TECHNICAL SPECIFICATIONS FOR

TRANSMISSION POTENTIAL INSTRUMENT TRANSFORMERS

JPS SPECIFICATION 6881TP-S-07

Effective: April 2007

The "Technical Specifications, General Requirements" forms a part of this specification.

1. SCOPE

1.1 This specification covers potential instrument transformers used in the measurement of electricity associated with the transmission of 50-Hertz alternating current at nominal voltages of 69 kV and 138 kV respectively.

2. GENERAL REQUIREMENTS

2.1 INFORMATION

2.1.1 Refer to "Submittal of Information" Section 2 paragraph 2.1 of "Technical Specifications, General Requirements".

2.1.2 Supplier shall complete the data sheet "Appendix A" for submission with bid.

2.2 DRAWINGS ETC. BY SUPPLIER

Refer to "Submittal of Information" Section 2, paragraph 2.2 of "Technical Specifications, General Requirements".

3. STANDARDS AND SERVICE CONDITIONS

3.1 STANDARDS

3.1.1 Refer to "Codes and Standards" Section 3 of "Technical Specifications General Requirements".

3.1.2 Design, construction, performance and tests shall conform to applicable sections of ANSI C57.13 - Requirements for Instrument Transformers and ANSI C12.11- Standard for Instrument Transformers for revenue metering.

3.1.3 In the event of conflicts between this specification and any other specification to which it refers, this specification shall have precedence and shall govern. However, the bidder shall point out these conflicts in his bid at the time of tendering.

4. DETAILED REQUIREMENTS

4.1 TYPE

4.1.1 Oil filled, induction type, outdoor, one high voltage line terminal, two secondary windings, potential transformers with covered secondary terminal box.

Potential transformer shall be primary rated 69 000GRD Y/40 250 V and is required for phase to ground connection on a 69 000 V Delta network with insulated or direct-grounded neutral points.

Secondary rated voltage: 115 V

4.1.2 Oil filled, induction type, outdoor, one high voltage line terminal, two secondary windings, potential transformers with covered secondary terminal box.

Potential transformer shall be primary rated 138 000 GRD Y/80 500 V and is required for phase to ground connection on a 138 000/80 500 V solidly grounded network.

Secondary rated voltage: 115 V

4.2 RATINGS

	Ratings	**69kV PT**	**138 kV PT**
4.2.1	Rated Primary Voltage	69 000GRD Y/40 250 V	138 000GRD Y/80 500V
4.2.2	Rated Secondary Voltage	115 V	115 V
4.2.3	Max System Voltage (kV)	72.5	145
4.2.4	BIL (kV)	350	650
4.2.5	Marked Ratio	350/600:1 & 350/600:1	700/1200 & 700/1200:1
4.2.6	Voltage Factor	1.9 for 8 hours	1.9 for 8 hours
4.2.7	Accuracy Class	0.3 for burdens W and X	0.3 for W and X
4.2.8	Frequency	50 Hz	50 Hz
4.2.9	Min Creepage Distance	25mm/kV	25mm/kV

4.3 PERFORMANCE

4.3.1 TEMPERATURE RISE

The temperature rise shall not exceed 55 degrees above a maximum ambient temperature of 35 degrees.

4.3.2 THERMAL BURDEN

Thermal burden rating of the potential transformers shall be at least 2000 VA for the 69kV potential transformers and 3,000 VA for the 138 kV potential transformer at thermal and current rating based on a temperature rise of 55°C above ambient temperature 30°C.

4.4 DATA TO BE FURNISHED BY BIDDER

Bidder must attach to his proposal the "Data Form" included in the "Schedule of Technical Data" as Exhibit `A' duly completed for each voltage rating of transformer offered. Any deviations from this specification should be clearly identified by the bidder. All sections of the data form shall be completed and all information requested in this specification shall be submitted at the time of tendering.

Five (5) instruction manuals shall be provided with each unit. The instruction manual shall contain all the drawings and information necessary to allow complete installation of the unit.

4.5 CONSTRUCTION

4.5.1 COIL

The potential transformer shall consist of a single coil housed in the tank at the base of the unit.

4.5.2 PRIMARY WINDING

The primary winding shall be manufactured from double enameled copper wire with paper layer insulation. The neutral end of primary winding shall be brought out in the terminal box.

4.5.3 SECONDARY WINDING

Two (2) secondary windings shall be provided. The double ratio shall be achieved by means of a secondary tap according to IEEE standard.

4.5.4 INSULATION

The internal insulation shall be provided by hermetically sealed oil and oil impregnated paper system. The outer insulation shall consist of a one-piece post type porcelain insulator.

The insulating paper shall be uniform, of high density and contain low residual humidity.

The outer insulator shall be a one piece baked, Grey ANSI 70, porcelain insulator. The porcelain flanges shall be made of cast iron and hot dipped and joined to porcelain by a high quality cement joint.

4.5.5 INSULATING OIL

The transformer shall be supplied filled with new unused mineral oil containing less than 2-ppm PCB. The insulating oil shall have good aging stability and gas absorbing properties.

4.5.6 TANKS AND COVERS

The tank and cover shall form a leak proof unit. The transformer tank shall be located in the lower section of the transformer. The tank and tank cover shall be fabricated from corrosion resistant aluminum or aluminum alloys.

4.5.7 HERMETIC SEAL

The transformer as a unit shall be designed such that the interior is protected from air and moisture, and the dielectric strength is preserved

while allowing for thermal expansion and contraction of oil.

The expansion system shall not contain any moving parts and shall allow for pressure compensation, which will allow the unit to operate with negligible effect due to pressure changes within the unit.

4.5.8 OIL LEVEL INDICATOR

A visible oil level indicator shall be designed in a window in the head of the transformer.

4.5.9 PRIMARY TERMINALS

The transformer shall come equipped with solderless primary terminals suitable for connecting 100mm sq to 470mm sq (#4/0 AWG to 927.2 MCM) copper or aluminum conductors.

The primary terminal of the 138 kV potential transformer shall withstand a static force of 1,000 N and a dynamic force of approximately 1,400N.

The primary terminal of the 69 kV potential transformer shall withstand a static force of 500 N and a dynamic force of approximately 700N.

4.5.10 SECONDARY TERMINALS

The secondary terminal shall be clamp or stud type with nut and washer. The terminals should be able to accommodate 34 – 6 mm sq (#2 - #10 AWG) copper stranded wire.

4.5.11 SECONDARY TERMINAL BOX

The terminal box for the secondary winding terminal shall be enclosed and mounted on the transformer enclosure. The terminal box shall be manufactured from corrosion resistant, cast aluminum.

Provision shall be made inside box for grounding of secondary terminal.

4.5.12 GROUNDING

The grounding terminal shall be clamp or stud type with nut and washer, and shall be situated at the terminal box. The terminal shall be suitable for connecting 100mm sq to 200 mm sq (#4/0 to 395.5MCM) copper conductors.

4.5.13 POLARITY MARKING

The relative instantaneous polarity of terminals or leads shall be clearly indicated by permanent markings that cannot be easily obliterated. The markings shall conform to ANSI C57.13 Paragraph 4.8.1.

4.5.14 EXTERNAL HARDWARE

All transformer external hardware shall be fabricated from aluminum alloys or hot dipped galvanized steel. All nuts and bolts shall be manufactured from acid proof steel. The transformer shall come complete with all the bolts and accessories necessary to facilitate mounting on a steel structure.

4.5.15 NAMEPLATE

Nameplate shall be fabricated from stainless steel or aluminum. Markings shall be engraved in nameplate. The nameplate shall contain as a minimum the information referenced in ANSI C57.13 Section 7.5

4.5.16 DIMENSION

The base dimensions of the potential transformer shall not exceed 650mm x 650mm. All other dimension shall be kept to a minimum.

5. TESTS

5.1 Refer to "Tests" Section 5 of "Technical Specification, General Requirements".

5.2 Standard tests shall be performed according to ANSI C 57.13 standards.

5.3 Certified test reports shall be provided for all instrument transformers supplied.

5.4 Certificates are required before approval is given to proceed with shipment.

6. PACKAGING AND MARKING

6.1 Refer to "Export Packaging" and "Export Marking" Section 7 and Section 8 of "Technical Specifications, General Requirements".

6.2 Potential transformer shall be supplied in weather proof shipping containers. All packaging shall be so constructed as to ensure acceptance and safe delivery by common or other carrier to the delivery point called for in the purchasing documents. The packaging procedure used shall have received prior approval in writing from JPSCO.

6.3 On each shipping container, in weather proof lettering, the following minimum information shall be shown:

(i) JPSCo specification number

(ii) JPSCo purchase order number

(iii) Manufacturer's name or trademark

(iv) Manufacturer's catalogue number

(v) Quantity

(vi) Weights (Gross, Net and Unit)

7. SHIPMENT

7.1 No shipment of potential transformers shall commence before the written authorization of the purchaser.

7.2 JPSCO shall be informed at least ten (10) workings days prior to shipment.

8. TRANSPORTATION

Units shall be transported in the upright position and shall be supplied ready for service

9. WARRANTY

9.1 Warranty on equipment supplied shall be valid for twelve months from the time of receipt of equipment by the purchaser.

9.2 For defective equipment and material refer to Technical Specifications – General Requirements Section 6.

APPENDIX A

SCHEDULE OF TECHNICAL DATA

DATA SHEET FOR CURRENT/POTENTIAL TRANSFORMERS

Manufacturer	
Country of Origin	
Style or catalog number	
Primary voltage	
Secondary voltage	
BIL	
Frequency	
ANSI metering accuracy	
Rating factor	
Voltage factor	
Creepage distance	
Weight	
Width	
Length	
Height	
Drawing Number	

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INDEX OF REVISIONS

Revision Number	Date of Revision	Revision Made	Checked By

Prepared By: Kenyatta Campbell 03/04/2007 Date: April 2007

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