

TECHNICAL SPECIFICATION

1) SCOPE

This specification provides for manufacture, at works and supply of 11 KV & 33 KV AB switches. The 11 KV and 33 KV AB switches shall conform to IS: 9920 (Part-I to IV)

2) AB SWITCHES

The 11 KV & 33KV Air Break Switches are required with two poles in each phase. The AB Switches shall be supplied complete with phase coupling shaft, operating rod and operating handle. It shall be manually gang and vertically break and horizontal mounting type.

The equipment offered by the bidder shall be designed for a normal current rating of 200 Amps and for continuous service at the system voltage specified as under:

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|--------------------|---|------------|---|
| i) 11 KV AB Switch | : | 11 KV+ 10% | continuous 50 CIS solidly grounded earthed neutral System |
| ii) 33KV AB Switch | : | 33 KV +10% | -do- |

The length of break in the air shall not be less than 400 mm for 11 KV AB Switches and 500 mm for 33 KV AB Switch.

The 11 KV & 33 KV AB Switches are required with post insulators. The AB switches should be suitable for mounting on the structure. The structure will be arranged by the bidder. However, the AB Switches shall be supplied with base channel for mounting on the structure which will be provided by the owner. The phase to phase spacing shall be 750mm in case of 11KV AB Switches & 1200mm in case of 33KV AB Switches.

3) POST INSULATORS

The complete set of three phase AB Switches shall have stacks of post insulators.

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|------------------|---|--------------------------------------|
| 11KV AB Switches | : | 3 No. 11 KV Post Insulator per stack |
| 33KV AB Switches | : | 3 No. 33 KV Post Insulator per stack |

The post insulators should conform to the latest applicable Indian standards IS: 2544 Specification for Porcelain Post insulator of compact solid core or long rod insulators are also acceptable. Creepage distance should be adequate for highly polluted outdoor atmosphere in atmosphere. The porcelain used for manufacture of AB Switches should be homogeneous free from flaws or imperfections that might affect the mechanical dielectric quality. They shall be thoroughly vitrified, tough and impervious to moisture. The glazing of the porcelain shall be of uniform brown in colour, free from blisters, burns and other similar defects. Insulators of the same rating and type shall be interchangeable.

The porcelain and metal parts shall be assembled in such a manner that any thermal expansion differential between the metal and porcelain parts through the range of temperature variation shall not hose the parts or create undue internal stresses which may affect the electrical or mechanical strength. Cap and base of the insulators shall be interchangeable with each other. The cap and base shall be properly cemented with insulators to give perfect grip. Excess cementing must be avoided.

Each 11 KV & 33KV Post Insulators should have technical particulars as detailed below:

		11 KV	33 KV
i	Nominal System Voltage KV (rms)	11	33
ii	High System Voltage KV (rms)	12	36
iii	Dry Power Frequency one kV minute withstand voltage (rms) in KV	35	75
iv	Wet Power frequency one minute withstand voltage (rms) in	35	75
v	Power Frequency puncture kV (rms) voltage	1.3 times the actual dry flashover voltage	
vi	Impulse withstand voltage kV (Peak)	75	170
vii	Visible discharge voltage kV (rms)	9	27
viii	Creepage distance in mm (minimum)	320	580

The rated level of the AB Switches shall not be lower than the values specified below:-

Sl. No.	Standard declared voltage	Rated. Voltage of the AB Switches	Standard impulse with stand voltage (positive & negative polarity kV (Peak)		One Minute power frequency withstand voltage kV (rms)	
			Across the Isolating distance	To earth & between poles	Across the isolating distance	To earth & between
i	11 KV	12 KV	85 KV	75 KV	32 KV	28 KV
ii	33 KV	36 KV	195 KV	170 KV	80 KV	70 KV

4) TEMPERATURE RISE

The maximum temperature attained by any part of the equipment when in service at site under continuous full load conditions and exposed to the direct rays of Sun shall not exceed 45 degree above ambient.

5) MAIN CONTACTS

AB Switches Shall have heavy duty self-aligning type contacts made of hard drawn electrolytic copper/brass. The various parts should be accordingly finished to ensure interchangeability of similar components. The moving contacts of the switch shall be made from hard drawn electrolytic copper brass. This contact shall have dimensions as per drawing attached so as to withstand safely the highest circuit currents and over voltage that may be encountered during service. The surface of the contact shall be rounded smooth and silver-plated. In nut shell the male and female contact assemblies shall ensure.

1. Electro-dynamic withstands ability during short circuits without any risk of repulsion of contacts.
2. Thermal withstands ability during short circuits.
3. Constant contact pressure even when the lower parts of the insulator stacks are subjected to tensile stresses due to linear expansion of connected bus bar of flexible conductors either because of temperature variations or strong winds.
4. Wiping action during closing and opening.
5. Fault alignment assuring closing of the switch without minute adjustments.

6) CONNECTORS

The connectors shall be made of hard drawn electrolytic copper or brass suitable for Raccoon/Dog ACSR conductor for both 11KV & 33KV AB Switches. The connector should be 4-bolt type.

7) OPERATING MECHANISM

All AB Switches shall have separate independent manual operation. They should be provided with ON/OFF indicators and padlocking arrangements for locking in both the end positions to avoid unintentional operation. The isolating distances should also be visible for the AB Switches.

The AB Switch will be supplied with following accessories:

Sl. No.	Item	Size of 11 KV AB Switch	Size of 33 KV AB Switch
i	Operating Rod (GI dia) ISI mark	Length 5.50 meter dia: 25MM	Length 5.50 mtrs dia: 40mm
ii	Coupling Square Rod (GI) ISI mark	Length 1800 mm Size 25x25 mm	Length 2700 mm Size 40 x 40 mm
iii	Hot dip galvanized operating Handle (GI)	1 No.	1 No.

The AB Switches shall be capable to resist any chance of opening out when in closed. The operating Mechanism should be of robust constructions, easy to operate by single person and to be located conveniently for local operation in the switchyard. The GI pipe shall conform to ('B' class or Medium class Blue strip) ISS: 1239-68 and ISI marked by embossing. The vertical down rod should be provided with adequate joint in the mid section to avoid bending or buckling. Additional leverage should be provided to maintain mechanical force with minimum efforts.

All iron parts should be hot dip galvanized as per IS 4759-1979 and zinc coating shall not be less than 610 gm/sq. meter. All brass parts should be silver and all nuts and bolts should be hot dip galvanized.

8) ARCING HORNS

It shall be simple and replaceable type. They should be capable of interrupting line-charging current. They shall be of first make and after break type.

9) BUSH

The design and construction of bush shall embody all the features required to withstand climatic conditions specified so as to ensure dependable and effective operations specified even after long periods of inaction of these Air Break Switches. They shall be made from highly polished Bronze metal with adequate provision for periodic lubrication through nipples and vent.

10) DESIGN, MATERIALS AND WORKMANSHIP

All materials used in the construction of the equipment shall be of the appropriate class, well finished and of approved design and material. All similar parts should be accurately finished and interchangeable. Special attention shall be paid to tropical treatment to all the equipment, as it will be subjected during service to extremely severe exposure to atmospheric moisture and to long period of high ambient temperature. All current carrying parts shall be of non-ferrous metal or alloys and shall be designed to limit sharp points/edges and similar sharp faces.

The firm should have the following type test certificate. The type test should be from CPRI or equivalent lab:-

1. Test to prove capability of rated peak short circuit current and the rated short time current. The rated short time current should correspond to minimum of 10K Amp and the peak short circuit current should correspond to minimum of 25K Amps.
2. Lightning impulse voltage test with positive & negative polarity.
3. Power Frequency voltage, dry test and wet test
4. Temperature rise test
5. Mill volt drop tests

The above tests should be performed on the AB Switches, manufactured as per owner approved drawing with the specification. Along with the type test certificate, the certified copy of the drawing (from the testing lab) should also be kept for inspection of our officer. Also the test certificates should not be older than 5 years from the date of opening of tender.

Dimension of 11 & 33 KV AB Switches in (Max.) Tolerance 5%

Sl. No.	Particulars	11 KV AB Switch	33 KV AB Switch
i	MS Channel	450×75×40	675×100×50
ii	Creepage distance of Post Insulator	320mm (Min)	580mm (Min)
lii	Highest of Port Shell	254 mm	368 mm
iv	Fixed Contact assembly		
	i) Base	165×36×8	165×36×8
	ii) Contact	70×30×6	70×30×6
	iii) GI Cover	110×44	140×44
	iv) Spring	6 Nos.	6 Nos.

11) Moving Contract Assembly

i	Base Assembly	135×25×8	170×40×8
ii	Moving	180×25×9	290×25×14
iii	Bush	Bronze Metal	Bronze Metal
iv	Thickness of Grooves	7	11

12) Connectors

I	Connector	60×50×8 (Moving & fix both)	60×50×8 (Moving & fix both)
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The bidder should provide AB Switches with terminal connectors, set of insulators, mechanical inter works and arcing horns sets. The base channel for the mounting of AB Switches shall also be included in the scope of AB Switches. The operating mechanisms together with down pipe operating handle etc. are also included in the scope of supply.