

DRG.NO: 3-CAD 10591

IF IN DOUBT, ASK

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, 25mm/kV)

SR. NO.	DESCRIPTION	DRG./DOC.NO.	APP. CAT.	REMARKS
01	GENERAL ARRANGEMENT	3-CAD 10592/R0	--	--
02	RATING/SCHEMATIC PLATE	3-CAD 10593/R0	--	--
03	SECONDARY TERMINAL BOX G.A.	3-CAD 10594/R0	--	--
04	SECTIONAL VIEW	3-CAD 10595/R0	--	--
05	LOWER PORCELAIN INSULATOR	3-CAD 10596/R0	--	--
07	GUARANTEED TECHNICAL PARTICULARS	S1/CV/T/689/R1	---	---
08	LIST OF TYPE TEST REPORTS	S1/CV/T/691/R0	--	---

LIST OF VARIABLE DRGS. APPLICABLE FOR 245 kV CVT (4400 pF, 25mm/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.

Drawing approval subject to valid vendor registration

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

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, 25mm/kV)	
THIRD ANGLE PROJECTION			
SCALE: NTS	INITIALS	NAME	
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB	
	CHD	HARI	
	APPD	USS	
DRG.NO: 3-CAD 10591		REV 1	
DATE : 24.07.2023			

2			
1	CUSTOMER COMMENTS DTD 09,01,2024 ADDED	HARI USS	09,01,2024
NO	REVISION	SIGN	DATE

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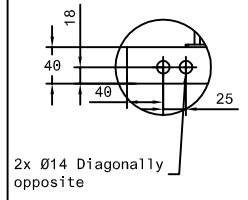
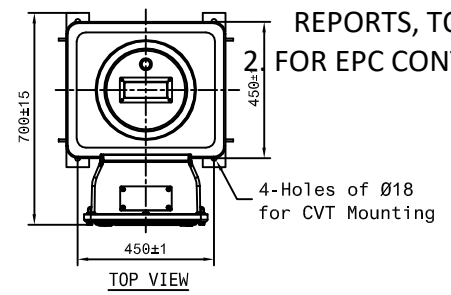
DRG.NO: 3-CAD 10592

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FRAME : U10e (MDSO)

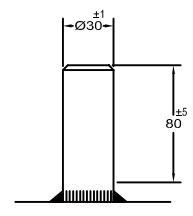
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NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS FOR EPC CONTRACTS ONLY



2x Ø14 Diagonally opposite

ITEM - 8

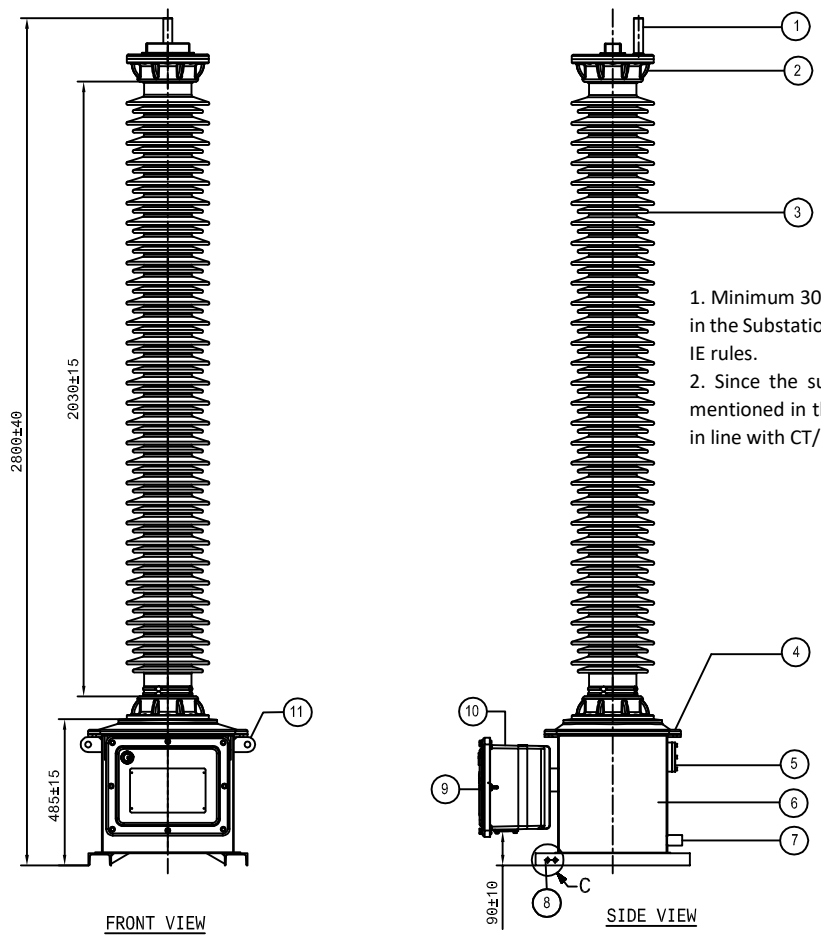


ITEM - 1

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	: 6125 mm (Min)



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

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : STANDARD DRAWING GENERAL ARRANGEMENT 245kV CVT (4400pF, 25mm/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



CG Power and Industrial Solutions Limited
S1 - DIVISION, AMBAD, NASHIK

DRG.NO: 3-CAD 10592

CAPACITOR VOLTAGE TRANSFORMER

Drawing approval subject to valid vendor registration

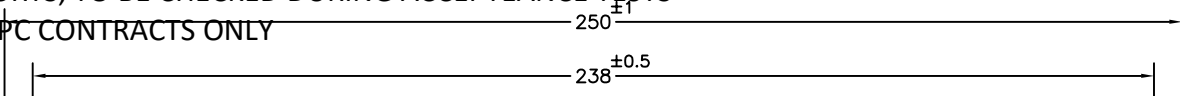
NO	REVISION	SIGN	DATE
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DRG.NO: 3-CAD 10593

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2. FOR EPC CONTRACTS ONLY

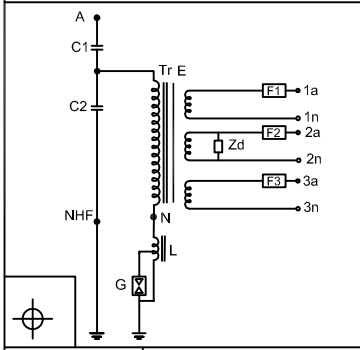


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	CG Power and Industrial Solutions Limited S1 - DIVISION, AMBAD, NASHIK	CAPACITOR VOLTAGE TRANSFORMER	RATING AND SCHEMATIC PLATE
		MADE IN INDIA	

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
YEAR	AS APPLICABLE	VF	1,2CONT./1.5-30SEC.			EMU OIL	32 ± 10% kg
SR.NO.		CREEPAGE DISTANCE	6125 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	$220000/\sqrt{3}$	$110/\sqrt{3}$	$110/\sqrt{3}$	$110/\sqrt{3}$
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.)

118 ±0.5
145 ±1

1 mm Thk. Aluminium

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.

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Chief Engineer/Projects
APTRANSCO/VS/Vijayawada.

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : <u>STANDARD DRAWING</u> RATING / SCHEMATIC PLATE 245kV CVT (4400pF, 25mm/kV)	
	SPEC.:		
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 10593			REV 0

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1			
NO	REVISION	SIGN	DATE

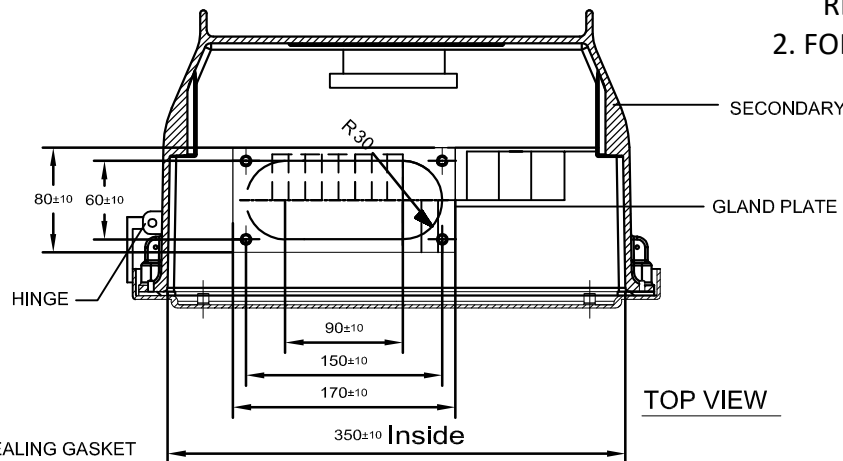
DATE : 24.07.2023

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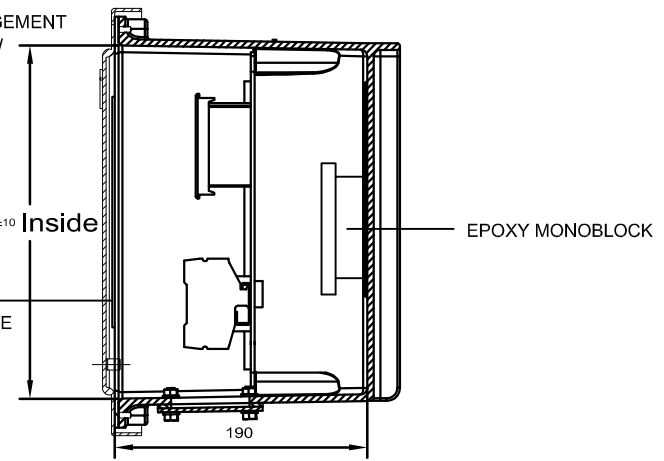
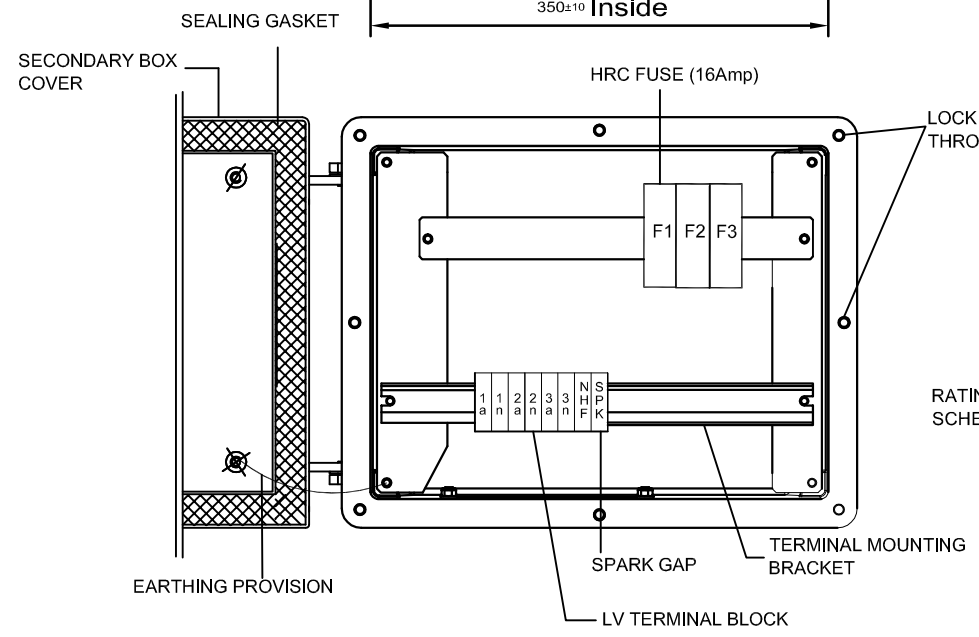
2. FOR EPC CONTRACTS ONLY

DRG.NO: 3-CAD 10594

IF IN DOUBT, ASK



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DEGREE OF PROTECTION : IP55

Chief Engineer/Projects
APTRANSCO/Vs/Vijayawada

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	
245kV CVT (4400pF, 25mm/kV)			
FIRST 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 10594	
		REV 0	



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S1 - DIVISION, AMBAD, NASHIK

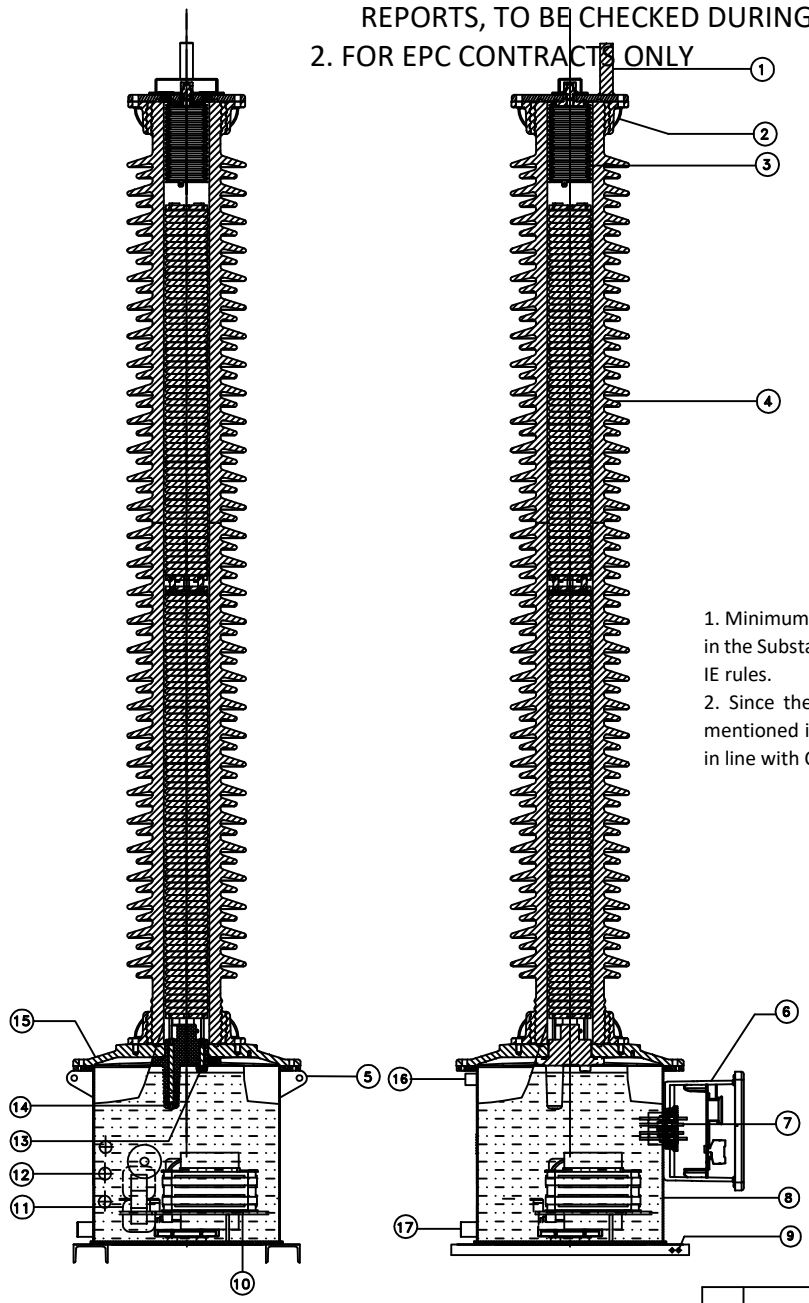
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DRG.NO: 3-CAD 10595

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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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CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : STANDARD DRAWING SECTIONAL VIEW 245kV CVT (4400pF, 25mm/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 10595			REV 0

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1				
NO	REVISION	SIGN	DATE	

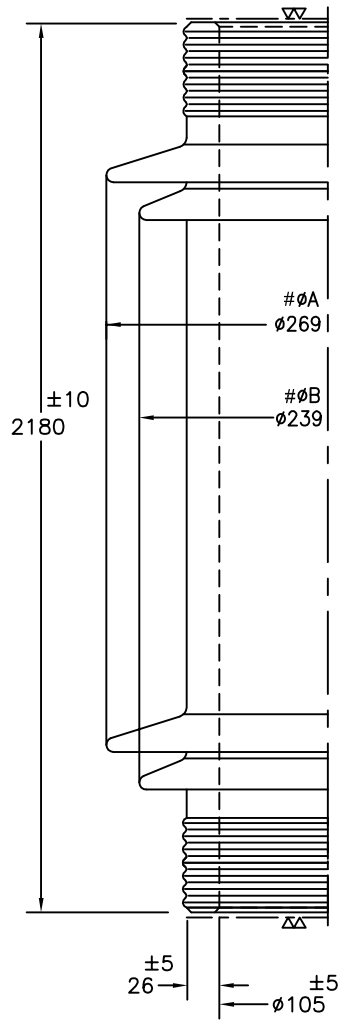
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DRG.NO: 3-CAD 10596

IF IN DOUBT, ASK U10

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- 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 = 6125 mm
 - * CANTILEVER LOAD OF PORCELAIN = 500 kgf
 - * QTY = 1 NO/CVT

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

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

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.: SPEC.:	TITLE : <u>STANDARD DRAWING</u> PORCELAIN INSULATOR 245kV CVT (4400pF, 25mm/kV)	
THIRD ANGLE PROJECTION			
SCALE: NTS	INITIALS	NAME	
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB	
	CHD	HARI	
	APPD	USS	
DATE : 24.07.2023		 CG Power and Industrial Solutions Limited S1 - DIVISION, AMBAD, NASHIK	
DRG.NO: 3-CAD 10596		REV	0

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1			
NO	REVISION	SIGN	DATE

CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 245 kV 4400pF CVT (25 mm/kV)	Document No. S1/CV/T/689/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%)

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Chief Engineer/Projects
PTRANSCO/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
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 (25 mm/kV)	Document No. S1/CV/T/689/R1
		Date : 09/01/2024
		Page 2 of 4

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 & μS)	520pF & 50μSiemens
17	Rated insulation levels 1.2/50 μsec lighting impulse withstand voltage	(kV peak)	1050
18	250/2500 μsec 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)	6125 (min)
21	Radio interference voltage	μV	Less than 1000 microvolt
22	Corona inception /extinction voltage	(kVrms)	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.	°C	55

Chief Engineer/Projects
APTRANSCO/VS/Vijayawada

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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 (25 mm/kV)	Document No. S1/CV/T/689/R1
		Date : 09/01/2024
		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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2. FOR EPC CONTRACTS ONLY**

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.

CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 245 kV 4400pF CVT (25 mm/kV)	Document No. S1/CV/T/689/R1
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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 (kV rms)	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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**Approved By
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