



CD 50/2023

**THE MANUFACTURE, SUPPLY, REPAIR,
AND DELIVERY OF 36 kV AND 12kV
OUTDOOR METAL CLAD SWITCHGEAR,
ASSOCIATED FIXED AND LINE
EQUIPMENT.**

Table of Contents

1.	STATEMENT OF INVITATION	3
2.	MINIMUM REQUIREMENTS	3
3.	LOCAL CONTENT PRE-QUALIFICATION	Error! Bookmark not defined.
4.	DEFINITIONS AND ABBREVIATIONS	5
5.	TECHNICAL SPECIFICATION	5
6.	HEALTH AND SAFETY REQUIREMENTS	44
7.	SPECIAL CONDITIONS OF THE CONTRACT	Error! Bookmark not defined.
8.	EVALUATION CRITERIA	45
9.	PRICING.....	47
10.	LIST OF SPARES (This is compulsory)	56
11.	Contact Details	57

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 manufacture, supply, repair, and delivery of 36kV and 12kV outdoor metal clad switchgear and associated fixed and line equipment as per specifications detailed below for a period of thirty-six (36) months.

Specified Goals for Preferential Point System

Specified Goals	Points Allocation
50% Black owned	6
50% Women owned	2
50% Youth owned <35 years	2
Total Points	10

2. MINIMUM REQUIREMENTS

- 2.1 Supply unique security personal identification number (PIN) and/or original TAX Clearance Certificate for TAX compliant status.
- 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 by the Landlord, the signed lease agreement and statement of account must be submitted by the bidder.
 - 2.2.1 In an event, that the Bidder utilizes prepaid services (e.g. Water or electricity) a valid municipal clearance certificate(s) must still be provided.
- 2.3 The bidder must be registered on the National Treasury Centralized Suppliers Database
- 2.4 A valid letter of good standing from the Compensation Commissioner with the Department of Labour or from relevant bodies.
- 2.5 CIDB grading – Level 6 EP, 6 EB and 6 CE
- 2.6 Proof of ISO 9001 quality accreditation from the manufacturer of the goods (a certified copy of the accreditation will suffice)
- 2.7 Please note that the Special Conditions table as per point 3 below, needs to be met. All supporting documents needs to be submitted where applicable.

3. SPECIAL CONDITIONS OF THE CONTRACT

Take Note that it is compulsory for Bidders to complete the table in full.

Description	Yes	No	Submit Documentation
The successful bidder will be expected to enter into a Service Level Agreement with CENTLEC			Upon appointment
Factory Acceptance Test for three (3) CENTLEC persons must include transport (flight arrangements), accommodation and transport. The cost will be for the successful bidder account. This is applicable to switch gear, PT's, CT's, NER's and NERCT's only if required from CENTLEC			Upon appointment
All the equipment delivered must be accompanied with protection wiring diagrams, panel layout drawings, factory test results, special keys, 200ml touch up paint, gas filling gauges (First delivery), and maintenance manuals. All the current transformer information will be indicated in the panel kiosk, easily accessible for data capturing.			Upon appointment
All the switch gear must be labeled according to the specification in the middle and on top of the panel kiosk (M/V 36kV or M/V 11kV as well as the Rated Amps) The labeling must be UV resistant (Cost to the successful bidder)			Upon appointment
The service provider will submit, with his tender a fully breakdown similar to the spares list, a list of spares that will be applicable to the maintenance of switchgears tendered for.			Submit spares list

4. DEFINITIONS AND ABBREVIATIONS

1. A - Ampere
2. V - Voltage
3. kVA - Kilo Volt Ampere
4. LV - Low Voltage
5. Hz - Hertz
6. ISO - International Organization for Standardization
7. IEC - International Electro Technical Commission Standards
8. SANS - South Africa Nasional Standard
9. Ue – Operational voltage
10. Ui - Isolation voltage
11. VA - Volt Ampere
12. kA - Kilo Ampere
13. Ct - Current transformer
14. Pt - Potential transformer
15. NER - Neutral Earth Resistor
16. NERCT – Neutral Earth Compensator Resistor
17. CENTLEC – CENTLEC (SOC) Ltd
18. B.I.L. – Basic insulation level

5. SCOPE OF WORK

This bid calls for the manufacturing, supply, repair and delivery 36kV and 12kV vacuum or SF6 Gas outdoor metal clad switchgear and associated stationary and line equipment. The service provider will be responsible for strip and quote quotations on repairs of 36kV and 12kV switchgear and related equipment. The transporting from Bloemfontein to their premises and back must be included.

6. TECHNICAL SPECIFICATION

6.1 METEOROLOGICAL CONDITIONS AT CENTLEC SUPPLY AREA THAT MUST INFORMED THE DESIGN AND MANUFACTURING OF THE EQUIPMENT ON THIS BID ARE:

Table 1 – Climatological Data

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. Thunder storm activity	Severe Thunderstorms

6.2 ELECTRICAL SYSTEM IN CENTLEC SUPPLY AREA

- 6.2.1 Voltage: 11 000 /400 Volt,132kV/33kV and 132kV/11kV
- 6.2.2 Phases: 3 (A-Red, B-Yellow and C-Blue)
- 6.2.3 Frequency: 50 Hz
- 6.2.4 On the 11 kV side at the 33/11 kV and 132kV/11kV distribution centres in Bloemfontein; the neutral is earthed through a resistor to limit the maximum current to 300 A, 20Ω.
- 6.2.5 Phase rotation is non-standard. (Red, Yellow, Blue) Must be label on switchgear.
- 6.2.6 The load on the system consists mainly of lighting, heating and inductive loads.
- 6.2.7 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.
- 6.2.8 The insulation level for the voltage transformers must be according to SANS 780: 2009.

6.3 SPECIFICATIONS ON SWITCHGEAR:

When tendered on the SF6 gas out door circuit breaker, it must include the indoor ring type current transformers that is wired to the kiosk part of the circuit breaker “Dog box type”. When tendered on the vacuum type out door circuit breaker the outdoor current transformers must be included with structures complete.

6.3.1 Busbar insulation: -

Busbars, incoming and outgoing terminals points and all live metal shall be fully and suitably insulated. Busbars which uses 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). The connections must be fully insulated. The degree of Ingress-Protection for the metal-clad switchgear shall conform to IP4X standard.

6.3.2 Rated insulation level: -

Switchgear must have a basic impulse insulation withstand level of 95 kV. The 36 kV and 12kV circuit breakers must be, 800A for the 12kV, 1600A, 1250A, and 630A for the 36kV, 25 kA, 200 kV BIL.The steel for the enclosure must be 3CR12. Circuit breakers and cubicles must be type tested to IEC 60056 standard. Developed and manufactured in the Republic of South Africa.

6.3.3 Details for 800 Amp, 36kV GCB. (Vacuum Breakers can be tendered for but the schedule must include the outdoor current transformers with the structures included.)

DESCRIPTION OF PARTICULARS “DOGBOX TYPE” 630Amp B1	UNITS	SPECIFIED REQUIREMENT	PARTICULARS OFFERED AND GAURANTEED
SWITCHGEAR GENERAL			
Kiosk Function		Circuit breaker	
Insulation Medium		Sf6 gas.	
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	
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		300/400/500/1	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Insulation Level		0.66kV	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		300/400/500/1	
Class		X or TPS or PX	
Quantity		Three	
Insulation Level		0.66kV	
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)	
Insulation Level		0.66kV	

Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		300/400/500/5	
Class		X or TPS or PX	
Quantity		Three	
Insulation Level		0.66kV	

Table 2: 800Amp 33kV Breaker details

6.3.4 Details for 1600 Amp, 36kV GCB. (Vacuum Breakers can be tendered for and the schedule must include the outdoor current transformers with the structures included.)

DESCRIPTION OF PARTICULARS "DOGBOX TYPE" 1600Amp B2	UNITS	SPECIFIED REQUIREMENT	PARTICILARS OFFERED AND GURANTEED
SWITCHGEAR GENERAL			
Kiosk Function		Circuit breaker	
Insulation Medium		Sf6 gas.	
System Voltage	kV	33	
Rated Voltage	kV	36	
Circuit Normal Rated Current	Amp	1600	
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	
Burden		15VA	
Class		10P15 minimum	
Quantity		Three (3)	
Insulation Level		0.66kV	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		1000/1400/1600/1	
Class		X or TPS or PX	
Quantity		Three	
Insulation Level		0.66kV	
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)	
Insulation Level		0.66kV	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		1000/1400/1600/5	
Class		X or TPS or PX	
Quantity		Three	
Insulation Level		0.66kV	

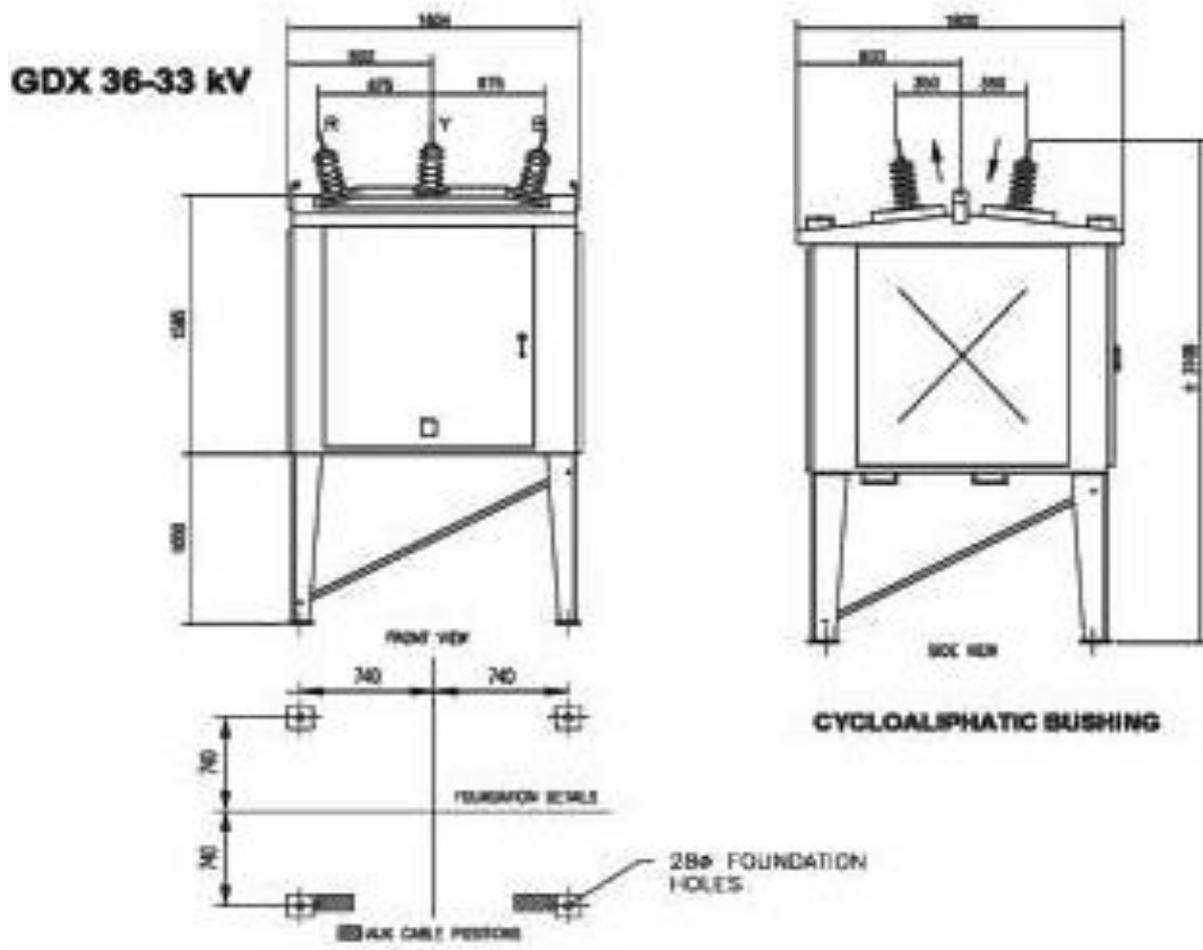
Table 3: 1600Amp 33kV Breaker details

5.3.5 Details for 1250 Amp, 36kV GCB. (Vacuum Breakers can be tendered for but the schedule must include the outdoor current transformers with the structures included.)

DESCRIPTION OF PARTICULARS "DOGBOX TYPE"1250Amp B3	UNITS	SPECIFIED REQUIREMENT	PARTICULARS OFFERED AND GAURANTEED
SWITCHGEAR GENERAL			
Kiosk Function		Circuit breaker	
Insulation Medium		Sf6 gas.	
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	
Doors	IP4X	The doors must be moisture 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	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		800/1000/1200/1	
Class		X or TPS or PX	
Quantity		Three	
Insulation Level		0.66kV	
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)	
Insulation Level		0.66kV	
Install Ct's (Differential)		Yes	
Purpose		Differential	
Knee Point Voltage		180V (minimum)	
Ratio		800/1000/1200/5	
Class		X or TPS or PX	
Quantity		Three	
Insulation Level		0.66kV	

Table 4: 1250Amp 33kV Breaker details



Drawing 1 of the 36kV Sf6 Gas dog box

5.3.6 Details for 800 Amp, 12kV GCB. (Vacuum Breakers can be tendered for and the schedule must include the outdoor current transformers with the structures included.)

DESCRIPTION OF PARTICULARS "DOGBOX TYPE" 800Amp B4	UNITS	SPECIFIED REQUIREMENT	PARTICULARS OFFERED AND GAURANTEED
SWITCHGEAR GENERAL			
Kiosk Function		Circuit breaker	
Insulation Medium		Sf6 gas.	
System Voltage	kV	11	
Rated Voltage	kV	12	
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 remote	
Status Indication Lamps (open/close)	YES	LED and Manual (see technical spec 5.3.11 below)	
Circuit Earthing Facilities		Bottom Entry	
System Earthing		NER 300 A Max 20Ω	
36kV Clamps		Yes (Palms with 4 x10mm holes)	
Completed stand		Legs, struts/straps and bolts	
Circuit Earthing		Yes (Stand and kiosk earth studs)	
Interlocks		Yes	
Surge Arrestors (suppressors)		36kV	
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:			
Install CT's	Yes		
Purpose		OC/EF	
Ratio		1200/800/200/1	
Burden		15VA	
Class		5P20	
Quantity		3	
Insulation Level		0.66kV	
Install Ct's (/Differential)	Yes		
Purpose		Differential	
Burden		15VA	
Ratio		1200/1	
Class		X or PX	
Knee Point		Min 180 Volts	
Quantity		3	
Insulation Level		0.66kV	
Install CT's Metering	Yes		
Purpose		Metering	
Ratio		600/300/200/1	
Burden		15VA	
Class		0.2	
Quantity		2	
Insulation Level		0.66kV	

Table 5: 800Amp 11kV Breaker details

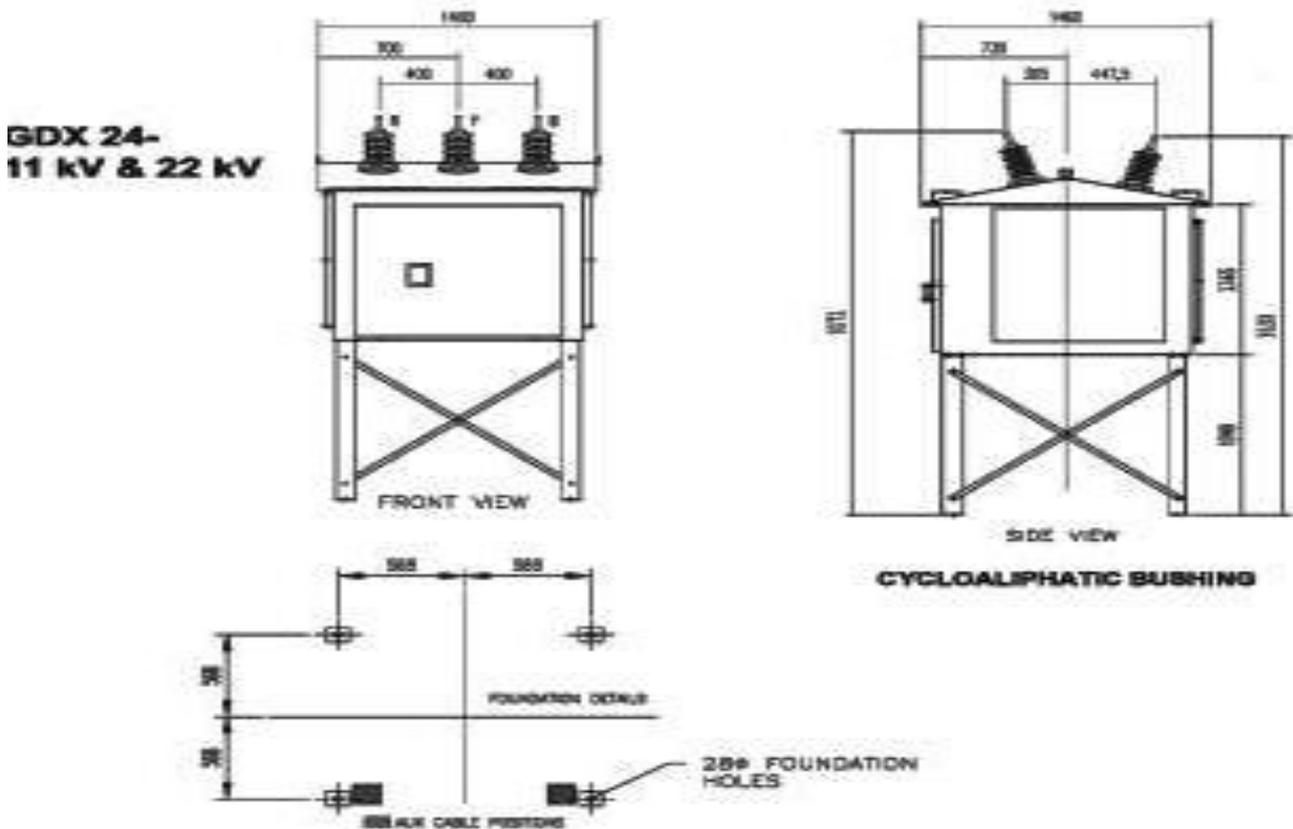
5.3.7 Details for 1250 Amp, 12kV GCB. (Vacuum Breakers can be tendered for and the schedule must include the outdoor current transformers with the structures included.)

DESCRIPTION OF PARTICULARS "DOGBOX TYPE" 800Amp B5	UNITS	SPECIFIED REQUIREMENT	PARTICULARS OFFERED AND GAURANTEED
SWITCHGEAR GENERAL			
Kiosk Function		Circuit breaker	
Insulation Medium		Sf6 gas.	
System Voltage	kV	11	
Rated Voltage	kV	12	
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)	YES	LED and Manual (see technical spec 5.3.11 below)	
Circuit Earthing Facilities		Bottom Entry	
System Earthing		NER 300 A Max 20Ω	
36kV Clamps		Yes (Palms with 4 x10mm holes)	
Completed stand		Legs, struts/straps and bolts	
Circuit Earthing		Yes (Stand and kiosk earth studs)	
Interlocks		Yes	
Surge Arrestors (suppressors)		36kV	
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:			
Install CT's	Yes		
Purpose		OC/EF	
Ratio		1200/800/200/1	
Burden		15VA	
Class		5P20	
Quantity		3	
Insulation Level		0.66kV	
Install Ct's (/Differential)	Yes		
Purpose		Differential	
Burden		15VA	
Ratio		1200/1	
Class		X or PX	
Knee point		Min 180 Volts	
Quantity		3	

Insulation Level		0.66kV	
Install CT's Metering	Yes		
Purpose		Metering	
Ratio		600/300/200/1	
Burden		15VA	
Class		0.2	
Quantity		2	
Insulation Level		0.66kV	

Table: 6

DIMENSION DATA



Drawing 2 of 12kV Sf6 Gas dog box

5.3.8 Protection and auxiliary equipment:-

All Current transformers will be studded type where all small wiring will be terminated labeled and numbered. The small wiring must be wired to test blocks in the kiosk. Gland plate for small cabling must be provide. Earth studs 6mm² brass with nuts and washers must be provide in the kiosk. Two 13mm² brass earth studs to connect to the main earth of the substations. (Opposite points on the steel enclosure).

5.3.9 Install in all units a 220 Volt heater to dry the air out in the switchgear compartments. Install a 220 Volt light inside the kiosk that must be energized when opening the kiosk door.

5.3.10 Hand-held remote control (Pendant control), for closing and tripping the circuit breaker, must be standard on all the dog boxes. This can be accomplished by a plug-in type extension lead with trip / close control (10m in length).

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

5.3.12 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).

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

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

5.3 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 complying with IEC60044-2.

Description	Particulars
Equipment	36 kV, Out Door, Three Phase, Oil Cooled Potential Transformer
Reference Standard	IS : 3156
Type	Dead tank
Rated voltage	33 kV
Highest voltage	36 kV
Power Frequency withstand (60s)	70kV
Frequency	50 Hz.
Lightning Impulse (BIL)	200kV
Basic Insulation Level	Primary : 36 kV / 70 kV / 170 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	$33000/\sqrt{3} : 110/\sqrt{3} - 110/\sqrt{3}$ 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	Out Door, 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 micron (minimum)
Secondary terminal box	IP 55
Suitability	Should be suitable for upright mounting on steel Structure 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: 7

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 life time of the unit. Type, date of manufacturing, serial number, rated voltage, etc.

5.4 Specification for 36 kV Outdoor Current Transformers

5.5.1 Outdoor 36kV Current Transformers (Preferably the Dry Type).

Type	Outdoor Porcelain (oil) or Head type Resin molded (Dry)
Phase	Single phase
Rated voltage	36kV
Purpose	Overcurrent and Earth fault
Ratio	300/400/500/1
Accuracy Class	5P20
Burden	Minimum 15 VA
Rated Maximum Primary Current	1500A
Rated Secondary Current	1A
Purpose	Differential
Ratio	500/1 or 300/1
Accuracy Class	X or Px or TPS
Knee Point Voltage	Minimum 180V
Rated Maximum Primary Current	1500A
Rated Secondary Current	1A
Rated insulation level	36/70/170kV
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 to 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.
Type	Outdoor Porcelain (oil) or Head type Resin molded (Dry)

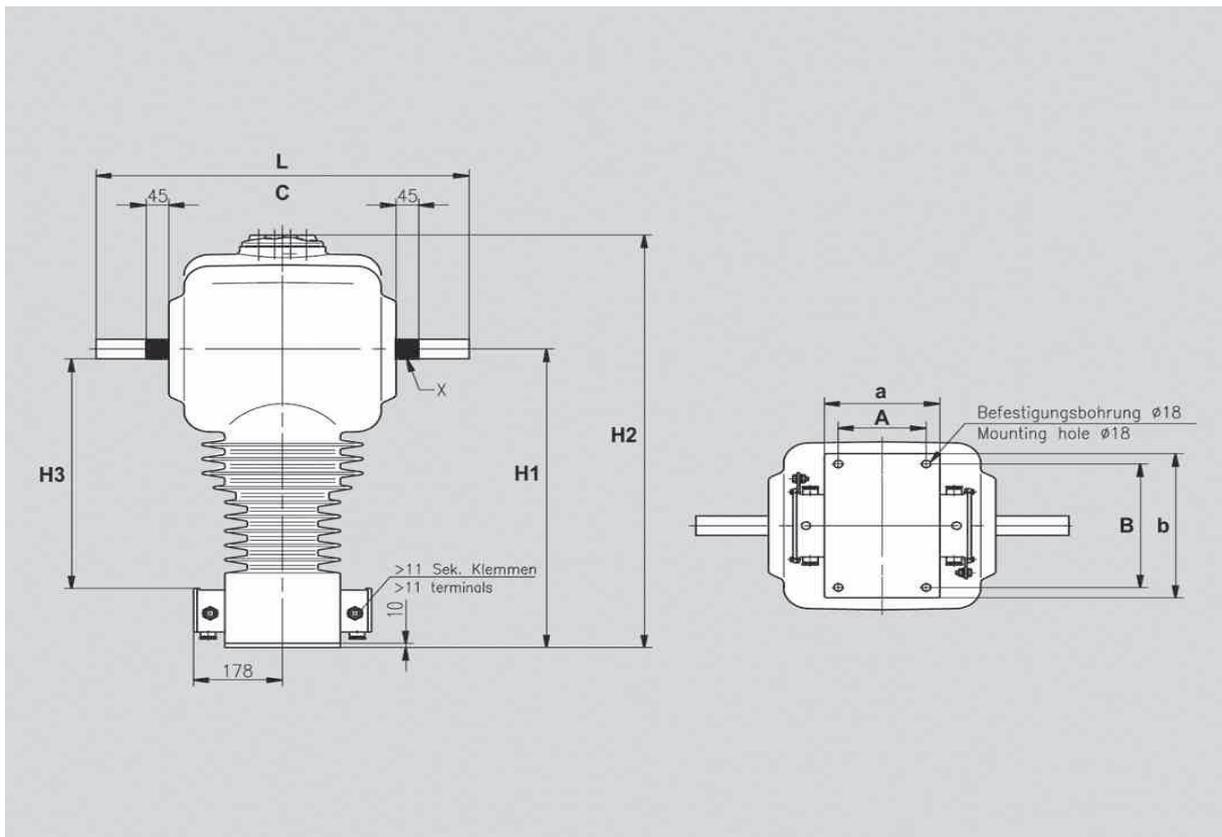
Phase	Single phase
Rated voltage	36kV
Ratio	Duel Ratio
Accuracy Class	0.2, 0.5, 1, 10P, 5P10
Burden	30 VA to 100VA
Rated Primary Current	5A to 1000A
Rated Secondary Current	5A or 1A
Rated insulation level	36/70/170kV;
Standard	IEC60044-1
Structure	Galvanized structure complete. The height of the structure 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 to 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: 8 Outdoor 1Ampere Current Transformers (Preferably the Dry Type)

5.5.2 Outdoor Current Transformers (Preferably the Dry Type).

Type	Outdoor Porcelain (oil) or 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	1500A
Rated Secondary Current	1A
Purpose	Differential
Ratio	500/5 or 300/5
Accuracy Class	X or Px or TPS
Knee Point Voltage	Minimum 180V
Rated Maximum Primary Current	1500A
Rated Secondary Current	5A
Rated insulation level	36/70/170kV
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 to 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 9 - Outdoor 5Ampere Current Transformers (Preferably the Dry Type)



Drawing: 3 36kV Dry Head type outdoor current transformer.

5.5.3 The name plate must have all the necessary information on it and must be durable for the life time 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

5.5 A. Specification for 3 Phase, 36kV, outdoor single side break disconnecter switches (Links) Type SSB36 from Actom or equivalent.

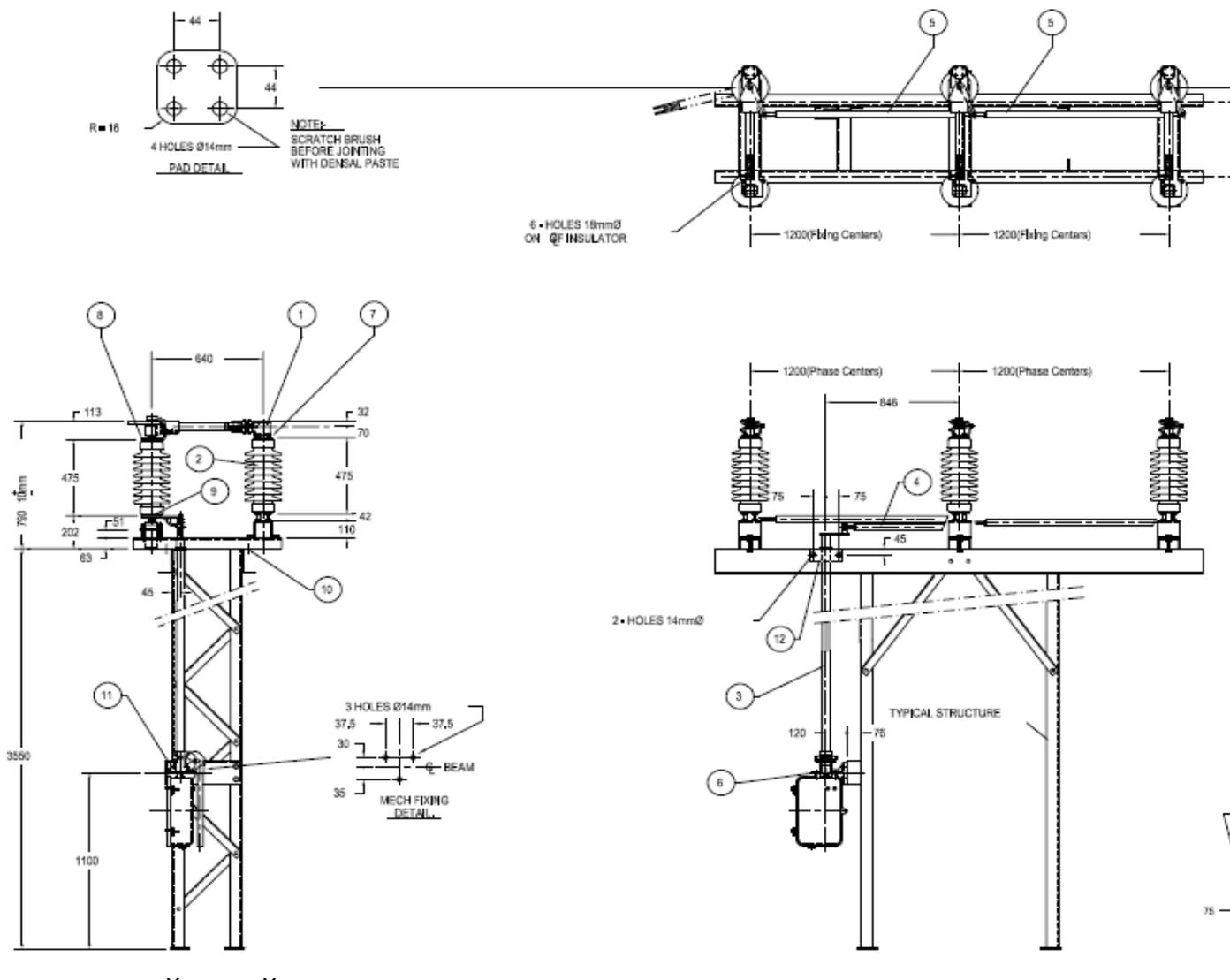
Rated current	Withstand test voltage				Short circuit rating R.M.S kA	Peak withstand current kA	Creepage distance (mm)	Resistance terminal to terminal
	To earth & between poles		Across the isolating distance					
	B.I.L Impulse voltage	Power frequency (Wet)	B.I.L Impulse voltage	Power frequency (Dry)				
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: 10 Single side arm disconnecter switches

Note:

1. Material: Insulator porcelain
: Contacts tinted hard drawn copper
: Bases must be mild steel H.D.G.

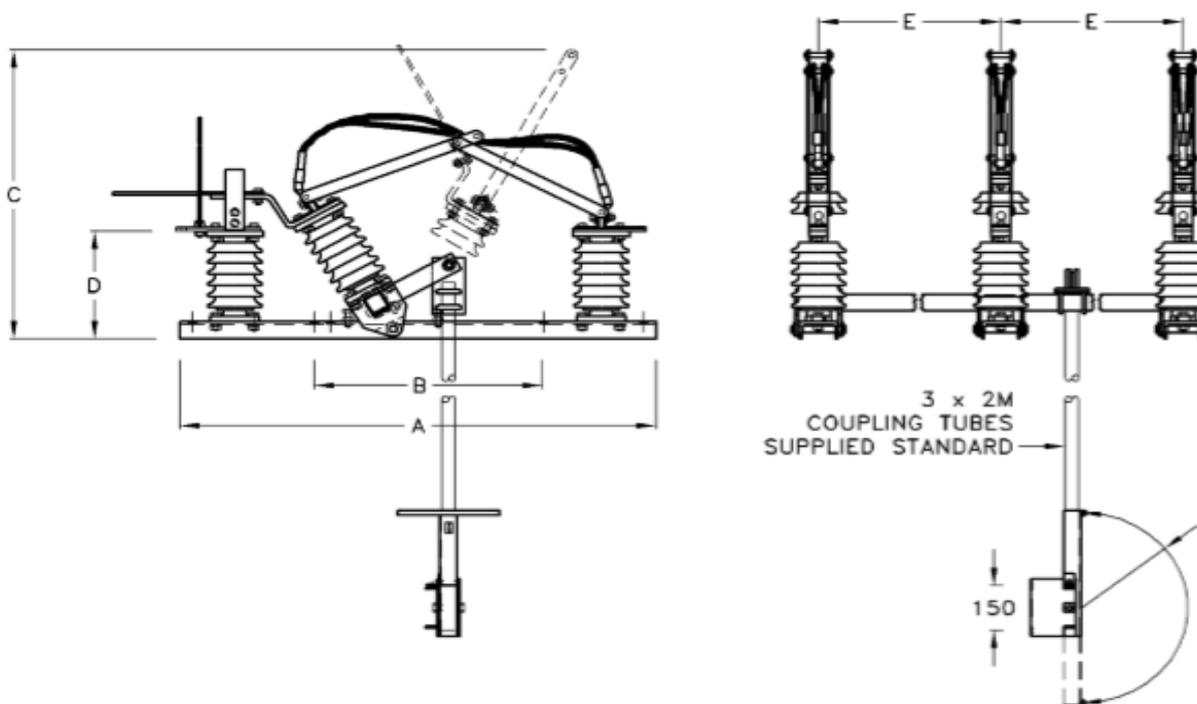
2. Operating handles must be supplied with auxiliary box.
3. Operating handles must make provision for pad lock.
4. Supply operating arm from the auxiliary box to the switch of 5 meters. No 3 on drawing below.
5. Isolators must be supplied with terminal lugs that have four hole for m12 bolts.
6. 400 to 1600 amp isolator's terminal pad must have four hole 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 wrap and transport in such a way that there is no damage to any part of the equipment.



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 11: Identification and parts list for drawing above.

B. Rocker Arm Disconnecter switch.



Three Phase Rocking Isolator Standard Type

Drawing 5: Rocker Arm Disconnecter Switch
5.6 B Rocker Arm Disconnecter Switches

Rated Voltage kV	Rated Current Amps	Test 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					A	B	C	D	E
		B.I.L impulse voltage withstand	Power frequency (wet)	B.I.L impulse voltage withstand	Power frequency (Dry)								
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 12

5.7 Specification for outdoor 36kV Lightning Arrestors

5.7.1 36kV stationary (Porcelain) Type of lightning arrestors. (Inclusive of all brackets)

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

Table: 13

5.7.2 36kV stationary (Silicone / Polymeric) Type of lightning arrestors. (Inclusive of all brackets)

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

Table: 14

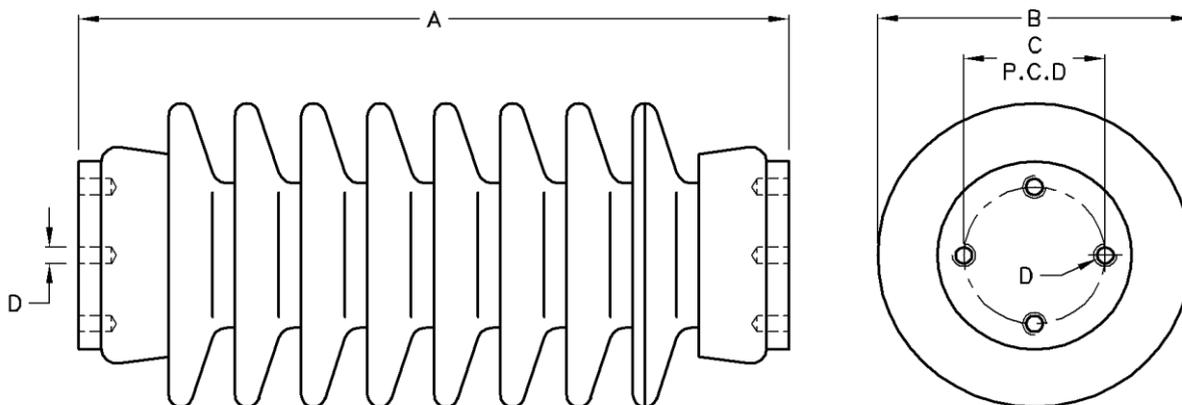
5.8 Specifications for outdoor 36 kV Stand-off Bushings:

Station post porcelain insulator 36kV to 132kV - 4kN:

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)	
475	194	76	M12	1100	170	129	254	375	239
1220	218	127	M16	3050	369	331	667	828	634

Table: 15

Note: The holes must be plugged so that dirt do not enter before it is installed.



Drawing: 6 Standoff bushing

5.9 Specification for outdoor pole mounted 36kV, single phase, disconnecter link switches, set of three, complete with mounting brackets

36kV rated, 630 Amp, BIL 150kV, GW9 (or equivalent) type of outdoor disconnecter 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. 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)

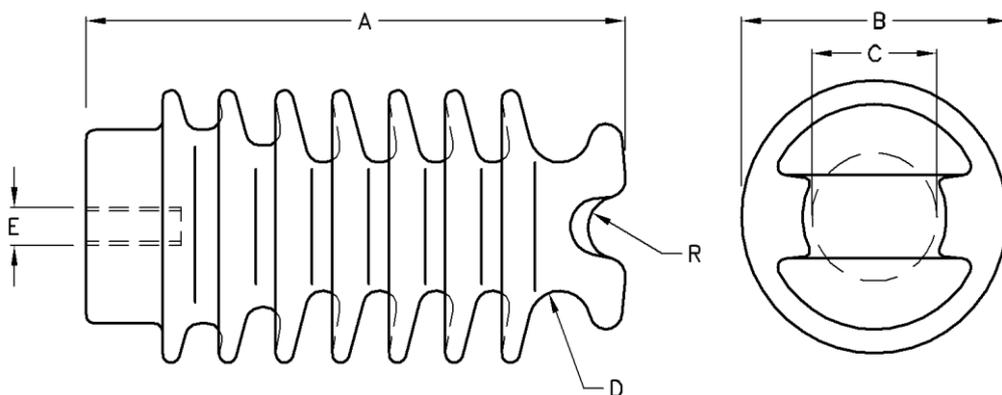
5.10 Specification for line post porcelain 36kV pin insulators complete.

5.10.1 36kV Pin Insulators

A Length	B Width	C Core width	D Skirt size	E Spindle size	R Tie top grove	Creepage (mm)	Power fre- quency flashover voltage		Critical Im- pulse flasho- ver 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: 16

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: 7 Line Post Insulator

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

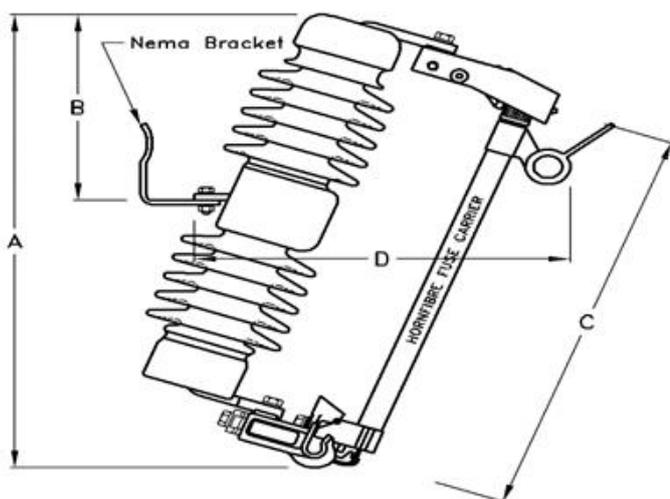
5.11.1 36kV Drop out fuses

Rated current	Creepage (mm)	Nema Bracket	100A fuse carrier	200A solid 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

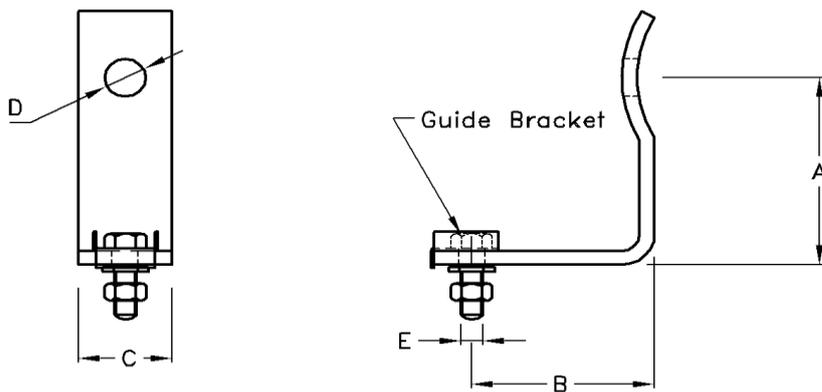
Table: 17

Note:

- Material: Insulator porcelain
: Contacts brass
: Fuse tube horn-fibre
- Nema Bracket must be steel x-arm.



Fuse assembly.



Drawing: 8 Nema Bracket and Fuse Assembly

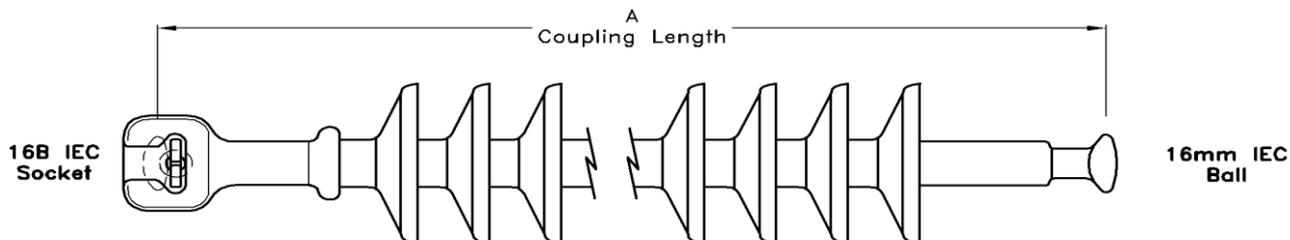
5.12 Specification for outdoor pole mounted 36kV long rod strain insulators complete with brackets. (Composite suspension strain / insulator. Socket/ball.)

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: 18

Notes:

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



Drawing: 9 Long Rod

5.13 Specification for bolted clamps.

5.13.1.1 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: 19

Note:

1. Conductor surface areas must be cast to suit conductor sizes.
2. 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: 10 Horizontal to vertical stud clamp for stranded to solid Conductor

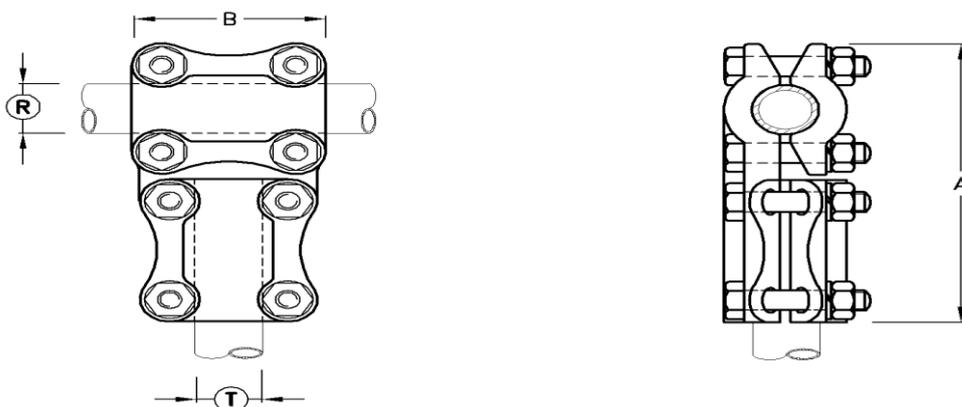
5.13.1.2 Tee-clamp for tubular busbar

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: 20

Note:

1. 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: 11 Tee-clamp for tubular busbar

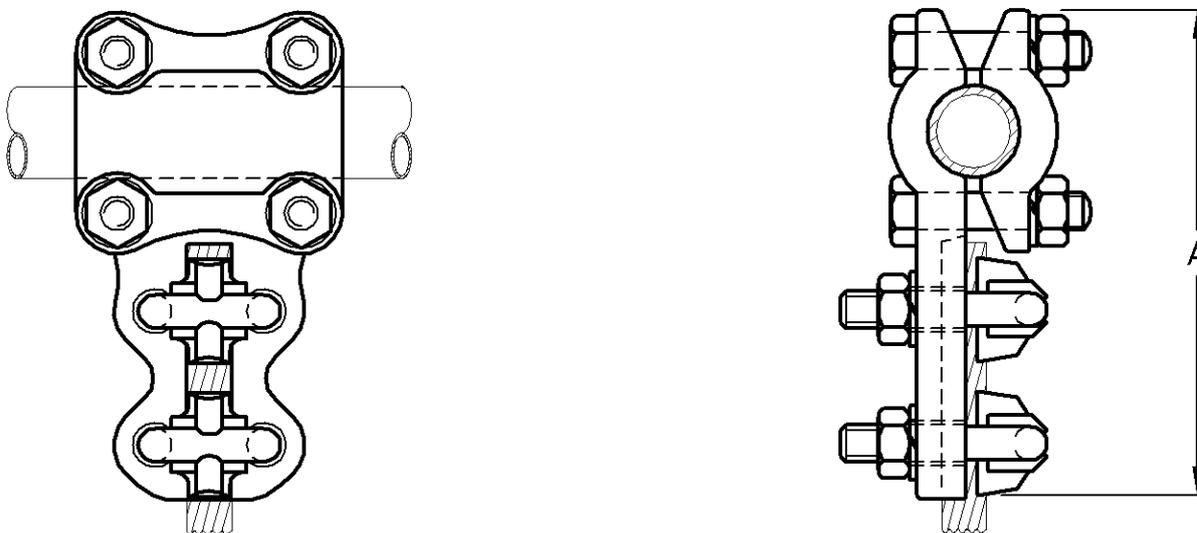
5.13.1.3 Horizontal to vertical clamp for busbar to stranded conductor:

Busbar (R)	Conductor (T)		A Length of Stranded clamp	B Length of solid clamp	Ampere rating
	MIN	MAX			
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: 21

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: 12 Horizontal to vertical clamp for busbar to stranded conductor

5.13.1.4 Horizontal to vertical 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: 22

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

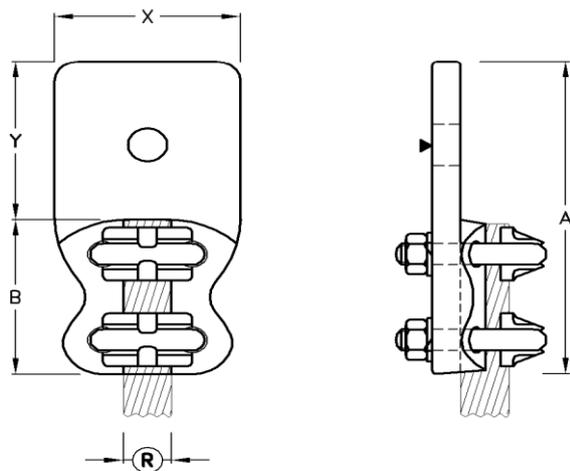
5.13.1.5 **lug stranded conductor: (in-line)**

Conductor (R)		Palm Size		A Length of clamp	B Length of Stranded clamp	Ampere rating
MIN	MAX	Width X	Length Y			
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: 23

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)

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

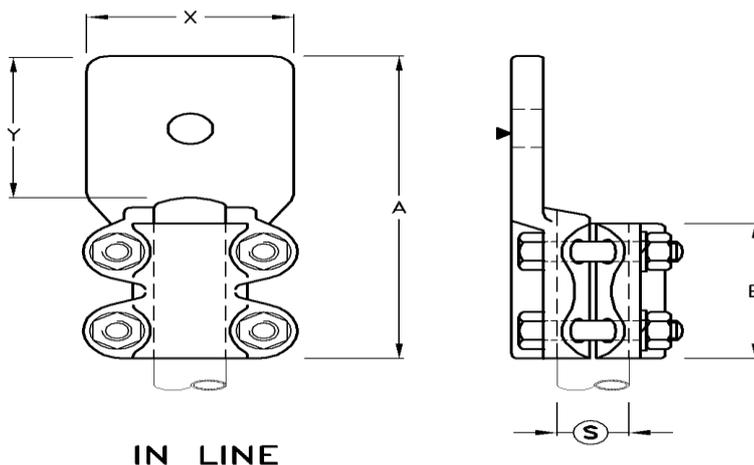
Busbar (S)	Palm Size		A Length of clamp	B Length of busbar clamp	Ampere rating
	Width X	Length Y			

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: 24

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)

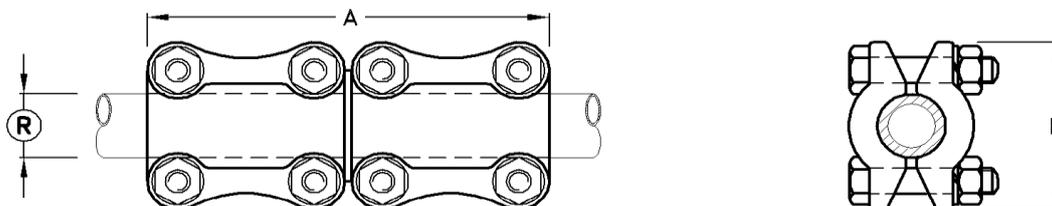
5.13.1.7 In-line coupler clamp for tubular busbar:

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: 25

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

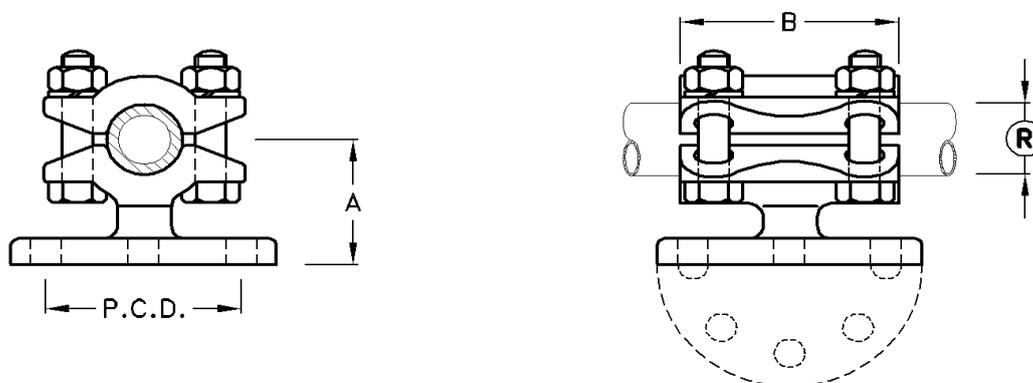
5.13.1.8 Fix support clamp for tubular busbar:

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: 26

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

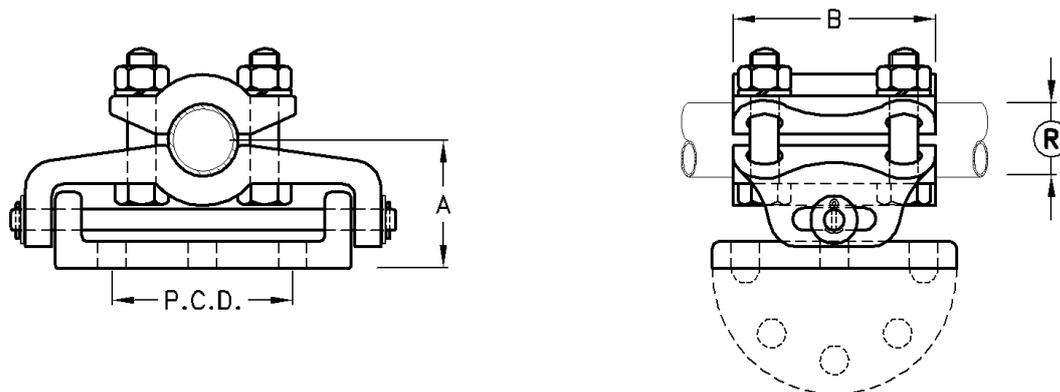
5.13.1.9 Slider support clamp for tubular busbar:

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: 27

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

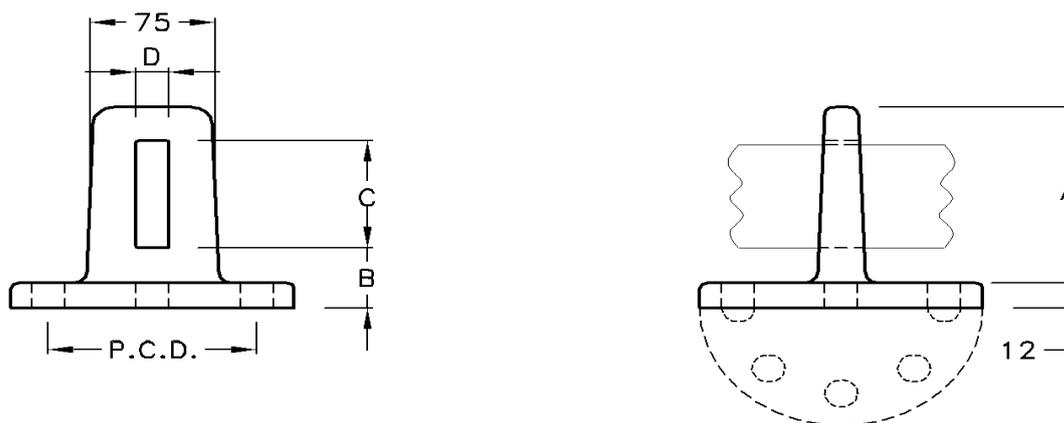
5.13.1.10 **SCC-type slider clamp for busbar support:**

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: 28

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

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

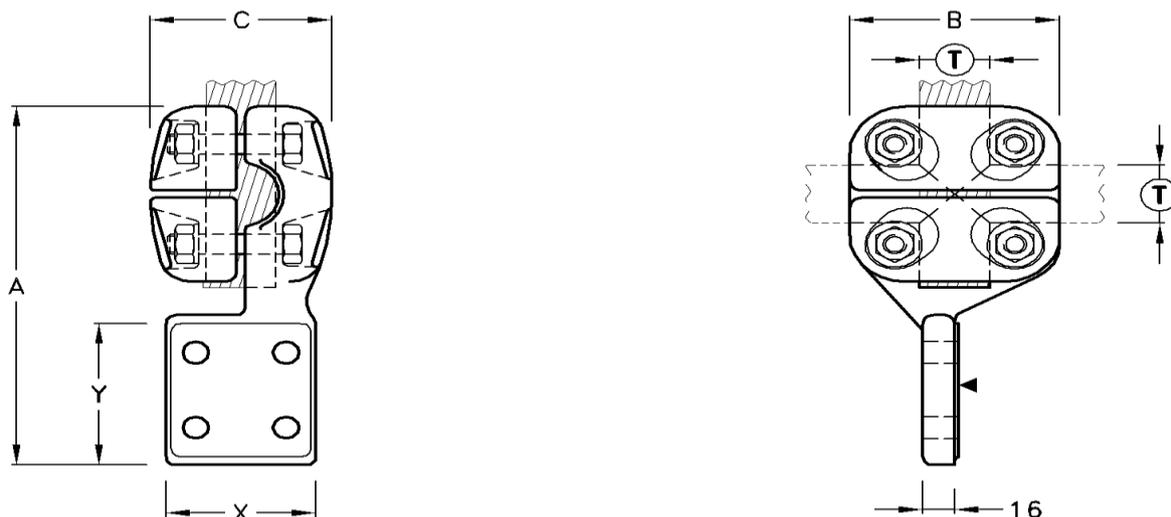
Conductor size	Palm (mm)		Size	Max Amp Rating	A Length of clamp	B Length of Stranded clamp	C Width of clamp	D
	Width X	Length Y						
Ø26mm	80	90	900A		208	95	82	12

Ø38mm	80	90	1350	215	105	88	15
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Table: 29

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)

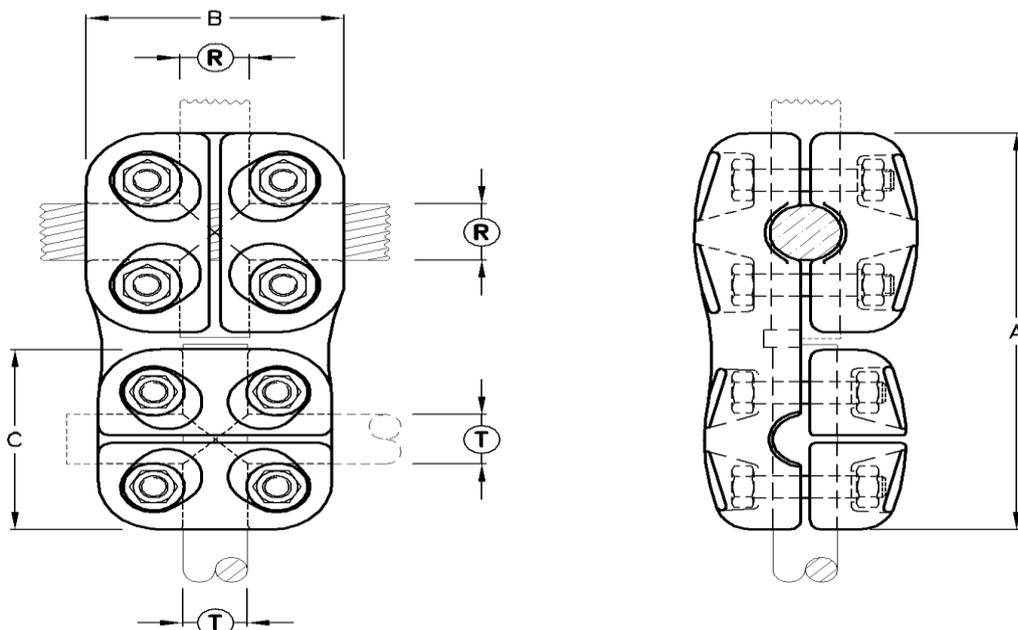
5.13.1.12 K - Type Cross Clamp For stud to stranded Conductor:(mm)

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: 30

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

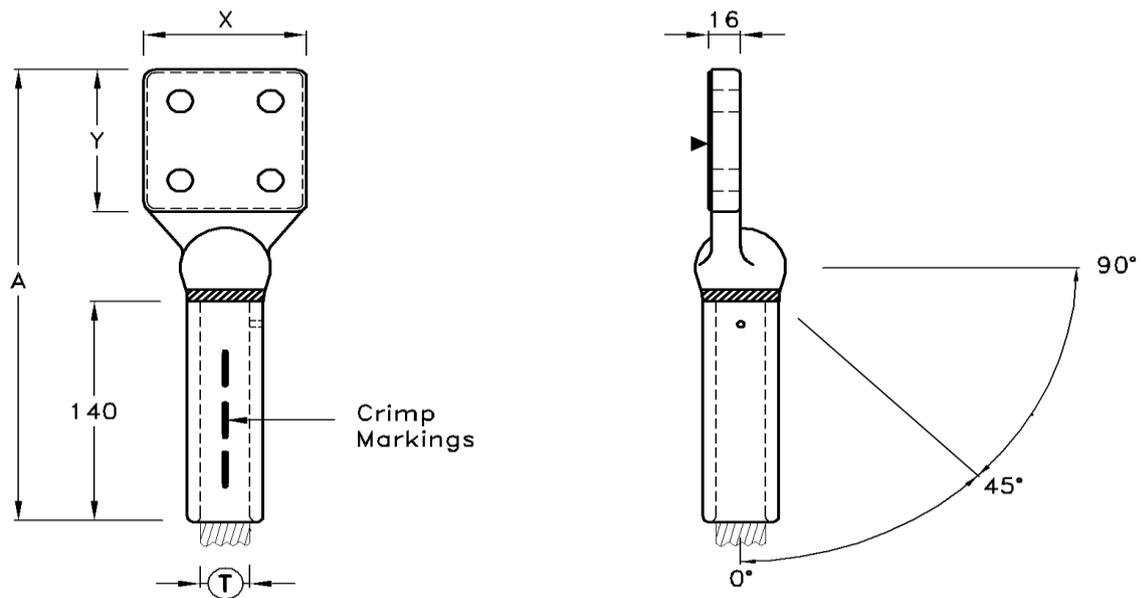
5.13.1.13 SPC – Type Palm Clamp to Stranded Conductor (Crimping)

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: 31

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

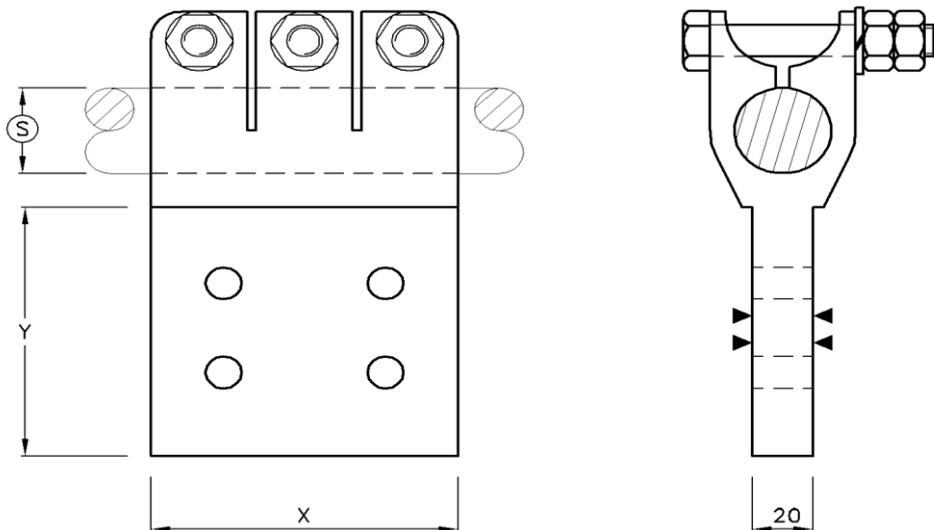


Drawing: 21 SPC – Type Palm Clamp to Stranded Conductor (Crimping)

5.13.1.14 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: 32



Drawing: 22 Transformer Palm Terminal

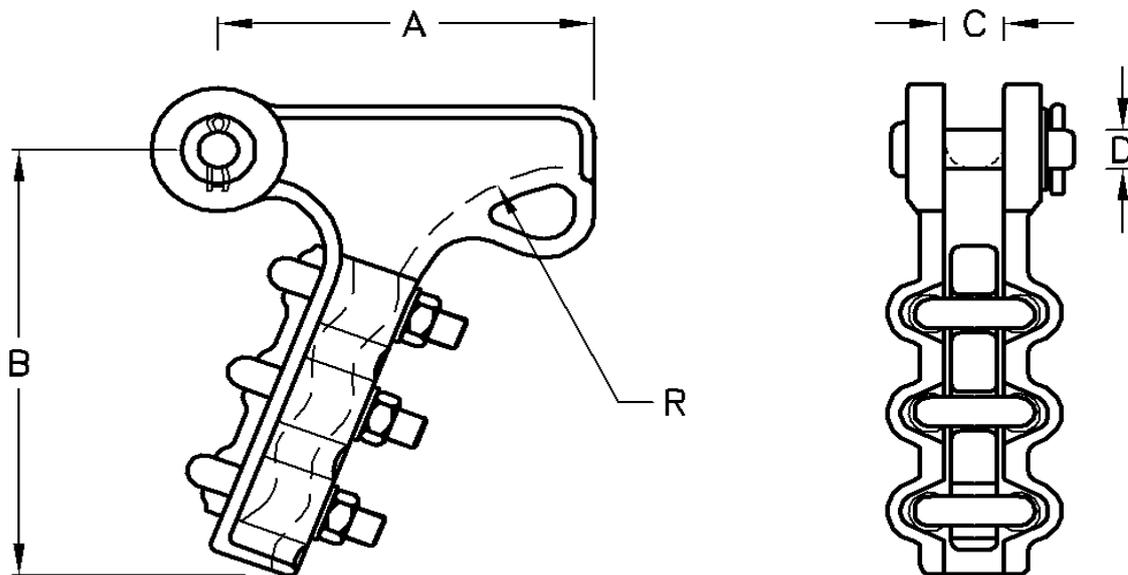
5.13.1.15 Strain Clamp aluminium, 70kN, 3 – bolt, Pistol Type:

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: 33

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

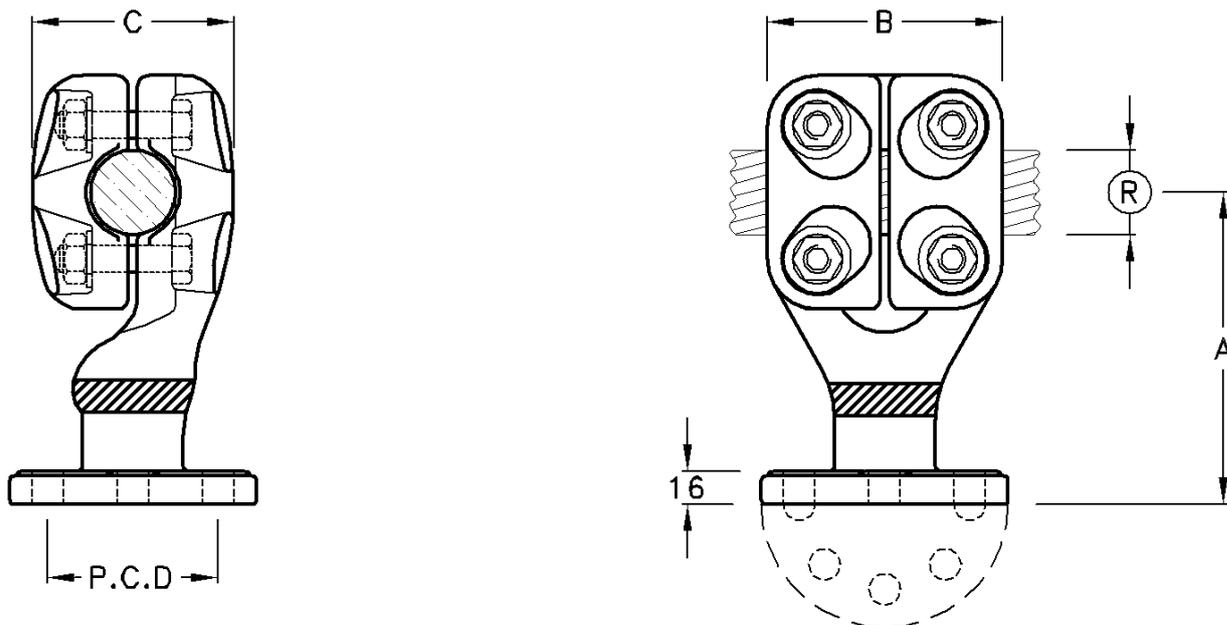
5.13.1.16 **KCP-type pedestal support**

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: 34

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

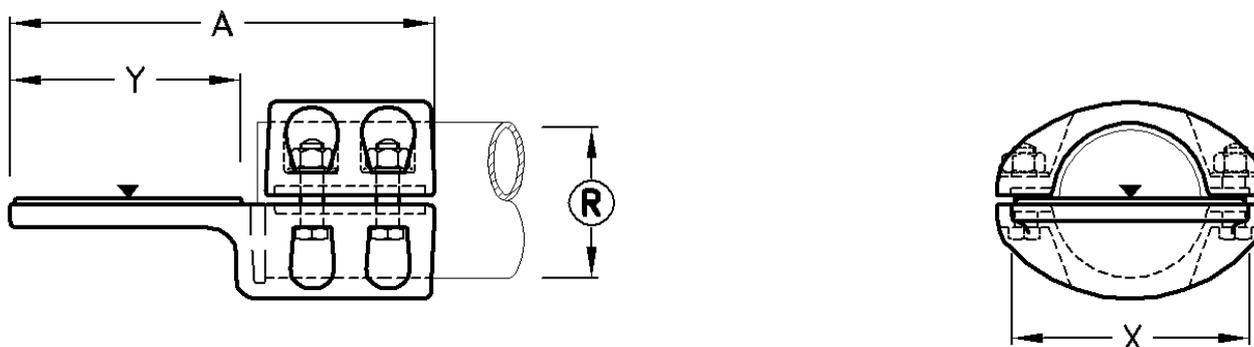
5.13.1.17 TBP Type Palm Terminal clamp

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: 35

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



TYPE A: In Line

Drawing: 25 TBP Type Palm Terminal clamp.

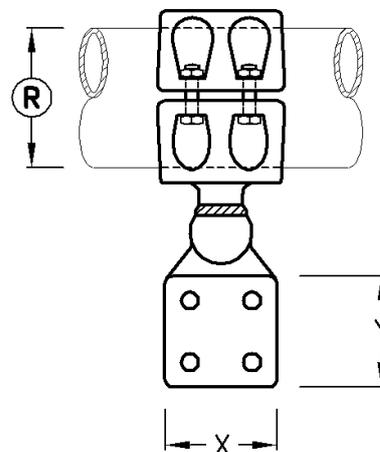
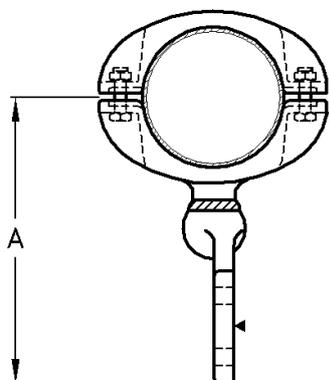
5.13.1.18 TBPT – Type Palm Tap-off Clamp

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: 36

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.

5.13.1.19 TBFCTS – Type Fixed Coupler Tee Support Clamp

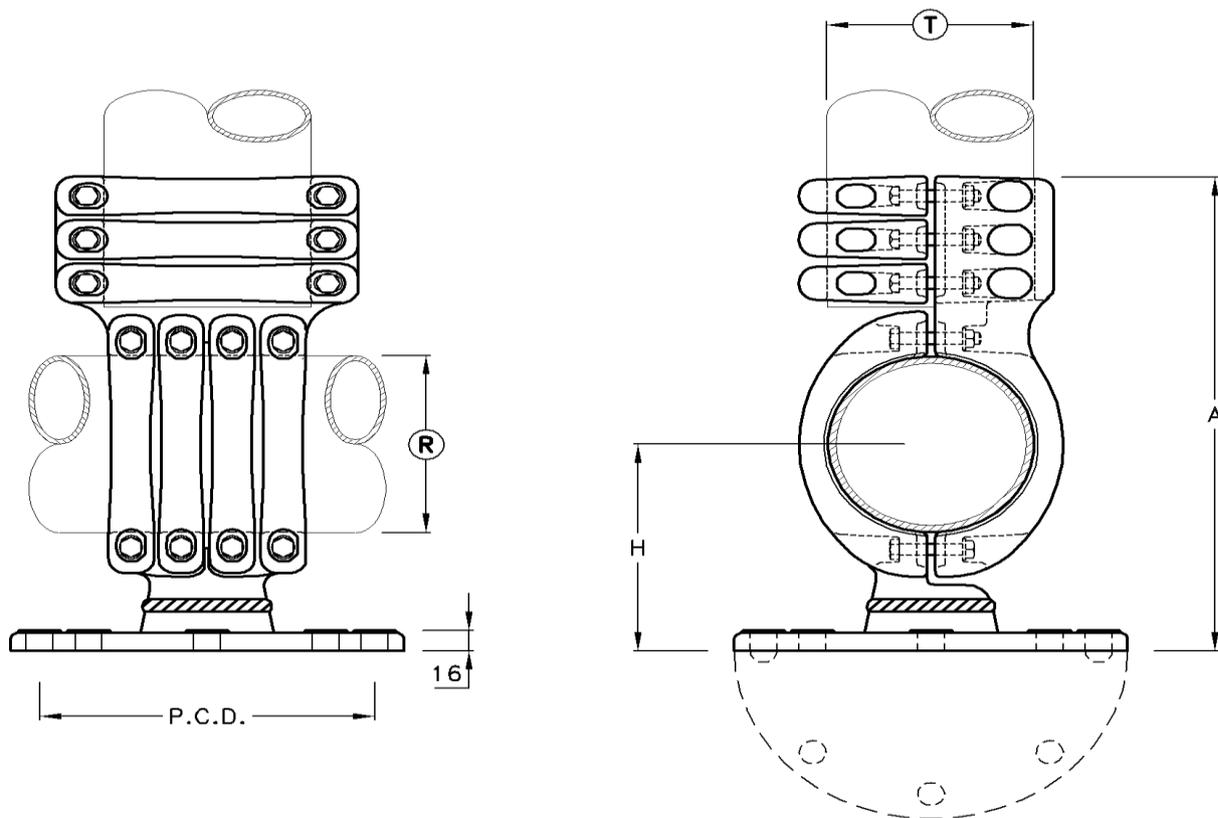
Tube Dia.		P.C.D.	A	H	Max. Rating Amps
R	T				
80	80	76	305	160	2300
100	100	76	330	160	2800
120	80	127	405	194	2300
120	120	127	405	194	3300
150	150	127	460	210	4000
160	160	127	460	210	4000
200	200	225	615	200	5200

Table: 37

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.

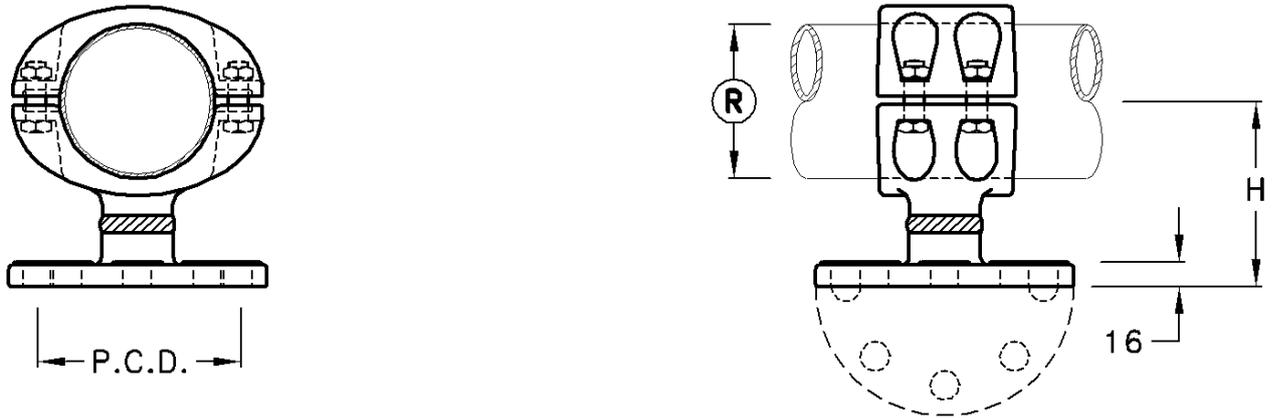
5.13.1.20 TBFS – Type Fixed support Clamp.

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: 38

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.

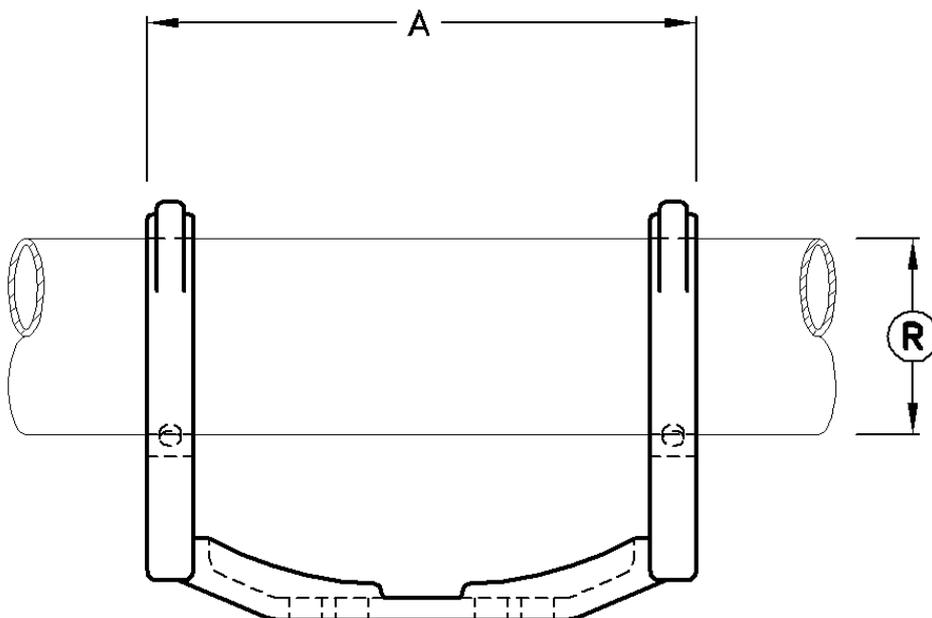
5.13.1.21 TBSS – Type Sliding Support Clamp.

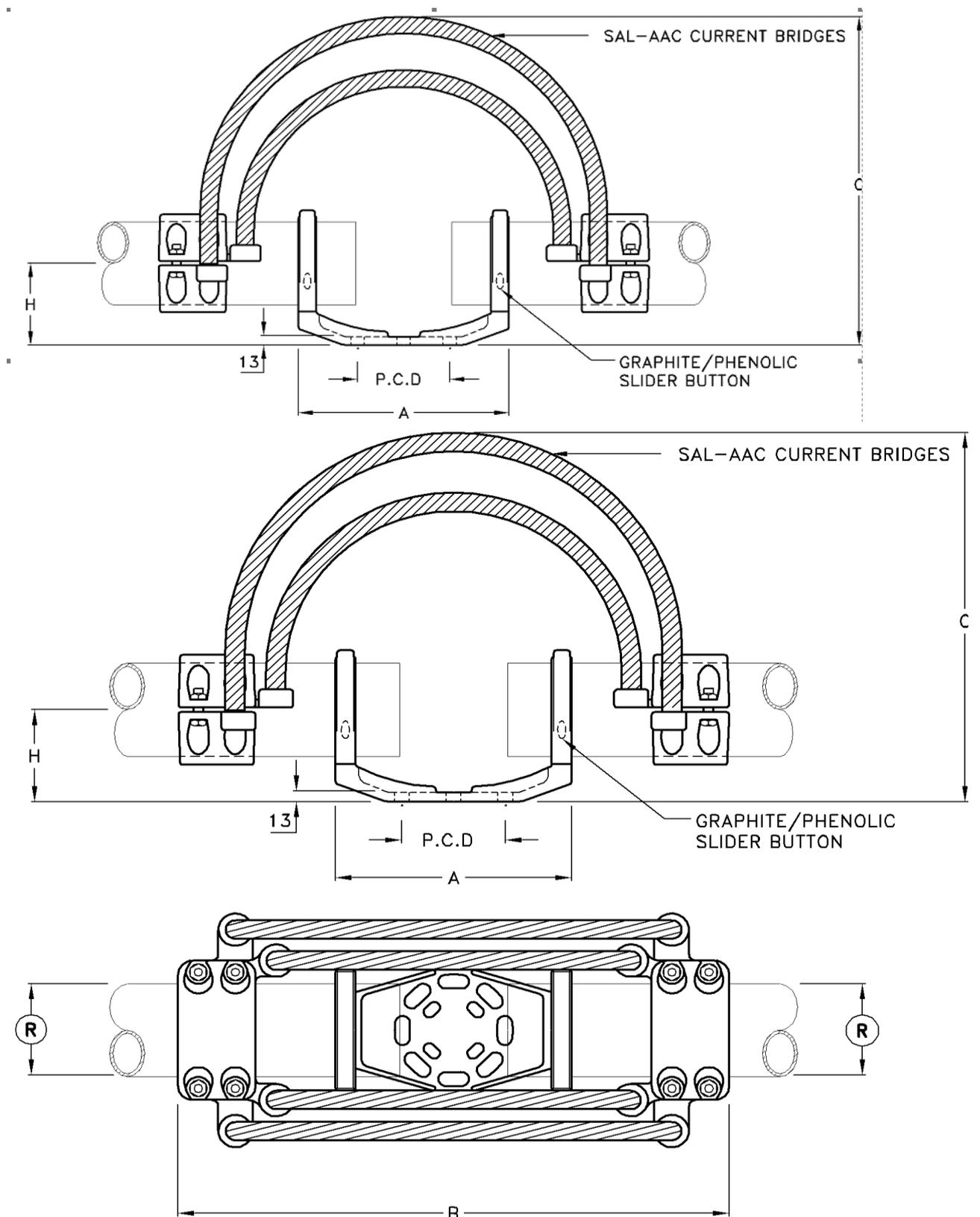
Tube Dia.	P.C.D.	A	H
80	76	290	120
100	76	290	120
120	76	300	150
80	127	290	120
100	127	290	120
120	127	300	150

Table: 39

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

5.13.1.23 Compression Dead End for ACSR Conductors

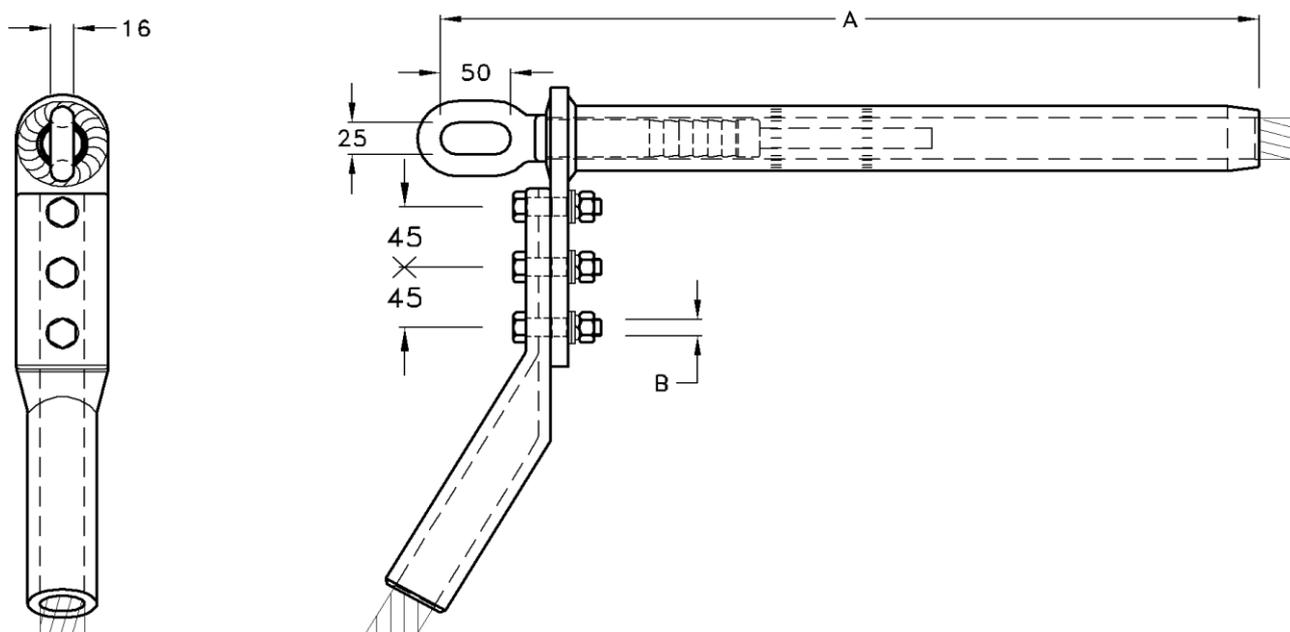
Conductor		A	B	UTS
Name	Dia.			kN
Fox	8.38	415	2 x M12	13.25
Mink	10.98	415	2 x M12	22.07

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: 41

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

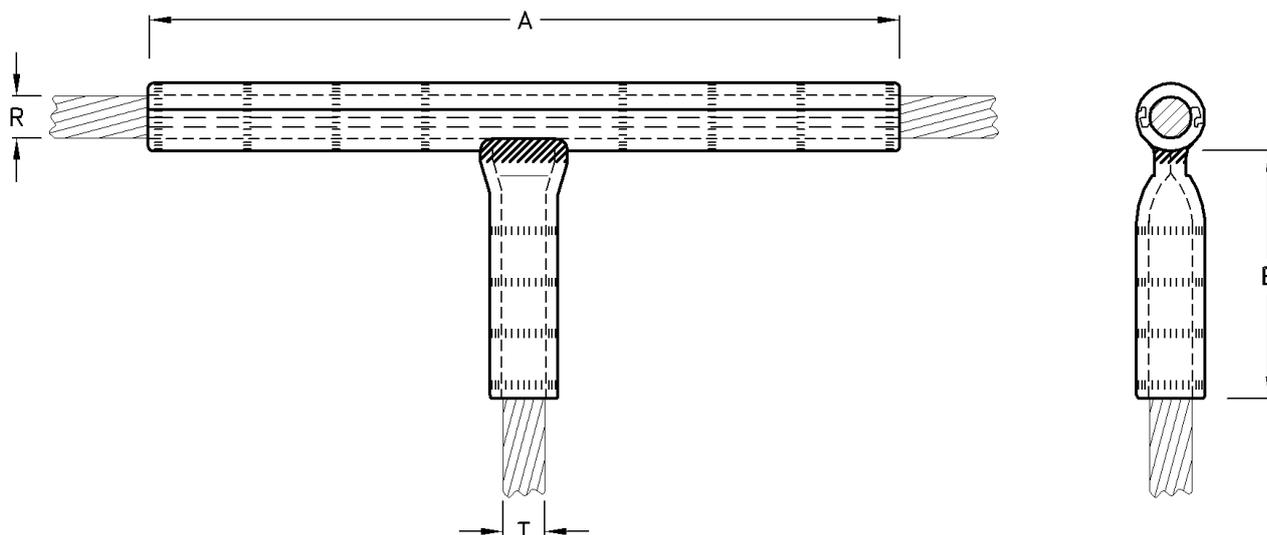
5.13.1.24 Non-Tension Compression Tap Connector Tee-off :

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: 42

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

5.14 Neutral Earth Resistor (NER) (tender on oil and dry type)

5.14.1 11kV NER

The NER must be design for 11000 Volts, 300 Amp, 20Ω , 10kA and 50Hz. The unit must have protection level of IP 55. The resistors must be 10Ω each and there must be four (4) installed. Two resistors in series and then in parallel. These resistors must be of robust design and easy to be replaced on site.

The resistors must be in a dead end tank and submerged in oil. The oil must be PCB free and 60kV dielectric strength. The Unit must be fitted with a temperature gauges. The tank must be fitted with an oil glass, top up and drain valve. The unit must have an over pressure valve rated according the design that is fitted with a limit switch to enable tripping. The unit must be fitted with a silica gel breather size that match the quantity of oil.

The cable and bushing kiosk/box must have the following:

1. The connection bushings must be clearly marked as follows:
 1. P1 label for bushing to earth, with current transformer.
 2. P2 label for bushing to reactor and star point of the transformer.
2. The Current transformer must be factory installed underneath P1 bushing.

CURRENT TRANSFORMER: For 11kV NER			
DESCRIPTION OF PARTICULARS	UNITS	SPECIFIED REQUIREMENT	PARTICULARS OFFERED AND GURANTEED
Install CT's		Yes	
Purpose		NER	
Ratio		100/1	
Burden		15VA	
Class		5P20	
Quantity		2	
Insulation Level		0.66kV	

Table: 43

5.15 Neutral Electromagnetic Coupler Combined with Neutral Earthing Resistor (NECRT) and Auxiliary Transformers. (tender on oil and dry type)

The NECRT must be design for 11000 Volts, 300 Amp, 20Ω, 10kA and 50Hz. The unit must have protection level of IP 55. The resistors must be 10Ω each and there must be four (4) installed. Two resistors in series and then in parallel. **These resistors must be of robust design and installed in a separate tank from the auxiliary transformer.** It must be easy to be replaced the resistors on site.

The resistors must be in a dead end tank and submerge in oil. The oil must be PCB free and 60kV dielectric strength. The Unit must be fitted with a temperature gauges. The reservoir tank must be fitted with an oil glass, top up and drain valve. The unit must have an over pressure valve rated according the design that is fitted with a limit switch to enable tripping. The unit must be fitted with a silica gel breather size that match the quantity of oil.

The cable and bushing kiosk/box must have the following:

1. The connecting bushings must be clearly marked as follows:
 1. P1 (Zn) label for bushing to earth, with current transformer.
 2. P2 label for bushing to reactor and star point of the transformer.
 3. The bushings must be alongside each other and not vertical on top of each other.
2. The Dual Current transformer must be factory installed underneath P1 bushing.

CURRENT TRANSFORMER: For 11kV NER			
DESCRIPTION OF PARTICULARS	UNITS	SPECIFIED REQUIREMENT	PARTICULARS OFFERED AND GURANTEED
Install CT's		Yes	
Purpose		NER	
Ratio		100/1	
Burden		15VA	
Class		5P20	
Quantity	two	2	
Insulation Level		0.66kV	

Table: 44

3. The low voltage kiosk on the 200kVA auxiliary transformer must be properly labeled. The bushings inside must be labeled, r, w, b and n. A 150 Amp three phase circuit breaker, earth bar and neutral bar must be installed underneath the bushings. The kiosk must have a gland plate of 3mm aluminium.
4. The medium voltage kiosk must accommodate an 11kV termination with PVC slider clamp and earthing facilities. The bushings must be clearly labeled R, W and B. The medium voltage cable size is 70mm², 3 core, PLIC. Provision for all clearances must be made.

5.16 Reactor single phase and NERM.

Provide an NER monitor relay 110VDC, "Test a Relay" RM110 or equivalent.

5.17 Reactor 11kV, 5kVA single core.

Provide an 11kV, single core reactor transformer with the bushings on the low voltage side marked as a, w, b and n.

5.18 Refurbishment of equipment, “strip & quote” and transport.

Provide 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 (Strip and Quote).

6. HEALTH AND SAFETY REQUIREMENTS

6.1.1 All the equipment must be properly wrapped and secure when transported.

6.1.2 All the items must be properly labeled with sticker, after wrapping, to identify the offloading without unwrapping the plastic rapping.

6.1.3 The offloading of equipment on CENTLEC premises must be done safely.

6.1.4 All equipment supplied filled with any chemical substance must be accompanied with the safety data sheet. (SF6 or Oil)

7. 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 bidders 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 the specified goals level of contribution 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 bidder offering the lowest price.

The relative specific goal criteria are as follows:

c	Criteria	Description	Points
1.	Track record and experience	Has the Bidder provided these products to a South African electrical distribution utility in the last four years? Two (2) letters = 10 points ; Three (3) letters or more = 20 points	20
2.	Local (CENTLEC supply area) operational capability and economic investment	Does the bidder have a RSA based company with operational capability to do services? Mangaung = 20 Points RSA = 5 Points	20
3	Guarantee and Warranty	Submit warranties and guarantees that is signed by the manufacturer of the switchgear. One (1) year = 10 points Two (2) years = 15 points Three (3) years = 20 points Four (4) years and more = 30 points	30
4	Test Reports	Submit type test certificate for switchgears = 15 points Submit type test certificate for voltage transformers. = 15 points	30
	TOTAL		100

Table: 45

A bidder who gets a minimum of 55 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 – 5 points

Item 3 – 10 points

Item 4 – 30 points in the Evaluation Criteria.

8.2. PRICE AND REFERENTIAL POINTS SCORING – STAGE 2 (Price and Special Goals requirement)

All Bidders that have passed the technical evaluation threshold of 55 points would also be scored based the 90/10 principle where 90 Points is for the Price and 10 points for special goals requirements as per the detail given below.

8.3 Points awarded for price

A maximum of 90 Points is allocated for price on the following basis:

$$\text{Where } Ps = 90 \left(1 - \frac{Pt - Pmin}{Pmin} \right)$$

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 Specified 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;

Table 3: Specified Goals for Preferential Point System

Specified Goals	Points Allocation
50% Black owned	6
50% Women owned	2
50% Youth owned <35 years	2
Total Points	10

8.5 Quotation Price

8.5.1. The quotation price(s) shall be SEIFSA based priced

8.5.2. The quotation price(s) shall be subject to negotiated increase, if absolutely unavoidable, should the contract be extended for one or more further periods, each period not exceeding 12 months.

NB: All transport cost will only be paid as per updated AA ratings at the time of invoicing!

9. PRICING

All prices must be exclusive of VAT but included the transport to CENTLEC.

Schedule	Description	Unit of measurement	Price per unit in (R) Rand	Delivery period in weeks
5.3.3	800 Amp 36kV GCB	Each		
5.3.4	1600 Amp 36kV GCB	Each		
5.3.5	1250 Amp 36kV GCB	Each		
5.3.6	800 Amp 12kV GCB	Each		
5.3.7	1250 Amp 12kV GCB	Each		
5.4.1	36kV, outdoor, structure mountable, 5 limb, 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: 47

5.6 A. Pricing for 3 Phase, 36kV, outdoor single side break disconnecter switches (Links) Type SSB36 from Actom or equivalent.

ITEM NO.	Rated current	Withstand test voltage				Short circuit rating R.M.S kA	Peak withstand current kA	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		
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Table: 47

5.6 B Pricing for Rocker Arm Disconnecter Switches

item	Rated Voltage kV	Rated Current Amps	Test withstand voltage				Short circuit current kA	Peak current withstand cur-	Creepage dis- tance mm	Price in rand (each)	Delivery time weeks
			To earth and between poles		Across the isolating distance						
			B.I.L im- pulse voltage	Power fren- cy (wet)	B.I.L im- pulse voltage	Power fren- cy (Dry)					
1	11kV	800	28	37	95	110	17.5	47	340		
2	36kV	1600	70	200	95	230	17.5	47	820		

Table: 48

5.7.1 Pricing for 36kV stationary (Porcelain) Type of lightning arrestors

Rated	36kV	Price in RAND	Delivery time weeks
Class	10kA		
Frequency	50Hz		
MCOV	29.0kV		

Table: 49

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

YH 10 W	36/108	Price in RAND	Delivery time weeks
Rated	36kV		
MCOV	29.0kV		
Frequency	50Hz		

Table: 50

5.8. Pricing for outdoor 36 kV Stand-off Bushings: Station post porcelain insulator 36kV to 132kV - 4kN:

ITEM	A Length	B width	C Width of holes	D Size of holes	Power frequency flashover voltage		Critical Impulse flashover voltage		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: 51

5.9. Pricing for outdoor pole mounted 36kV, 630 Amp, single phase, disconnecter link switches, set of three, complete with mounting brackets

Schedule	Description	Unit of meas- urement	Price per unit in (R) Rand	Delivery period in weeks
1	Single phase disconnecter link 630 Amp, 36kV. (Silicone / Polymeric / Porcelain) complete with brackets.	Per set of 3		

Table: 52

5.10. Pricing for 36kV Pin Insulators

ITEM	A Length	B Width	C Core width	D Skirt size	E Spindle size	R Tie top groove	Creepage (mm)	Power frequency flashover voltage		Critical Impulse flashover voltage		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: 53

5.11. Pricing for 36kV Drop out fuses

Item	Rated current Amps	Creepage (mm)	Nema Bracket	100A fuse carrier	200A solid link	A Length of assembly	B Nema bracket from top	C Length of fuse carrier	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		

Table: 54

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

Item	Volt kV	A	Number of sheds	Creepage distance mm	Power frequency flashover voltage		Critical impulse flashover voltage		B.I.L	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: 55

5.8.1.1 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	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: 56

5.8.1.2 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	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: 57

5.8.1.3 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	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: 58

5.8.1.4 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	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: 59

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

Item	Conductor (R)		Palm Size		A Length of clamp	B Length of Stranded clamp	Ampere rating	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: 60

5.8.1.6 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	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: 61

5.8.1.7 In-line coupler clamp for tubular busbar:

Item	Busbar tube diameter	A Length of clamp	B Width of busbar clamp	Ampere rating	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: 62

5.8.1.8 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	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: 63

5.8.1.9 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	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: 64

5.8.1.10 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.	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: 65

5.8.1.11 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	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: 66

5.8.1.12 Pricing for K - Type Cross Clamp for stud to stranded Conductor:(mm)

Item	Conductor (R)	Stud (T)	Max. Amp rating	A	B	C	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: 67

5.8.1.13 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	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: 68

5.8.1.1 Pricing for Transformer Palm Terminal

Item	Stud Size	Palm Size		Hole sizes	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: 69

5.8.1.14 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)	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: 70

5.8.1.15 Pricing for KCP-type pedestal support

Item	Conductor R	P.C.D.	A	B	C	Max. Rating Amps	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: 71

5.8.1.16 Pricing for TBP Type Palm Terminal clamp

Item	Tube Dia.	Palm sizes		A	Max. rating Amps	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: 72

5.8.1.17 Pricing for TBPT – Type Palm Tap-off Clamp

Item	Tube Dia.	Palm sizes		A	Max. rating Amps	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: 73

5.8.1.18 Pricing for TBFCTS – Type Fixed Coupler Tee Support Clamp

Item	Tube Dia.		P.C.D.	A	H	Max. Rating Amps	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: 74

5.8.1.19 Pricing for TBFS – Type Fixed support Clamp.

Item	Tube Dia. R	P.C.D.	H	Max. Rating Amps	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: 75

5.8.1.20 Pricing for TBSS – Type Sliding Support Clamp.

Item	Tube Dia.	P.C.D.	A	H	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: 76

5.8.1.21 Pricing for TBFX – Type Full In – Line Expansion Clamp Slide.

Item	Tube Dia. R	P.C.D.	A	B	C	H	Max. Rating. Amps	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: 77

5.8.1.22 Pricing for Compression Dead End for ACSR Conductors

Item	Conductor		A	B	UTS	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: 78

5.8.1.23 Pricing for Non-Tension Compression Tap Connector Tee-off:

Item	Conductor R		Conductor T		A	B	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: 79

5.14 Neutral Earth Resistor 11kV. (Price on oil and dry type)

Item	Description	Unit of measurement	Price in (R)	Delivery Time
1	NER oil type	Each		
1	NER Dry type	Each		

Table: 80

5.15 Neutral Electromagnetic Coupler Combined with Neutral Earthing Resistor (NECRT) and Auxiliary Transformers. 11kV/420V (Price on oil and dry type)

Item	Description	Unit of measurement	Price in (R)	Delivery Time
1	NECRT oil type	Each		
1	NECRT dry type	Each		

Table: 81

5.9 Reactor single phase and NERM.

Item	Description	Unit of measurement	Price in (R)	Delivery Time
1	Please provide an NER monitor relay 110Vdc, "Test a Relay" RM110 or equivalent.	Each		

Table: 82

5.10 Reactor 11kV, 5kVA single core.

Item	Description	Unit of measurement	Price in (R)	Delivery Time
1	Please provide an 11kV, single core reactor transformer with the bushings on the low voltage side marked as a, w, b and n.	Each		

Table: 83

5.11 Refurbishment/repair of equipment, "strip & quote" and transport.

Item	Description	Unit of measurement	Price in (R)	Delivery Time
1	Provide 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: 84

10. LIST OF SPARES (This is compulsory)

Item	Description	Unit of measurement	Price in (R)	Delivery Time
1	110 volt trip coils	each		
2	110 Volt Closing Coils	each		
3	Resistors for NER's	each		
4	Resistors for NECRT's	each		
5	Bushings 36kV for GCB (Dog Box)	each		
6	Bushings 11kV for GCB (Dog Box)	each		
7	Set of GCB SF6 Gas Fittings to refill gas.	each		

8	Current transformers 36kV, as specified in technical specification.	each		
9	Current transformers 11kV, as specified in technical specification.	each		
10	Current transformers for NER and NECRT as specified in technical specifications.	each		
11	Supply and delivering (refilling) of 9Kg Sf6 gas cylinders.	Each (9Kg)		

Table: 85

11. Contact Details

11.1 For any further technical information regarding the document contents please contact Mr. P Niemann e-mail:Piet.niemann@centlec.co.za or Mme Lindiwe Kalane email: Lindiwe.kalane@centlec.co.za. Such 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.

11.2 For Supply Chain related questions, please contact Ms. Palesa Makhele at Palesa.Makhele@centlec.co.za