

**SPECIFICATIONS FOR 33 KV CONTROL PANNEL FOR (5/10 MVA)**  
**SINGLE/DOUBLE TRANSFORMER (WITHOUT DIFFERENTIAL**  
**PROTECTION).**

**SCOPE:**

This specification covers design, manufacture. Testing, packing and delivery of 33 KV Control Panels.

**GENERAL DESCRIPTION OF PANNELS:**

The control and relay panels should be floor mounted, freestanding cubicle type and should be vermin proof. Such control and relay panels should be complete in all respects i.e. all relays and other auxiliary instruments/equipments should be mounted on this panel only. The instruments to be mounted on the panel are given in Annexure-I.

The control panel should consist of fabricated sheet steel enclosure on the sides, front, rear and top. The rear of the panel should be in the form of lockable-hinged two-flap door. The front and rear sheet should have folded construction for providing rigidity and strength. The panel should not be made of any framework with sheets screwed or bolted to it.

The front of the panels, which accommodates most of the mounting, should be fabricated with sheet steel of thickness 10 SWG. For the rest of the sides, which does not carry weight of mounting, the sheet steel of thickness 14 SWG should be used. The height, depth and width of the panel shall be 2300x 500x600 mm approx. to accommodate all mounting properly.

The tenderer shall submit 4 complete sets of drawings (General arrangement of wiring diagram) and dimensions of both type of control panels along with tender. If required drawings submitted have to be coordinated with the breaker to be supplied. The panels shall have provisions for earthing the mountings and the panel by providing copper ground bus. The panel should be equipped with necessary links and HRC type fuses of good quality, which should be mounted on sheet steel brackets. Each fuse shall be identified with the suitably engraved plastic label. Each panel should be provided with two-pin socket and switch for a heat lamp and with internal panel lighting arrangement operated by a door switch. A space for heater rated at 100 W/230 Volt AC enclosed in a casing is also to be provided along with a ON / OFF switch. DC failure scheme along with DC fail accept and AC audible alarm shall be provided in the panel.

All relays should conform in all respect to IS-3231: 1965 and IS-8686: 1977 and subsequent revision thereof. Panels wiring should also conform to BSS: 258/1948 or equivalent Indian standards. The control panel shall be completely assembled and following routine tests shall be conducted as per provisions of specifications and IS: 8623.

1. Insulation test.
2. High voltage test.
3. Electrical operations.
4. Checking of protective measures and the electrical continuity of the protective circuits.

**TYPE TEST:**

Meters and all the relays should be type tested and verification of the same may be done during inspection.

**WIRING:**

The internal wiring of the panel should be carried out with 650 Volt grade pre insulated 2.5 sq. mm copper conductor conforming to IS: 2465 and the latest amendment thereof. Both ends of wires should have numbered plastic ferrules for identification. The panel wiring should be suitably bunched, dressed and clamped to present a neat appearance. All panel wirings should withstand 2.5 KV AC 50 Hz. RMS for one minute between conductors and earth.

All panel wiring terminations for connecting external apparatus circuits should be neatly terminated on terminal blocks having links for disconnection and plugging in facility for testing purposes. The terminal block should be suitably labeled to readily identify the outgoing /incoming wires. 20% extra terminals should be provided in each panel for future use. Suitable trays for fixing of cable glands for cables should be provided. Such trays should have suitable strength and dimensions to receive the PVC multicore cable and should be mounted to form the bottom of the panels. Cable gland should be provided with rubber rings for proper sealing and holding. The bottom tray shall be provided with suitable openings covered with sheet steel blanking plates of 4mm. thickness.

All the equipments including relays and meters etc. should be flush mounted. All the mountings should be provided on the front side.

Alarm bell and buzzer should be provided on one end of the relay and control panel.

The panel should be complete with mimic diagram representing bus bars, transformers, breakers, isolators earthing switches etc. and having semaphore indicator to show breaker position.

Brilliant green colour, fully glossy as per shade No. 221 of IS-5 for 33 KV and for 11 KV black full glossy may be adopted for mimic diagram etc. the interior of panels shall be furnished with stove enamel white and the base frame shall be painted glossy black.

The outside surface of the panels should be synthetic enamel painted in light gray as per shade No. 631 of IS-5 to achieve a durable surface. Pre-treatment of all the surface of panel shall be done as follows.

**STEPS:**

1. Degreasing (Either trichloro ethylene hot vapour or dip in alkali.)
2. Cold water rinsing (if degreased in alkali)
3. Pickling in acid to remove surface seal and/or rust.
4. Cold water rinsing to remove traces of acid.
5. Phosphatising to obtain oxidation resistant and pre storage finish.
6. Cold water rinsing to remove traces of phosphatising agent.
7. Rinsing with suitable liquid to remove any traces of salts.
8. Air-drying by blowing hot air.
9. Primer spray first coat with wet zinc chromate primer and stove at 150-160<sup>0</sup>C for 30 minutes.
10. Rub/putty – To remove minor surface flows and stove for 10-15 minutes.
11. Surface sand down (wet) with mechanical abrasive and stove for 5-10 minutes.
12. Primer spray second coat and stove at 150<sup>0</sup> C for 30 minutes.
13. Rub down dry and spray first coat of synthetic enamel point wet on wet and stove for 30 minutes.
14. Sand down (wet) or rub dry to prepare for final finish.
15. Spray second and final coat of desired colour synthetic enamel finish paint wet on wet and stove at 150<sup>0</sup> C-160<sup>0</sup> C for 30 minutes.

**CLIMATIC CONDITIONS:**

- i) Peak ambient temperature in shade – 50<sup>0</sup>C.
- ii) Max, average temperature over a period of 24 hrs. in shade – 45<sup>0</sup>C.
- iii) Minimum ambient temperature - 0<sup>0</sup>C.
- iv) Average No. of thunder storm days per annum – 40
- v) Average no. of rainy days per annum – 40.

- vi) Average annual rainfall – 50 to 100 cm.
- vii) No. of months of tropical monsoon conditions – 4  
(Middle June to Middle of October)
- viii) Max. relative humidity – 100%.

### **COMPLETENESS OF THE CONTRACT:**

The specification has been brought out in broader sense and some minor accessories, which are essentially required for smooth functioning of the mounting / panel might have been left out. Such fittings if required shall also be provided.

### **ANNEXURE: I**

#### **MOUNTINGS**

#### **THE CUBICLE SHALL BE MOUNTED WITH FOLLOWINGS**

Sl. No.	Items.	Single T/f Panels (No.)	Double T/f Panels (No.)
1	2	3	4
1.	Ammeter – AE/IMP make – Type Misc. Size 144 Sq. mm. Range 0-100/200 A.	One	Two
2.	Selector Switch – Kaycee or equivalent make, Type Rotary stay put, 4 Position (R-Y-B-OFF)	One	Two
3.	Relay Case, GEC Alsthom/ABB make: Type CDG-31 / ICM 21n drawout type Tripple Pole IDMT non directional having 2 O/C + 1 E/F, O/C Element 50-200% of 1A, E/F Element 10-40% of in 3-10 sec. The relay will be provided with 2 NO S/R Contacts with hand-reset flag.	One Set	Two Sets
4.	Relay Case non- drawout type containing high speed tripping relays. GEC Alsthom/ ABB/ Ashida/Schneider make: Type AHT-ih VAJH13/pq8chu, 24 V DC, with hand reset type operation indicator having 3NO, N/R contacts.	One	Two
5.	Circuit Breaker ‘TNC’ Control Switch Kaycee make of robust construction complete with lost motion device for auto trip indications.	One	Two
6.	CB position indication lamp, Vaishno make with bulbs rated 24 V DC, Red for ON, Green for OFF and Amber for Auto Trip.	Three	Six

7.	Relay Case non drawout type, Ashida/Schneider/ABB/GEC Alsthom/ Type: CV2Cj containing 5 auxiliary relay 24 V DC, with hand reset operation indicator on each element with inscription, Buchholtz Trip, Buchholtz Alarm, Oil level Low Alarm, Winding Temp. High Alarm and Trip.	One	Two
8.	Indication Lamp for Trip Circuit Healthy(Yellow).	One	Two
9.	a) Indicating Lamp of white colour to give non-trip alarm indication. b) Indicating Lamp of blue colour to give CB spring charged indication.	One One	Two Two
10.	Push Button for cancellation of audible alarm/Buzzer.	One	One
11.	Cubicle illumination lamp with door switch.	One	One
12.	Space heater with switch inside the cubicle.	One	One
13.	Two Pin Socket and switch in the cubicle.	One	One
14.	DC operated Electric Bell for trip and non-trip alarm and AC operated buzzer for DC failure.	One each	One each
15.	Cable Gland.	Three Set.	Six Set.
16.	DAV Industries or equivalent make, DC voltage operated Semaphore indicator for breaker position indicator.	One	Two
17.	Sufficient space as approved in the drawing shall be provided along with the wiring etc. for mounting of electronic energy meter in future.	One	Two
18.	Numerical differential relay Ashida/Schneider/ABB/GEC Alsthom/ : along with interposing CTS proved on notified control panels only.	One	One

**Note:**

1. Mimic diagram with semaphore indicators is to be provided as per specification.
2. Meters and relays provided in the control panel should have been type tested within last five years as per relevant ISS copies of relevant Type Test certificate should be enclosed along with the tender. Tenderers shall offer panels with relays of approved make as mentioned in the technical specification.
3. All relays should conform in all respect to relevant ISS: 3231/1965 and subsequent revisions thereof. Any other authoritative standard, which ensures an equal or better quality than the said IS/IEC, shall also be acceptable.

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