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NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.
 LIST OF DRAWINGS AND DOCUMENTS FOR 245 KV, 4400 pF Capacitive Voltage Transformer (31 mm/ KV)

SR NO.	DESCRIPTION OF DRAWINGS	DRAWING NO.	REVISION	DATE
01	General Arrangement Drawing	(4)G71AIN-NA203-Z2283-500	--	22.12.2022
02	Rating Plate Drawing	(4)G71AIN-NA203-N2283-500	--	22.12.2022
03	Secondary Box GA Drawing	(4)G71AIN-NA203-W2283-500	--	22.12.2022
04	Cross Sectional View for CVT	(4)G71AIN-NA203-E2283-500	--	22.12.2022
05	Cross Sectional View for Insulator	(4)G71AIN-NA203-L2283-500	--	22.12.2022
06	Guaranteed Technical Particulars	245 KV CVT/ GTP/ APTRANSCO	--	22.12.2022
07	Type Test reports List	245 KV CVT/ TTR/ APTRANSCO	--	22.12.2022

FOR EPC CONTRACTS ONLY

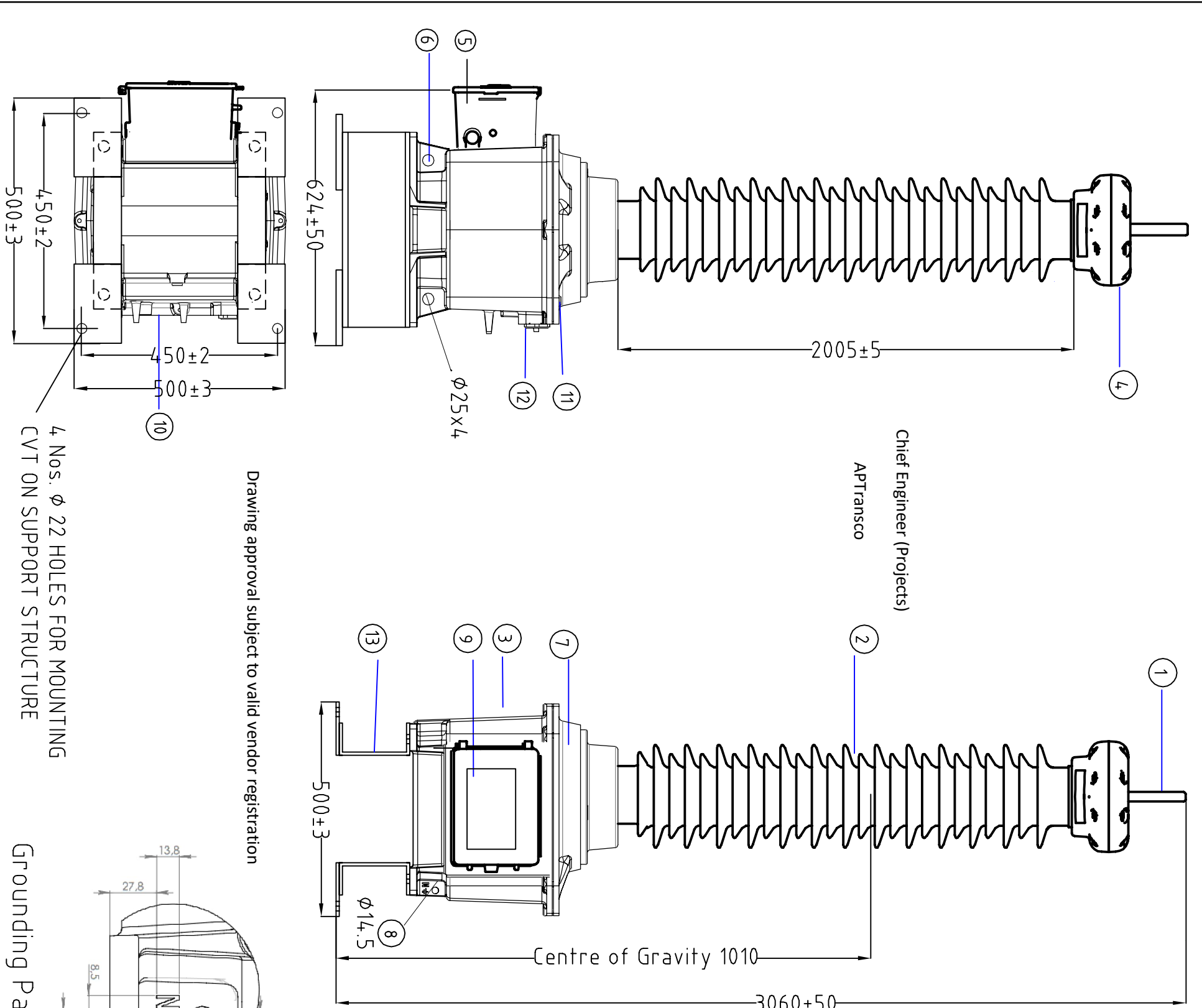
Drawing approval subject to valid vendor registration
 Chief Engineer (Projects)
 APTransco

7257841/2023/EEMRT-ENE51

Date	22.12.22	Customer: Transmission Corporation of Andhra Pradesh Limited	Siemens Ltd.	Desor : 245 KV Outdoor, Oil Cooled	S O No. : --	Quantity : --	NOT TO SCALE
Prep	LB	Project: --	AURANGABAD	Hermetically sealed Capacitive Voltage Transformer.	Item No. : --		All dimensions are in mm
Okd.	AR	LOA No. : --		Details : List of Drawing and Documents			
Date	Prep	Okd.	Original/Replaced By :-				

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Grounding Pad Details

NOS	DESCRIPTION	MATERIAL	QTY
①	H.V. TERMINAL (φ 30X100mm)	ALUMINUM ALLOY	01
②	INSULATOR	PORCELAIN	01
③	BASE BOX	ALUMINUM ALLOY	01
④	TOP COVER	ALUMINUM ALLOY	01
⑤	TERMINAL BOX	ALUMINUM ALLOY	01
⑥	LIFTING EYE	ALUMINUM ALLOY	04
⑦	TANK COVER	ALUMINUM ALLOY	01
⑧	ARRANGEMENT FOR GROUND PAD	ALUMINUM ALLOY	01
⑨	RATING PLATE	ALUMINUM ALLOY	01
⑩	MV TAP GROUNDING SWITCH	ALUMINUM ALLOY	01
⑪	OIL SAMPLING PLUG	SS	01
⑫	OIL LEVEL INDICATOR	ALUMINUM ALLOY +GLASS	01
⑬	BASE FRAME	MS+HDG	02

TECHNICAL DETAILS:
 APPLICABLE STANDARD : IEC 61869-1 & 5 & IEC 60358
 RATED VOLTAGE : 220 kV/sqrt3
 HIGHEST SYSTEM VOLTAGE : 245 kV
 H.V. TEST VOLTAGE : 460 kV rms for 1 min
 IMPULSE TEST VOLTAGE : 1050 kVp
 RATED FREQUENCY : 50 Hz
 'HF' CAPACITANCE : 4400 pF (+10%, -5%)
 PRIMARY CAPACITANCE C1 : 4773.7 pF (+10%, -5%)
 SECONDARY CAPACITANCE C2 : 62058.1 pF (+10%, -5%)
 TOTAL OUTPUT SIMULTANEOUS : 50 VA/ 0.2 & 150 VA/ 3P

NOTES
 1. TOTAL CREEPAGE DISTANCE : 7595 mm
 2. OIL QUANTITY : 37 kg (Approx.)
 3. WEIGHT OF CVT:265 kg (Approx.)
 4. WEIGHTS INDICATED ARE APPROXIMATED
 5. GENERAL TOLERANCE AS PER IS:2102 WILL BE APPLICABLE WHERE TOLERANCE IS NOT INDICATED.
 6. PORCELAIN MAKE: MODERN/IEC/CJI/ABI.

Date: 22.12.22		Customer: Transmission Corporation of Andhra Pradesh Limited.	
Prep: LB		Contractor: --	
Date: --		Project: --	
Date: --		LOA No.: --	
Date: --		Original/Replaced By: --	
Date: --		Siemens Ltd.	
Date: --		AURANGABAD	
Date: --		Descr : 245 kV, Outdoor, Oil Cooled hermetically sealed Capacitive Voltage Transformer.	
Date: --		Details : General Arrangement Drawing.	
S.O.No. : --		Quantity : --	
Item No. : --		Drawing No. :- (4)G71AIN-NA203-Z2283-500	
NOT TO SCALE		All dimensions are in mm	
SH 1		SH 1	



CAPACITOR VOLTAGE TRANSFORMER

RATING AND SCHEMATIC PLATE

Made in India.

Customer: Transmission Corporation of Andhra Pradesh Limited.

Project : --

Pradesh Limited.

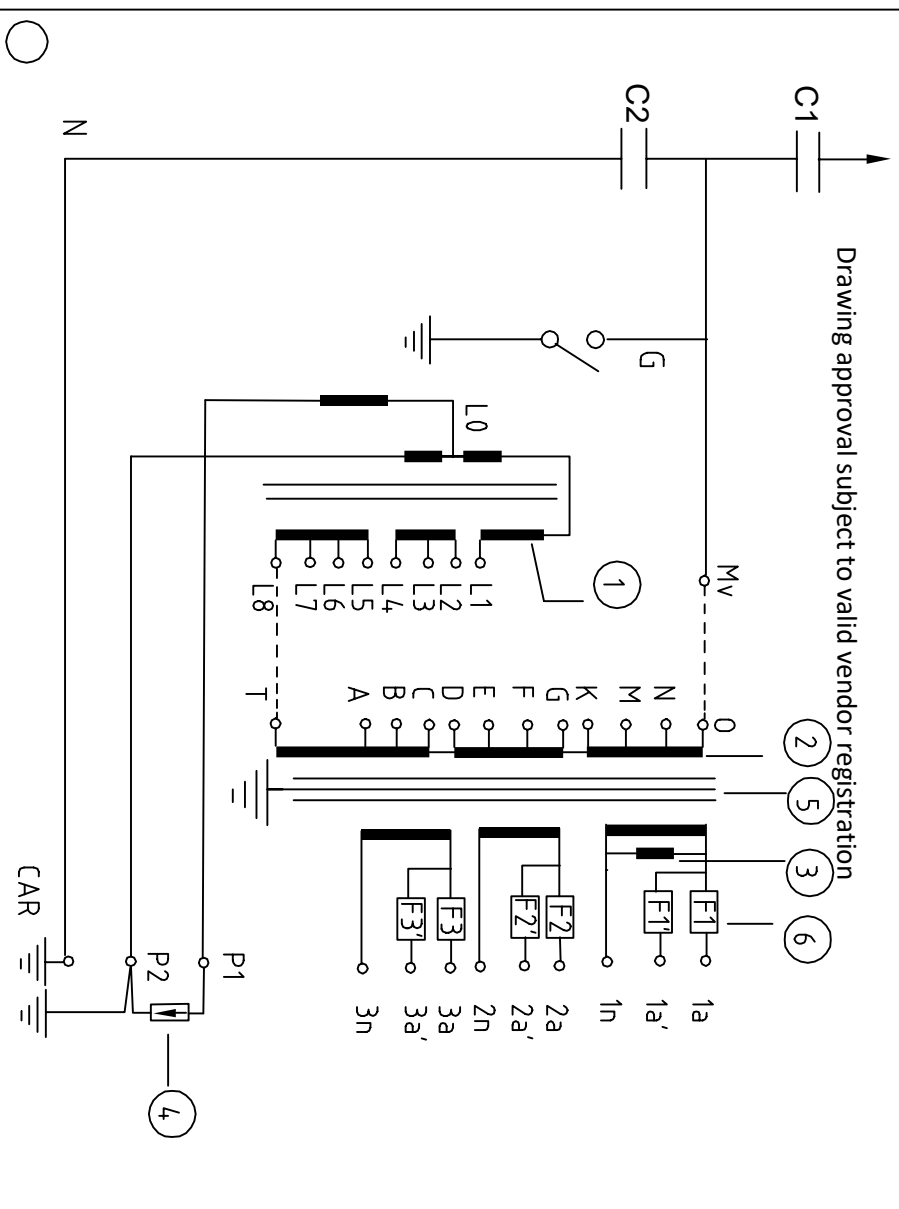
LOA No. : --

Contractor : --

Type **TCVT 245** Insulation level **460 kV/ 1050 kV_p** Standard **IEC 61869-5** Capacitance **4400 pF (+10%, -5%)** Total Weight **265 kg** S.O. No. **--**

Highest System Voltage **245 kV** Voltage Factor **1.2 Continuous/ 1.5 - 30 sec** Frequency **50 Hz** Simultaneous Burden **50 VA/ 0.2 & 150 VA/ 3P** Oil Weight **37 kg** Sr. No. Year

TO HV POWER CIRCUIT(H)



	H-N	1a - 1n	2a - 2n	3a - 3n
VOLTS		$110/\sqrt{3}$	$110/\sqrt{3}$	$110/\sqrt{3}$
VA BURDEN	---	50	50	50
ACCURACY CLASS	---	3P	3P	0.2

Notes 1.

- Series Reactor
- Intermediate Transformer
- Filter
- Protective gap
- Faraday Shield
- Fuse

H : HV Terminal
 N : HF Terminal
 C1 : Primary Capacitance
 C2 : Secondary Capacitance
 G : MV tap grounding switch
 Mv: Intermediate Voltage tap

Caution :

- Short circuit the Capacitor units when erecting or dismantling the CVT and remove the short circuit before pre-test or commissioning.
- Under no condition should the Load / Burden values mentioned on the Rating Plate be exceeded.
- When terminal N is not used for HF transmission It must be connected to Earth, when Supplied N is connected to Earth.

Notes 2.

- Connection between L1--L8 & A,D--0 are made in factory as required.
- Suitable for Hot line Washing.

RATING PLATE DETAILS :

MATERIAL : ALUMINUM ALLOY
 SIZE : 250 x 150 x 1 mm THICK.
 COLOUR : LETTERS PRINTED IN BLACK OVER ALUMINUM NATURAL BACKGROUND.

NOTE : SERIAL NO. IS ENGRAVED ON RATING PLATE

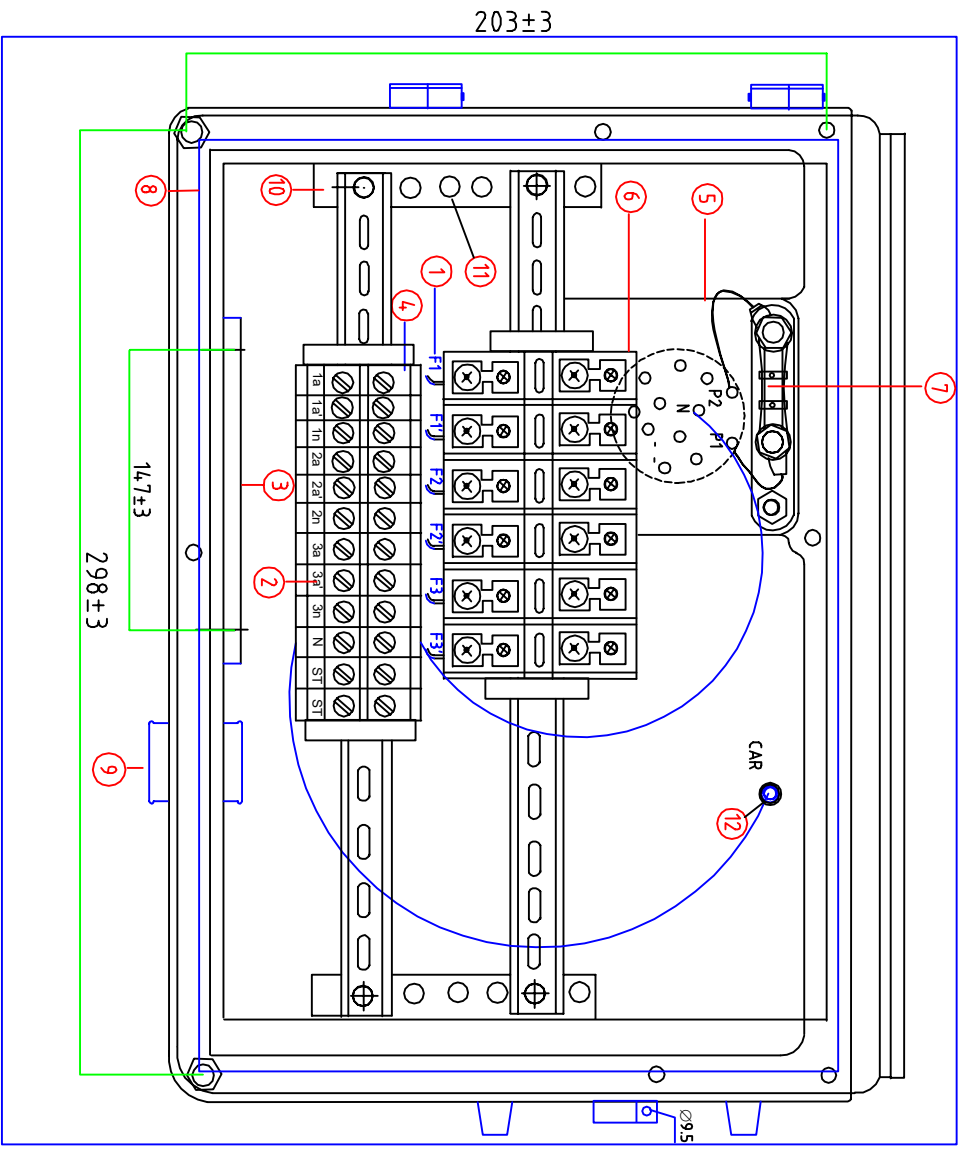
Chief Engineer (Projects)

APTransco

Date	22.12.22	Customer: Transmission Corporation of Andhra Pradesh Limited.	Descr :	245 kV, Outdoor, Oil Cooled Hermetically sealed Capacitive Voltage Transformer.	S.O.No. : --	Item No. : --	Quantity : --	NOT TO SCALE
Prep.	LB	Contractor: --	Details :	Rating Plate Drawing.				All dimensions are in mm
Ckd.	AR	LOA No.: --						
Norm.		Original/ Replaced By: --						

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NOS.	DESCRIPTION
1	TERMINALS - CONNECTED TO 1a, 2a, 3a, 1a', 2a' & 3a' (Not shown for clarity)
2	IDENTIFICATION STRIP
3	GLAND PLATE (122 X 147)
4	TERMINAL BLOCK (STUD TYPE NON DISCONNECTING TYPE)
5	OIL TO AIR SEAL PLATE
6	FUSES, 10 A, HRC TYPE, MAKE SIEMENS
7	SURGE PROTECTOR
8	GASKET
9	RUBBER GORMET
10	ALUMINUM TERMINAL CHANNEL HOLDER
11	EARTHING ARRANGEMENT
12	HF TERMINAL SCREW 'M10'

- NOTES :
- DOOR REMOVED FOR CLARITY
 - TERMINAL BOX SHALL CONFIRM AS PER IP55.
 - 20 % SPARE TERMINALS SHALL BE PROVIDED.
 - SHEET THICKNESS : 5 MM
 - SECONDARY TERMINAL BLOCKS ARE OF STUD TYPE & PHOENIX/ CONNECT WELL MAKE (4/1 A RATING)
 - TERMINAL BOX IS MADE UP OF ALUMINIUM

Chief Engineer (Projects)

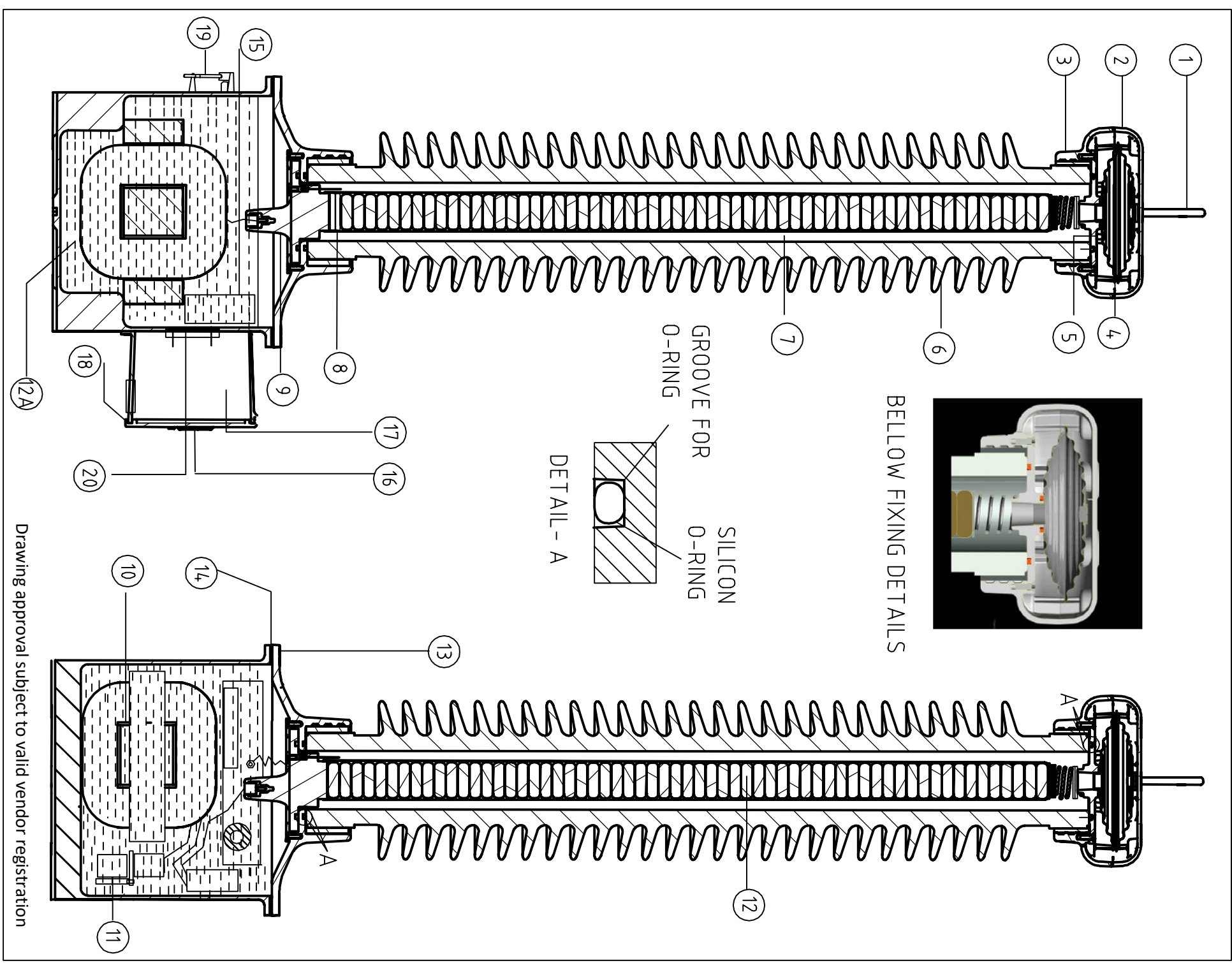
APTransco

257811/2023/EEMRT-ENE51

Rev	Description	Date	Prep	Norm	Original/Replaced By :-
		22.12.22			
		Prep. LB			
		AR			
		LOA No. :-			
		Contractor :-			
		Customer: Transmission Corporation of Andhra Pradesh Limited			
		Siemens Ltd.			
		AURANGABAD			
		Descr : 245 KV Outdoor, Oil Cooled hermetically sealed Capacitive Voltage Transformer.			
		Details : Secondary Box GA Drawing			
		S.O No. :-			
		Item No. :-			
		Quantity :-			
		Drawing No. :- (4)G71AIN-NA203-W2283-500			
		NOT TO SCALE			
		All dimensions are in mm			
		SH 1			
		1 SH			

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NOS.	DESCRIPTION	MATERIAL	QTY
1	H.V. TERMINAL ROD (φ 30 X 100)	ALUMINIUM ALLOY	01
2	TOP CAP	ALUMINIUM ALLOY	01
3	UPPER FLANGE	ALUMINIUM ALLOY	01
4	BELLOW	STAINLESS STEEL	01
5	GASKET FOR PORCELAIN TO PLATE	SILICON	01
6	PORCELAIN INSULATOR	PORCELAIN	01
7	CAPACITOR STACK ASSEMBLY	-	01
8	BOTTOM PLATE FOR STACK ASSEMBLY	ALUMINIUM ALLOY	01
9	L.V. BUSHING	EPOXY	01
10	TRANSFORMER ASSEMBLY	-	01
11	REACTOR ASSEMBLY	-	01
12/12A	OIL (NON PCB BASED)	SYNTHETIC OIL / MINERAL OIL	13 / 24 kg
13	TANK COVER PLATE	ALUMINIUM ALLOY	01
14	GASKET FOR TANK	NBR	01
15	HARMONIC SUPPRESSION FILTER	-	01
16	RATING PLATE	ALUMINIUM ALLOY	01
17	SECONDARY TERMINAL BOX	ALUMINIUM ALLOY	01
18	GASKET FOR SECONDARY TERMINAL BOX	EPDM	01
19	SWITCH HANDLE	ALUMINIUM ALLOY	01
20	SEALING FOR OIL TO AIR SEAL PLATE	SILICON	01

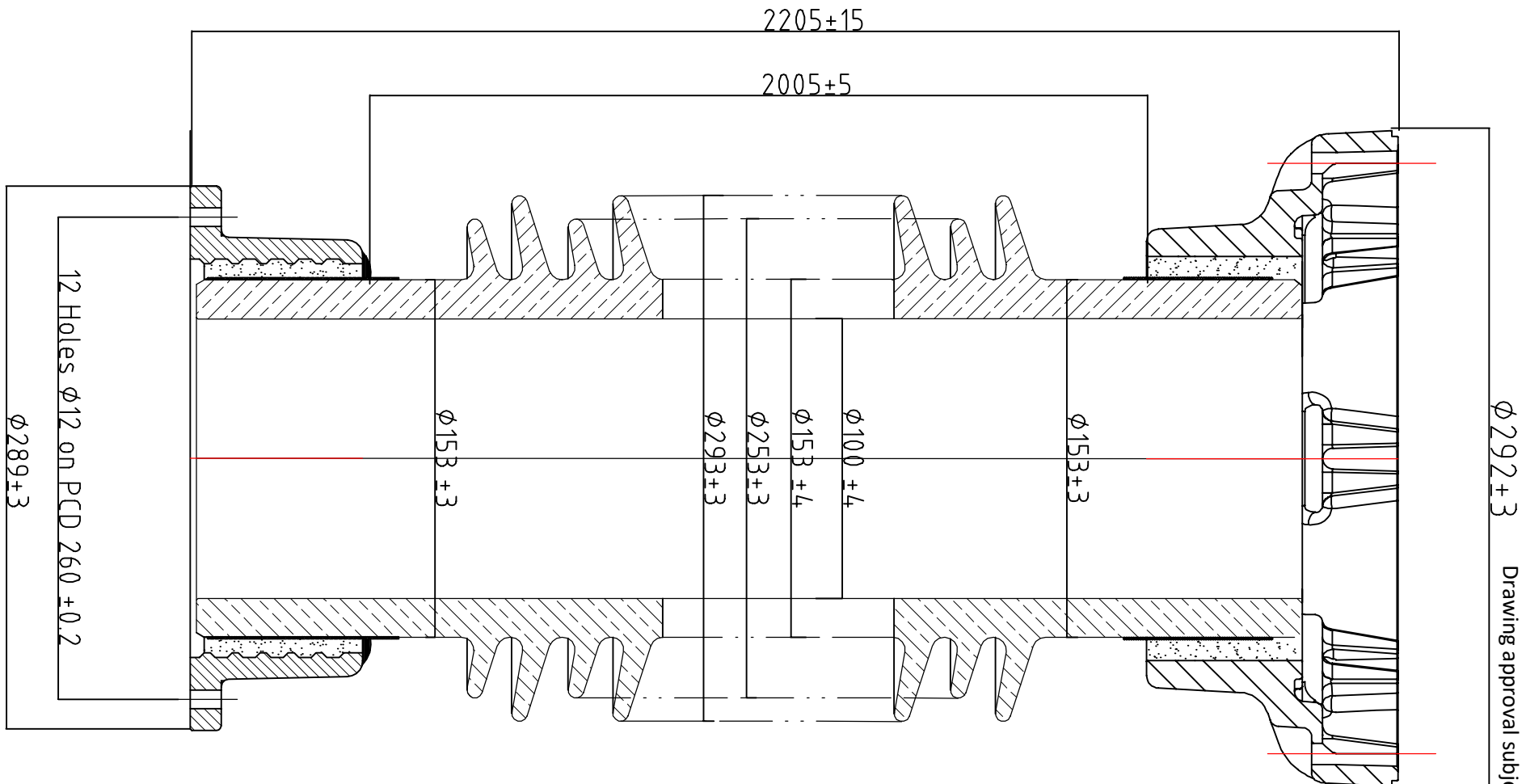
- NOTE :
- HERMETICALLY SEALED ARRANGEMENT IS ACHIEVED BY USING SS BELLOW FOR VOLUMETRIC COMPENSATION.
 - SILICON O-RING & EPDM GASKETS USED AT ALL JOINTS (DETAILS SHOWN IN ABOVE TABLE) ENSURES COMPLETE SEALING OF CVT.

Chief Engineer (Projects)
APTranSCO

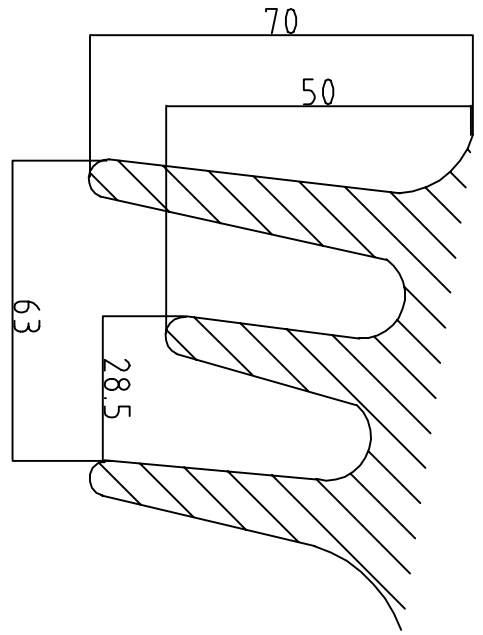
Date: 22.12.22		Customer: Transmission Corporation of Andhra Pradesh Limited.	
Prep: LB	Contractor: --		
Ckd: AR	Project: --		
Date: --	LOA No.: --		
Prep Norm: --	Original/Replaced By: --		
Siemens Ltd.		AURANGABAD	
Descr : 245 KV, Outdoor, Oil Cooled hermetically sealed Capacitive Voltage Transformer.		Details : Cross Sectional View of CVT	
S.O.No. : --	Item No. : --	Quantity : --	NOT TO SCALE
Drawing No. :- (4)G71AIN-NA203-E2283-500		All dimensions are in mm	
		SH 1	

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NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.



DETAILS OF SHED PROFILE

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.

NOTES


1. Total Creepage Distance: 7595 mm (min)
2. Applicable Standard: IS-5621/IEC-233/IEC-815
3. Material of Insulator: Porcelain
4. Make of Porcelain: IEC/Modern/CJI/ABI.
5. General tolerance: ± 3% or 1.5 mm
6. One minute Power frequency withstand Voltage: 460 kV(rms)
7. 1.2/50 Micro Sec impulse withstand Voltage : 1050 kVp
8. Cantilever Strength : 350 kg
9. Colour : Brown
10. All Dimensions are in mm unless otherwise specified.
11. Single epoxy joint allowed.

Chief Engineer (Projects)

APTransco

Customer: Transmission Corporation of Andhra Pradesh Limited.	Date: 22.12.22	Prep.:	LB
Contractor: --	AR	CKD:	AR
Project: --	Original/Replaced By: --	LOA No.:	--
Descr : 245 kV, Outdoor, Oil Cooled hermetically sealed Capacitive Voltage Transformer.	S.O.No. : --	Item No. : --	Quantity : --
Details : Cross Sectional View of Porcelain Insulator.	Drawing No. :- (4)G71AIN-NA203-L2283-500	All dimensions are in mm	
		SH 1	SH 1


7257811/2023/EEMR/TYPE 50 DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.

DOCUMENT: GTP_245 kV 4400 pF CVT		Page 1/2	
Customer: Transmission Corporation of Andhra Pradesh Limited. Contractor: -- Project:-- LOA No: -- Drawing approval subject to valid vendor registration		Rev.00	
DOC. NO : 245 kV CVT/GTP/ APTRANSCO	Prepared By LB	Approved By AR	Date 22.12.2022

FOR EPC CONTRACTS ONLY

DATA SHEET FOR 245 kV CAPACITOR VOLTAGE TRANSFORMER

1.	Name and Address of Manufacture	Siemens Limited, India. E-76, MIDC Waluj, Aurangabad.
2.	Manufacturer's type designation	TCVT 245
3.	Type of mounting	Pedestal mounting
4.	Type of Insulation used	Mixed Dielectric (Paper, Oil)
5.	Standards Applicable	IEC 61869-5 / IS 3156 (1992)
6.	Rated Primary Voltage	220 kV/ $\sqrt{3}$ rms
7.	Rated Secondary Voltage	WINDING I : 110 V/ $\sqrt{3}$ WINDING II : 110 V/ $\sqrt{3}$ WINDING III : 110 V/ $\sqrt{3}$
8.	Number of Secondary	3
9.	Rated frequency	50 Hz
10.	Rated output of each secondary winding	WINDING I: 50 VA WINDING II: 50 VA WINDING III: 50 VA
11.	Total simultaneous burden	50 VA/ 0.2 & 150 VA/ 3P
12.	Rated total thermal burden	300 VA
13.	Highest system voltage	245 kV rms (line to line)
14.	Rated voltage factor and corresponding rated time	
	i) Continuous	1.2
	ii) 30 seconds	1.5
15.	Accuracy class of each Secondary winding	WINDING I: 3P WINDING II: 3P WINDING III: 0.2
16.	Capacitance	4400 pF (+10 %, -5 %)
17.	Carrier frequency coupling (pF)	4400 pF (+10 %, -5 %)
18.	Natural frequency of coupling	More than 600 kHz
19.	Self tuning frequency of CVT	More than 600 kHz
20.	Band width (kHz)	40 kHz to 500 kHz
21.	One minute Power frequency test Voltage of secondary winding (kV rms)	3 kV rms
22.	One minute Power frequency test Voltage of H.F. terminal	4 kV rms
23.	One minute power frequency test voltage of capacitor (kV rms) (dry & wet)	460 kVrms
24.	1.2 / 50 micro second impulse withstand test Voltage of Capacitor (kV _p)	1050 kV peak Chief Engineer (Projects)
25.	250/ 2500 micro switching surge withstand Voltage of Capacitor (Dry & wet) (kV _p)	Not Applicable APTransco
26.	Corona extinction Voltage	156 kV rms
27.	Max. Radio interference Voltage at 1.1 Ur/ root 3 at 1.0 MHz	1000 micro Volts
28.	Total Weight (Approx.)	265 kg

DOCUMENT: GTP_245 kV 4400 pF CVT		Page 2/2	
Customer: Transmission Corporation of Andhra Pradesh Limited. Contractor: -- Project:-- LOA No: --		Rev.00	
DOC. NO : 245 kV CVT/GTP/ APTRANSCO	Prepared By RRD	Approved By AR	Date 09.11.2019

29.	Quantity of Oil (Approx.)	37 kg
30.	Overall Height in mm	3060 ± 50
31.	Whether CVTs are hermetically sealed, and how	Yes - 'O' rings and stainless-steel bellow used
32.	No. of terminals in terminal box	12
33.	Material of primary and secondary winding of IVT	Copper
34.	Material of Tank	Aluminum
35.	Type of insulator	Porcelain, (4)G71AIN-NA203-L2283-500
36.	Compliance to technical specification w.r.t.	
	i. Bushing insulator	Yes, (4)G71AIN-NA203-L2283-500
	ii. Marshalling Box Drawing	Not in Siemens Scope of supply
	iii. Terminal Connector	Not in Siemens Scope of supply
37.	Overall GA drawing of CVT enclosed	Yes, (4) G71AIN-NA203-Z2283-500.
38.	Total Minimum Creepage Distance	7595 mm (31 mm/kV)
39.	Temperature rise of winding by resistance	Max 13 deg.
40.	Partial discharge level at rated voltage for Capacitor divider.	As per IEC.
41.	Seismic acceleration (Horizontal & Vertical)	0.3 g horizontal & 0.5 g Vertical.
42.	Hardware exposed to atmosphere (Bolts, Nuts & Washer)	All Exposed hardware is of SS A2 grade.

1. Tan Delta of CVT shall be less than 0.5 %.
2. Partial Discharge shall be less than 5 PC @ 1.2 Um/v³ and shall be less than 10 PC @ Um.
3. Range of frequency for valid accuracy : 96 % to 102 % for Protection, 99 % to 101 % for Metering.

1) Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators in the substation during foundation works to ensure safe live to ground clearances as per IE rules.

2) Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings, the EPC contractors shall be instructed to supply the same in line with CT/PT/CVT/Isolators requirement and compatibility.

Chief Engineer (Projects)

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