CONTROLLED SWITCHING DEVICE

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Engineering Department

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CONTROLLED SWITCHING DEVICE (CSD)

1. SCOPE

This technical specification covers the requirements of design, manufacture, testing at works, packing & dispatch and supervision of erection, testing & commissioning of Controlled Switching Devices (CSD) for 420 kV Circuit Breakers complete with accessories.

2. SPECIFIC REQUIREMENTS

400KV Circuit Breakers shall be equipped with controlled switching device with consequent optimization of switching behavior if mentioned in BOQ. The CSD shall be provided in Circuit breaker of switchable line reactor bay and in Main & Tie Bay circuit breakers of Transformers, line with non-switchable line reactors and Bus reactors.

The controlling relay shall record and monitor the switching operations and make adjustments to the switching instants to optimize the switching behavior as necessary. It shall provide self-diagnostic facilities, signaling of alarms and enable downloading of data captured from the switching events.

The controlled closing of a power apparatus should consists of triggering the electrical make of a CB pole contact at a desired voltage point-on-wave angle so as to eliminate voltage or current transients that can result from closing in a random fashion.

3. TECHNICAL REQUIREMENT

a) The CSD shall be designed to operate correctly and satisfactorily with the excursion of auxiliary A/C & DC voltages and frequency as specified in General Technical Requirement.

b) The CSD shall meet the requirements of IEC-61000-4-16 class IV for HF disturbance test (for short and long durations both) and fast transient test shall be as per IEC-61000-4-4 level IV and insulation test as per IEC 60255–5.

c) The CSD shall have functions for switching ON & OFF the circuit breakers.

d) The CSD shall get command to operate the breakers manually. The controller shall be able to analyze the current and voltage waves available through the signals from secondaries of CTs &

CVTs for the purpose of calculation of optimum moment of the switching the circuit breaker and issue command to circuit breaker to operate.

e) The CSD shall also have an adaptive control feature to consider the next operating time of the breaker in calculation of optimum time of issuing the switching command. In calculation of next operating time of the breaker, the CSD must consider all factors that may affect the operating time of the breaker such as, but not limited to, ambient temperature, control voltage variation, SF6 gas density variations etc. Schematic drawing for this purpose shall be provided by the contractor. The accuracy of the operating time estimation by the controller shall be better than ± 0.5 ms.

f) The CSD should have display facility at the front for the display of settings and measured values.

g) The CSD shall be PC compatible for the setting of various parameters and down loading of the settings and measured values, date, time of switching etc. Window based software for this purpose shall be supplied by the contractor to be used on the owner's PC.

h) The controller shall be suitable for current input of 1 ampere from the secondary of the CTs. and 110 V (Ph to Ph) from the CVTs. The CSD shall withstand transient and dynamic state values of the current from the secondary of the CTs and CVTs.

i) The CSD shall have time setting resolution of 0.1 ms or better.

j) The CSD shall have sufficient number of output/input potential free contacts for connecting the monitoring equipment and annunciation system available in the control room. Necessary details shall be worked out during engineering of the scheme.

k) The CSD shall also record and monitor the switching operations and make adjustments to the switching instants to optimize the switching behavior as necessary. It shall provide self-diagnostic facilities, signaling of alarms and enable downloading of data captured from the switching events.

l) The provision for bypassing the Controlled switching device shall be provided through BCU and SCADA both so that whenever, the CSD is not healthy due to any reason (including auxiliary supply failure), uncontrolled trip/close command can be extended to the circuit Breaker. Alternatively, in case of any non-operation of the CSD after receiving a close/trip command after a pre-determined time delay, the CSD should automatically be bypassed so as to ensure that the trip and close commands are extended to the Trip/Close coils through subsequent command.

m) The CSD shall be provided with a communication port to facilitate online communication of the CSD with Substation automation system directly on IEC 61850 protocols. If the CSD does not meet the protocols of IEC 61850, suitable gateway shall be provided to enable the communication of CSD as per IEC 61850.

4. TYPE TESTING

Bidder shall submit valid type test reports (as per relevant IEC/IS Standard) for approval. The bidder should have conducted type test on identical or similar equipment/ components to those offered. In case type test reports are found to be technically unacceptable, the type test shall be conducted without cost and delivery implication to WBSETCL.

5. TRAINING AND DEMONSTRATION

The successful bidder shall impart necessary training and demonstration on design, operation, maintenance and commissioning aspect to WBSETCL's personnel at site. Location for training is at the sole discretion of end Customer. All related expenses of the trainer shall be borne by the bidder.

6. GUARANTEE

Electrical characteristics shall be guaranteed by the bidder. In case of failure of materials to meet the guarantee, WBSETCL shall have right to reject the material.

7. CONTRACT DRAWING AND MANUAL

The contractor shall submit dimensional general arrangement drawing showing all fittings and accessories, sectional drawing with all technical parameters and G.T.P. Sufficient copies of detailed manual is to be submitted.

8. TESTS AND TEST CERTIFICATES:

All routine and acceptance tests shall be carried out at the works of the manufacturer as per relevant Indian Standards & IEC.

All acceptance tests shall be carried out at the manufacturer's works on every lot offered for inspection as per relevant Indian Standards in presence of the representative of WBSETCL. Selection of samples for acceptance test as well as rejection and re-testing shall be guided by relevant IS and IEC. The entire cost of acceptance and routine tests that are to be carried out as per relevant IS shall be treated as included in quoted price.

The material shall not be dispatched before it has been satisfactorily inspected tested and clearance issued by WBSETCL for dispatch.

An advance notice shall be given by the contractor intimating the actual date of tests, Routine test reports and details of all inspection that are to be carried out.