

TECHNICAL SPECIFICATION

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Document No.	ENG-HV-33KV,400A Vertical AB Switch	Eff. Date: 01/03/2021	
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1.0	SCOPE	<p>1. This Specification covers the technical requirements of design, manufacturing, testing at manufacturer's works, packing, forwarding, supply and unloading of polymer 33 kV, 400 Amps Polymeric Vertical AB Switch at site / stores complete with all accessories.</p> <p>2. The material shall be complete with all components and accessories, which are necessary or usual for their efficient performance and trouble free operation under the various operating and atmospheric conditions specified in clause no. 3</p> <p>3. Such of the parts that may have not been specifically included, but otherwise form part of the GO Switch as per standard trade and/or professional practice and/or are necessary for proper operation, will be deemed to be also included in this specification. The successful bidder shall not be eligible for any extra charges for such accessories etc. notwithstanding the fact that at the time of an initial offer bidder had segregated such items and quoted for them separately.</p>														
2.0	APPLICABLE STANDARDS	<p>The equipment (and the materials used) covered by this specification shall unless otherwise stated, be designed, manufactured and tested in accordance with the latest editions of the following Indian standards & other relevant standards for components, BEE & CEA guidelines with latest amendment from time to time, thereof, some of which are listed below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Indian Standards (IS)</th> <th style="text-align: left;">Title</th> </tr> </thead> <tbody> <tr> <td>IS 9920</td> <td>High Voltage Switches for rated voltages above 11kV and up to and including 52kV</td> </tr> <tr> <td>IEC 61109</td> <td>Composite insulators for A.C. overhead line with nominal voltages greater than 1000V</td> </tr> <tr> <td>IEC 62271-102</td> <td>High Voltage switchgear and control gear- Part 102: Alternating current disconnectors and earthing switches</td> </tr> <tr> <td>IS: 2633</td> <td>Method for testing uniformity of coating on zinc coated articles</td> </tr> <tr> <td>IS: 2629</td> <td>Recommended practice for hot dip galvanizing of iron and steel</td> </tr> <tr> <td>IS 4759</td> <td>Hot-dip zinc coatings on structural steel and other allied product</td> </tr> </tbody> </table>	Indian Standards (IS)	Title	IS 9920	High Voltage Switches for rated voltages above 11kV and up to and including 52kV	IEC 61109	Composite insulators for A.C. overhead line with nominal voltages greater than 1000V	IEC 62271-102	High Voltage switchgear and control gear- Part 102: Alternating current disconnectors and earthing switches	IS: 2633	Method for testing uniformity of coating on zinc coated articles	IS: 2629	Recommended practice for hot dip galvanizing of iron and steel	IS 4759	Hot-dip zinc coatings on structural steel and other allied product
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3.0 CLIMATIC CONDITIONS OF THE INSTALLATION	<p>The material shall be suitable for following climatic conditions,</p> <ol style="list-style-type: none"> 1. Maximum altitude above sea level 1,000m 2. Maximum ambient air temperature 50°C 3. Maximum daily average ambient air temperature 35°C 4. Minimum ambient air temperature 0°C 5. Maximum relative humidity 95% 6. Average number of thunderstorm days per annum (isokeraunic level) 70 7. Average number of rainy days per annum 120 8. Average annual rainfall 150cm 9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g 10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity) 11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr. <p>Environmentally, some of the regions, where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas.</p> <p>Therefore, Outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.</p> <p>The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g.</p>
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4.0 GENERAL TECHNICAL REQUIREMENTS			
S No	Description	Requirements	Requirements
1	Nos. of Supporting Post insulator/pole 22kV/24kV Polymeric Post Insulator per Phase	3	2
2	Rating of GO Switch	400 Amps Vertical AB GO Switch	400 Amps Vertical AB GO Switch
3	Installation	Outdoor	Outdoor
4	Type	3 Pole	3 Pole
5	Service Voltage	33 kV	33 kV
6	Rated Voltage	36 kV	36 kV

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7	Rated Frequency	50 Hz	50 Hz
8	Current Carrying Capacity	400 Amps	400 Amps
9	Rated short time current	28 KA	28 kA
10	Rated Short circuit Making Capacity	25 KA	25KA
11	Rated peak withstand current	70 kA	70 kA
12	Rated main active load breaking capacity	10 KAmp	10 KAmp
13	Rated off-loads breaking capacity	6.3 A	6.3 A
14	Power Frequency withstand voltage between pole and earth	75kV	75kV
15	Power frequency withstand voltage across the isolation distance	85kV	85kV
16	One minute Power Frequency Withstand Voltage Dry	95KV	95KV
17	One minute Power Frequency Withstand Voltage Wet	75KV	75KV
18	PF Flash Over Voltage		
	a) Wet	90 kV	90 kV
	b) Dry	130 kV	130 kV
19	Impulse Flash Over Voltage (1.2/50µs)		
	a) Positive	170kV _P	170kV _P
	b) Negative	180kV _P	180kV _P
20	Visible Discharge Voltage	27KV _{rms}	27KV _{rms}
21	No. of Post Per Phase	3	2
22	Total No. of post	9	6
23	Minimum Creepage Distance	900 mm	900 mm
24	Phase to Phase Clearance	1200mm	1200mm
25	Isolation Distance	640mm	640mm
26	Size of flexible tinned copper braid/rope	200 sq.mm	200 sq.mm
27	Minimum length of insulated tinned copper braid/rope per phase	750 mm	750 mm
28	Size of fixed contacts	300 sq. mm	300 sq. mm
29	Size of Moving contacts	300 sq. mm	300 sq. mm
30	Current density of tinned Copper	< 2 Amps/mm ²	< 2 Amps/mm ²
31	Size of rods used for arcing horns	10 mm	10 mm
32	Insulation for tinned Copper braid/rope	Polyolefin, (RSFR-H) type	Polyolefin, (RSFR-H) type
33	Minimum size*Length of Coupling GI Solid Rod	32*32*2700mm	32*32*2700mm
34	Minimum Thickness of GI Strip (Pentagraph)	25mm * 3mm	NA

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35	Temperature Rise Limit (w.r.t ambient temp)		
	- Tinned Copper contacts	50° C	50° C
	- Terminals	40° C	40° C
	- Metal Parts	40° C	40° C

5.0	GENERAL CONSTRUCTION	<ol style="list-style-type: none"> 1. The Air break switch shall be outdoor type, triple pole gang operated and shall be suitable for vertical installation. 2. The operating mechanism shall be suitable for manual operation from ground level and shall be designed in such way that all the three phases shall open and close simultaneously in smooth way. 3. The air break switch shall be with the arcing horns, the sizes of the rods used for the arcing horns would be 10mm M.S. Hot dip galvanized, arcing horn shall be bolted on double bolt. 4. The current carrying connectors should be two-bolt type having nuts and bolts, with spring washer and plane washer. 5. Each joint shall be provided with one plane and one spring of not less than 2mm thickness. 6. Connectors shall be of tinned copper. 7. All current carrying parts should have current density less than 2Amps/mm². 8. Tinned Copper braid/rope shall be insulated by Polyolefin, (RSFR-H) type to prevent animal electrocution. 9. All ferrous parts shall be hot dip galvanized with heavy coating after proper surface treatment as per standards. Coating thickness shall not be less than 87micron at any point. 10. All Copper parts shall be heavily tinned plated as per relevant standards and coating thickness not less than 30micron at any point. 11. Equipment grounding shall be provided by bidder at two points with terminals. 12. The GI strip of the pantograph should be riveted, full threaded bolts in the pantograph will not be accepted. 13. Metal Pantograph shall be connected through insulator on live post to prevent flow of parallel current. 14. Metal Pentograph must be insulated with polyolefin. 15. All the nut bolt used must be Hot dip Galvanized and of size not less than M10. 16. A rigid base of galvanized steel channel of size approx. 100x50x6mm shall be provided with suitable holes, clamps and bolts for vertical mounting firmly on steel structure. 17. Each member of the switch shall be free from Rust, sharp edges, burr and any kind of deformation.
5.1	SILICONE RUBBER POST INSULATOR	<ol style="list-style-type: none"> 1. All insulators provided to form a stack shall conform to the relevant standard specifications. 2. Composite insulator's shed and sheath shall be made of High Temperature Vulcanizing (HTV) type silicone rubber having silicone polymer content by weight 30% minimum.

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		<ol style="list-style-type: none"> 3. The sheath and shed shall have excellent Hydrophobic and anti-tracking properties. 4. The composite polymer weathersheds made via injection molded and shall be free from imperfections, dust and air bubble etc. It should protect the FRP rod against environmental influences, external pollution and humidity. 5. The strength of the weather shed to sheath interface shall be greater than the tearing strength of the polymer. 6. The FRP rods used for insulator shall be of glass-fiber reinforced epoxy resin rod of high strength (FRP rod). 7. Glass fibers shall be Boron free electrically corrosion resistant (ECR) glass fiber (minimum 80%) and shall exhibit both high electrical integrity and high resistance to acid corrosion. 8. Glass fibers and resin shall be optimized in the FRP rod. 9. The end fitting transmit the mechanical load to the core. They shall be made of spheroidal graphite cast iron, malleable cast iron or forged steel or aluminum alloy. 10. Metal end fitting shall be suitable for hardware support of respective specified mechanical load and shall be hot dip galvanized with average minimum of 115micron and no value less than 90micron in accordance with IS 2629. They shall be connected to the rod by means of a controlled compression technique. 11. The OD of end fittings should be machined to make the surface uniform round to ensure effective sealing when housing is molded over it. The material used in fittings shall be corrosion resistant. 12. The Post insulator shall be homogenous and free from all the cavities and flaws. 13. Design of insulators shall ensure ample insulation, mechanical strength and rigidity for satisfactory operation under site conditions. 14. The design shall also ensure that the losses caused by capacitive current or conduction through dielectric are minimum and that the leakage due to moist and dirty insulators surfaces is least. 15. All metal caps and supports shall be crimped to the FRP rod. 16. There should be a closed ring of Stainless steel of 0.3x1mm at insulated bottom of the insulators.
5.2	FIXED AND MOVABLE CONTACT SYSTEM	<ol style="list-style-type: none"> 1. The material of the fixed and moving contacts shall be electrolytic hard drawn copper (min. 95% copper) heavily tinned Coated. 2. The contact shall be of high pressure and self-aligning type with positive wiping action and minimum contact pressure shall be ¼ gram per amp of current carrying capacity. 3. The fixed contact shall have insulating bushes at spring ends and proper guide arrangement for preventing misalignment of springs. 4. The minimum distance between the fixed and the nearest part on the moving contact in the completely open position shall not be less than the defined value in GTP. 5. The withstand level across the break, shall be as specified under Type test.
5.3	TERMINATIONS	<ol style="list-style-type: none"> 1. The electrical terminations shall be made of tinned copper with minimum cross section and rating equivalent to fixed contact.

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		<ol style="list-style-type: none"> The terminations shall be suitable for connections for AL conductor with AL Lug. Incoming terminal shall be of extended dimension for LILLO connections, there should be provision for connecting two nos. of Al Lugs. For outgoing side, there should be provision for connecting one nos. of connections. All nut bolts, washer, spring washers required for connections shall be provided with equipment.
5.4	OPERATING MECHANISM	<ol style="list-style-type: none"> Bidder shall provide `B' Class G.I. Operating pipe of 32 mm outer diameter and 6 meter length in single piece without joint. The mechanism shall provide good mechanical leverage with minimum of loose/lost motion. There shall not be any misalignment in post insulators/complete assembly and the touch time of main contacts of all poles shall be same i.e. at the time of closing, the moving main contacts of all poles shall come in touch with fix contact at the same instance. There shall not be any discrepancy in contact touch timing while operations. At the time of installation if any issue arises because of alignment, then the bidder shall extend the support in attaining the same or replacing the GO switch with in 15days. Suitable padlock/locking arrangement shall be provided for for pad-locking in both `ON' and `OFF' position.
5.5	MECHANICAL STRENGTH	<ol style="list-style-type: none"> GO switches shall withstand rated mechanical terminal load and electromagnetic forces without impairing their operational reliability or current carrying properties. GO switches inclusive of their operating mechanism shall not come out of their open or closed positions by gravity, wind pressure, vibrations or reasonable shocks. GO switches shall be capable of resisting in closed position dynamic and thermal effects of the maximum possible short circuit current at the installation point and should not open under the influence of short circuit current.
6.0	NAME PLATE AND MARKING	<p>Below parameters should be embossed on SS sheet of thickness 1mm with black background. It should be riveted on MS channel of switch :</p> <ol style="list-style-type: none"> Rated Voltage Manufacturer's Name Month/Year of Manufacture Serial Number PO no. Rated normal current in Amps Rated one second short-time current in Amps
7.0	TESTS	<ol style="list-style-type: none"> All routine, acceptance & type tests shall be carried out in accordance with the relevant IS 9921 and relevant IEC. All routine/acceptance tests shall be witnessed by the TPSODL authorized representative. All the components and fittings shall also be type tested as per the

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		relevant standards. 4. Following tests for Air Break GO Switch should be done as per relevant IS/IEC standards:			
7.1	ROUTINE TEST	1. Power Frequency Voltage dry test 2. Dimensional Check 3. Satisfactory Operation Test 4. Measurement of resistance in main circuit 5. Voltage test for auxiliary circuit			
7.2	ACCEPTANCE TEST	Sr. No.	Test to be done	Reference BIS	Clause no.
		1	Power Frequency Voltage Dry test	IS 9920 part-4	4.1
		2	Satisfactory Operation Test	IS 9920 part-4	4.3
		3	Measurement of resistance in main circuit	IS 9920 part-4	4.2
		4	Visual and Dimensional checks		
		5	Verification of metallic or no nonmetallic dust and air bubbles with in polymeric housing and shed of insulator (Destructive test)		
		6	Voltage test for auxiliary circuit	IS 9920 part-4	4.01 & 3.1.11
		7	Galvanizing test for– i. GI pantograph ii. Operating Rod, channel and base structure iii. Post Insulator parts iv. Nut bolts	IS 4759	cl.9
7.3	TYPE TEST	1. Test for Temperature rise as per IS 9920 part4 cl.3.2. 2. Test to verify the insulation level including withstand test at power frequency voltages on auxiliary equipment test as per IS 9920 part4 cl. 3.1. 3. Test to prove satisfactory operation and mechanical endurance as per IS 9920 part4 cl.3.5. 4. Making and breaking test as per IS 9920 part4 cl.3.3. 5. Test to prove the capability of the switch to carry the rated peak withstand current and rate short circuit current as per IS 9920 part4 cl.3.4. 6. Test to prove satisfactory operation under ice conditions as per IS 9920 part4 cl.3.6.			
8.0	TYPE TEST CERTIFICATES	The bidder shall furnish the type test certificates as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA/NABL accredited LAB as per the relevant standards. Type tests should have been conducted in certified Test laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable same shall be carried out without any cost implication to TPSODL.			

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9.0	PRE-DESPATCH INSPECTION	<p>Equipment shall be subject to inspection by a duly authorized representative of TPSODL. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to TPSODL's representatives at all times when the work is in progress. Inspection by TSODL or authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPSODL</p> <p>Following documents shall be sent along with material:</p> <ol style="list-style-type: none"> Test report MDCC issued by TPSODL Invoice in duplicate Packing list Drawings & catalogue Guarantee / Warrantee card Delivery Challan Other Documents (as applicable)
10.0	INSPECTION AFTER RECEIPT AT STORE	The material received at TPSODL store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Engineering department.
11.0	GUARANTEE:	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/ manufacturing of items under the contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 18 months from the date of commissioning or 24 months from the date of last supplies made under the contract, whichever is earlier, supplier shall be liable to undertake to replace/rectify such defects at his own costs. within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges(@ 20% of expenses incurred), from the supplier or from the " Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company
12.0	PACKING	<p>Bidder shall ensure that all the equipment covered under this specification shall be prepared for rail/road transport in a manner so as to protect the equipment from damage in transit.</p> <p>Note: One use plastic not to be used for packing of the material.</p>
13.0	TENDER SAMPLE	One no. Sample of braided tinned Copper to be submitted during technical bid submission along with current density calculation.

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14.0	TRAINING	The bidder shall arrange to provide training of our staff if required for installation & commissioning or maintenance etc.
15.0	QUALITY CONTROL	<p>The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. TPSODL's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.</p> <p>The following information shall necessarily be submitted with the bid:</p> <ol style="list-style-type: none"> 1. List of important raw materials, names of sub-suppliers for raw materials, standards to which raw material is tested and the copies of test reports of the tests carried out on raw materials in presence of Bidder's representatives. 2. List of manufacturing facilities available, level of automation achieved and the areas where manual process exists. 3. List of areas in manufacturing process where stage inspections are normally carried out for quality control and details of these tests and inspections 4. List of testing equipment for final testing with valid calibration reports. Manufacturer shall possess 0.1 class instruments for measurement of losses. 5. QAP withhold points for TPSODL inspection.
16.0	MINIMUM TESTING FACILITIES	Bidder shall have adequate in house testing facilities for carrying out all routine tests, acceptance tests and pre-dispatch inspection as per relevant International / Indian standards.
17.0	MANUFACTURING ACTIVITIES	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart should be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.
18.0	SPARES, ACCESSORIES ND TOOLS	<ol style="list-style-type: none"> 1. Bidder shall provide a list of recommended spares with quantity and unit prices for 5 years of operation after commissioning. The Purchaser may order all or any of the spare part listed at the time of award of contract and these parts shall be supplied as a part of definite works. The Purchaser may order additional spares at any time during the contract period at the rates stated in the Contract document. 2. Bidder shall give an assurance that the reparability of GO Switch, spare parts and consumable items will continue to be available through the life of the equipment which shall be 15 years minimum. However, the Purchaser shall be given a minimum of 12 months' notice in the event that the Bidder or any sub-vendor plans to discontinue manufacture of any component used in this equipment. 3. Any spare apparatus, parts or tools shall be subject to the same specification, tests and conditions as similar material supplied under the

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		Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification.
19.0	DRAWINGS AND DOCUMENTS	<p>Following drawings and documents shall be prepared based on TPSODL specifications and statutory requirements and shall be submitted with the bid:</p> <ol style="list-style-type: none"> Completely filled in Technical Particulars and compliance to each clause of the specification General Technical Requirements to Additional Details. Description of the equipment and all components including brochures. General Drawing arrangement of GO Switch. Bill of material. Experience Certificate and list. Type test certificates. List of makes of major components. Current density calculation of tinned braided Copper. <p>Drawings / documents to be submitted after the award of the contract are as under:</p> <p><u>List of Drawings/Parameters to be submitted:</u></p> <ol style="list-style-type: none"> Technical Parameters as asked in Specification (General Technical Particulars, General Technical Requirements, Additional Details, Fittings, Type test Reports and Routine test certificates of bought out accessories). General Arrangement Drawing of the GO Switch (Front view, Top view and both sides view. Complete list of fittings to be displayed and quantities to be mentioned with the drawing). Terminal and connection drawings Manual catalogue Instructions for use Transport/shipping dimension drawing Type Test Certificates. Installation/ Mounting Instructions/Drawing. Quality Assurance plan. <p><u>List of Calculations to be submitted:</u></p> <p>All the calculations shall be step by step showing the use of formulas and other practical considerations. Concise calculations in table or excel sheet shall not be accepted. Also, the reference (only standard sources as IS, IEC or any such standard is acceptable) of the formulas shall be mentioned.</p> <ol style="list-style-type: none"> Short Circuit withstand. Temperature Rise Calculations. <p><u>Additional Documents to be submitted :</u></p>

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		<p>a. List of raw materials as well as bought out accessories and the names of sub-suppliers selected from those furnished along with offer.</p> <p>b. Type test certificates of the raw materials and bought out accessories.</p> <p>c. The successful Bidder shall submit the routine test certificates of bought out accessories and central excise passes for raw material at the time of routine testing.</p> <p>All the documents & drawings shall be in English language. After the receipt of the order, the successful bidder will be required to furnish all relevant drawings/parameters/calculation to TPSODL for approval.</p> <p>Instruction Manuals: Bidder shall furnish softcopies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.</p>						
20.0	GUARANTEED TECHNICAL PARTICULARS	All clauses and points in the Specification to be complied for along with GTR.						
21.0	SCHEDULE OF DEVIATIONS							
	<p><u>(TO BE ENCLOSED WITH THE BID)</u></p> <p>All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:</p> <table border="1"> <thead> <tr> <th>S.No.</th> <th>Clause No.</th> <th>Details of deviation with justifications</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>We confirm that there are no deviations apart from those detailed above. Seal of the Company: Signature Designation</p>		S.No.	Clause No.	Details of deviation with justifications			
S.No.	Clause No.	Details of deviation with justifications						

Initiator		HOG (Engineering)	
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TECHNICAL SPECIFICATION

Document Title	Specification of 33 kV, 400 Amps Polymeric Vertical AB Switch		
Document No.	ENG-HV-33KV,400A Vertical AB Switch	Eff. Date: 01/03/2021	
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ANNEXURE-I**INSPECTION TEST PLAN FOR PRE-DELIVERY OF GO SWITCH**

1	Name of the firm / BA	
2	Date of inspection	
3	Details of offer made	
	(i) Order No. and date	
	(ii) Rating	
	(iii) Quantity	
	(iv) Sl. No. of material offered	
4	Sample Quantity	Sr. No.-----

ACCEPTANCE TESTS TO BE CARRIED OUT

S No.	PARTICULARS	Specified Value	Reference documents	Test Results	Pass/Fail
1	Power Frequency Voltage Dry Withstand test	35KV	IS 9920 part-4 cl.4.1		
2	Satisfactory Operation Test	satisfactory	IS 9920 part-4 cl.4.3		
3	Measurement of resistance in main circuit	GTP	IS 9920 part-4 cl.4.2		
4	Voltage test for auxiliary circuit		IS 9920 part-4 cl.4.01 & 3.1.11		
5	Visual and Dimensional checks	GTP/TPSODL Specification			
6	Verification of metallic or nonmetallic dust and air bubbles within polymeric housing of Post insulator (Destructive test)	Free from metallic or nonmetallic dust, air bubbles etc.			
7	Mechanical strength test	GTP			
8	Galvanizing test for– i. GI pantograph ii. Operating Rod, channel and base structure iii. Post Insulator parts iv. Nut bolts	- GI Coating min. >86micron - Uniform GI coating - Free from rust, burr deformation	IS 4759 cl.9		
9	Verification of Raw material TC, invoice and its consumption record	Record must be maintained for each raw material			

PURCHASER'S OFFICER

BIDDER'S REPRESENTATIVE

DATE OF INSPECTION

Initiator		HOG (Engineering)	
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ANNEXURE – II**SOURCE OF MATERIAL/PLACES OF MANUFACTURE, TESTING AND INSPECTION**

S No.	Item	Source of Material	Place of Manufacture	Place of testing and Inspection
1	Steel (channel, angle etc)			
2	Galvanizer			
3	Zinc			
4	Silicon Rubber			
5	FRP Rod			
6	Insulation			
7	Tinned Copper braid/rope			
8	Copper for terminal & contacts			

Initiator		HOG (Engineering)	
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