Section IV T -Technical Specification

CENTRAL POWER RESEARCH INSTITUTE, BENGALURU/BHOPAL Web: www.cpri.res.in

Tender Enquiry No : CPRIBLR23EMD15M1180

Description of the Equipment/Goods/Services :Supply of Potential transformers of 33kV class 33kV/V3 / 110/V3 – 110/V3. Complete specification is as below.

Note : 1) The technical bid submitted in other than this format is liable to be rejected.

2) All blue fields are mandatorily to be filled in.

Name and address of the bidder	
Quotation Number and Date	

Sl.No.	Technical Specifications/Parameters	Qty		To be completed by the Bidder: Detials of guaranteed technical parameters offered by the bidder	Guaranteed Technical Particulars (GTP)	Deviations from GTP
1	Place where equipment /service to be supplied /provided.	**Electrical Maintenace Division (EMD),33kV Sub station CPRI, Bengaluru**				
2	Scope	**Complete supply covers design, engineering, manufacture, testing and inspection before dispatch and delivery of Potential Transformer as per details below**	**04 (Four nos.)**			
1	This specification covers design, engineering, manufacture, testing and inspection before dispatch and delivery.					
2	The specification covers Oil immersed naturally Air cooled (type ONAN) outdoor type Live tank single phase 33kV PT conforming to IS: 3156:1992. 33 kV PT shall be suitable for 50 Hz frequency & for service under the system conditions having frequency fluctuations of +/- 4% and voltage fluctuation of + 9% / -13.5%.					
3	**STANDARDS:**					
	Indian Standard	**Title specification**				
	IS: 3156:1992	**Specification for Voltage Transformers**				
	IS: 335:1983	**Specification of Transformers Oil**				
	IS: 2099:1986	**Specification for bushing for AC voltage above 1 KV**				
	IS:5561	**Specification for terminal connector**				
4	**CLIMATIC SERVICE CONDITIONS:**					
5	**The 33 KV oil immersed PT Unit to be supplied against this specification should be capable of performing and maintaining required accuracy under hot, cold, tropical and dusty climate and solar radiation typically existing in the State of Karnataka. The33 kV oil immersed PT Unit shall be required to operate satisfactorily and continuously under the following tropical climatic conditions: a) Maximum ambient temperature : 40- °C b) Relative Humidity : 10to to 99 % c) Maximum annual rainfall : 2500 mm' d) Maximum wind velocity : 47 m/sec e) Minimum ambient air temperature : 10°CAll the parts & surface, which are subject to corrosion shall either be made of such material or shall be provided with such protective finish, which provides protection from any injurious effect of humidity. PRINCIPAL PARAMETERS : 33 kV PT units shall be suitable for 50 Hz frequency & for service under the system conditions having frequency fluctuations of +/- 4% and voltage fluctuation of + 9% / -13.5%. The 33 kV oil immersed PT shall be hermetically sealed and suitable for service under the system conditions as per following specific parameters**					
	33 kV PT units shall be suitable for 50 Hz frequency & for service under the system conditions having frequency fluctuations of +/- 4% and voltage fluctuation of + 9% / -13.5%. The 33 kV oil immersed PT shall be hermetically sealed and suitable for service under the system conditions as per following specific parameters					
6	**TECHNICAL REQUIREMENT:**					
	The 33 KV oil immersed PT units shall conform to the following specific parameters					
	Sl. no. Particulars Requirement 1. PT Ratio : 33000/√3 / 110/√3 -110/√3 2. Accuracy Class :Core - 1Core - 2 1.0/3P 3.VA burden : 100100 4.Power Frequency withstand voltage : 70kVrms 5.Lightning impulse with standvoltage : 170kVp					
	33 kV PT unit shall conforming to IS-3156: 1992 and should not exceed the ratio error and phase replacement as prescribed therein. The oil characteristics shall be conforming to IS-335: 1983 & with latest amendments and upgrade, if any. The PT secondary winding shall be suitable for transformer oil filled equipment.					
	The primary of PTs shall be 1 phase with HV side neutral floating. The primary winding has to be designed for unearthed neutral for the highest system voltage i.e. 36 KV for 33 kV . PT winding should have uniform insulation throughout from terminal to neutral end, and not the graded insulation. It should be capable of withstanding the disturbance of back e.m.f., magnetic characteristic and consequential mechanical inter-play of forces, if any, Secondary winding of PT should be single phase with neutral brought out. On secondary side of PT two terminals shall be marked as per standard. No PT fuses are to be provided either on primary side or on secondary side. The primary winding shall be of adequate cross section to carry continuously the rated voltage with current plus 20% percent overload continuously.					
7	**PT TANK 7.1 The PT tank shall be contained in a weather proof out door double pole mounting type M.S. tank with single 33 kV weather proof bushings with Brass stud as per rating of PT units. 7.3 The tank should be given three coats of rust preventing paint and finished with light grey No.631-IS-5 on all external surfaces. The internal surface of the tank shall be painted with two coats of a suitable oil- insoluble paint. 7.4 The PT shall be supplied complete with duly filled Transformer oil conforming to IS:335–1982 with latest amendment thereof. The test certificate of oil being used shall be provided at the time of inspection. The oil in the PT shall be filled under vacuum. Oil drain valve or sampling cock or non return type oil filling valve provided to facilitate factory processing shall be sealed before dispatch of PTs. 7.5 The PT shall be hermetically sealed and shall be provided with oil level gauge, of adequate size to facilitate expansion/ contraction of oil due to change in temperature. above the oil level in the tank shall be filled with Nitrogen gas conforming to commercial grade as per IS:1747:72. 7.6 A pressure release safety device suitable for operation at a pressure of 0.4 to 0.5 Kg/sq.cm. May be provided at the top of the tank if required. 7.7 An explosion vent diaphragm may be provided opposite side of secondary terminal box which should operate at a pressure of 0.6 to 0.8 Kg/sq.cm. The manufacturer has to produce the test/calibration certificate for proper operation of the device at the defined pressure. 7.8 The pressure of Nitrogen gas, pressure release device and explosion vent diaphragm shall be properly coordinated if provided.**					

	7.9 The PT shall be fitted on HV side with outdoor type porcelain bushings of appropriate voltage & current. These bushings shall conform to IS:2099:1986. Further, sealing arrangement shall be such that oil should not leak out from the bushing PT tank. For gasket joints, wherever used, nitrite butyl rubber gaskets/neoprene or any other improved material shall be used. The gasket shall be fitted in properly machined groove with adequate space for accommodating the gasket under compression. It should be ensured that the quality of gaskets used between the joints and also for mounting of oil level indicator will be of best quality to avoid leakage of oil. The quality of gasket should be selected keeping in mind the ambient temperature of of 50ºC The end turns insulation of PT HV winding towards bushing side should be appropriately enhanced. The dimensions and electrical characteristics of the bushing shall be in accordance with relevant ISS and its subsequent amendments, if any. The minimum electrical clearance between phase to earth shall be provided as specified in relevant ISS. **7.10 The insulating materials for winding between HV & LV between interlayer of the winding and for end turn shall be as per relevant ISS. However, end turns have to be provided with enhanced insulation and lead connecting the bushing shall be provided extra insulation of fiber glass sleeve. 7.11 The PT equipment shall have a built-in secondary terminal box. Entry of cable into the box on the shall be through GI pipe of size (1.25" dia) 40mm dia, therefore one no. cable entry to suit 40mm dia. GI pipe shall be provided.** **7.12 The location of the secondary terminal box shall be with front fitting cover in the bottom of the unit.7.13 The PT unit shall be provided with non-detachable anodized aluminum name plate showing position of the terminals, their marking, connection diagram along with the information as specified in IS: 3156 i.e. type, voltage ratio, CT ratio, rated burden, class of accuracy, sr. no. of unit, order no. & date, month and year of dispatch etc. of metering unit. Further, MS plate size 125 x 125 mm be got welded on width side of metering unit for fixing of the nameplate .**				
	7.13 The PT unit shall be provided with non-detachable anodized aluminum name plate showing position of the terminals, their marking, connection diagram along with the information as specified in IS: 3156 i.e. type, voltage ratio, CT ratio, rated burden, class of accuracy, sr. no. of unit, order no. & date, month and year of dispatch etc. of metering unit. Further, MS plate size 125 x 125 mm be got welded on width side of metering unit for fixing of the nameplate . **7.14 The gaskets used should be of best quality having a thickness of 3 mm or more. The information about the gasket material used for the metering unit should be mentioned in the offer. The tank shall be of robust construction having thickness of top and bottom sheet of minimum 5mm and all the sides of tank made up of minimum 3 mm sheet. The welded joints of the metering unit shall be strengthened by providing 25 x 25 x 3mm angle all along the welded length and welded properly inside the tank. All joints of the tank and fitting shall be oil tight. 7.15 The terminal marked A of primary and N for other end which is corresponding shall have the same polarity at any instant on secondary side of PT a & n two terminals. The PT unit shall have the following:-** **i) Riveted Rating and Diagram plate.** **ii) 2 Nos. welded lifting lugs of MS plate 4 mm thick.** **iii) 2 Nos. base mounting channels size 75 x 40 mm across length of PT unit.** **iv) 2 Nos. earthing terminals with lugs.** **v) Provision of 1 no. Bi-metallic clamps suitable for AAAC Panther conductor for 33kV . The terminal connector shall conform to the latest version of IS:5561. In respect of terminal connectors following should be ensured a) The terminal connector should be made of A6 Aluminum Alloy and manufactured by gravity die-cast.** **b) All castings shall be free from blow holes, surface blisters, cracks and cavities. All sharp edges should be rounded off.** **c) No part of clamp shall be less than 12 mm thic** **d) The bimetallic strips/sleeves shall be minimum 2 mm thick**				
8 **9**	**e) All nuts/bolts/washers shall be of stainless steel.** **f) The conductor should be tightened by minimum 4 bolts. Conductor hold must not be less than 50 mm** **8.0 Earthing:** **The assembly comprising of chassis, frame work and the fixed parts of the metal casing of the PT shall be provided with two separate earthing terminals in accordance with clause 5.2 of IS:3156 (part-I) TESTS:** **9.0 TYPE TEST** **9.1 The design of PT unit shall having the type tested report for short time current test, temperature rise test, lightning impulse test, accuracy test, high voltage power frequency voltage withstand test as per IS-d IS-3156/1992 (with latest amendment) from CPRI,** **9.2 ROUTINE TEST** **Each of completely assembled metering unit shall be subjected to the following routine tests at the manufacturer's works in accordance with the details specified in IS:3156 :-** **a) Verification of terminal marking and polarity test of PT unit** **b) Power frequency dry withstand test on primary winding of PT** **c) Power frequency dry withstand test on secondary windings of PT unit** **e) Determination of errors or other characteristics according to requirements and class of accuracy of PT** **f) Induced voltage test .** **g) Break down voltage test of transformer oil.** **h) Pressure test on tank of metering unit at 0.8 kg./sq.cm** **j) Insulation Resistance test with 1 KV megger.** **Each of completely assembled PT unit shall be subjected to the following routine tests at CPRI and test report to be submitted at the time of dispatch, in accordance with the details specified in IS: 3156**				
10	**a) Verification of terminal marking and polarity test of PT.** **b) Power frequency dry withstand test on primary winding of PT unit** **c) Power frequency dry withstand test on secondary windings of PT unit** **d) Determination of errors or other characteristics according to requirements and class of accuracy of PT.** **e) Ratio & phase angle error test of PT unit.** **f) Induced voltage test .** **10.0 Guarantee:** **The PT shall have to be guaranteed for a period 12 months, whichever is earlier. During performance guarantee period, if any defect is observed in PTs, the same shall have to be replaced by the supplier free of cost within 20 days of intimation.**				

PN: 1) Mere statement of "Complied" do not suffice the requirement. The details of technical parameters in proof of CPRI requirements shall be furnished along with technical write-up, catalogues, brouchers, literatures, phamplates, or any other documents shall be submitted in hard copy along with technical bid.
2) Calibration reports/certificates, factory test reports/certificates from an accreditated agencies/facilites shall be submitted wherever applicable.
3) CPRI reserves the right to conduct "predispatch inspection" prior to dispatch at the works of the supplier and the expenditure towards PDI shall be borne by CPRI. However information regarding the rediness of the equipment/machinary for the PDI shall be communicated in writing at lease 70 days in advance.