

CORRIGENDUM -1FOR NIT NO: CMC/BR/26-27/FK/PR/AG/1366 FOR SCHEME NO: EW25ML1044 CONVERSION OF 66KV O/H S/C T/L FROM PANKHA ROAD - SAGARPUR CIRCUIT (FROM PANKHA ROAD GRID TO SAGARPUR GRID) WITH ROUTE LENGTH - 3100M & 66KV O/H T-OFF CIRCUIT OF PPK-1 TO REWARI LINE (DABRI CROSSING TO PANKHA ROAD) BY LAYING OF 02 NO'S. 66KV 3CX300SQ.MM. XLPE CABLE ROUTE LENGTH - 1400 M & SCHEME NO: EW25ML1045 CONVERSION OVERHEAD TO U/G OF 33KV PANKHA ROAD TO MAYAPURI CIRCUIT 1 & 2 BY LAYING OF 03 NO'S 33KV 3X400MM 2 XLPE CABLE.

REVISED PRICE BID

CORRIGENDUM DATE: 24-06-2026

Sl. No.	Description	Status
1	Revised Price Bid (Section- VI)	ATTACHED

BOQ Supply

EW25ML1044 - Conversion of 66kV O/H S/C T/L from Pankha Road -Sagarpur Circuit (from pankha Road Grid to Sagarpur Grid) with Route Length - 3100M and 66kV O/H T-off Circuit of PPK-1 to Rewari Line (Dabri Crossing to Pankha Road) by laying of 02 Nos. 66KV 3Cx300sq.mm. XLPE cable Route Length - 1400 M

EW25ML1045: Conversion overhead to U/G of 33kv Pankha Road to Mayapuri Circuit 1 & 2 by laying of 03 nos 33 kv 3x400mm2 XLPE cable with Route Length - 5000M.

S. No.	Description	UOM	Qty EW25ML1044	Qty EW25ML1045	Rate in (Rs)	EW25ML1044 Amount in Rs.	EW25ML1045 Amount in Rs.
1	ARRSTR,ELEC,OUTDR ELEC;60KV;10KA	EA	12	0			
2	ARRSTR,ELEC,OUTDR ;33KV;10KA	NOS	0	6			
3	ANGLE,STRCTL,50MM;50MM;6MM;MS	KG	1000	0			
4	RLY,NUMERICAL,220VDC,DISTANCE,MICO	NOS	2	2			
5	CHNL,STRCTL,ISMC100;100MM;50mm;7.7	MT	3	1			
6	STP,MTLC,EARTHING;50X6MM;GI	KG	2200	500			
7	ISOLATOR,ELEC,66KV;2000AMPS;W/O E	NOS	2	0			
8	ANGLE,STRCTL,65MM;65MM;6MM;MS	MT	2	0.5			
9	ANGLE,STRCTL,75MM;75MM;6MM;IS2062	MT	0.5	0			
10	CNDCTR,ACSR ZEBRA UNINSUL	M	120	60			
11	CLMP,PARRL GROV,ACSR ZEBRA CNDCTR	NOS	18	24			
12	LUG,CRIMPING;630MM2;HVVDTY LG	EA	18	0			
13	Number plate, PLT,MTLC, RECTANGULAR;AL;NUMBER,	EA	12	4			
14	Danger Plate, BRD,SIGN,DANGER	EA	12	4			
15	Phase Plate in Set of red Blue & Yellow, PLT,MTLC, RECTANGULAR; PHASE R Y B	SETS	10	4			
16	TAPE,SFTY BARR,150MM;PVC;DNGER 66KV BSES (WARNING TAPE)	M	3390	3500			
17	TAG,SFTY,RCTNGL;AL;MTLC	NOS	640	1020			
18	CVR,CBL;600X550X50MM;RCC	NOS	3352	3281			
19	MRKR,CBL;ELEC BAL MRKR PASSIVE	NOS	146	100			
20	MRKR,CBL;ELEC BAL MRKR ACTIVE	EA	34	51			
21	PI,SPL	M	5200	0			
22	HDPE pipes,PN 6 class PE 80 - 180mm dia	M	0	9900			
23	Cable Route/Joint Marker as per approved drawing.For 33/66 KV cables.	EA	106	183			
24	RCC Coffin for joint as per the specification of BRPL	EA	34	51			
25	Galvanized Nut & Bolts	KG	330	200			
26	Circuit Plates	EA	8	4			
27	Supply of fixing of wire mesh fencing 2.65 mtr height with gate frame of 3 mtr x 2.5 mtr with complete material including painting eg angle,chain link,wire mesh and civil material etc complete as per specification,drawing no.Angle iron size 50x50x6 mm & MS strip 50 x 3 mm wire mesh 1"x3", 8 SWG wire to be used for wire-mesh with providing support at 1.25 distance.	SQM	108	0			
28	Optical Fiber Cable	M	1000	2200			
29	40 mm HDPE duct	M	960	2000			

30	Joint enclosure 48F Optic Fiber Cable	EA	4	6			
31	LIU	EA	4	2			
	Material Cost						
	GST 18%						
	Grand Total Value in Rs.						

BOQ Service

EW25ML1044 - Conversion of 66kV O/H S/C T/L from Pankha Road -Sagarpur Circuit (from pankha Road Grid to Sagarpur Grid) with Route Length - 3100M and 66kV O/H T-off Circuit of PPK-1 to Rewari Line(Dabri Crossing to Pankha Road) by laying of 02 Nos. 66KV 3Cx300sq.mm. XLPE cable Route Length - 1400 M

EW25ML1045: Conversion overhead to U/G of 33kV Pankha Road to Mayapuri Circuit 1 & 2 by laying of 03 nos 33 kv 3x400mm2 XLPE cable.

S. No.	Service code	Description	UNIT	Quantity		Rate in Rs.	EW25ML1044 Amount in Rs.	EW25ML1045 Amount in Rs.
				EW25ML1044	EW25ML1045			
1	4060369	Digging of cable trench as per specification and drawings. Rate is inclusive of digging and backfilling. Measurement shall be as per actual depth excavated . For Dense Carpeted bituminous Road.	CUM	4698	4464			
2	4060377	Digging of joint pit suitable for 33/66 KV cable joint box and covering the joint box with sand and providing protection as per BYPL/BRPL design. For Dense	Cum	480	510			
3	4060383	Digging of test pits of required size(not less than 1/2 Mtr. Wide at site for identification of cable route). Relevant volume shall be deducted from quantities of same item of cable digging For Dense carpeted	EA	125	167			
4	4060390	Grouting of cable mounting structure with cement concrete having ratio 1:3:6 including fixing with gantry structure. Badarpur, cement and stone ballast shall be supplied by contractor.Suitable for mounting 33/66	EA	5	2			
5	4060372	Removal of Malba including Loading / Unloading on own vehicle. The payment shall be restricted to the	CUM	1301	714			
6	4060388	Laying of under ground cable in trench ,covering with RCC cable cover,covering with sand ,Sand cushion will be min 75mm below and 75mm above the cable, fixing of cable identification tags (9" X 4") at every 30 Mtrs, Laying of warning tape above 250mm of the docket, refilling the trench and ramming the surface & removal of malba if any, including watch and ward till charging of cable (This activity includes only labour	M	9000	0			
7	4060386	Laying of under ground cable in trench ,covering with RCC cable cover,covering with sand ,Sand cushion will be min 75mm below and 75mm above the cable, fixing of cable identification tags (9" X 4") at every 30 Mtrs, Laying of warning tape above 250mm of the docket, refilling the trench and ramming the surface & removal of malba if any, including watch and ward till	M	0	15000			
8	4060373	Providing and Laying Sand cushioning for cable route as per BRPL/BYPL specification and drawing.	CUM	758	595			
9	4060391	Supply and fixing of Cable Route/Joint Marker as per approved drawing.For 33/66 KV cables.	EA	106	183			
10	4060357	Providing and Fixing of Danger plates.	EA	0	4			
11	4060358	Providing and Fixing of number plates .	EA	0	4			
12	4060359	Providing and Fixing of Phase plates .	EA	0	4			
13	4060360	Providing and Fixing of circuit plates .	EA	8	4			
14	4060363	Supply and fixing of wire mesh fencing 2.65 mtr height with gate frame of 3 mtr x 2.5 mtr with complete material including painting eg angle,chain link,wire mesh and civil material etc complete as per specification,drawing no.Angle iron size 50x50x6 mm & MS strip 50 x 3 mm wire mesh 1"x3", 8 SWG wire to	SQM	108	0			
15		Laying of HDPE pipe of 225mm dia.of PN6 Class PE80 For crossing of roads by trenchless technology including required equipment, manpower & transport of equipment from one place to another.	M	2200	0			
16		Crossing of roads by trench-less technology by laying of HDPE pipe excluding supply of pipe .Laying by Pneumatic Jack Hammer Road Cutting.laying . 225	M	1400	0			
17	3005496	Crossing of roads by trench-less technology by laying of HDPE pipe excluding supply of pipe .Laying by HDD Machine Moling. Drilling and laying. 200mm dia.	M	0	4500			

18	3005531	Crossing of roads by trench-less technology by laying of HDPE pipe excluding supply of pipe .Laying by Pneumatic Jack Hammer Road Cutting.laying .	M	0	1200			
19	4060398	Laying of HDPE pipe for crossing small Nallas in the cable route or in the existing trenches	M	1600	4200			
20	4060353	Providing and laying in position specified grade of reinforced cement concrete excluding the cost of shuttering,centring,finishing and reinforcement-All work upto plinth level : 1:2:4 (1cement :2 coarse sand :4 graded stone agg.20mm nominal size.)	CUM	20	22			
21	4060249	Fabrication of MS structure as well as galvanised for different equipment like isolator, C.T.'s, P.T.'s, CVT, LA's etc, cable supporting structure including supply of nuts and bolts, consumables , welding electrode, hacksaw blades etc. excluding supply of steel.	MT	6.5	2			
22	4060348	Erection of MS as well as galvanised structure for different equipment like isolator, C.T.'s, P.T.'s, CVT, LA's , ISO etc, cable supporting structure, 33kV/66 kV GI gantry structure , Tower Structure i/c consumables , welding electrode ,tack welding & hacksaw blades	MT	6.3	2			
23	4060400	Painting of any M.S.Structure with one coat of Red oxide and two coats of AL.paint ISI marked including supply of paint by contractor.	KG	7300	0			
24	4060405	Digging of earth pit upto depth of 10 ft. inrocky/ semi rocky as per feasibility at site of embedding 600 x600mm earth plate with M.S Flate 50 x8 mm running the same through 3/4 " dia G.I. grouting pipe. Earth Plate to be covered by charcoal 200kg. And 100 Kg. Sodium chloride in the earth pit and refilling etc. NOTE: Charcoal, commonsalt, earth plate, G.I. Pipe,	EA	22	6			
25	4060409	Making of civil goomitties around GI earthpipe as per standard design of BSES. Supply of necessary bricks, cement, badarpur, sand, C1 cover of size 1'x1' and providing the same at the top of goomitties.	EA	22	6			
26	4060401	Charges for providing continous steel barricade 1.2 mtr high including cost of all material plant consumables transport and labour for shifting placing painting and regular maintenance.40% qty for selected	M	3100	5000			
27	4060397	Mounting of 66KV,1x630sq.mm.XLPE cable with cable end box on the steel structure and fixing it with suitable wooden cleats (wooden cleats shall be supplied by contractor) i/c.its jumpering with the isolator as	EA	12	0			
28	4060000	Charges for carrying out Route survey and identification of underground utilities of various civic agencies before/ during execution of scheme involving cable laying work. Route length will be considered for payment. Route length will be specifically verified by	M	4500	5000			
29		Survey and submission of Ground penetration report for entire Route (before and after of cable laying)	M	4500	5000			
30	4060342	Detail survey i/c.prepration of site plan & profile.	KM	4.5	5			
31	4060175	Erection of electrical equipment Including supply of T & P, all consumable items such as welding rods, hacksaw blades etc and minor modification in support structure for fixing as required.For 33 kV LA's	EA	0	6			
32	4060169	Erection of electrical equipment Including supply of T & P, all consumable items such as welding rods, hacksaw blades etc and minor modification in support structure for fixing as required.For 66 kV LA's with or	EA	12	0			
33	4060396	Mounting of 33KV,3x400sq.mm.XLPE cable with cable end box on the steel structure and fixing it with suitable wooden cleats (wooden cleats shall be supplied by contractor) i/c.its jumpering with the isolator as	EA	0	6			
34	4060336	Dismantalling of poles of following sizes after digging the pit and taking out the pole and stacking the pole at a proper place in safe positions and refilling the pit with loose earth and ramming including removal of	EA	0	32			
35		ETC of Horizontally Rotating double break motorized isolators with one earth switch	EA	2	0			

36	4060197	Stringing and sagging of main bus and cover bus bar with ACSR Zebra conductor and Jumpering of various electrical equipment by ACSR Zebra conductor in between equipment to equipment of any length required and from bus bar to equipment of any length required with the help of PG clamps, T connectors and	M	120	60			
37	4060204	Stringing of Rigid Spacer Clamp with tee – off suitable for single Zebra conductor and double zebra to single	EA	0	24			
38	4060205	Excavation of trench below the ultimate good earth level in following type of soil including refilling after laying of eath mat riser, fixing of earth electrodes	CUM	218	78			
39	4060208	Laying of MS flat in the excavatd trench including risers, equipment earthing, overlapping of MS flat at the joints by twice of its width and welding of over lapping and cross joints including supply of electrodes, red oxide/bitumin compound , paint etcand Laying of GI earth strip for equipment earthing, along the wall, trench, cable trays etc including fabrication of supports/cleats and fixing with wall bolts, welding works, painting of earth strip and riser with red oxide	M	630	178			
40		Providing and laying Autoclaved Aerated concrete (AAC) blocks masonry with 150mm/230mm/300 mm thick with Grade-I AAC blocks of density 551 to 650 Kg/ Cum conforming to IS: 2185 (Part 3) in super structure above plinth level up to floor V level with RCC band at sill level and lintel level with approved block laying polymer modified adhesive mortar all complete as per direction of Engineer-in-Charge. (The	CUM	0	100			
41		Installation of TAG,SFTY,RCTNGL;AL;MTLC	NOS	0	1020			
42		Installation of RCC Cable Cover	EA	3352	3281			
43		Installation of Warning Tape as per the Specification of	M	3390	3500			
44		Installation, testing and commissioning of RFID active Electronic ball markers (for 33kV and 66kV joint)	EA	34	51			
45		Installation, testing and commissioning of RFID passive Electronic ball markers (for 33kV and 66kV	EA	146	100			
46	4060404	Laying of Optical Fiber cable	M	1000	2200			
47	4060402	Laying of 40mm dia, HDPE Duct through trenchless method using HDD machine	M	0	600			
48	4060403	Laying of 40mm dia HDPE Duct in open trench	M	960	1400			
49		Splicing of 48F Optic Fiber Cable	EA	4	6			
50		Installation of LIU (OFC) with wall	EA	4	2			
51		Splicing Termination 48F Optical Fiber Cable at LIU	EA	4	2			
52		installation of LDR	EA	2	2			
53	4060337	Dismantling of MS as well as galvanised structure for different equipment like isolator, C.T.'s, P.T.'s, CVT, LA's , ISO etc, cable supporting structure, 33kV/66 kV GI gantry and tower structure including consumables ,	MT	21.5	14			
54	4060329	Dismantalling of ACSR GOAT Conductor, Earthwire, Insulator & Hardware Fittings i.e.Single Tension String Insulator fittings with single tension clamp for single GOAT conductor ,Single Tension String Insulator fittings with double tension clamp for twin GOAT conductor,Double Tension String Insulator fittings with single tension clamp for single GOAT conductor,Single Suspension String Insulator fittings with single drop/tension clamp for single GOAT conductor, Single Suspension String Insulator fittings with double drop/tension clamp for twin GOAT conductor,Single Suspension String Insulator fittings with single suspension clamp for single GOAT conductor,Single Suspension String Insulator fittings with double suspension clamp for twin GOAT conductor ,Bolted type 'T' Connector suitable for single GOAT conductor,Vibration Damper for GOAT Conductor, Repair Sleeve for GOAT, Mid span compression joint	KM	4.2	7.5			
55		VLF High Voltage test as per IEEE 400.2	LS	1	1			
56		VLF Tan Delta as per IEEE 400.2	LS	1	1			
57		VLF Partial Discharge as per IEEE 400.2	LS	1	1			
58		Sheath integrity test as per IEEE 400.2	LS	1	1			
59		Electrical Inspection Fees	LS	1	0			
		Total						
		GST 18%						
		Net Total						



BSES Rajdhani Power Ltd.

GRAND SUMMARY OF THE QUOTED PRICE

Sr. No.	Scheme no.	SCHEME DESCRIPTION	Total price for supply F.O.R site inclusive all duties taxes	Total Price for Erection, Testing & Commissioning inclusive all Taxes (INR)	Grand Total (INR)
1	EW25ML1045	Conversion overhead to U/G of 33kV Pankha Road to Mayapuri Circuit 1 & 2 by laying of 03 nos 33 kv 3x400mm ² XLPE cable			
2	EW25ML1044	Conversion of 66kV O/H S/C T/L from Pankha Road - Sagarpur Circuit with Route Length - 3100M and 66kV O/H T-off Circuit of PPK-1 to Rewari Line by laying of 02 Nos. 66KV 3Cx300sq.mm. XLPE cable Route Length - 1400 M			
TOTAL Package Cost					
In words :					

We declare that the following are our quoted prices in INR for the entire project/schemes.

Date:

Bidder Name:

Place:

Bidders Address:

Name & Signature

Designation:

Common Seal:.....

CONTROLLED COPY



Reliance Energy
A Dhirubhai Ambani Enterprise

Specifications

Lightning Arrestor

(66 & 33 KV)

Specification no. : SP-LALU-01-R0

Prepared By		Reviewed By		Approved By		Revision	Date
Name	Sign.	Name	Sign.	Name	Sign.		
AAG		HPB		DG		0	29-Jan-2005

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General Specification

1.0.0 Codes & Standards

Materials, equipment and methods used in the manufacture of Lightning Arresters shall conform to the latest edition of following –

National Standards

Standard Code	Standard Description
	Indian Electricity Rules
	Indian electricity act
	CBIP manual
IS : 3070 – Part 3	Lightning Arresters for Alternating Current Systems
IS : 2071 - Part I	Method of high voltage testing
IS : 2629 - 1985	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
IS : 5621 - 1980	Hollow insulators for use in electrical equipment
IS : 6639 - 1972	Specification for Hexagon Bolts for Steel Structures

International Standards

Standard Code	Standard Description
IEC 60099-4-2001	Metal-Oxide Surge Arresters without gaps for AC Systems

Important Note :

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows –

- i. Specification including applicable codes, standards
- ii. Guaranteed Technical Particulars (GTP)
- iii. Approved Vendor Drawings

Sr. No.	Description	Requirement / Rating
2.0.0	Design Features	Common for both 66KV and 33 KV Lightning Arresters
2.1.0	Application	To be used for protection of transformers, circuit breakers and other sub-station equipment against lightning and switching surges.
2.2.0	Type of Lightning Arrester	Gap-less metal oxide type (ZnO Type).
2.3.0	Pressure relief device	Pressure relief device of class 40 KA shall be provided.
2.4.0	Accessories	Refer Annexure-A : Scope of Supply.
2.5.0	Mounting	LA mounting vertically on steel structures with insulating bases. Surge counters in weather proof enclosures suitable for mounting on structure of lightning arrester.
2.6.0	Line side Terminal Connectors	Suitable for ACSR Zebra/ Goat conductor (Refer GTP)
2.7.0	Ground Terminal Connectors	Suitable for 50x6 mm GS flat
2.8.0	Surge Counter	Non-resettable type
2.9.0	Name plate Marking	Following minimum information must be marked – i) Name of the manufacturer ii) Type and serial No. iii) Model No. iv) Rated voltage v) Max. continuous Operating Voltage vi) Nominal discharge current vii) Pr. Relief Class viii) Identification mark on each separately housed unit to enable it to be replaced in correct position after the multiunit arrester has been dismantled.
3.0.0	Approved Make of Components	Common for both 66KV and 33 KV Lightning Arresters
3.1.0	Insulators	JSI / WSI/ BHEL/ Modern/ Saravana

Sr. No.	Description	Requirement / Rating
4.0.0	Testing & Inspection	
4.1.0	Internal Test	Manufacturer shall carry out comprehensive inspection and testing during manufacture of the equipment.
4.2.0	Type test	The product must be of type tested quality. Type test reports shall be submitted for the type, size & rating of equipment offered along with bid. If the manufacturer's lab is accredited by govt./ authorised body then it shall be acceptable for type testing.
4.3.0	Routine test	As per relevant IS / IEC.
4.4.0	Acceptance test	As per relevant IS / IEC.
4.5.0	Test Witness	
4.5.1		The Buyer reserves the right to witness all tests specified on completed product.
4.5.2		The Buyer reserves the right to inspect the product at the Sellers works at any time prior to dispatch, to verify compliance with the specifications.
4.5.3		In-process and final inspection call intimation shall be given in advance to purchaser.
4.6.0	Tests on fitting and Accessories	As per Manufacturer's Standards and relevant IS / IEC.
5.0.0	Drawing, Data & Manuals	
5.1.0	To be submitted along with bid	The seller has to submit :
	i)	Tentative GA / cross sectional drawing of product showing all the views / sections.
	ii)	Detailed reference list of customers already using the offered product during the last 5 years with particular emphasis on units of similar design and rating.
	iii)	Completely filled GTP
	iv)	Deviations from this specification. Only deviations approved in writing before award of contract shall be accepted.
	v)	Details of manufacturer's quality assurance standards and program and ISO 9000 series or equivalent national certification.

Sr. No.	Description	Requirement / Rating
	vi)	Type test reports shall be submitted for the type, size & rating of product / equipment offered along with bid. In case the type test report for identical product is not available then type test report of nearby size/ rating shall be submitted for review. They shall be considered valid for 5 years from date of test performed on product /equipment.
	vii)	Complete product catalogue and Manual along with the bid.
	viii)	Recommended spare parts and consumable items for five years of operation with prices and spare parts catalogue with price list for future requirements
	ix)	Bill of material with make, model & quantity of items.
5.2.0	To be submitted after award of contract	The seller has to submit : for buyer's Approval (A) / Reference (R)
	i)	Program for production and testing (A)
	ii)	Guaranteed Technical Particulars (A)
	iii)	Calculations to substantiate choice of electrical, structural, mechanical component size / ratings (A)
	iv)	a) Detailed dimension drawing for all components, ge b) Drawings of major components (A) c) Rating and diagram plate (R)
	v)	Detailed loading drawing to enable the buyer to design and construct foundations (as applicable) (R)
	vi)	Transport / Shipping dimensions with weights (R)
	vii)	Detailed Bill of Materials for all fittings and accessories with their make, model & tag no. etc. (A)
	viii)	Detailed installation and commissioning instructions (R)
	ix)	Quality plan (A)
5.3.0	Submittals required prior to dispatch	The seller has to submit :
	i)	Inspection and test reports, carried out in manufacturer's works (R)
	ii)	Test certificates of all bought out items
	iii)	Operation and maintenance Instruction as well as trouble shooting charts/ manuals
5.4.0	Drawing and document sizes	Standard size paper A0, A1, A2, A3, A4
5.5.0	No of drgs. / Documents required at different stages	As per Annexure- A

Sr. No.	Description	Requirement / Rating
6.0.0	Packing	
6.1.0	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration
6.2.0	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label
6.3.0	Packing Identification Label	In each packing case, following details are required :
	i)	Individual serial number
	ii)	Purchaser's name
	iii)	PO number (along with SAP item code, if any) & date
	iv)	Equipment Tag no. (if any)
	v)	Destination
	vi)	Manufacturer / Supplier's name
	vii)	Address of Manufacturer / Supplier / it's agent
	viii)	Description and Quantity
	ix)	Country of origin
	x)	Month & year of Manufacturing
	xi)	Case measurements
	xii)	Gross and net weights in kilograms
	xiii)	All necessary slinging and stacking instructions
7.0.0	Shipping, Handling & Storage	
7.1.0	Shipping Information	The seller shall give complete shipping information concerning weight, size etc. of each package.
7.2.0	Shipping Constraints	The seller shall ascertain at an early date before the commencement of manufacture, any transport limitations such as weights, dimensions, road culverts, overhead lines, free access etc. from the manufacturing plant to the project site. Bidder shall furnish the confirmation that the proposed packages can be safely transported, as normal or oversize packages, upto the site. Any modifications required in the infrastructure and cost thereof in this connection shall be brought to the notice of the Purchaser.
7.3.0	Transit Damage	The seller shall be responsible for any transit damage due to improper packing.
7.4.0	Handling & Storage	Manufacturer's instructions shall be followed. Detail handling & storage instruction sheet / manual needs to be furnished before commencement of supply.

Sr. No.	Description	Requirement / Rating
8.0.0	Quality Assurance	
8.1.0	Vendor quality plan	To be submitted for purchaser approval
8.2.0	Inspection points	To be mutually identified & agreed in quality plan
9.0.0	Progress Reporting	
9.1.0	Outline Document	To be submitted for purchaser approval for outline of production, inspection, testing, inspection, packing, dispatch, documentation program
9.2.0	Detailed Progress report	To be submitted to Purchaser once a month containing
	i)	Progress on material procurement
	ii)	Progress on fabrication (As applicable)
	iii)	Progress on assembly (As applicable)
	iv)	Progress on internal stage inspection
	v)	Reason for any delay in total program
	vi)	Details of test failures if any in manufacturing stages
	vii)	Progress on final box up
	viii)	Constraints / Forward path
10.0.0	Deviations	
	i)	Deviations from this Specification are only acceptable where the Seller has listed in his quotation the requirements he can't or does not wish to comply with and the buyer has accepted in writing the deviations before the order is placed.
	ii)	In the absence of a list of deviations, it will be assumed by the Buyer that the Seller complies fully with this specification.

Annexure – A
1.0 Scope

Sr. No.	Description	Requirement / Rating				
1.0.0	Scope					
1.1.0	Main Equipment	Design, manufacture, assembly & testing at manufacturer's works before dispatch, packing & delivery of Lightning Arresters rated up to 66 kV.				
1.2.0	Accessories					
	i)	Supporting insulators for LA.				
	ii)	Line terminal connectors.				
	iii)	Surge counter with leakage current ammeter.				
	iv)	Grounding terminal bracket				
	v)	Necessary flanges alongwith all stainless steel hardware like nut bolts/ washers etc. for mounting of LA & surge Counter				
	vi)	Suitably sized Cu flat or insulated copper cable for connection between LA and surge counter				
	vii)	Any other item necessary or usual for efficient performance and satisfactory maintenance under the various operating and atmospheric conditions				
1.3.0	Documentation	Submission of all drawings & documents pertaining to the equipment.				
1.4.0	Site Supervision	Supervision of testing & commissioning of equipment at site.				
1.5.0	Bill of Materials	Complete bill of materials shall be submitted in the following format.				
	Sr. No.	Purchaser Equipment Tag No. / Sap Code	Equipment Description	Location / Substation Name	Unit	Quantity
				e.g. Santacruz	Nos.	e.g. 1
				e.g. Alaknanda	Nos.	e.g. 6

2.0.0 Document Submission

Submission of drawings, calculations, catalogues, manuals, test reports shall be as follows :

Item Description	Along with offer	For Approval after award of contract	Final after approval	Remarks
Drawings	3 copies (Typical drgs)	4 copies + 1 Soft Copy	6 copies + 1 soft copy in CD	See Clause 5.0.0 for various drawings required
Calculations	3 copies (Typical)	4 copies + 1 Soft Copy	6 copies + 1 soft copy in CD	See Clause 5.0.0 for details
Catalogues	1 copy		6 copies + 1 soft copy in CD	
Instruction manual	1 copy		6 copies + 1 soft copy in CD	
Test Report	2 copies		6 copies + 1 soft copy in CD	Type test and routine test reports

3.0.0 Delivery Schedule

Sr. No.	Description	Requirement / Rating
i)	Delivery period start date	From date of purchase order
ii)	Delivery period end date	As agreed with supplier
iii)	Material dispatch clearance	After inspection by purchaser

Annexure – B
Ambient Conditions :
A) Mumbai

a)	Average grade atmosphere	Heavily polluted , salt Laden, dusty, humid with possibility of condensation
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 45 deg C, Average 35 deg C
d)	Minimum ambient air temperature	20 deg C
e)	Relative Humidity	100 % Max
f)	Thermal Resistivity of Soil	150 Deg. C cm/W
g)	Seismic Zone	3
h)	Rainfall	3000 mm concentrated in four months

B) Delhi

a)	Average grade atmosphere	Heavily polluted, dry
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 50 deg C, Average 40 deg C
d)	Minimum ambient air temperature	0 Deg C
e)	Relative Humidity	100 % Max
f)	Thermal Resistivity of Soil	150 Deg. C cm/W
g)	Seismic Zone	4
h)	Rainfall	750 mm concentrated in four months

Annexure – C1
Guaranteed Tech. Particulars for 66KV Lightning Arrester

Sr. No.	Description	Data By Purchaser	Data by Supplier
1	Name of manufacturer		
2	Type	Gapless, ZnO type, single pole, heavy duty, station class, pedestal mounted	
3	Model		
4	No. of units.		
5	Installation	Outdoor	
6	Application	Protection of Transformers, circuit breakers, lines and other outdoor S/S equipment.	
7	LA connection to system	Phase to earth	
8	Type of Conductor	ACSR Zebra / Goat	
9	Construction	Single Phase	
10	Rated voltage of arrester (KVrms)	60 KV	
11	Nominal discharge current (Amps) (8x20 micro sec. wave) peak value	10KA	
12	System Particulars		
i)	Highest System Voltage	72.5 KV	
ii)	Frequency	50HZ $\pm$ 5%	
iii)	System neutral	Solidly earthed	
iv)	Max. value of temporary over voltage & its max. duration		
	- Insulation level of equipment to be protected	325 KVp	
	- System short circuit level	31.5KA for 3 seconds.	
13	Maximum continuous operating voltage (MCOV)	52KV	
14	Impulse withstand current	100KA _p	
15	Long Duration discharge class	3	
16	Minimum single impulse energy capability		
17	Maximum residual voltage at switching impulse current of 1KA _p (30/60 micro sec. wave)	136 KVp	

Sr. No.	Description	Data By Purchaser	Data by Supplier
18	Max. residual voltage (1x20 micro sec. wave)		
i)	At 05 KAp		
ii)	At 10 KAp		
iii)	At 20 KAp		
19	Minimum creepage distance	31 mm/KV	
20	Pressure relief class	40KA	
21	Reference current (mA)		
22	Leakage current at COV (mA)		
	Resistive		
	Capacitive		
23	Dry and wet power frequency withstand voltage of arrester insulation (KVrms)		
24	Virtual steepness for front of wave for above (KV/micro sec.)		
25	Ratio of system voltage withstand level to protection level of surge arrester		
26	High current impulse withstand 4/10 micro second peak value (KV)		
27	Long duration current Impulse		
i)	Current peak.		
ii)	Virtual duration.		
28	Temporary Over Voltage Capacity (KVp)		
i)	At 0.1 Sec.		
ii)	At 1.0 Sec.		
iii)	At 10.0 Sec.		
iv)	At 100.0 Sec.		
29	Weight of complete unit (Kg)		
30	Height of complete unit from base to the line side (mm)		
31	Minimum recommended spacing between arresters Centro to Centro (mm)		
32	Clearance required from ground equipment at various heights of arresters unit (mm)		

Sr. No.	Description	Data By Purchaser	Data by Supplier
33	Earthing arrangement provided for earthing side of arresters.		
34	Mounting flanges dimensional details.		
35	Type and range of milli-ampere meter.		
36	Type and specifications of the surge connectors.		
37	Surge counter min. current for recording a lightning stroke	200 Amp	
38	Surge counter max. disch. Current withstand	100KA peak for 4/10 wave shape.	
39	Range of continuous leakage current at rated voltage with variation due to change in temperature & frequency		
40	Size and length of flexible Cu cable for connection between LA & surge counter		
41	Voltage time curve for thermal stability of LA after a stroke	To be provided	
42	Paint shade of surge counter housing	Polyurethane, 692 of IS-5	

Annexure – C2
Guaranteed Tech. Particulars for 33KV Lightning Arrester

Sr. No.	Description	Data By Purchaser	Data by Supplier
1	Name of manufacturer		
2	Type	Gapless, ZnO type, single pole, heavy duty, station class, pedestal mounted	
3	Model		
4	No. of units.		
5	Installation	Outdoor	
6	Application	Protection of Transformers, circuit breakers, lines and other outdoor S/S equipment.	
7	LA connection to system	Phase to earth	
8	Type of Conductor	ACSR Zebra / Goat	
9	Construction	Single Phase	
10	Rated voltage of arrester (KVrms)	30 KV	
11	Nominal discharge current (Amps) (8x20 micro sec. wave) peak value	10KA	
12	System Particulars		
i)	Highest System Voltage	36 KV	
ii)	Frequency	50HZ $\pm$ 5%	
iii)	System neutral	Solidly earthed	
iv)	Max. value of temporary over voltage & its max. duration		
	- Insulation level of equipment to be protected	170 KVp	
	- System short circuit level	26.3KA for 3 seconds.	
13	Maximum continuous operating voltage (MCOV)	25KV	
14	Impulse withstand current	100KA	
15	Long Duration discharge class	3	
16	Minimum single impulse energy capability		
17	Maximum residual voltage at switching impulse current of 1KA (30/60 micro sec. wave)	70 KVp	

Sr. No.	Description	Data By Purchaser	Data by Supplier
18	Max. residual voltage (1x20 micro sec. wave)		
i)	At 05 KAp		
ii)	At 10 KAp		
iii)	At 20 KAp		
19	Minimum creepage distance	31 mm/KV	
20	Pressure relief class	40KA	
21	Reference current (mA)		
22	Leakage current at COV (mA)		
	Resistive		
	Capacitive		
23	Dry and wet power frequency withstand voltage of arrester insulation (KVrms)		
24	Virtual steepness for front of wave for above (KV/micro sec.)		
25	Ratio of system voltage withstand level to protection level of surge arrester		
26	High current impulse withstand 4/10 micro second peak value (KV)		
27	Long duration current Impulse		
i)	Current peak.		
ii)	Virtual duration.		
28	Temporary Over Voltage Capacity (KVp)		
i)	At 0.1 Sec.		
ii)	At 1.0 Sec.		
iii)	At 10.0 Sec.		
iv)	At 100.0 Sec.		
29	Weight of complete unit (Kg)		
30	Height of complete unit from base to the line side (mm)		
31	Minimum recommended spacing between arresters Centro to Centro (mm)		
32	Clearance required from ground equipment at various heights of arresters unit (mm)		

Sr. No.	Description	Data By Purchaser	Data by Supplier
33	Earthing arrangement provided for earthing side of arresters.		
34	Mounting flanges dimensional details.		
35	Type and range of milli-ampere meter.		
36	Type and specifications of the surge connectors.		
37	Surge counter min. current for recording a lightning stroke	200 Amp	
38	Surge counter max. disch. Current withstand	100KA peak for 4/10 wave shape.	
39	Range of continuous leakage current at rated voltage with variation due to change in temperature & frequency		
40	Size and length of flexible Cu cable for connection between LA & surge counter		
41	Voltage time curve for thermal stability of LA after a stroke	To be provided	
42	Paint shade of surge counter housing	Polyurethane, 692 of IS-5	

Annexure – D**Recommended spares (Data by supplier)**

List of recommended spares shall be submitted as follows –

Sr. No.	Description of spare part	Unit	Quantity
1		Nos.	
2		Nos.	
3			
4			
5			
6			

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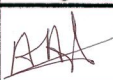
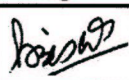
Reliance Energy
A Dhirubhai Ambani Enterprise

Specifications

Outdoor Disconnecting Switch

(66 & 33 KV)

Specification no. : SP-ISLU-01-R0

Prepared By		Reviewed By		Approved By		Revision	Date
Name	Sign.	Name	Sign.	Name	Sign.		
AAG		HPB		DG		0	29-Jan-2005

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General Specification

1.0.0 Codes & Standards

Materials, equipment and methods used in the manufacture of outdoor disconnecting switch shall conform to the latest edition of following –

National Standards

Standard Code	Standard Description
	Indian Electricity Rules
	Indian electricity act
	CBIP manual
IS : 9921 - Part I to V	Specification for Alternating Current Disconnectors (Isolators) and Earthing Switches
IS : 0996 -1979	Single phase small AC and Universal Electric Motors.
IS : 7572 -1974	Guide for testing single phase AC and Universal motors.
IS : 4237 -1967	General Requirement for switchgear for voltage not exceeding 1.1 kV.
IS : 2147 -1962	Degree of protection provided by enclosure for low-voltage switchgear control gear
IS : 2544	Porcelain Post Insulator
IS : 2629 -1985	Recommended Practice for Hot-Dip Galvanizing of Iron and Steel
IS : 6639 - 1972	Specification for Hexagon Bolts for Steel Structures

Important Note :

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows –

- i. Specification including applicable codes, standards
- ii. Guaranteed Technical Particulars (GTP)
- iii. Approved Vendor Drawings

Sr. No.	Description	Requirement / Rating
2.0.0	Design Features	Common for both 66KV and 33 KV equipment
2.1.0	Disconnect Switch Type & Mechanism	Motor operated, central rotating double break with turn and twist mechanism, triple pole, outdoor type for installation and operation in horizontal plane for 66KV & in vertical plane for 33 kv with or without earth switches, as required complete in all respects.
i)	Motor assembly	Suitable for 3 phase 415V, 50 Hz. Provided with a quick electro-mechanical brake on high speed shaft for rapid braking.
2.2.0	Earth Switch Mechanism	Manually operated
2.3.0	Disconnect Switch Controls	
i)	Remote electrical control	Required
ii)	Local Manual control	Required
iii)	Local electrical control	Required from integral Local Control Cabinet
2.4.0	Interlock with circuit breakers	Electrical interlock suitable for 220 V / 50 V DC
2.5.0	Interlock with Earth Switch	Mechanical & Electrical interlock
2.6.0	Padlock for Earth Switch	Padlock & keys for both positions i.e. when earth switch is grounded and when earth switch is un-grounded
2.7.0	Fixed Contacts	
i)	Type of contacts	Spring loaded with smooth surface, silver plated
ii)	Current carrying castings	Non corrodible, non ferrous material
iii)	Current carrying Springs	Made of non aging, non magnetic stainless steel with life long spring action strength
2.8.0	Insulators	
i)	Construction	Comprising of cylindrical solid core post insulators. The porcelain used in the insulators shall be homogeneous, free from laminations, cavities or any other defect which may affect its mechanical and dielectric qualities and shall be thoroughly vitrified, tough and impervious to moisture. The glazing of the porcelain shall be of uniform brown colour, free from blisters, burrs and other defects.
ii)	Fasteners	All metal caps, jointing flanges, bolts and nuts shall be made of high grade cast iron or malleable steel casting, machine faced and hot-dip galvanised.

Sr. No.	Description	Requirement / Rating
2.9.0	Moving Contacts	
i)	Type of contacts	High pressure relieving copper contacts, silver plated
ii)	Wiping Action	Required during opening & closing. Shall be adequate to remove any oxide film formed without causing scouring or abrasion on the contact surfaces.
2.10.0	Current carrying Springs	Made of non aging, non magnetic stainless steel with life long spring action strength
2.11.0	Fault Current rating	Earth switch shall be able to carry same Fault Current as assigned to the disconnecting switch.
2.12.0	Disconnecting Switch contacts movement	90 deg from full open to full close in order to ensure a distinct break and clear visibility.
2.13.0	Corona Effect	Shall be free from visible corona discharge in both open & close positions at visible discharge test voltages.
2.14.0	Control cabinet	
i)	Enclosure	Weather-proof, water-shedding, corrosion-proof IP-55 steel cabinet
ii)	Cabinet Door	Gasketed, hinged access door shall have a mechanical indicator fitted to clearly indicate fully opened and fully closed positions of the disconnection switch.
iii)	Wiring	Control wiring shall be done using 1.1KV grade 2.5 sq.mm stranded copper conductor, PVC insulated, cables laid in GI conduits.
iv)	Locking arrangement	Padlocking arrangement to be provided.
v)	Incomer	A local TPN MCB to be provided in cabinet at power supply incoming point.
vi)	Outgoing Control Wiring	All outgoing control wiring shall terminate on terminal blocks, inside the cabinet so as to have maximum access to all conductor terminals.
vii)	Aux. Contacts	All auxiliary contacts of the disconnection switch and earthing switches shall be supplied duly wired up to the terminal blocks.
viii)	Terminals	Stud type terminals with at least twenty (20) percent spare terminals shall be provided over and above the number actually required.
ix)	Paint Shade	Polyurethane Paint Shade no. 692 of IS-5.
x)	Local Controls	A local/ remote changeover switch shall be fitted inside the cabinet together with open/ close push buttons for local control.

Sr. No.	Description	Requirement / Rating
xi)	Cabinet accessories	Cabinet illumination incandescent lamp with ON/OFF switch, 5/15A single phase 3 pin socket with switch & fuse, 240V AC space heater with switch & thermostat etc.
2.15.0	Manual Operation	Manual operation of disconnection switch by means of crank handle disconnecting power supply to the 3-pole operating mechanism on insertion into its socket. The height of socket shall be about 1.2 metre above the finished ground level of the substation.
2.16.0	Disconnection switches with Earth switch	Switch shall have three (3) grounding blades forming integral part of the isolator. These blades shall be capable of being fitted on either side of the blades. Flexible heavily tinned copper braids of adequate cross-sectional area with connector suitable for the specified short circuit current shall be provided on the hinged end of the grounding blade for connection to the station grounding grid.
2.17.0	Grounding Blades Operation	Manually operated and interlocked with disconnection switch so that the grounding blades can be closed only when the disconnection switch is open.
2.18.0	Pivot bearings	Shall be maintenance-free and corrosion resistant. Double tapered-roller bearings located 150 mm apart suitable for ensuring smooth and dependable operation of the disconnection switch shall be located at the base of the supporting insulators. The earthing switch shaft shall also be provided with necessary bearings. The bearings shall be suitable for effective operation of disconnection switch and earthing switches even after long periods of their remaining in closed/ open position.
2.19.0	Disconnection Switch Poles & base	Each pole of the disconnection switch shall be provided with a complete galvanized steel base designed for mounting on a supporting structure/ gantry. The base shall be rigid and self-supporting and shall require no guying or cross bracing between phases. The group operated isolators shall have a common supporting structure for all the three (3) poles.
2.20.0	Grounding Pads	Each pole of disconnection switch shall be provided with two (2) grounding pads of non-corrodible material brazed to the channel base at opposite ends. Flexible tinned copper (15-25 microns) connectors shall be provided for a) Connection of earthing pad of each pole, b) Operating handle, c) Earthing switches.

Sr. No.	Description	Requirement / Rating
2.21.0	Counter-Balancing Springs/ Weights	Springs/ weights of non-rusting alloy composition shall be provided for counter-balancing the earthing switch blades to prevent impact at the end of travel both on opening and closing of the earthing switch.
2.22.0	Name Plates	Corrosion-proof nameplates giving all the relevant mandatory as well as optional information as stipulated in IS shall be provided on disconnection switches, earthing switches and operating devices as per the Purchaser's/ Consulting Engineer's approval.
3.0.0	Approved Make of Components	Common for both 66KV and 33 KV outdoor disconnecting switch
3.1.0	Motors	ABB / Siemens / Crompton
3.2.0	Insulators	JSI / WSI / Modern / Saravana / BHEL
3.3.0	Switch	Kaycee / L&T (Salzer)
3.4.0	HRC Fuse Links	Alstom / Siemens / L&T
3.5.0	AC Contactors & O/L Relay	L&T / Siemens / Schneider
3.6.0	Terminals	Connectwell / Elmex
3.7.0	Push buttons / Actuator	L&T / Teknic / Siemens
3.8.0	MCB	Merlin Gerin / Siemens / Schneider

Sr. No.	Description	Requirement / Rating
4.0.0	Testing & Inspection	
4.1.0	Internal Test	Manufacturer shall carry out comprehensive inspection and testing during manufacture of the equipment.
4.2.0	Type test	The product must be of type tested quality. Type test reports shall be submitted for the type, size & rating of equipment offered along with bid. If the manufacturer's lab is accredited by govt./ authorised body then it shall be acceptable for type testing.
4.3.0	Routine test	As per relevant IS / IEC.
4.4.0	Acceptance test	As per relevant IS / IEC.
4.5.0	Test Witness	
4.5.1		The Buyer reserves the right to witness all tests specified on completed product.
4.5.2		The Buyer reserves the right to inspect the product at the Sellers works at any time prior to dispatch, to verify compliance with the specifications.
4.4.3		In-process and final inspection call intimation shall be given in advance to purchaser.
4.6.0	Tests on fitting and Accessories	As per Manufacturer's Standards and relevant IS / IEC.
5.0.0	Drawing, Data & Manuals	
5.1.0	To be submitted along with bid	The seller has to submit :
	i)	Tentative GA / cross sectional drawing of product showing all the views / sections.
	ii)	Detailed reference list of customers already using the offered product during the last 5 years with particular emphasis on units of similar design and rating.
	iii)	Completely filled GTP
	iv)	Deviations from this specification. Only deviations approved in writing before award of contract shall be accepted.
	v)	Details of manufacturer's quality assurance standards and program and ISO 9000 series or equivalent national certification.

Sr. No.	Description	Requirement / Rating
	vi)	Type test reports shall be submitted for the type, size & rating of product / equipment offered along with bid. In case the type test report for identical product is not available then type test report of nearby size/ rating shall be submitted for review. They shall be considered valid for 5 years from date of test performed on product /equipment.
	vii)	Complete product catalogue and Manual along with the bid.
	viii)	Recommended spare parts and consumable items for five years of operation with prices and spare parts catalogue with price list for future requirements.
	ix)	Bill of material with make, model & quantity of items.
5.2.0	To be submitted after award of contract	The seller has to submit : for buyer's Approval (A) / Reference (R)
	i)	Program for production and testing (A)
	ii)	Guaranteed Technical Particulars (A)
	iii)	Calculations to substantiate choice of electrical, structural, mechanical component size / ratings (A)
	iv)	a) Detailed dimension drawing for all components, general b) Drawings of major components (A) c) Rating and diagram plate (R)
	v)	Detailed loading drawing to enable the buyer to design and construct foundations (as applicable) (R)
	vi)	Transport / Shipping dimensions with weights (R)
	vii)	Detailed Bill of Materials for all fittings and accessories with their make, model & tag no. etc. (A)
	viii)	Detailed installation and commissioning instructions (R)
	ix)	Quality plan (A)
5.3.0	Submittals required prior to dispatch	The seller has to submit :
	i)	Inspection and test reports, carried out in manufacturer's works (R)
	ii)	Test certificates of all bought out items
	iii)	Operation and maintenance Instruction as well as trouble shooting charts/ manuals
5.4.0	Drawing and document sizes	Standard size paper A0, A1, A2, A3, A4
5.5.0	No of drgs. / Documents required at different stages	As per Annexure- A

Sr. No.	Description	Requirement / Rating
6.0.0	Packing	
6.1.0	Packing Protection	Against corrosion, dampness, heavy rains, breakage and vibration
6.2.0	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label
6.3.0	Packing Identification Label	In each packing case, following details are required :
	i)	Individual serial number
	ii)	Purchaser's name
	iii)	PO number (along with SAP item code, if any) & date
	iv)	Equipment Tag no. (if any)
	v)	Destination
	vi)	Manufacturer / Supplier's name
	vii)	Address of Manufacturer / Supplier / it's agent
	viii)	Description and Quantity
	ix)	Country of origin
	x)	Month & year of Manufacturing
	xi)	Case measurements
	xii)	Gross and net weights in kilograms
	xiii)	All necessary slinging and stacking instructions
7.0.0	Shipping, Handling & Storage	
7.1.0	Shipping Information	The seller shall give complete shipping information concerning weight, size etc. of each package.
7.2.0	Shipping Constraints	The seller shall ascertain at an early date before the commencement of manufacture, any transport limitations such as weights, dimensions, road culverts, overhead lines, free access etc. from the manufacturing plant to the project site. Bidder shall furnish the confirmation that the proposed packages can be safely transported, as normal or oversize packages, upto the site. Any modifications required in the infrastructure and cost thereof in this connection shall be brought to the notice of the Purchaser.
7.3.0	Transit Damage	The seller shall be responsible for any transit damage due to improper packing.
7.4.0	Handling & Storage	Manufacturer's instructions shall be followed. Detail handling & storage instruction sheet / manual needs to be furnished before commencement of supply.

Sr. No.	Description	Requirement / Rating
8.0.0	Quality Assurance	
8.1.0	Vendor quality plan	To be submitted for purchaser approval
8.2.0	Inspection points	To be mutually identified & agreed in quality plan
9.0.0	Progress Reporting	
9.1.0	Outline Document	To be submitted for purchaser approval for outline of production, inspection, testing, inspection, packing, dispatch, documentation program
9.2.0	Detailed Progress report	To be submitted to Purchaser once a month containing
	i)	Progress on material procurement
	ii)	Progress on fabrication (As applicable)
	iii)	Progress on assembly (As applicable)
	iv)	Progress on internal stage inspection
	v)	Reason for any delay in total program
	vi)	Details of test failures if any in manufacturing stages
	vii)	Progress on final box up
	viii)	Constraints / Forward path
10.0.0	Deviations	
	i)	Deviations from this Specification are only acceptable where the Seller has listed in his quotation the requirements he can't or does not wish to comply with and the buyer has accepted in writing the deviations before the order is placed.
	ii)	In the absence of a list of deviations, it will be assumed by the Buyer that the Seller complies fully with this specification.

Annexure – A
1.0 Scope

Sr. No.	Description	Requirement / Rating				
1.0.0	Scope					
1.1.0	Main Equipment	Design, manufacture, assembly & testing at manufacturer's works before dispatch, packing & delivery of outdoor disconnecting switch rated up to 66 kV.				
1.2.0	Accessories					
	i)	Clamps & terminal connectors.				
	ii)	Stainless steel hardware like nut bolts/ washers etc. for fixing of all equipment / accessories in the scope of the bidder with supporting structure.				
	iii)	Any other item necessary or usual for efficient performance and satisfactory maintenance under the various operating and atmospheric conditions				
1.3.0	Documentation	Submission of all drawings & documents pertaining to the equipment.				
1.4.0	Site Supervision	Supervision of testing & commissioning of equipment at site.				
1.5.0	Bill of Materials	Complete bill of materials shall be submitted in the following format.				
	Sr. No.	Purchaser Equipment Tag No. / Sap Code	Equipment Description	Location / Substation Name	Unit	Quantity
				e.g. Santacruz	Nos.	e.g. 1
				e.g. Alaknanda	Nos.	e.g. 6

2.0.0 Document Submission

Submission of drawings, calculations, catalogues, manuals, test reports shall be as follows :

	Along with offer	For Approval after award of contract	Final after approval	Remarks
Drawings	3 copies (Typical drgs)	4 copies + 1 Soft Copy	6 copies + 1 soft copy in CD	See Clause 5.0.0 for various drawings required
Calculations	3 copies (Typical)	4 copies + 1 Soft Copy	6 copies + 1 soft copy in CD	See Clause 5.0.0 for details
Catalogues	1 copy		6 copies + 1 soft copy in CD	
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Test Report	2 copies		6 copies + 1 soft copy in CD	Type test and routine test reports

3.0.0 Delivery Schedule

Sr. No.	Description	Requirement / Rating
i)	Delivery period start date	From date of purchase order
ii)	Delivery period end date	As agreed with supplier
iii)	Material dispatch clearance	After inspection by purchaser

Annexure – B
Ambient Conditions :
A) Mumbai

a)	Average grade atmosphere	Heavily polluted , salt Laden, dusty, humid with possibility of condensation
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 45 deg C, Average 35 deg C
d)	Minimum ambient air temperature	20 deg C
e)	Relative Humidity	100 % Max
f)	Thermal Resistivity of Soil	150 Deg. C cm/W
g)	Seismic Zone	3
h)	Rainfall	3000 mm concentrated in four months

B) Delhi

a)	Average grade atmosphere	Heavily polluted, dry
b)	Maximum altitude above sea level	1000 M
c)	Ambient Air temperature	Highest 50 deg C, Average 40 deg C
d)	Minimum ambient air temperature	0 Deg C
e)	Relative Humidity	100 % Max
f)	Thermal Resistivity of Soil	150 Deg. C cm/W
g)	Seismic Zone	4
h)	Rainfall	750 mm concentrated in four months

Annexure – C1
Guaranteed Tech. Particulars for 66KV Outdoor Disconnecting Switch

Sr. No.	Description	Data By Purchaser	Data by Supplier
1	Name of manufacturer		
2	Type	Motor operated, central rotating double break with turn & twist mechanism.	
3	Model		
4	No. of units.		
5	Installation	Outdoor horizontal	
6	System Particulars		
i)	Highest System Voltage	72.5 kV	
ii)	Rated frequency	50 Hz $\pm$ 5%	
iii)	System Neutral	Solidly Earthed	
7	Rated Insulation Data		
7.1	1.2/50 μ s lightning impulse withstand voltage (Positive and negative polarity)		
i)	To earth	325 kV	
ii)	Across the isolating distance	375 kV	
7.2	Rated One minute power frequency withstand voltage		
i)	To earth	140 kV	
ii)	Across the isolating distance	160 kV	
8	Main Switch Current Capacity		
i)	Rated normal current	800 A / 1250 A	
ii)	Rated Short time withstand Current	31.5 kA for 3 Sec.	
iii)	Rated peak withstand current	2.5 times of short time withstand current	
iv)	Maximum magnetizing current (Make/ break capacity)	6 - 8 Amps.	
9	Earthing switch current capacity		
i)	Rated Short time withstand Current	31.5 kA for 3 Sec.	
ii)	Rated peak withstand current	2.5 times of short time withstand current	
iii)	Making capacity for discharging line charge		
10	Minimum clearances		
i)	In air between live parts and earth	630 mm	
ii)	In air between Phase to phase	630 mm	
iii)	Minimum ground clearance	4000 mm	

Sr. No.	Description	Data By Purchaser	Data by Supplier
11	Phase spacing	2000 mm (Project Specific)	
12	No. of breaks per circuit pole	Two for double break	
13	Nos. of insulators pedestal	Three stacks per phase of heavy duty post type insulators	
14	Main Switch Contacts		
i)	Type of Contact	High pressure relieving copper contacts (rotating blade features of twist mechanism). The moving arm enters the fixed female contact assembly developing high pressure.	
ii)	Material for rotating blade	Electrolytic tinned copper	
iii)	Material of contact	Silver plated electrolytic copper.	
15	Earth Switch Contacts		
i)	Type of Contact of Earth switch	High pressure banging type	
ii)	Material for earth switch blade	Electrolytic tinned copper	
iii)	Material of earth switch contact	Silver plated electrolytic copper.	
16	Thickness of Silver Coating	15 - 25 microns.	
17	Maximum current density	1.5 A /sq mm	
18	Type of bearing for rotating insulator stocks		
19	Number of auxiliary contacts		
i)	Isolator operating mechanism	10 NO + 10 NC	
ii)	Earthing Device	4 No + 4 NC	
20	Temperature rise	As per IS 9921	
21	Control supply voltage	220 V / 110 V / 50 V DC	
22	AC Aux. Supply (4 wire)	415 V $\pm$ 10%	
23	Inter Locking arrangement	Electrical and mechanical	

Sr. No.	Description	Data By Purchaser	Data by Supplier
24	Terminal connectors	Suitable for twin ACSR Zebra conductor	
25	Minimum creepage distance of insulator		
26	Type of control for		
i)	Disconnection switch	Motorised with Manual Facility	
ii)	Earthing switch	Manual	
27	Locking arrangement		
28	Rated mechanical terminal loads in addition to wind load acting on the equipment and short-circuit forces		
29	Total operating time of disconnection switch including that of its operating mechanism		
30	Weight of Isolators		
31	Post insulators		
i)	Make & type		
ii)	Height		
iii)	Voltage level		
iv)	Cantilever Strength		
v)	Torsional Strength		
vi)	Creepage Distance	Min 31mm/KV	
vii)	Basic insulation level (1 min. power frequency flashover voltage)		
	a) Dry	140 KV rms	
	b) Wet	140 KV rms	
viii)	Visible corona discharge voltage		
ix)	1.2/50 micro second impulse flashover voltage	325 KVp	
x)	Insulation class	A	
32	Drive Motor		
i)	Make		
ii)	KW Rating / rpm		
iii)	Rated current		
iv)	Frame size		
v)	Rated Voltage	415 V AC	
vi)	Degree of Protection	IP-55	
vii)	Insulation Class	B/F	
viii)	Duty		

Annexure – C2
Guaranteed Tech. Particulars for 33KV Outdoor Disconnecting Switch

Sr. No.	Description	Data By Purchaser	Data by Supplier
1	Name of manufacturer		
2	Type	Motor operated, central rotating double break with turn & twist mechanism.	
3	Model		
4	No. of units.		
5	Installation	Outdoor Vertical	
6	System Particulars		
i)	Highest System Voltage	36 kV	
ii)	Rated frequency	50 Hz $\pm$ 5%	
iii)	System Neutral	Solidly Earthed	
7	Rated Insulation Data		
7.1	1.2/50 μ s lightning impulse withstand voltage (Positive and negative polarity)		
i)	To earth	145 kV	
ii)	Across the isolating distance	165 kV	
7.2	Rated One minute power frequency withstand voltage		
i)	To earth	70 kV	
ii)	Across the isolating distance	80 kV	
8	Main Switch Current Capacity		
i)	Rated normal current	1250 A	
ii)	Rated Short time withstand Current	26.3 kA for 3 Sec.	
iii)	Rated peak withstand current	2.5 times of short time withstand current	
iv)	Maximum magnetizing current (Make/ break capacity)	6 - 8 Amps.	
9	Earthing switch current capacity		
i)	Rated Short time withstand Current	26.3 kA for 3 Sec.	
ii)	Rated peak withstand current	2.5 times of short time withstand current	
iii)	Making capacity for discharging line charge		
10	Minimum clearance		
i)	In air between live part and earth	320 mm	
ii)	In air between Phase to phase	320 mm	
iii)	Minimum ground clearance	3700 mm	

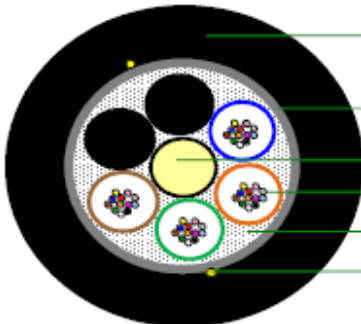
Sr. No.	Description	Data By Purchaser	Data by Supplier
11	Phase spacing	1500 mm (Project Specific)	
12	No. of breaks per circuit pole	Two for double break	
13	Nos. of insulators pedestal	Three stacks / phase of heavy duty post type insulators	
14	Main Switch Contacts		
i)	Type of Contact	High pressure relieving copper contacts (rotating blade features of twist mechanism). The moving arm enters the fixed female contact assembly developing high pressure.	
ii)	Material for rotating blade	Electrolytic tinned copper	
iii)	Material of contact	Silver plated electrolytic copper.	
15	Earth Switch Contacts		
i)	Type of Contact of Earth switch	High pressure banging type	
ii)	Material for earth switch blade	Electrolytic tinned copper	
iii)	Material of earth switch contact	Silver plated electrolytic copper.	
16	Thickness of Silver Coating	15 - 25 microns.	
17	Maximum current density	1.5 A /sq mm	
18	Type of bearing for rotating insulator stocks		
19	Number of auxiliary contacts		
i)	Isolator operating mechanism	10 NO + 10 NC	
ii)	Earthing Device	4 No + 4 NC	
20	Temperature rise	As per IS 9921	
21	Control supply voltage	220 V / 110 V / 50 V DC	
22	AC Aux. Supply (4 wire)	415 V $\pm$ 10%	
23	Inter Locking arrangement	Electrical and mechanical	

Sr. No.	Description	Data By Purchaser	Data by Supplier
24	Terminal connectors	Suitable for twin ACSR Zebra conductor	
25	Minimum creepage distance of insulator		
26	Type of control for		
i)	Disconnection switch	Motorised with Manual Facility	
ii)	Earthing switch	Manual	
27	Locking arrangement		
28	Rated mechanical terminal loads in addition to wind load acting on the equipment and short-circuit forces		
29	Total operating time of disconnection switch including that of its operating mechanism		
30	Weight of Isolators		
31	Post insulators		
i)	Make & type		
ii)	Height		
iii)	Voltage level		
iv)	Cantilever Strength		
v)	Torsional Strength		
vi)	Creepage Distance	Min 31mm/KV	
vii)	Basic insulation level (1 min. power frequency flashover voltage)		
	a) Dry	70 KV rms	
	b) Wet	70 KV rms	
viii)	Visible corona discharge voltage		
ix)	1.2/50 micro second impulse flashover voltage	145 KVp	
x)	Insulation class	A	
32	Drive Motor		
i)	Make		
ii)	KW Rating / rpm		
iii)	Rated current		
iv)	Frame size		
v)	Rated Voltage	415 V AC	
vi)	Degree of Protection	IP-55	
vii)	Insulation Class	B/F	
viii)	Duty		

Annexure – D**Recommended spares (Data by supplier)**

List of recommended spares shall be submitted as follows –

Sr. No.	Description of spare part	Unit	Quantity
1		Nos.	
2		Nos.	
3			
4			
5			
6			

48F Composite Fiber Multitube (MDPE) Single Sheath Duct Lite Optical Fiber Cable			
PRODUCT INFORMATION			
Fiber			
Single Mode Optical Fiber	36 Nos.	Fiber ITU.T - G.657A1	
Maximum Cabled Fiber Attenuation dB/Km		1310nm : 0.36 & 1550nm : 0.23 & 1625nm : 0.26	
Multi Mode Optical Fiber	12 Nos.	Fiber OM2 : 50/125	
Maximum Cabled Fiber Attenuation dB/Km		8500nm : 3.5 & 1300nm : 1.5	
Loose Tube			
Filling Gel		Thixotropic gel to prevent water ingress in loose tube (ITCO T 250)	
Fiber Per Tube	12 Nos.		
Tube	4 Nos.	Thermoplastic Material (PBT)	
Core			
Central Strength Member		Fibre Reinforced Plastic (FRP) to provide tensile strength and antibuckling properties.	
Filler	2 Nos.	Polyethylene Black	
Water blocking elements		Cable flooding gel is added in interstices of core to prevent water ingress in the cable core (ITCO C 480)	
Core Covering		Binder and Polyester Tape	
Cable			
Rip Cord	2 Nos.	Polyester Based Twisted Yarn	Applied below Outer Sheath
Outer Sheathing		UV Proof Black MDPE (ME 6052/ME 6056)	2.2 mm Nominal Thickness
CONSTRUCTIONAL DETAILS			
			
Typical construction Diagram - Not to Scale			
OPTICAL FIBER CABLE PERFORMANCE			
MECHANICAL		ENVIRONMENTAL	
Max. Tensile strength	2500 N	Crush Resistance	2000 N / 100x100 mm
Minimum Bend Radius	20 D	Impact strength	25 Nm.
Repeated Bending Test	20 D,30Cycle	Torsion	±180°
Water Penetration	1m head, 3m samples, 24 Hr		
Tests shall be carried out as per IEC 60793 & IEC 60794-1-2/GR 20 Standards. Change in attenuations shall be ≤ 0.05 dB.		Temp. Performance	
		Installation	-20°C to +80°C
		Service	-20°C to +80°C
		Storage	-20°C to +80°C
		Drip Test	30 cm, 70°C, 24 hr
COLOR DETAILS			
Optical Fibre Colour	Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Pink, Aqua.		
Loose Tube Colour	For G657A1 : Blue, Orange, Green & For OM2 : Brown.		
Outer Sheath Colour	Black		
PHYSICAL PARAMETERS			
Cable Diameter (mm)	11.75 ± 0.25	Cable Wt. (Kg/Km)	114 ± 10%
		Cable Length:	2 Km ± 5%
PRINTING DETAILS			
Cable Printing details (White - Hot Foil Emb.)	48F TELEPHONE SYMBOL LASER SYMBOL MONTH & YEAR OF MANUFACTURE LENGTH CODE METER MARKING		
The accuracy of marking shall be ± 0.5%. Occasional loss of printing & remarking shall be as per Bell core GR 20 and this supercedes the earlier markings.			