

DRG.NO: 3-CAD 10597

IF IN DOUBT, ASK

6 5 4 3 2 1

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
2. FOR EPC CONTRACTS ONLY

LIST OF STANDARD DRGS./ DOCUMENTS APPLICABLE FOR 245 kV CVT (4400 pF, 31mm/kV)

SR. NO.	DESCRIPTION	DRG./DOC.NO.	APP. CAT.	REMARKS
01	GENERAL ARRANGEMENT	3-CAD 10598/R0	--	--
02	RATING/SCHEMATIC PLATE	3-CAD 10599/R0	--	--
03	SECONDARY TERMINAL BOX G.A.	3-CAD 10600/R0	--	--
04	SECTIONAL VIEW	3-CAD 10601/R0	--	--
05	PORCELAIN INSULATOR	3-CAD 10602/R0	--	--
06	GUARANTEED TECHNICAL PARTICULARS	S1/CV/T/690/R1	--	--
07	LIST OF TYPE TEST REPORTS	S1/CV/T/691/R0	---	---

LIST OF VARIABLE DRGS. APPLICABLE FOR 245 kV CVT (4400 pF, 31mm/kV)

SR. NO.	DESCRIPTION	DRAWING NO.
01	COVER SHEET	AS APPLICABLE
02	RATING/SCHEMATIC PLATE	AS APPLICABLE

CUSTOMER	:	} AS APPLICABLE
LOA NO.	:	
PO. NO.	:	
S.O. NO.	:	
QUANTITY	:	


1. Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators/IV/LA/Breakers in the Substation during foundation works to ensure safe live to ground clearance 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 contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/IVT/LA/Breakers requirement and compatibility.

**Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.**

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2			
1	CUSTOMER COMMENTS DTD 09.01.2024 ADDED	HARI USS	09.01.2024
NO	REVISION	SIGN	DATE

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.: SPEC:	TITLE : <u>STANDARD DRAWING</u> LIST OF STANDARD DRGS. / DOCUMENTS APPLICABLE FOR 245kV CVT (4400pF, 31mm/kV)	
THIRD ANGLE PROJECTION			
SCALE: NTS		INITIALS	NAME
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG		NSB
	CHD		HARI
	APPD		USS
		 CG Power and Industrial Solutions Limited S1 - DIVISION, AMBAD, NASHIK	
DRG.NO: 3-CAD 10597			REV 1
DATE : 24.07.2023			

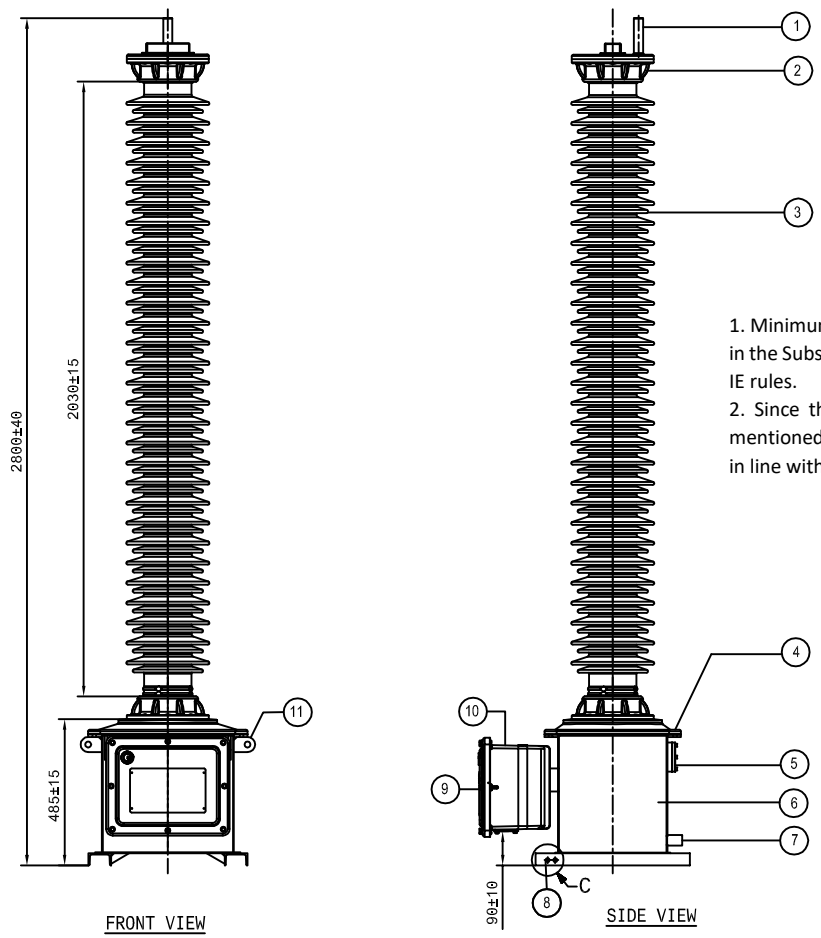
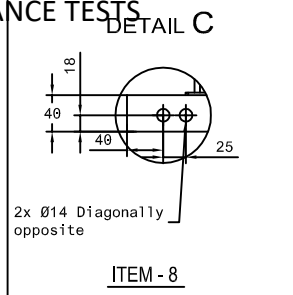
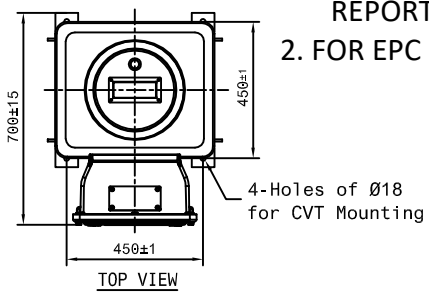
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FRAME : U10(HC)e (MDSO)

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CAPACITOR VOLTAGE TRANSFORMER

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SR.NO	QTY.	DESCRIPTION	MATERIAL
1	1	H.V. TERMINAL Ø30x80 mm LONG	ALUMINIUM
2	2	PORCELAIN FLANGE	ALUMINIUM
3	1	PORCELAIN INSULATOR	PORCELAIN
4	1	TANK COVER	ALUMINIUM
5	1	OIL LEVEL INDICATOR ON EMU	POLYCARBONATE
6	1	EMU TANK	STEEL HDG
7	1	OIL SAMPLING VALVE (FOR EMU)	STEEL GALVANISED
8	2	EARTHING HOLES	—
9	1	RATING/SCHEMATIC PLATE	ALUMINIUM (METAL PHOTO)
10	1	SECONDARY TERMINAL BOX	ALUMINIUM
11	4	LIFTING LUGS	STEEL HDG

NOTE : THE CVT IS SUITABLE FOR POWERLINE CARRIER COMMUNICATION ALONG WITH ASSOCIATED ACCESSORIES (OPTIONAL).

TOTAL MASS	: 325 kg ±10%
OIL MASS	: 42 kg ±10%
TOTAL CREEPAGE	: 7595 mm (Min)

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CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : STANDARD DRAWING GENERAL ARRANGEMENT 245kV CVT(4400pF, 31mm/kV)	
	SPEC.:		
THIRD ANGLE PROJECTION			
SCALE: NTS		INITIALS	NAME
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	DRN		NSB
	CHD		HARI
	APPD		USS
DATED : 24.07.2023			REV 0



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DRG.NO: 3-CAD 10598

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2			
1			

DRG.NO: 3-CAD 10599

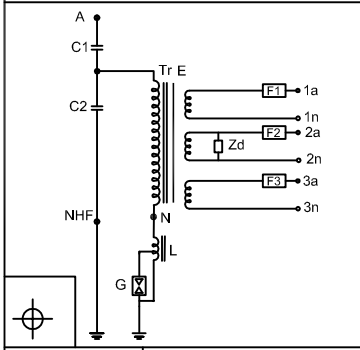
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CAPACITOR VOLTAGE TRANSFORMER
MADE IN INDIA
RATING AND SCHEMATIC PLATE

CUSTOMER : APTRANSCO		PROJECT : AS APPLICABLE LOA NO. : AS APPLICABLE	
TYPE : CVE:245 / 1050 / 50	HSV : 245 kV	EQUI. CAPACITANCE : 4400 +10%,-5%pF	THERMAL OUTPUT : 400 VA
STD. : IEC 61869 - 1 & 5	FREQ. : 50 Hz	TOTAL SIM.BURDEN/CLASS : 50VA/0.2 & 150VA/3P	TOTAL MASS : 325 ±10% kg
S.O. : AS APPLICABLE	INSULATION LEVEL : 460 kV/1050 kVp	CAPACITOR OIL : 10 ± 10% kg	EMU OIL : 32 ± 10% kg
YEAR : AS APPLICABLE	VF : 1,2CONT/1.5-30SEC.		
SR.NO. : [REDACTED]	CREEPAGE DISTANCE : 7595 mm		



- A = HV TERMINAL
- C1 = PRI. CAPACITANCE
- C2 = SEC. CAPACITANCE
- NHF = HF TERMINAL
- L = COMPENSATING CHOKE
- N = NEUTRAL
- Tr. = INT. TRANSFORMER
- F1-F3 = HRC FUSE (16 AMP)
- E = EARTH SCREEN BETWEEN HV & LV
- Zd = DAMPING DEVICE
- G = SPARK GAP

	A - NHF	1a - 1n	2a - 2n	3a - 3n
VOLTS	220000/√3	110 / √3	110 / √3	110 / √3
VA	---	50	50	50
CLASS	---	3P	3P	0.2

CAUTION ...
1) SHORT CIRCUIT THE CAPACITOR UNITS WHEN ERECTING OR DISMANTLING THE CVT AND REMOVE THE SHORT CIRCUIT BEFORE PRETEST OR COMMISSIONING.
2) UNDER NO CONDITIONS SHOULD THE LOAD/BURDEN VALUES MENTIONED ON THE RATING PLATE BE EXCEEDED.
3) WHEN TERMINAL NHF IS NOT USED FOR HF TRANSMISSION IT MUST BE CONNECTED TO EARTH. (AS SUPPLIED NHF IS CONNECTED TO EARTH.)

IMPORTANT
- BEFORE COMMISSIONING IT IS ESSENTIAL TO CHECK THE LOW VOLTAGE RATIO OF CVT. (REFER INSTRUCTION MANUAL)
- DURING SERVICE, PLEASE CLOSE THE TERMINAL BOX COVER FIRMLY TO ENSURE PROPER SEALING OF BOX.
- PLUG UNUSED HOLES ON THE GLAND PLATE.

All letters in this blocks (250X15) will be in RED colour on natural aluminium background.

- Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators/IV/LA/Breakers in the Substation during foundation works to ensure safe live to ground clearance as per IE rules.
- Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings. The EPC contractor shall be instructed to supply the same in line with CT/PT/CVT/Isolator/IVT/LA/Breakers requirement and compatibility.

Chief Engineer/Projects
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CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : <u>STANDARD DRAWING</u> RATING / SCHEMATIC PLATE 245kV CVT (4400pF, 31mm/kV)	
	SPEC.:		
THIRD ANGLE PROJECTION			
SCALE: NTS		INITIALS	NAME
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG		NSB
	CHD		HARI
	APPD		USS
DATE : 24.07.2023			DRG.NO: 3-CAD 10599
			REV 0

Drawing approval subject to valid vendor registration

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NO	REVISION	SIGN	DATE

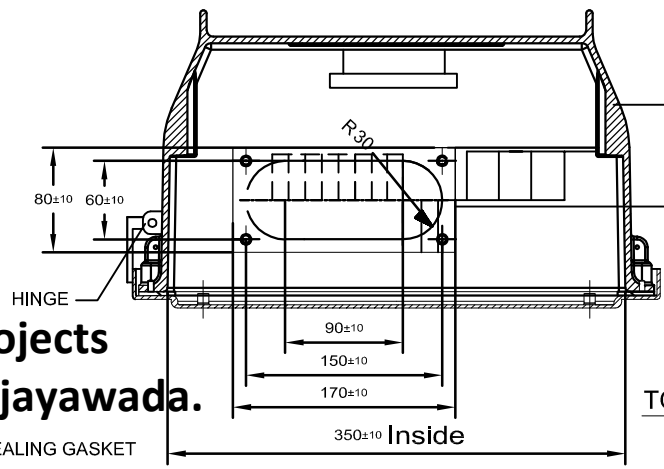
NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST

REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS
2. FOR EPC CONTRACTS ONLY

DRG.NO: 3-CAD 10600

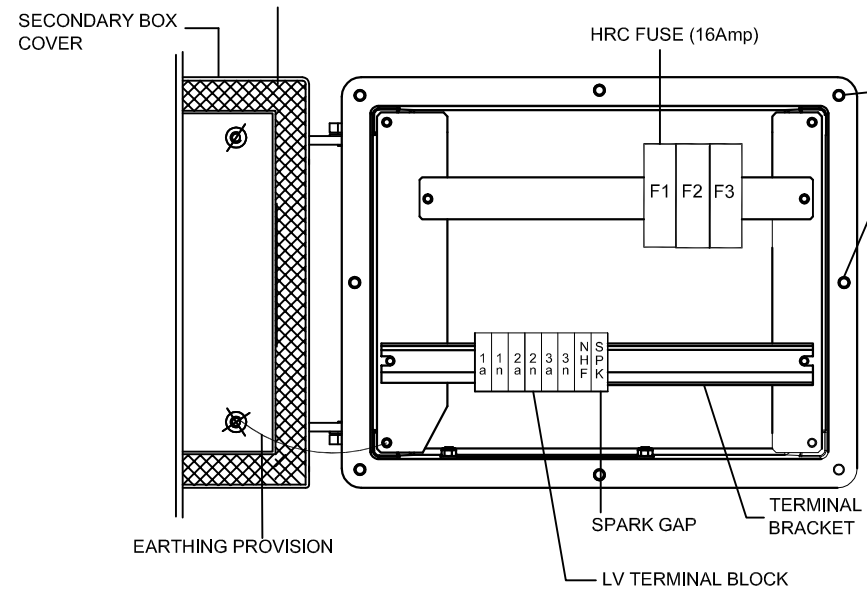
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Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

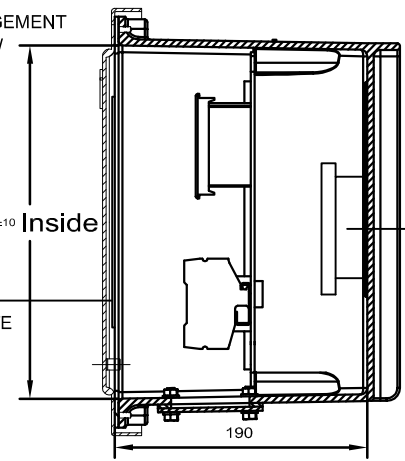


TOP VIEW

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FRONT VIEW



SIDE VIEW

DEGREE OF PROTECTION : IP55

Drawing approval subject to valid vendor registration

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : <u>STANDARD DRAWING</u>	
	SPEC.:	SECONDARY BOX GA	
THIRD ANGLE PROJECTION			
SCALE: NTS	INITIALS	NAME	
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB	
	CHD	HARI	
	APPD	USS	
DATE : 24.07.2023		DRG.NO: 3-CAD 10600	
		REV 0	

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1			
NO	REVISION	SIGN	DATE

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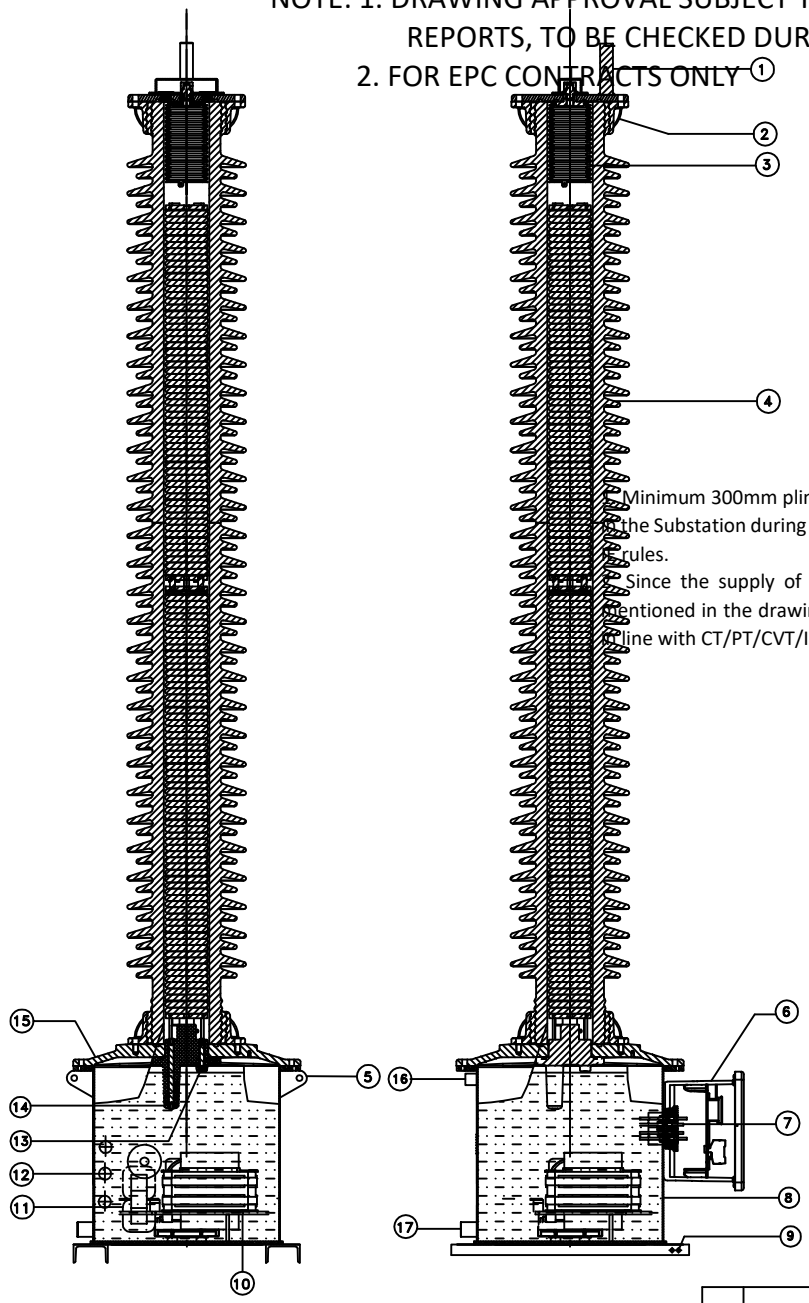
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SR.NO	QTY	DESCRIPTION
1	1	H.V. TERMINAL Ø30x80 mm LONG
2	2	PORCELAIN FLANGE
3	1	BELLOW
4	1	PORCELAIN INSULATOR
5	4	LIFTING LUGS
6	1	SECONDARY TERMINAL BOX
7	1	MONOBLOCK
8	1	EMU TANK
9	2	EARTHING HOLES
10	1	INDUCTIVE VOLTAGE TRANSFORMER
11	1	COMPENSATING CHOKE
12	1	DAMPING DEVICE
13	1	NHF TERMINAL
14	1	M.V. TAP TERMINAL
15	1	TANK COVER
16	1	OIL FILLING PLUG(FOR EMU)
17	1	OIL SAMPLING VALVE (FOR EMU)




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Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

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NO	REVISION	SIGN	DATE
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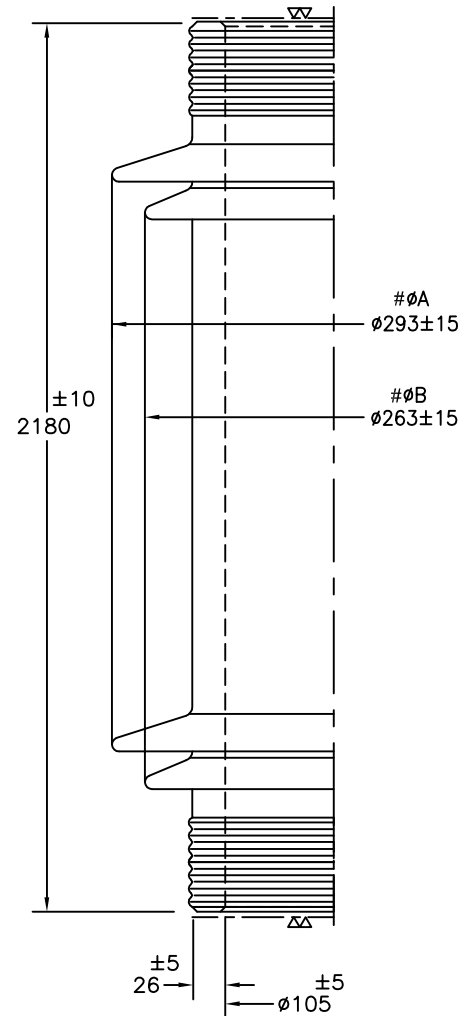
CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : STANDARD DRAWING SECTIONAL VIEW 245KV CVT (4400pF, 31mm/kV)	
	SPEC.:		
THIRD ANGLE PROJECTION			
SCALE: NTS		INITIALS	NAME
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	DRN		NSB
	CHD		HARI
	APPD		USS
DATED : 24.07.2023		 CG Power and Industrial Solutions Limited S1 - DIVISION, AMBAD, NASHIK	
DRG.NO: 3-CAD 10601			REV 0

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DRG.NO: 3-CAD 10602

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U110(HC)



NOTE

- * VV INDICATE UNGLAZED SURFACE GROUND SMOOTH, PERPENDICULAR TO THE AXIS AND PARALLEL TO EACH OTHER.
- * SHALL BE HIGH VOLTAGE ELECTRICAL PORCELAIN CONFORMING TO IS 5621:80 (OR IEC 62155:2003) UN SPECIFIED TOLERANCES AS PER IS 5621:80
- * INSIDE AND OUTSIDE SHALL BE BROWN GLAZED.
- * SHED FORM CONFORMS TO IEC 60815:2008 REQUIREMENTS.
- * TOTAL CREEPAGE DISTANCE = 7595 mm
- * CANTILEVER LOAD OF PORCELAIN = 500 kgf
- * QTY = 1 NOS/CVT

NOTE:
 TOLERANCES ON ØA, ØB ARE AS PER IS 5621:1980 AND THE SAME ARE ±(0.025xd+6)mm. WHERE d IS ØA OR ØB

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Chief Engineer/Projects
APTRANSCO/VS/Vijayawada

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CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : <u>STANDARD DRAWING</u>	
	SPEC.:	PORCELAIN INSULATOR	
THIRD ANGLE PROJECTION			
SCALE: NTS	INITIALS	NAME	
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB	
	CHD	HARI	
	APPD	USS	
DRG.NO: 3-CAD 10602		REV 0	
DATE : 24.07.2023			



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CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 245 kV 4400pF CVT (31 mm/kV)	Document No. S1/CV/T/690/R1
		Date : 09/01/2024
		Page 1 of 4

245 kV SINGLE PHASE CAPACITOR VOLTAGE TRANSFORMER

Sl. No	Description	Units	245kV
1	Manufacturers/suppliers name and country of manufacture.		M/s. CG Power and Industrial Solutions Limited, A-3, MIDC, Ambad, Nasik, Maharashtra-India
2.1	Governing standard		IEC-61869-1&5 & IEC 60358
2.2	Type of tank		Outdoor, Dead Tank Type
2.3	Type of Mounting		Pedestal Type
2.4	Type of CVT		CVE: 245/1050/50
3	Rated voltage		
a)	Nominal (phase voltage)	(kVrms)	220 / $\sqrt{3}$
b)	Maximum (phase voltage)	(kVrms)	245 / $\sqrt{3}$
4	Rated frequency	(Hz)	50
5	No of Phases		Single
6	Maximum temperature rise over 50 deg.C	°C	55 As per IEC 61869-5
7	Reference range of frequency	(kHz)	40 to 500
8	Reference range of temperature	°C	-5°C to + 55 °C
9	Simultaneous burden / Accuracy Class	VA	50VA/0.2 & 150VA/3P
10 a)	Rated primary voltage	(kVrms)	132/ $\sqrt{3}$
b)	Rated secondary voltage	(V rms)	110/ $\sqrt{3}$; 110/ $\sqrt{3}$; 110/ $\sqrt{3}$
c)	Rated secondary burden	(VA)	50; 50; 50
d)	Accuracy class		3P;3P; 0.2
11	Rated voltage factor		1.2 for continuous, 1.5 for 30 seconds
12	Rated intermediate voltage	(kVrms)	9
13	Total capacitance	(pF)	4400pF (+10% -5%)

Revision Status:

Sr. No.	Revision No.	Date	Description Of Revision
1	0	27/07/2023	First time issue
2	1	09/01/2024	Corona extinction/ inception changed to Corona inception /extinction

Prepared By
Hari Baskhar.S

Approved By
Uday Sanvatsarkar

Chief Engineer/Projects
APTRANSCO/VS/Vijayaw

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CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 245 kV 4400pF CVT (31 mm/kV)	Document No. S1/CV/T/690/R1
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14	High frequency capacitance for entire carrier frequency range	(pF)	4400pF (+10% -5%)
15	Equivalent series resistance over the entire carrier frequency range	(ohms)	< 40 ohms
16	Stray capacitance and strap conductance of the Low Voltage Terminal over entire carrier frequency range	(pF & μ S)	520pF & 50 μ Siemens
17	Rated insulation levels 1.2/50 μ sec lighting impulse withstand voltage	(kV peak)	1050
18	250/2500 μ sec switching surge withstand voltage	(kV peak)	NA
19	1 minute dry power frequency withstand test voltage	(kV rms)	460
20	Creepage distance (min) (with tolerance positive side)	(mm)	7595 (min)
21	Radio interference voltage	μ V	Less than 1000 microvolt
22	Corona inception/ extinction voltage	(kV rms)	202/156
23	Rated total thermal burden	VA	400
24	Capacitance		
a)	Primary capacitance (C1)	(pF)	4734 Nominal
b)	Secondary capacitance (C2)	(pF)	62240 Nominal
c)	Equivalent capacitance	(pF)	4400 (+10% -5%)
25	If CVT suitable for carrier coupling. If so, the range of carrier frequency	(kHz)	40-500
26	Natural frequency of coupling capacity	(kHz)	More than 600kHz
27	Number of secondary windings	Nos.	03
28	Temperature rise at 1.2 times rated voltage and rated burden after steady state conditions at normal rated voltage and burden.	$^{\circ}$ C	55

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

Revision Status:

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1	0	27/07/2023	First time issue
2	1	09/01/2024	Corona extinction/ inception changed to Corona inception /extinction

Prepared By
Hari Baskhar.S

Approved By
Uday Sanvatsarkar

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CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 245 kV 4400pF CVT (31 mm/kV)	Document No. S1/CV/T/690/R1
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		Page 3 of 4

29	Temperature rise at 1.5 times rated voltage for 30 sec.	°C	55
30	One minute power frequency withstand voltage on secondary's		
	Winding No. I	(kVrms)	3
	Winding No. II	(kVrms)	3
	Winding No. III	(kVrms)	3
31	Partial discharge level at 1. Um; 2. 1.2*Um/√3	pC	<10pC <5pC
32	Over all dimensions - Packing		
a)	Length	(mm)	760 ± 100
b)	Width	(mm)	880 ± 100
c)	Height	(mm)	2995 ± 100
d)	Gross Weight	kg	420 ± 10%
33	Value of pressure for sealing test	(kg/cm ²)	1.1
34	Weight of oil and the standard to which it conforms		
a)	In capacitor unit	kg	Oil Mass: 10 ± 10% IEC 60867 (2022)
b)	In measuring unit	kg	Oil Mass: 32 ± 10% IEC 60296 (2012)
35	Total weight	kg	Total Mass: 325 ± 10% Total Oil Mass : 42 ± 10%
36	Minimum centre to centre recommended spacing between CVT's.	(mm)	Not In our scope.
37	Clearance required from grounded equipment at various heights of CVT's	(mm)	Not In our scope
38	Mounting flange dimensional details	(mm)	Ø 18 Hole, 4 Nos. 450 X 450 hole to hole
39	Do the CVT's contain built in compensating choke, surge arresters , spark gaps and damping devices in P.T. Portions?		Yes.

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

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Prepared By
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Approved By
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CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 245 kV 4400pF CVT (31 mm/kV)	Document No. S1/CV/T/690/R1
		Date : 09/01/2024
		Page 4 of 4

40	Transportation Details [vertical/Horizontal].		Vertical
41	Type of Insulation		Class A
42	Degree of Protection		Secondary Box confirms to IP 55
43	One minute power frequency test voltage of secondary winding	kVrms	3
44	One minute power frequency test voltage of H.F. terminal	kVrms	4
45	Range of frequency for which accuracy are valid for 1. Metering 2. Protection		99% to 101% 96% to 102%
46	Tan delta of capacitor unit	Tan δ	< 0.002
47	Seismic Acceleration (Horizontal + Vertical)	g	0.3
48	No. of terminals in terminal box	Nos.	08
49	Primary and secondary winding material		Copper
49	EMU Tank material & tank coating		MS STEEL HDG HGD thickness \geq 85 micron
50	H/w exposed to atmosphere		S.S / MS HDG
51	Bolts , nuts & washers		S.S / MS HDG
52	Porcelain Housing		Hollow ceramic insulator
52.1	Insulator height	mm	2180 +/- 10
52.2	Diameter (Top)	mm	105 +/- 5
52.3	Diameter (Bot)	mm	105 +/- 5
53	Porcelain make		IEC / CJI / RAVIKIRAN
54	Sealing	-	Yes," O" ring / Gaskets and stainless steel bellow.
55	Cantilever Strength	kgf	128 for complete CVT.

**Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.**

Revision Status:

Sr. No.	Revision No.	Date	Description Of Revision
1	0	27/07/2023	First time issue
2	1	09/01/2024	Corona extinction/ inception changed to Corona inception /extinction

**Prepared By
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