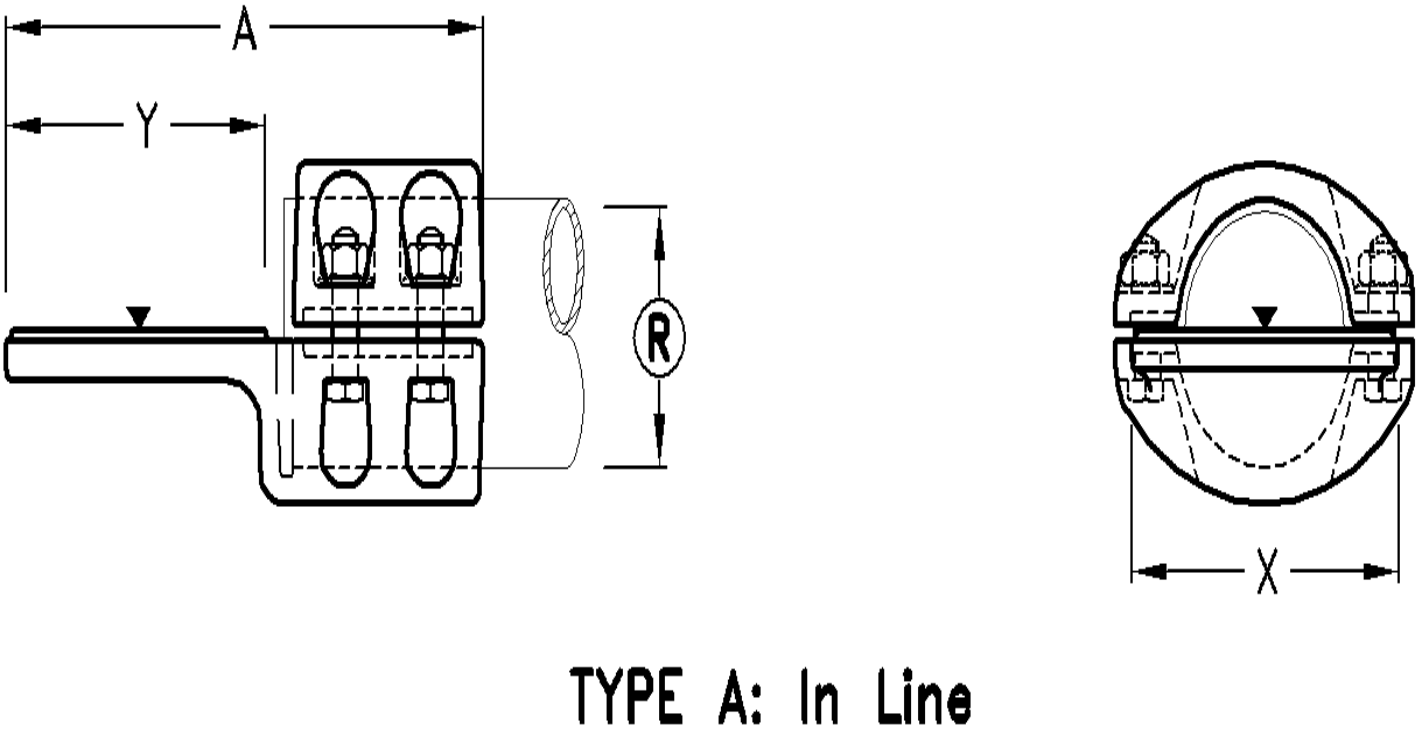
1.2.15 **TBP Type Palm Terminal clamp**

Tube Dia.	Palm sizes		A	Max. rating Amps
	X	Y		
80	125	125	225	2300
100	125	125	225	2800
120	125	125	230	3300

Table 33: TBP Type Palm Terminal clamp

Notes:

1. Palm and busbar contact areas must be serrated
2. Material: Cast aluminium
   : Bolts & nuts steel HT8.8 H.D.G
3. Voltage 500kV Max



Drawing 25: TBP Type Palm Terminal clamp.

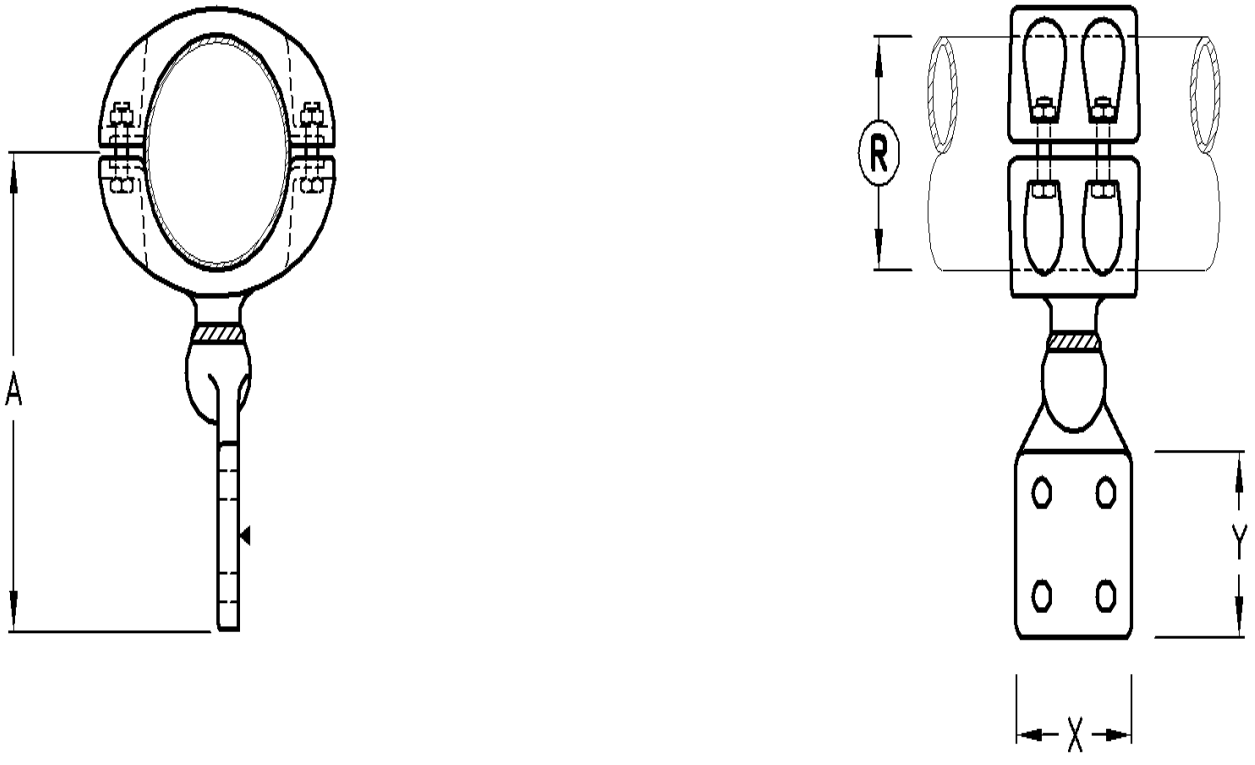
1.2.16 **TBPT – Type Palm Tap-off Clamp**

Tube Dia.	Palm sizes		A	Max. rating Amps
	X	Y		
80	80	90	210	1350
100	80	90	225	1350
120	80	90	235	1350

Table 34: TBPT – Type Palm Tap-off Clamp

Note:

1. Palm and busbar contact areas must be serrated.
2. Material: Cast aluminium
   : Bolts & nuts steel HT8.8 H.D.G
3. Supplied undrilled.
4. Voltage 500kV Max



Drawing 26: TBPT – Type Palm Tap-off Clamp.

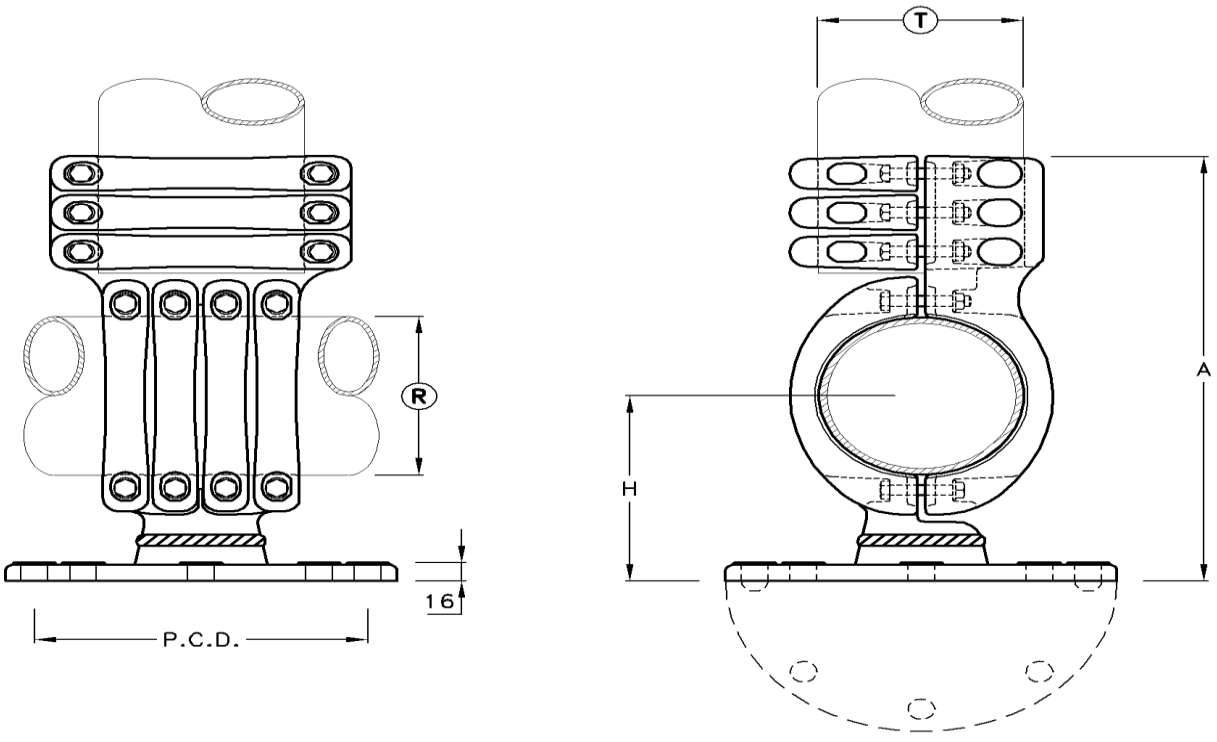
1.2.17 TBFCTS – Type Fixed Coupler Tee Support Clamp:

Tube Dia.		P.C.D.	A	H	Max. Rating Amps
R	T				
80	80	76	305	160	2300
100	100	76	330	160	2800
120	80	127	405	194	2300
120	120	127	405	194	3300
150	150	127	460	210	4000
160	160	127	460	210	4000
200	200	225	615	200	5200

Table 35: TBFCTS – Type Fixed Coupler Tee Support Clamp

Note:

1. Busbar surfaces must be serrated.
2. Material: Cast aluminium
   : Bolts & nuts steel HT8.8 H.D.G
3. Voltage 500kV Max



Drawing 27: TBFCTS – Type Fixed Coupler Tee Support Clamp.

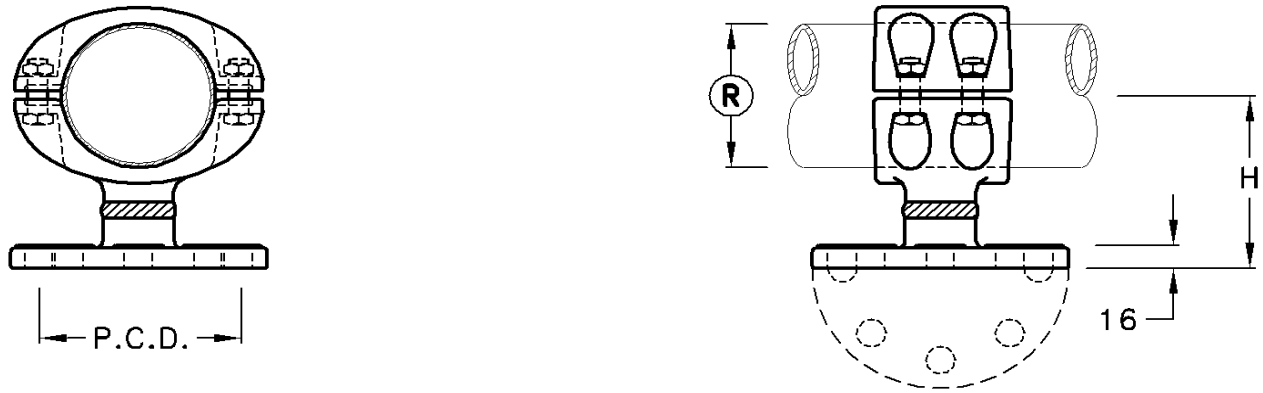
1.2.18 **TBFS – Type Fixed support Clamp.**

Tube Dia. R	P.C.D.	H	Max. Rating Amps
80	76	120	2300
80	127	120	2300
100	76	120	2800
100	127	120	2800
120	76	150	3300
120	127	150	3300

Table 36: TBFS – Type Fixed support Clamp.

Note:

1. Busbar surfaces must be serrated.
2. Material: Cast aluminium
   : Bolts & nuts steel HT8.8 H.D.G
3. Voltage 500kV Max



Drawing 28: TBFS – Type Fixed support Clamp.

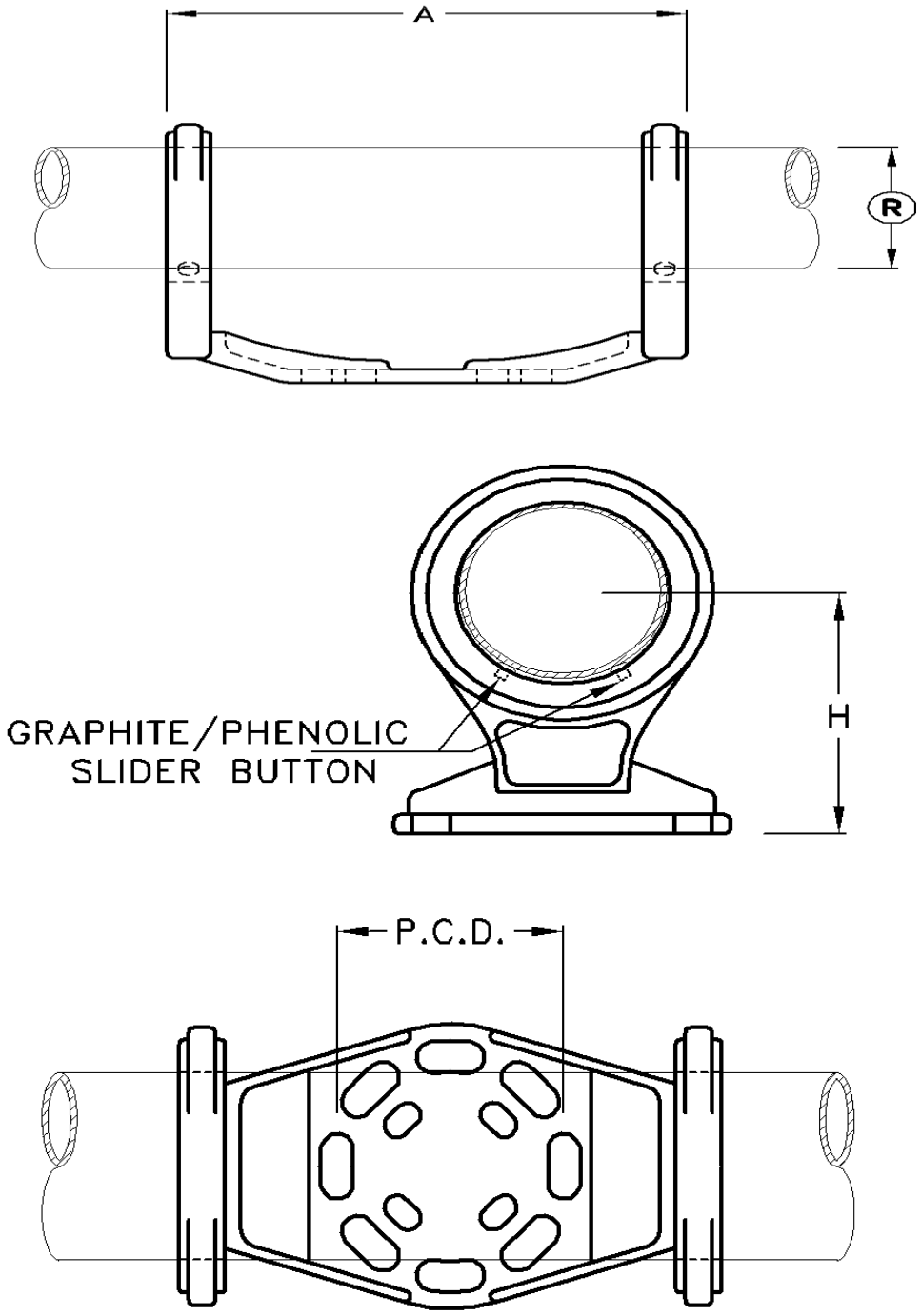
1.2.19 **TBSS – Type Sliding Support Clamp.**

Tube Dia.	P.C.D.	A	H
80	76	290	120
100	76	290	120
120	76	300	150
80	127	290	120
100	127	290	120
120	127	300	150

Table 37: TBSS – Type Sliding Support Clamp

Note:

1. Clamps must be supplied with a suitable base.
2. Clamps must be supplied with four phenolic slider buttons and a stainless-steel potential discharge spring.
3. Material: Cast aluminium
   : Bolts & nuts steel HT8.8 H.D.G
4. Voltage 500kV Max



Drawing 29: TBSS – Type Sliding Support Clamp.

1.2.20 TBFX – Type Full In – Line Expansion Clamp Slide.

Tube Dia. R	P.C.D.	A	B	C	H	Max. Rating. Amps
80	76	280	650	390	120	2300
100	76	280	650	430	120	2800
120	76	280	675	480	150	3300
80	127	280	650	390	120	2300
100	127	280	650	430	120	2800
120	127	280	675	480	150	3300

Table 38: TBFX – Type Full In – Line Expansion Clamp Slide.

Note:

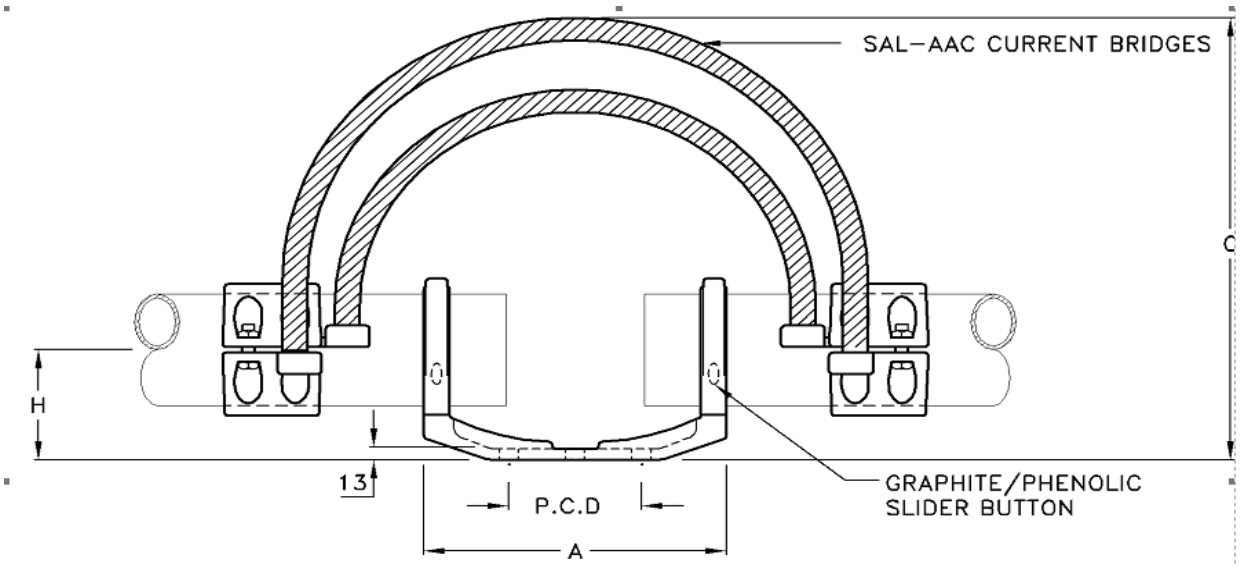
1 The busbar contacts must be serrated.

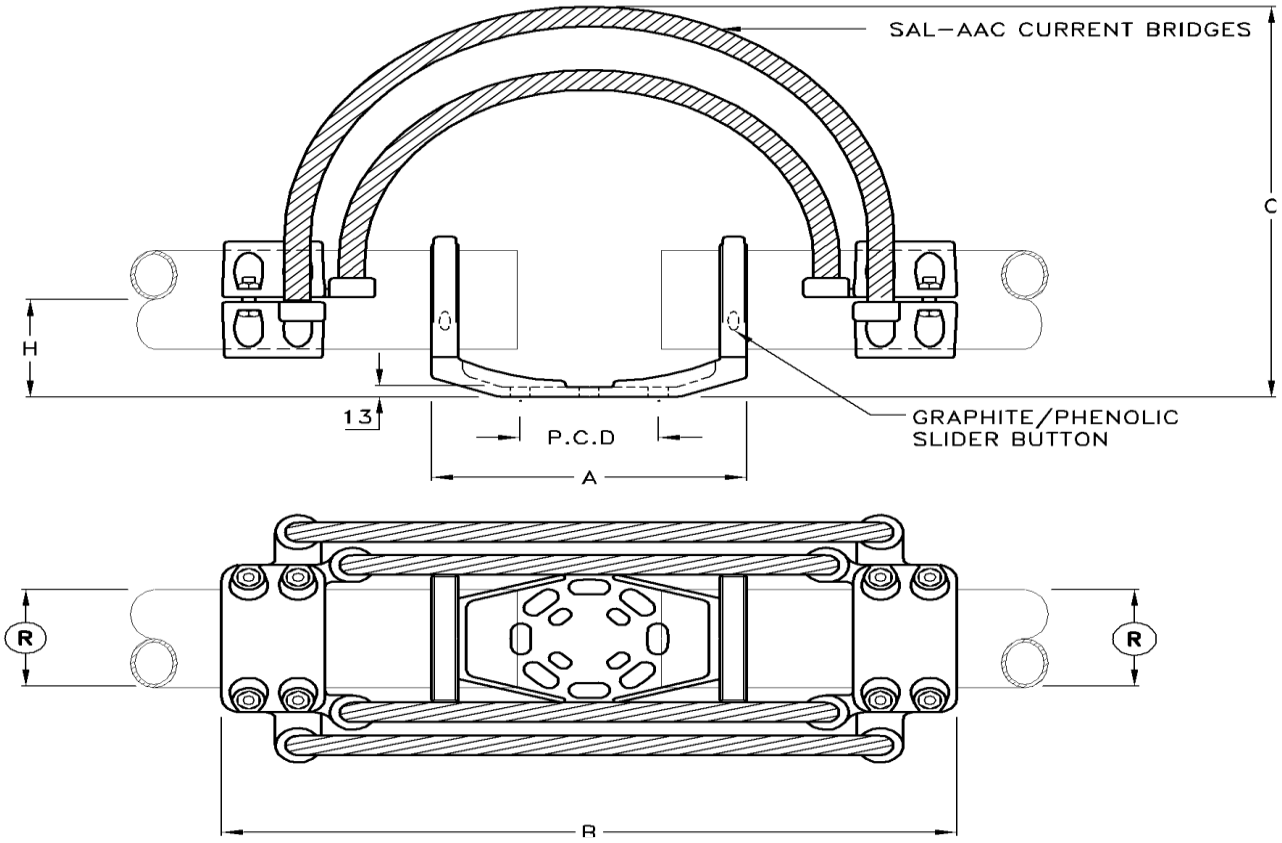
2 Clamps must be supplied with four phenolic slider buttons and a stainless-steel potential discharge spring.

3 Material: Cast aluminium

: Bolts & nuts steel HT8.8 H.D.G

4 Voltage 500kV Max





Drawing 30: TBFX – Type Full In – Line Expansion Clamp Slide.

1.2.21 Compression Dead End for ACSR Conductors

Conductor		A	B	UTS
Name	Dia.			kN
Fox	8.38	415	2 x M12	13.25
Mink	10.98	415	2 x M12	22.07
Hare	14.21	465	2 x M12	37.42
Wolf	18.13	470	2 x M12	67.50
Chickadee	18.87	470	2 x M12	44.68
Bear	23.47	555	2 x M12	111.13
Centipede	26.49	515	3 x M12	67.20
Bull	38.30	565	4 x M12	138.0

Table 39: Compression Dead End for ACSR Conductors

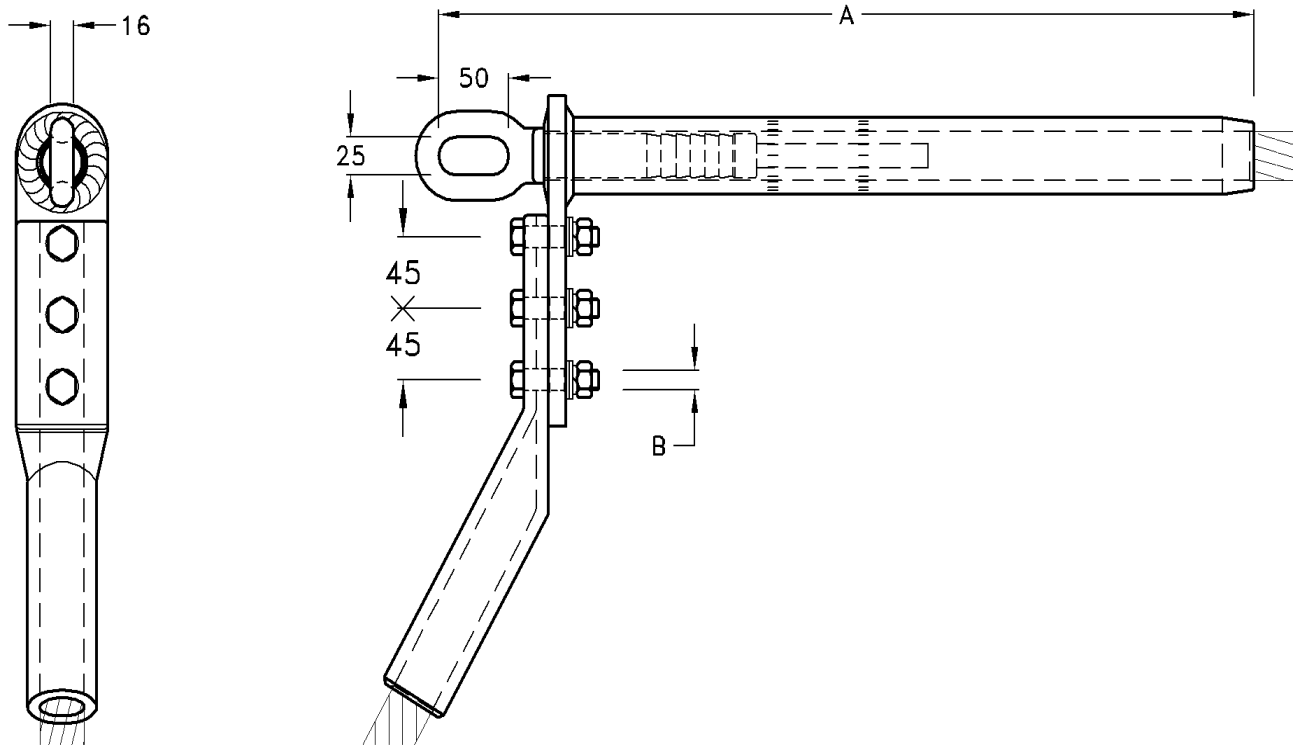
Note:

1 Conductor tubes must be marked showing conductor name and crimping position.

2 Material: Extruded Aluminium

: Eye Bolt – D.F. Steel H.D.G.

: Bolts & Nuts – Steel H.D.G.



Drawing 31: Compression Dead End for ACSR Conductors

1.2.22 **Non-Tension Compression Tap Connector Tee-off:**

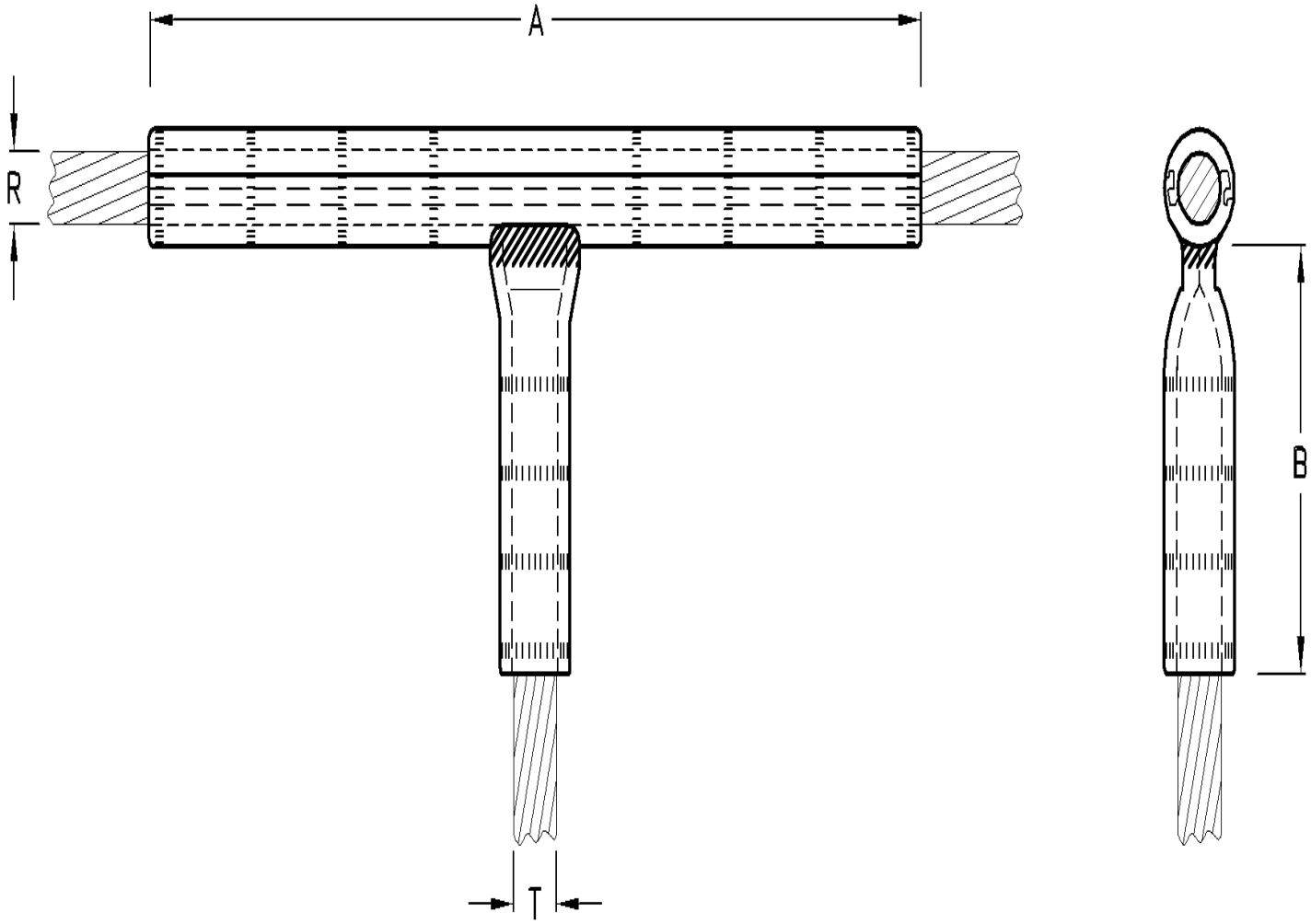
Conductor R		**Conductor T**		A	B
Name	**Name**	**Name**	**Name**		
Fox	8.38	Fox	8.38	300	150
Mink	10.98	Mink	10.98	300	150
Hare	14.21	Hare	14.21	300	150
Wolf	18.13	Wolf	18.13	300	150
Chickadee	18.87	Chickadee	18.87	300	150
Bear	23.47	Bear	23.47	300	150
Centipede	26.49	Centipede	26.49	300	150
Bull	38.30	Bull	38.30	300	150

Table 40: Non-Tension Compression Tap Connector Tee-off.

Note:

1 Conductor tubes must be marked showing conductor name and crimping position.

2 Material: Extruded Aluminium



Drawing 32: Non-Tension Compression Tap Connector Tee-off.

6. Special conditions

6.1 The successful bidder will be expected to enter into a Service Level Agreement with CENTLEC.
6.2 Any amendments to the legal and procedural content of this bid shall be addressed in the SLA entered, into, by CENTLEC and successful bidder(s).
6.3 Factory Acceptance Test for CENTLEC personnel must be arrange at least a week before time so that proper arrangements can be made. Please complete no.9.73, Table 116, in the pricing schedule.
6.4 All the equipment delivered must be accompanied with protection wiring diagrams, panel layout drawings, factory test results, special keys, 200ml touch up paint and maintenance manuals.
6.5 All the current transformer information will be indicated in the panel kiosk easily accessible for data capturing
6.6 All the switchgear must be labeled according to the specification in the middle and on top of the panel kiosk. (M/V 36kV as well as the rated Amps.) The labeling must be UV resistant.
6.7 The services provider will train CENTLEC personnel on all equipment supplied under this contract for the duration of contract. (Cost to the successful bidder).
6.8 The service provider will submit with his tender a full breakdown of the spares list, no.9.72 below in the pricing schedule, that will be applicable to the maintenance of switchgears tendered for.

7. Safety requirements

7.1 All the equipment must be properly wrapped and secure when transported.
7.2 All the Items must be properly labeled with stickers after wrapping, to identify the offloading without unwrapping the plastic wrapping.
7.3 The off-loading of equipment on CENTLEC premises must be done safely.-
7.4 All equipment supplied filled with any chemical substance must be accompanied with the safety data sheet. (Sf6 or Oil)

8. EVALUATION CRITERIA

All proposals submitted will be evaluated in accordance with the criteria set out in the policy of Supply Chain Management of the Entity.

The most suitable candidate will then be selected. Please take note that CENTLEC (SoC) Ltd is not bound to select any of the firms' submitting proposals. CENTLEC (SoC) Ltd furthermore reserves the right to select more than one bidder.

Furthermore, technical competence is the principal selection criteria, CENTLEC (SoC) Ltd will evaluate the technical criteria first and will only look at the price and Specified Goals if it is satisfied with the technical evaluation. As a result of this, CENTLEC (SoC) Ltd does not bind itself in **any *way*** *to* select the firm offering the lowest price.

8.1 The relative specific goal criteria are as follows:

c	Criteria	Description	Points
1.	Track record and experience	Submit a minimum of two (2) reference letters, signed off by an Authorised official to confirm the successful completion of manufacturing, supplying, delivering, installation and commissioning of similar equipment to a local authority. Two (2) separate letters or one letter stating two successfully completed projects = 10 **points.** Three (3) or more separate letters or one letter stating three (3) or more successfully completed projects **= 20 points.**	20
2.	Capability	The bidder(s) must provide proof of their ability to manufacture this equipment by submitting proof of the following: Manufacturing and test facility must be compliant to IEC 62271-100 **= 20 Points**	20
3.	Local (Mangaung) operational capability and economic investment	Does the bidder have a local office with operational capability? Existing and established local office = **10 points** If not, but within RSA = **5 points**	10
4.	Technical schedules	Did the Manufacturer complete all the Schedules and submit it? **Spare lists, in the pricing schedules must be completed in full = 30 Points**	30
5.	Test Reports	Submit type test certificate for switchgears and for voltage transformers = 2**0 points**	20
	TOTAL		**100**

Table 42: Evaluation Criteria

A bidder who gets a minimum of 85 points and above will qualify to the next stage. Individual tenders would have to be evaluated according to the preferential point system.

The bidder must score minimum points as follows:

Item 1 – 10 points

Item 2 – 20 points

Item 3 – 5 points

Item 4 – 30 points

Item 5 – 20 points in the Evaluation Criteria.

8.2 PRICE AND REFERENTIAL POINTS SCORING – STAGE 2 (Price and B-BBEE status)

All Bidders that have passed the technical evaluation threshold of 65 points would also be scored based the 90/10 principle where 90 Points is for the Price and 10 points for B-BBEE as per the detail given below.

8.3 Points awarded for price.

A maximum of 80 Points is allocated for price on the following basis:

Where $Ps = 90[1 - \frac{\text{Pt} - \text{P min}}{\text{P min}}]$

Ps = Points Scored for comparative price of bid under consideration

Pt = Comparative Price of bid under consideration

P min = Comparative Price of lowest acceptable bid

8.4 Points awarded for Specific Goals Requirement

In terms of Regulation 3.(1) An organ of state must, in the tender documents, stipulate— (a) the applicable preference point system as envisaged in regulations 4, 5, 6 or 7; (b) the specific goal in the invitation to submit the tender for which a point may be awarded, and the number of points that will be awarded to each goal, and proof of the claim for such goals in accordance with the table below;

Specified Goals	**Points Allocation**
50% Black owned	5
50% Women owned	3
50% Youth owned <35 years	2
Total Points	10

Table 43: Specified Goals for Preferential Point System

8.5 Quotation Price

Pricing should include any other unspecified expenses related to items listed under technical specifications.

Are the quoted prices firm for the full duration of the contract? Yes/No

If not, indicate CPA or SEIFSA price adjustment method: _____

CPA- Suppliers price list date: _____ or

SEIFSA indexes – Price basis month and year _____

8.6 NB: All traveling cost will only be paid as per updated AA rates at the time of invoicing!

9. PRICING SCHEDULES

All prices must be exclusive of VAT but include transport to CENTLEC premises. (Please indicate if any items in the specification are discontinued and price on the new Items.)

9.1 Switchgears, PT's and CT`s

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price per unit in (R) Rand	Delivery period in weeks
9.1.1	800 Amp 36kV GCB	Each			
9.1.2	1600 Amp 36kV GCB	Each			
9.1.3	1250 Amp 36kV GCB	Each			
9.1.4	36kV, outdoor, structure mountable, 5 limp, 3 phase, Potential Transformers.	Each			
9.1.5	Outdoor Current Transformers (Preferably the oil Type). Complete assembly	Each			
9.1.6	Outdoor Current Transformers (Preferably the Dry Type). Complete assembly	Each			

Table 45: Switchgears, PT's and CT`s

9.2 36kV, outdoor single side break disconnector switches

ITEM	Rated current	Withstand test voltage				Short circuit rating R.M.S kA	Peak withstand current kA	Manufacturer Brand Name and type.	Price in rand each	Delivery time weeks
		To earth & between poles		Across the isolating distance						
		B.I.L Impulse voltage	Power frequency (Wet)	B.I.L Impulse voltage	Power frequency (Dry)					
1	400	70	200	95	230	13.1	34			
2	800	70	200	95	230	17.5	47			
3	1200	70	200	95	230	17.5	47			
4	1600	70	200	95	230	17.5	47			

Table 46: Pricing for 3 Phase, 36kV, outdoor single side break disconnector switches.

9.3 36kV Rocker Arm Disconnector Switches or new type of Disconnector Switches

Item	Rated Voltage kV	Rated Current Amps	Test withstand voltage				Short circuit current kA	Peak current withstand current kA	Creepage distance mm	Manufacturer Brand Name and type.	Price in rand each	Delivery time weeks
			To earth and between poles		Across the isolating distance							
			B.I.L impulse voltage	Power frequency (wet)	B.I.L impulse voltage withstand	Power frequency (Dry)						
1	11kV	800	28	37	95	110	17.5	47	340			
2	36kV	1600	70	200	95	230	17.5	47	820			

3	**Set Of Contacts male and female for number 1**							
4	**Set Of Contacts male and female for number 2**							

Table 47: Pricing for Rocker Arm Disconnector Switches or new type of Disconnector Switches.

9.4 Pricing for 36kV Stationary (Porcelain) Type of lightning arrestors

Item	**Description**	**Manufacturer Brand Name and type.**	**Price in RAND**	**Delivery time weeks**
Rated	36kV			
Class	10kA			
Frequency	50Hz			
MCOV	29.0kV			

Table 48: Pricing for 36kV Stationary (Porcelain) Type of lightning arrestors

9.5 Pricing for 36kV stationary (Silicone / Polymeric or porcelain) Type of lightning arrestors

Item	**Description**	**Manufacturer Brand Name and type.**	**Price in RAND**	**Delivery time weeks**
YH 10 W	36/108			
Rated	36kV			
MCOV	29.0kV			
Frequency	50Hz			

Table 49: Pricing for 36kV stationary (Silicone / Polymeric or porcelain) Type of lightning arrestors

9.6 Pricing for outdoor 36 kV Stand-off Bushings

ITEM	A Length	B width	C Width of holes	D Size of holes	Power frequency flashover voltage		Critical Impulse flashover voltage		Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
					Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)			
1.	355	184	76	M12	680	98	81	190			
2.	475	194	76	M12	170	129	254	375			
3.	1220	218	127	M16	369	331	667	828			

Table 50: Pricing for outdoor 36 kV Stand-off Bushings

9.7 Pricing for outdoor pole mounted 36kV, 630-amp, single phase, disconnector link switches a set of three complete with mounting brackets.

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price per unit in (R) Rand	Delivery period in weeks
1	Single phase disconnector link 630 Amp, 36kV. (Silicone / Polymeric / Porcelain) complete with brackets.	Per set of 3(With mounting brackets)			
2	Set of male and female contacts	Per set			

Table 51: Pricing for outdoor pole mounted 36kV, 630-amp, single phase, disconnector link switches a set of three complete with mounting brackets.

9.8 Pricing for 36kV Pin Insulators

ITEM	A Length	B Width	C Core width	D Skirt size	E Spindle size	R Tie to grove	Creepage (mm)	Power frequency flashover voltage		Critical Impulse flashover voltage		Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
								Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)			
1	430	189	73	25	M20	25	1100	150	125	255	340			

Table 52: Pricing for 36kV Pin Insulators

9.9 Pricing for 36kV Drop out fuses

Item	Rated current Amps	Creepage (mm)	Nema Bracket	100A fuse carrier	200A solid brass link	A Length of assembly	B Nema bracket from top	C Length of fuse carrier	Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
1	100	650	YES	YES	NO	616	245	526			
2	200	650	YES	NO	YES	616	245	526			
3	100	Spare fuse each.		Yes							
4	200	Spare brass link.			Yes						

Table 53: Pricing for 36kV Drop out fuses.

9.10 Pricing for outdoor pole mounted 36kV long rod strain insulators complete with brackets.

Item	Volt kV	A	Number of sheds	Creepage distance mm	Power frequency flashover voltage		Critical impulse flashover voltage		B.I.L	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
					Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)				
1	33	572	12	1127	181	151	333	319	282			
2	132	1740	35 / 4	4510	604	582	988	993	894			

Table 54: Pricing for outdoor pole mounted 36kV long rod strain insulators complete with brackets.

9.11 Pricing for horizontal to vertical stud clamp for stranded to solid Conductor

Item	Conductor (R)		Stud (S)		A Length of Stranded clamp	B Length of solid clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	MIN	MAX	MIN	MAX						
1	12	19	20	26	150	70	900			
2	22	28	18	22	162	74	750			
3	22	28	26	26	162	74	900			
4	12	19	28	33	150	76	950			
5	22	28	38	38	175	85	1350			

Table 55: Pricing for horizontal to vertical stud clamp for stranded to solid Conductor.

9.12 Pricing for Tee-clamp for tubular bus bar

Item	Busbar (R)	Busbar (T)	A Length of Stranded clamp	B Length of solid clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	25	25	165	67	900			
2	38	38	185	97	1300			
3	50	20	185	102	1750			
4	50	50	156	100	1750			

Table 56: Pricing for Tee-clamp for tubular bus bar.

9.13 Pricing for horizontal to vertical clamp for bus bar to stranded conductor

Item	Busbar (R)	Conductor (T)		A Length of Stranded clamp	B Length of solid clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		MIN	MAX						
1	25	12	19	105	62	600			
2	38	12	19	125	70	1300			
3	38	24	32	135	70	1300			
4	50	12	16	160	75	1750			
5	50	38	38	160	75	1750			

Table 57: Pricing for horizontal to vertical clamp for bus bar to stranded conductor:

9.14 Pricing for horizontal to vertical clamp for stranded conductor

Item	Conductor (R)		Conductor (T)		A Length of Stranded clamp	B Width of clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	MIN	MAX	MIN	MAX						
1	12	19	6	11	130	70	750			
2	12	19	12	19	120	60	750			
3	22	28	12	19	150	75	1100			
4	22	28	22	28	150	75	1100			
5	12	19	22	28	150	75	1100			

Table: 58: Pricing for horizontal to vertical clamp for stranded conductor:

9.15 Pricing for lug stranded conductor: (in-line)

Item	Conductor (R)		Palm Size		A Length of clamp	B Length of Stranded clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	MIN	MAX	Width X	Length Y						
1	8	13	50	75	90	65	450			
2	12	19	75	85	90	70	750			
3	22	28	75	85	95	75	1100			
4	30	38	75	85	95	80	1350			

Table 59: Pricing for lug stranded conductor: (in-line)

9.16 Pricing for Terminal lug for tubular bus bar: (in-line)

Item	Busbar (S)	Palm Size		A Length of clamp	B Length of busbar clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X	Length Y						
1	20	50	85	90	60	700			
2	25	75	85	90	60	900			
3	32	75	85	90	60	1000			
4	38	100	105	90	85	1300			
5	38	75	85	90	85	1300			
6	50	100	110	90	93	1750			
7	64	100	110	125	95	2150			

Table 60: Pricing for Terminal lug for tubular bus bar: (in-line)

9.17 Pricing In-line coupler clamp for tubular busbar:

Item	Busbar tube diameter	A Length of clamp	B Width of busbar clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	25	135	64	900			
2	38	175	85	1300			
3	50	195	95	1750			
4	76	260	127	2500			

Table 61: Pricing In-line coupler clamp for tubular busbar:

9.18 Pricing for fix support clamp for tubular busbar

Item	Busbar tube diameter	A Height of clamp	B Width of busbar clamp	P.C.D. Base center	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	25	50	64	76			
2	38	50	64	76			
3	50	50	64	76			
4	76	50	76	76			

Table 62: Pricing for fix support clamp for tubular busbar:

9.19 Pricing for slider support clamp for tubular busbar:

Item	Busbar tube diameter	A Height of clamp	B Width of busbar clamp	P.C.D. Base center	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	38	75	64	76			
2	50	75	64	76			
3	76	75	76	76			
4	76	75	76	76			

Table 63: Pricing for slider support clamp for tubular busbar:

9.20 Pricing for SCC-type slider clamp for busbar support

Item	A Height of slider	B Height from bottom of busbar	C Busbar size	D Busbar thickness	P.C.D.	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	150	40	100	12	76			
2	200	40	150	15	76			
3	250	40	200	15	76			
4	250	50	100	12	127			
5	300	50	150	12	127			
6	350	50	200	12	127			

Table 64: Pricing for SCC-type slider clamp for busbar support

\

9.21 Pricing for STP- Type Palm Clamp (in line)

Item	Conductor size	Palm Size (mm)		Max Amp Rating	A Length of clamp	B Length of Stranded clamp	C Width of clamp	D	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X	Length Y								
1	Ø26mm	80	90	900A	208	95	82	12			
2	Ø38mm	80	90	1350	215	105	88	15			

Table 65: Pricing for STP- Type Palm Clamp (in line)

9.22 Pricing for K - Type Cross Clamp For stud to stranded Conductor.

Item	Conductor (R)	Stud (T)	Max. Amp rating	A	B	C	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	16.3	26	500	173	95	70			
2	26.5	38	900	209	105	95			
3	19	38	600	182	105	70			
4	16	26	600	173	95	70			
5	21	26	650	198	95	95			
6	26.5	26	900	198	95	95			

Table 66: Pricing for K - Type Cross Clamp For stud to stranded Conductor.

9.23 Pricing for SPC – Type Palm Clamp to Stranded Conductor (Crimping)

Item	A (mm)	Palm Size (mm)		M10 Hole Centers (mm)	Conductor size (mm)	Max Amp Rating	T / O Angle	A/F	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X (mm)	Length Y (mm)								
1	250	80	90	50 X 50	8.380 Fox	400	45˚	13.5			
2	250	80	90	50 X 50	8.380 Fox	400	0˚	13.5			
3	250	80	90	50 X 50	14.16 Hare	400	45˚	25.4			

Item	A (mm)	Palm Size (mm)		M10 Hole Centers (mm)	Conductor size (mm)	Max Amp Rating	T / O Angle	A/F	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X (mm)	Length Y (mm)								
4	250	80	90	50 X 50	14.16 Hare	400	0˚	25.4			
5	250	80	90	50 X 50	18.13 Wolf	600	45˚	28.8			
6	250	80	90	50 X 50	18.13 Wolf	600	0˚	28.8			
7	250	80	90	50 X 50	18.87 Chickadee	600	45˚	28.2			
8	250	80	90	50 X 50	18.87 Chickadee	600	0˚	28.2			
9	250	80	90	50 X 50	26.49 Centipede	900	45˚	36.2			
10	250	80	90	50 X 50	26.49 Centipede	900	0˚	36.2			
11	250	80	90	50 X 50	38.30 Bull	1200	45˚	49.7			

Item	A (mm)	Palm Size (mm)		M10 Hole Centers (mm)	Conductor size (mm)	Max Amp Rating	T / O Angle	A/F	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X (mm)	Length Y (mm)								
12	250	80	90	50 X 50	38.30 Bull	1200	0˚	49.7			

Table 67: Pricing for SPC – Type Palm Clamp to Stranded Conductor (Crimping)

9.24 Pricing for Transformer Palm Terminal

Item	Stud Size	Palm Size		Hole sizes	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		X - Width of palm	**Y**- Length of palm				
1	Ø 13 to 38mm	100	85	4 X M10			
2	Ø 38 to 60mm	100	85 to 120	4 X M12			

Table 68: Pricing for Transformer Palm Terminal

9.25 Pricing for Strain Clamp aluminum, 70kN, 3 – bolt, Pistol Type

Item	Conductor min. - max.	A	B	C	D	R	Number of U-bolts	U.T.S (kN)	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks

1	5 - 16	126	118	19	16	63	3 – M12	70			
2	5 - 21	140	150	22	16	70	3 – M12	70			
3	10 - 24	180	150	25	16	70	3 – M12	70			
4	18 - 38	200	180	27	16	77	3 – M12	70			

Table 69: Pricing for Strain Clamp aluminum, 70kN, 3 – bolt, Pistol Type:

9.26 Pricing for KCP-type pedestal support

Item	Conductor R	P.C.D.	A	B	C	Max. Rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	14.5	76	130	95	82	600			
2	14.5	127	130	95	82	600			
3	26.5	76	130	95	82	900			
4	26.5	127	130	95	82	900			
5	38.3	76	140	105	90	1350			
6	38.3	127	140	105	90	1350			

Table 70: Pricing for KCP-type pedestal support

9.27 Pricing for TBP Type Palm Terminal clamp

Item	Tube Dia.	Palm sizes		A	Max. rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		X	Y					
1	80	125	125	225	2300			
2	100	125	125	225	2800			
3	120	125	125	230	3300			

Table 71: Pricing for TBP Type Palm Terminal clamp

9.28 Pricing for TBPT – Type Palm Tap-off Clamp

Item	Tube Dia.	Palm sizes		A	Max. rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		X	Y					
1	80	80	90	210	1350			
2	100	80	90	225	1350			
3	120	80	90	235	1350			

Table 72: Pricing for TBPT – Type Palm Tap-off Clamp

9.29 Pricing for TBFCTS – Type Fixed Coupler Tee Support Clamp

Item	Tube Dia.		P.C.D.	A	H	Max. Rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	R	T							
1	80	80	76	305	160	2300			

2	100	100	76	330	160	2800			
3	120	80	127	405	194	2300			
4	120	120	127	405	194	3300			
5	150	150	127	460	210	4000			
6	160	160	127	460	210	4000			
7	200	200	225	615	200	5200			

Table 73: Pricing for TBFCTS – Type Fixed Coupler Tee Support Clamp

9.30 Pricing for TBFS – Type Fixed support Clamp.

Item	Tube Dia. R	P.C.D.	H	Max. Rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	80	76	120	2300			
2	80	127	120	2300			
3	100	76	120	2800			
4	100	127	120	2800			
5	120	76	150	3300			
6	120	127	150	3300			

Table 74: Pricing for TBFS – Type Fixed support Clamp.

9.31 Pricing for TBSS – Type Sliding Support Clamp

Item	Tube Dia.	P.C.D.	A	H	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	80	76	290	120			
2	100	76	290	120			
3	120	76	300	150			
4	80	127	290	120			
5	100	127	290	120			
6	120	127	300	150			

Table 75: Pricing for TBSS – Type Sliding Support Clamp.

9.32 Pricing for TBFX – Type Full In – Line Expansion Clamp Slide

Item	Tube Dia. R	P.C.D.	A	B	C	H	Max. Rating. Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	80	76	280	650	390	120	2300			
2	100	76	280	650	430	120	2800			
3	120	76	280	675	480	150	3300			
4	80	127	280	650	390	120	2300			
5	100	127	280	650	430	120	2800			
6	120	127	280	675	480	150	3300			

Table 76: Pricing for TBFX – Type Full In – Line Expansion Clamp Slide

9.33 Pricing for Compression Dead End for ACSR Conductors

Item	Conductor		A	B	UTS	Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
	Name	Dia.			kN			
1	Fox	8.38	415	2 x M12	13.25			
2	Mink	10.98	415	2 x M12	22.07			
3	Hare	14.21	465	2 x M12	37.42			
4	Wolf	18.13	470	2 x M12	67.50			
5	Chickadee	18.87	470	2 x M12	44.68			
6	Bear	23.47	555	2 x M12	111.13			
7	Centipede	26.49	515	3 x M12	67.20			
8	Bull	38.30	565	4 x M12	138.0			

Table 77: Pricing for Compression Dead End for ACSR Conductors

9.34 Pricing for Non-Tension Compression Tap Connector Tee-off.

Item	Conductor R		Conductor T		A	B	Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
	Name	Name	Name	Name					
1	Fox	8.38	Fox	8.38	300	150			
2	Mink	10.98	Mink	10.98	300	150			
3	Hare	14.21	Hare	14.21	300	150			

4	Wolf	18.13	Wolf	18.13	300	150			
5	Chickade e	18.87	Chickade e	18.87	300	150			
6	Bear	23.47	Bear	23.47	300	150			
7	Centiped e	26.49	Centipede	26.49	300	150			
8	Bull	38.30	Bull	38.30	300	150			

Table 78: Pricing for Non-Tension Compression Tap Connector Tee-off.

9.35 Pricing for refurbishment, “strip & quote” and transport.

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price in (R)	Delivery Time
1	Please provider a price per kilo meter for pick-up and delivery from Centlec premises to the successful bidder’s premises and back. The successful bidder will	**Per Kilometer**			**N/A**

	receive an order for a small amount. It will be rectified with the submission of the invoice.				

Table 79: Pricing for refurbishment, “strip & quote” and transport

9.36 Pricing 36kV Switchgears, PT’s and CT`s

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price per unit in (R) Rand	Delivery period in weeks
5.3.3	800 Amp 36kV GCB / Vacuum	Each			
5.3.4	1600 Amp 36kV GCB / Vacuum	Each			
5.3.5	1250 Amp 36kV GCB / Vacuum	Each			
5.4.1	36kV, outdoor, structure mountable, 5 limp, 3 phase Potential Transformers.	Each			
5.5.1	Outdoor Current Transformers (Preferably the oil Type). Complete assembly	Each			
5.5.2	Outdoor Current Transformers (Preferably the Dry Type). Complete assembly	Each			

Table 80: Switchgears, PT’s and CT`s

9.37 Pricing for 3 Phase, 36kV, outdoor single side break disconnector switches

ITEM		Withstand test voltage					

	Rated current	To earth & between poles		Across the isolating distance		Short circuit rating R.M.S kA	Peak withstand current kA	Manufacturer Brand Name and type.	Price in rand each	Delivery time weeks
		B.I.L Impulse voltage	Power frequency (Wet)	B.I.L Impulse voltage	Power frequency (Dry)					
1	400	70	200	95	230	13.1	34			
2	800	70	200	95	230	17.5	47			
3	1200	70	200	95	230	17.5	47			
4	1600	70	200	95	230	17.5	47			

Table 81: Pricing for 3 Phase, 36kV, outdoor single side break disconnector switches

9.38 Pricing for Rocker Arm Disconnector Switches

Item	Rated Voltage kV	Rated Current Amps	Tests withstand voltage				Short circuit current kA	Peak current withstand current kA	Creepage distance mm	Manufacturer Brand Name and type.	Price in rand each	Delivery time weeks
			To earth and between poles		Across the isolating distance							
			B.I.L impulse voltage withstand	Power frequency (wet)	B.I.L impulse voltage withstand	Power frequency (Dry)						
1	11kV	800	28	37	95	110	17.5	47	340			

2	**36kV**	**1600**	**70**	**200**	**95**	**230**	**17.5**	**47**	**820**			

Table 82: Pricing for Rocker Arm Disconnector Switches

9.39 Pricing for 36kV Stationary (Porcelain) Type of lightning arrestors

Item		**Manufacturer Brand Name and type.**	**Price in RAND**	**Delivery time weeks**
Rated	36kV			
Class	10kA			
Frequency	50Hz			
MCOV	29.0kV			

Table 83: Pricing for 36kV Stationary (Porcelain) Type of lightning arrestors

9.40 Pricing for 36kV stationary (Silicone / Polymeric) Type of lightning arrestors

Item	**Description**	**Manufacturer Brand Name and type.**	**Price in RAND**	**Delivery time weeks**
YH 10 W	36/108			
Rated	36kV			
MCOV	29.0kV			
Frequency	50Hz			

Table 84: Pricing for 36kV stationary (Silicone / Polymeric) Type of lightning arrestors

9.41 Pricing for outdoor 36 kV Stand-off Bushings

ITEM	A Length	B width	C Width of holes	D Size of holes	Power frequency flashover voltage		Critical Impulse flashover voltage		Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
					Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)			
1	475	194	76	M12	170	129	254	375			
2	1220	218	127	M16	369	331	667	828			

Table 85: Pricing for outdoor 36 kV Stand-off Bushings

9.42 Pricing for outdoor pole mounted 36kV, 630-amp, single phase, disconnector link switches a set of three complete with mounting brackets.

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price per unit in (R) Rand	Delivery period in weeks
1	Single phase disconnector link 630 Amp, 36kV. (Silicone / Polymeric / Porcelain) complete with brackets.	Per set of 3(With mounting brackets)			

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price per unit in (R) Rand	Delivery period in weeks
2	Set of Male and Female contacts	set			

9.43 **Table 86:** Pricing for outdoor pole mounted 36kV, 630-amp, single phase, disconnector link switches a set of three complete with mounting brackets.

9.44 Pricing for 36kV Pin Insulators

ITEM	A Length	B Width	C Core width	D Skirt size	E Spindle size	R Tie to grove	Creepage (mm)	Power frequency flashover voltage		Critical Impulse flashover voltage		Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
								Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)			
1	430	189	73	25	M20	25	1100	150	125	255	340			

Table 87: Pricing for 36kV Pin Insulators

9.45 Pricing for 36kV Drop out fuses.

Item	Rated current Amps	Creepage (mm)	Nema Bracket	100A fuse carrier	200A solid link	A Length of	B Nema bracket	C Length of fuse carrier	Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks

						assembly	**from top**				
1	100	650	YES	YES	NO	616	245	526			
2	200	650	YES	NO	YES	616	245	526			

Table 88: Pricing for 36kV Drop out fuses.

9.46 Pricing for outdoor pole mounted 36kV long rod strain insulators complete with brackets.

Item	**Volt kV**	**A**	**Number of sheds**	**Creepage distance mm**	**Power frequency flashover voltage**		**Critical impulse flashover voltage**		**B.I.L**	**Manufacturer Brand Name and type.**	**Price in RAND per each**	**Delivery time in weeks**
					Dry (kV)	Wet (kV)	Pos. (kV)	Neg. (kV)				
1	33	572	12	1127	181	151	333	319	282			
2	132	1740	35 / 4	4510	604	582	988	993	894			

Table 89: Pricing for outdoor pole mounted 36kV long rod strain insulators complete with brackets.

9.47 Pricing for horizontal to vertical stud clamp for stranded to solid Conductor

Item	**Conductor (R)**	**Stud (S)**	**A**	**B**	**Ampere rating**	**Manufacturer Brand Name and type.**	**Price in RAND per each**	**Delivery time in weeks**

					Length of Stranded clamp	Length of solid clamp				
	MIN	MAX	MIN	MAX						
1	12	19	20	26	150	70	900			
2	22	28	18	22	162	74	750			
3	22	28	26	26	162	74	900			
4	12	19	28	33	150	76	950			
5	22	28	38	38	175	85	1350			

Table 90: Pricing for horizontal to vertical stud clamp for stranded to solid Conductor.

9.48 Pricing for Tee-clamp for tubular bus bar

Item	Busbar (R)	Busbar (T)	A Length of Stranded clamp	B Length of solid clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	25	25	165	67	900			
2	38	38	185	97	1300			
3	50	20	185	102	1750			
4	50	50	156	100	1750			

Table 91: Pricing for Tee-clamp for tubular bus bar.

9.49 Pricing for horizontal to vertical clamp for bus bar to stranded conductor:

Item	Busbar (R)	Conductor (T)		A Length of Stranded clamp	B Length of solid clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		MIN	MAX						
1	25	12	19	105	62	600			
2	38	12	19	125	70	1300			
3	38	24	32	135	70	1300			
4	50	12	16	160	75	1750			
5	50	38	38	160	75	1750			

Table 92: Pricing for horizontal to vertical clamp for bus bar to stranded conductor:

9.50 Pricing for horizontal to vertical clamp for stranded conductor

Item	Conductor (R)		Conductor (T)		A Length of Stranded clamp	B Width of clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	MIN	MAX	MIN	MAX						
1	12	19	6	11	130	70	750			
2	12	19	12	19	120	60	750			
3	22	28	12	19	150	75	1100			
4	22	28	22	28	150	75	1100			
5	12	19	22	28	150	75	1100			

Table: 93: Pricing for horizontal to vertical clamp for stranded conductor:

9.51 Pricing for lug stranded conductor: (in-line)

Item	Conductor (R)		Palm Size		A Length of clamp	B Length of Stranded clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	MIN	MAX	Width X	Length Y						
1	8	13	50	75	90	65	450			
2	12	19	75	85	90	70	750			
3	22	28	75	85	95	75	1100			
4	30	38	75	85	95	80	1350			

Table 94: Pricing for lug stranded conductor: (in-line)

9.52 Pricing for Terminal lug for tubular bus bar: (in-line)

Item	Busbar (S)	Palm Size		A Length of clamp	B Length of busbar clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X	Length Y						
1	20	50	85	90	60	700			
2	25	75	85	90	60	900			
3	32	75	85	90	60	1000			
4	38	100	105	90	85	1300			
5	38	75	85	90	85	1300			
6	50	100	110	90	93	1750			
7	64	100	110	125	95	2150			

Table 95: Pricing for Terminal lug for tubular bus bar: (in-line)

9.53 Pricing In-line coupler clamp for tubular busbar:

Item	Busbar tube diameter	A Length of clamp	B Width of busbar clamp	Ampere rating	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	25	135	64	900			
2	38	175	85	1300			
3	50	195	95	1750			
4	76	260	127	2500			

Table 96: Pricing In-line coupler clamp for tubular busbar:

9.54 Pricing for fix support clamp for tubular busbar

Item	Busbar tube diameter	A Height of clamp	B Width of busbar clamp	P.C.D. Base center	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	25	50	64	76			
2	38	50	64	76			
3	50	50	64	76			
4	76	50	76	76			

Table 97: Pricing for fix support clamp for tubular busbar:

9.55 Pricing for slider support clamp for tubular busbar:

Item	Busbar tube diameter	A Height of clamp	B Width of busbar clamp	P.C.D. Base center	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	38	75	64	76			
2	50	75	64	76			
3	76	75	76	76			
4	76	75	76	76			

Table 98: Pricing for slider support clamp for tubular busbar:

9.56 Pricing for SCC-type slider clamp for busbar support

Item	A Height of slider	B Height from bottom of busbar	C Busbar size	D Busbar thickness	P.C.D.	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	150	40	100	12	76			
2	200	40	150	15	76			
3	250	40	200	15	76			
4	250	50	100	12	127			
5	300	50	150	12	127			
6	350	50	200	12	127			

Table 99: Pricing for SCC-type slider clamp for busbar support

9.57 Pricing for STP- Type Palm Clamp (in line)

Item	Conductor size	Palm Size (mm)		Max Amp Rating	A Length of clamp	B Length of Stranded clamp	C Width of clamp	D	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X	Length Y								
1	Ø26mm	80	90	900A	208	95	82	12			
2	Ø38mm	80	90	1350	215	105	88	15			

Table 100: Pricing for STP- Type Palm Clamp (in line)

9.58 Pricing for K - Type Cross Clamp For stud to stranded Conductor.

Item	Conductor (R)	Stud (T)	Max. Amp rating	A	B	C	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	16.3	26	500	173	95	70			
2	26.5	38	900	209	105	95			
3	19	38	600	182	105	70			
4	16	26	600	173	95	70			
5	21	26	650	198	95	95			
6	26.5	26	900	198	95	95			

Table 101: Pricing for K - Type Cross Clamp For stud to stranded Conductor.

9.59 Pricing for SPC – Type Palm Clamp to Stranded Conductor (Crimping)

.Item	A (mm)	Palm Size (mm)		M10 Hole Centers (mm)	Conductor size (mm)	Max Amp Rating	T / O Angle	A/F	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		Width X (mm)	Length Y (mm)								
1	250	80	90	50 X 50	8.380 Fox	400	45˚	13.5			
2	250	80	90	50 X 50	8.380 Fox	400	0˚	13.5			
3	250	80	90	50 X 50	14.16 Hare	400	45˚	25.4			
4	250	80	90	50 X 50	14.16 Hare	400	0˚	25.4			
5	250	80	90	50 X 50	18.13 Wolf	600	45˚	28.8			
6	250	80	90	50 X 50	18.13 Wolf	600	0˚	28.8			
7	250	80	90	50 X 50	18.87 Chickadee	600	45˚	28.2			
8	250	80	90	50 X 50	18.87 Chickadee	600	0˚	28.2			
9	250	80	90	50 X 50	26.49 Centipede	900	45˚	36.2			
10	250	80	90	50 X 50	26.49 Centipede	900	0˚	36.2			
11	250	80	90	50 X 50	38.30 Bull	1200	45˚	49.7			
12	250	80	90	50 X 50	38.30 Bull	1200	0˚	49.7			

Table 102: Pricing for SPC – Type Palm Clamp to Stranded Conductor (Crimping)

9.60 Pricing for Transformer Palm Terminal

Item	Stud Size	Palm Size		Hole sizes	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		X - Width of palm	**Y**- Length of palm				
1	Ø 13 to 38mm	100	85	4 X M10			
2	Ø 38 to 60mm	100	85 to 120	4 X M12			

Table 103: Pricing for Transformer Palm Terminal

9.61 Pricing for Strain Clamp aluminum, 70kN, 3 – bolt, Pistol Type

Item	Conductor min. - max.	A	B	C	D	R	Number of U-bolts	U.T.S (kN)	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	5 - 16	126	118	19	16	63	3 – M12	70			
2	5 - 21	140	150	22	16	70	3 – M12	70			
3	10 - 24	180	150	25	16	70	3 – M12	70			
4	18 - 38	200	180	27	16	77	3 – M12	70			

Table 104: Pricing for Strain Clamp aluminum, 70kN, 3 – bolt, Pistol Type:

9.62 Pricing for KCP-type pedestal support

Item	Conductor R	P.C.D.	A	B	C	Max. Rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	14.5	76	130	95	82	600			
2	14.5	127	130	95	82	600			
3	26.5	76	130	95	82	900			

4	26.5	127	130	95	82	900			
5	38.3	76	140	105	90	1350			
6	38.3	127	140	105	90	1350			

Table 105: Pricing for KCP-type pedestal support

9.63 Pricing for TBP Type Palm Terminal clamp

Item	Tube Dia.	Palm sizes		A	Max. rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		X	Y					
1	80	125	125	225	2300			
2	100	125	125	225	2800			
3	120	125	125	230	3300			

Table 106: Pricing for TBP Type Palm Terminal clamp

9.64 Pricing for TBPT – Type Palm Tap-off Clamp

Item	Tube Dia.	Palm sizes		A	Max. rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
		X	Y					
1	80	80	90	210	1350			
2	100	80	90	225	1350			
3	120	80	90	235	1350			

Table 107: Pricing for TBPT – Type Palm Tap-off Clamp

9.65 Pricing for TBFCTS – Type Fixed Coupler Tee Support Clamp

Item	Tube Dia.		P.C.D.	A	H	Max. Rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
	R	T							
1	80	80	76	305	160	2300			
2	100	100	76	330	160	2800			
3	120	80	127	405	194	2300			
4	120	120	127	405	194	3300			
5	150	150	127	460	210	4000			
6	160	160	127	460	210	4000			
7	200	200	225	615	200	5200			

Table 108: Pricing for TBFCTS – Type Fixed Coupler Tee Support Clamp

9.66 Pricing for TBFS – Type Fixed support Clamp

Item	Tube Dia. R	P.C.D.	H	Max. Rating Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	80	76	120	2300			
2	80	127	120	2300			
3	100	76	120	2800			
4	100	127	120	2800			
5	120	76	150	3300			
6	120	127	150	3300			

Table 109: Pricing for TBFS – Type Fixed support Clamp.

9.67 Pricing for TBSS – Type Sliding Support Clamp.

Item	Tube Dia.	P.C.D.	A	H	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	80	76	290	120			
2	100	76	290	120			
3	120	76	300	150			
4	80	127	290	120			
5	100	127	290	120			
6	120	127	300	150			

Table 110: Pricing for TBSS – Type Sliding Support Clamp.

9.68 Pricing for TBFX – Type Full In – Line Expansion Clamp Slide

Item	Tube Dia. R	P.C.D.	A	B	C	H	Max. Rating. Amps	Manufacturer Brand Name and type.	Price in RAND per each	Delivery time in weeks
1	80	76	280	650	390	120	2300			
2	100	76	280	650	430	120	2800			
3	120	76	280	675	480	150	3300			
4	80	127	280	650	390	120	2300			
5	100	127	280	650	430	120	2800			
6	120	127	280	675	480	150	3300			

Table 111: Pricing for TBFX – Type Full In – Line Expansion Clamp Slide

9.69 Pricing for Compression Dead End for ACSR Conductors

Item	Conductor		A	B	UTS	Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
	Name	Dia.			kN			
1	Fox	8.38	415	2 x M12	13.25			
2	Mink	10.98	415	2 x M12	22.07			
3	Hare	14.21	465	2 x M12	37.42			
4	Wolf	18.13	470	2 x M12	67.50			
5	Chickadee	18.87	470	2 x M12	44.68			
6	Bear	23.47	555	2 x M12	111.13			
7	Centipede	26.49	515	3 x M12	67.20			
8	Bull	38.30	565	4 x M12	138.0			

Table 112: Pricing for Compression Dead End for ACSR Conductors

9.70 Pricing for Non-Tension Compression Tap Connector Tee-off.

Item	Conductor R		Conductor T		A	B	Manufacturer Brand Name and type.	Price per each in RAND	Delivery time in weeks
	Name	Name	Name	Name					
1	Fox	8.38	Fox	8.38	300	150			
2	Mink	10.98	Mink	10.98	300	150			
3	Hare	14.21	Hare	14.21	300	150			
4	Wolf	18.13	Wolf	18.13	300	150			
5	Chickadee	18.87	Chickadee	18.87	300	150			
6	Bear	23.47	Bear	23.47	300	150			
7	Centipede	26.49	Centipede	26.49	300	150			
8	Bull	38.30	Bull	38.30	300	150			

Table 113: Pricing for Non-Tension Compression Tap Connector Tee-off.

9.71 Pricing for refurbishment, "strip & quote" and transport

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price in (R)	Delivery Time
1	Please provider a price per kilo meter for pick-up and delivery from Centlec premises to the successful bidder's premises and back. The successful bidder will receive an order for a small amount. It will be rectified with the submission of the invoice.	**Per Kilometer**			**N/A**

Table 114: Pricing for refurbishment, **"strip & quote"** and transport.

9.72 Pricing spare list is compulsory. Please tender on specified new and existing equipment tendered on, that are required for maintenance.

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price in (R)	Delivery Time
1.	110 Volt trip coils (new equipment)	each			
2.	110 Volt Closing Coils(new equipment)	each			
3.	110 Volt trip coils (Existing equipment)	each	**Actom**		
4.	110 Volt Closing Coils(Existing equipment)	each	**Actom**		

Item	Description	Unit of measurement	Manufacturer Brand Name and type.	Price in (R)	Delivery Time
5.	Bushings 36kV for GCB (Dog Box) or new Vacuum Circuit breakers(Existing equipment)	each	**Actom**		
6.	Bushings 11kV for GCB (Dog Box) or new Vacuum Circuit breakers(Existing equipment)	each	**Actom**		
7.	Set of GCB Fittings to refill gas. (new equipment)	each			
8.	Current transformers 36kV, as specified in technical specification. (new equipment)	each			
9.	Current transformers 11kV, as specified in technical specification. (new equipment)	each			
10.	Set of operating handles and specified tools on offered switchgear. (new equipment)	set			
11.	Rocker arm disconnector switch 36kV stand of bushings with high creepage and high pollution withstand. (new equipment)	Set of 3			
12.	Rocker arm disconnector switch 36kV male and female contacts. (new equipment)	Per set / 3 each			
13.	Single side arm disconnector switch 36kV male and female contacts. (new equipment)	Per set / 3 each			
14.	Sf6 gas filling gauges, wire-rap pipes and fittings	Set	**Actom**		

Table 115: Pricing for spares

9.73 TRAVEL & SUBSISTENCE

The bidder must take note that all travel and subsistence will be as per the entity`s S&T policy. The table below will be used for each CENTLEC official participating.

Table 116: Travel and Subsistence Pricing

Description	**Class**	**Unit of measure**	**Price in Rands (R)**
Flights	Economy (Local Travel)	Per person	
Accommodation	3 Star hotel	Per person	
Meals	Breakfast, lunch, and supper	Per person	
Car Rental	Group B	Per trip	
Shuttle service (for a group)		Per trip	

10. CONTACT INFORMATION

10.1 For any further technical information regarding the document contents please contact Mr. P.J. Niemann at piet.niemann@centlec.co.za, lindiwe.kalane@centlec.co.za or teboho.nkala@centlec.co.za and all queries must be done in writing, the email address provided serves this purpose. The answer to one question will be sent to all the other prospective bidders that have bought the bid documents.

10.2 For Supply Chain Related questions, please contact Me. Palesa Makhele at Palesa.Makhele@centlec.co.za