

DRG.NO: 3-CAD 10585

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 145 kV CVT (4400 pF, 31mm/kV)

SR. NO.	DESCRIPTION	DRG./DOC.NO.	APP. CAT.	REMARKS
01	GENERAL ARRANGEMENT	3-CAD 10586/R0	--	--
02	RATING/SCHEMATIC PLATE	3-CAD 10587/R0	--	--
03	SECONDARY TERMINAL BOX G.A.	3-CAD 10588/R0	--	--
04	SECTIONAL VIEW	3-CAD 10589/R0	--	--
05	PORCELAIN INSULATOR	3-CAD 10590/R0	--	--
06	GUARANTEED TECHNICAL PARTICULARS	S1/CV/T/688/R1	---	---
07	LIST OF TYPE TEST REPORTS	S1/CV/T/687/R0	--	--

LIST OF VARIABLE DRGS. APPLICABLE FOR 145 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.

Drawing approval subject to valid vendor registration

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

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)			
GEN. TOL.	MATL.:	TITLE : <u>STANDARD DRAWING</u> LIST OF STANDARD DRGS. / DOCUMENTS APPLICABLE FOR 145kV 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
 <b>CG Power and Industrial Solutions Limited</b> S1 - DIVISION, AMBAD, NASHIK			DRG.NO: 3-CAD 10585
NO REVISION SIGN DATE			DATE : 24.07.2023

2			
1	CUSTOMER COMMENTS DTD 09.01.2024 ADDED	HARI USS	09.01.2024

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DRG.NO: 3-CAD10586

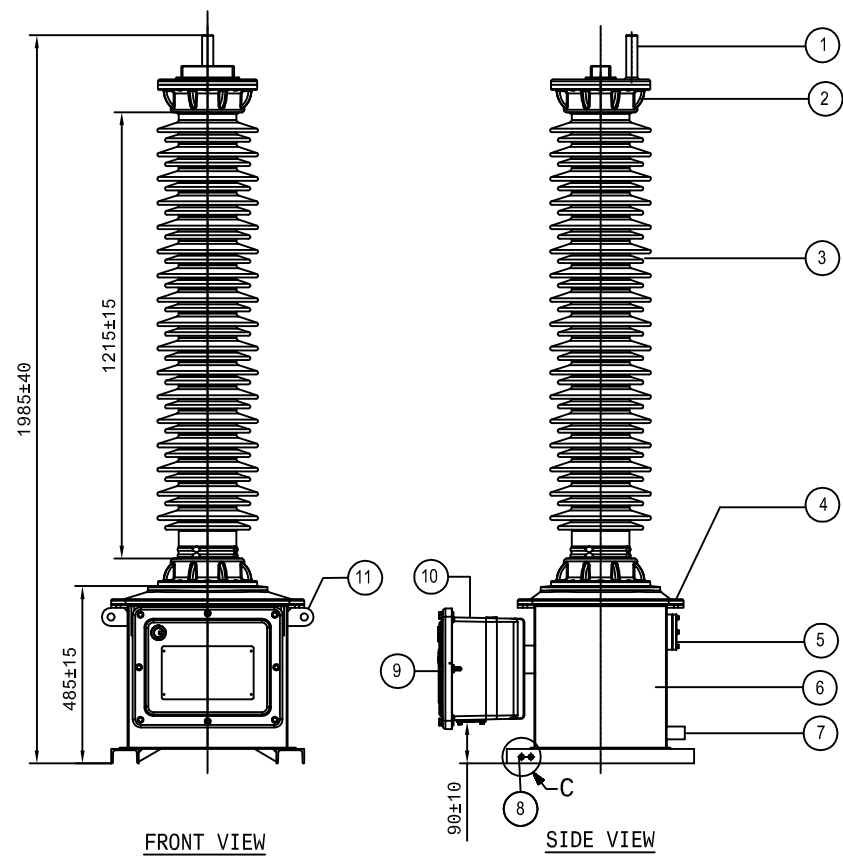
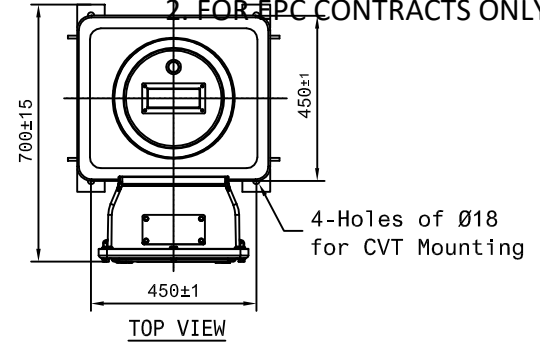
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FRAME : B10(HC)je (MDSO)

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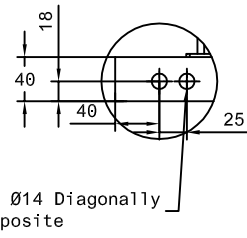
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2. FOR EPC CONTRACTS ONLY

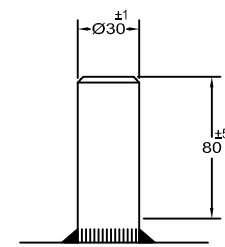


CAPACITOR VOLTAGE TRANSFORMER

DETAIL C



ITEM - 8



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.

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

\* MAKE OF PORCELAIN : IEC / CJI / RAVIKIRAN


TOTAL MASS	: 245 kg	±10%
OIL MASS	: 37 kg	±10%
TOTAL CREEPAGE	: 4495 mm (Min)	

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Chief Engineer/Projects  
APTRANSCO/VS/Vijayawada.

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)

GEN. TOL.	MATL. SPEC.	TITLE : STANDARD DRAWING GENERAL ARRANGEMENT 145kV CVT (4400pF, 31mm/kV)
THIRD ANGLE PROJECTION		
SCALE: NTS	INITIALS	NAME

ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB	 <b>CG Power and Industrial Solutions Limited</b> S1 - DIVISION, AMBAD, NASHIK
	CHD	HARI	
	APPD	USS	

2			
1			
NO	REVISION	SIGN	DATE

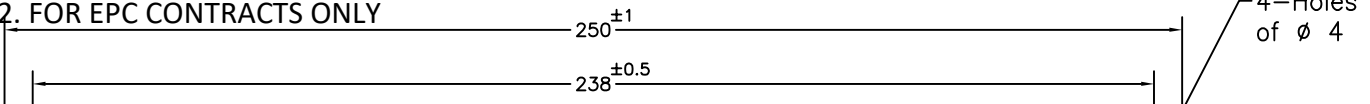
DRG.NO: 3-CAD10586	REV 0
DATE : 24.07.2023	

DRG.NO: 3-CAD 10587

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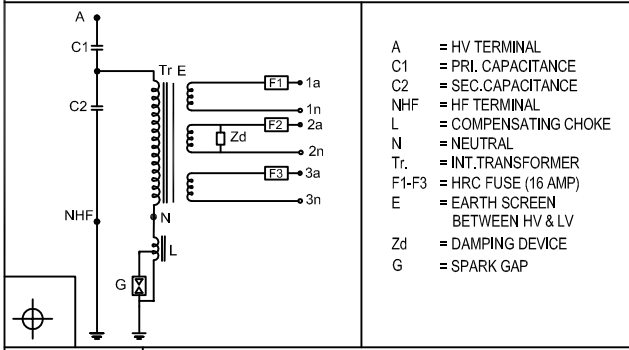
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2. FOR EPC CONTRACTS ONLY



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

CUSTOMER : APTRANSCO		PROJECT : AS APPLICABLE	
		LOA NO. : AS APPLICABLE	
TYPE	CVE:145 / 650 / 50	HSV	145 kV
STD.	IEC 61869 - 1 & 5	FREQ.	50 Hz
S.O.	AS APPLICABLE	INSULATION LEVEL	275 kV / 650 kVp
YEAR	AS APPLICABLE	VF	1,2CONT./1.5-30SEC.
SR.NO.	[REDACTED]	CREEPAGE DISTANCE	4495 mm
EQUI. CAPACITANCE	4400 +10%,-5%pF	THERMAL OUTPUT	300 VA
TOTAL SIM.BURDEN/CLASS	50VA/0.2 & 150VA/3P	TOTAL MASS	245 ±10% kg
		CAPACITOR OIL	5 ± 10% kg
		EMU OIL	32 ± 10% kg



- 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	132000/√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.

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 IEC 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.**

CUSTOMER : TRANSMISSION CORPORATION OF ANDHRA PRADESH (APTRANSCO)

MATERIAL:	SPECIFICATION:	TITLE : <b>STANDARD DRAWING</b> RATING / SCHEMATIC PLATE 145kV CVT (4400 pF, 31mm/kV)
THIRD ANGLE PROJECTION		
SCALE: NTS	INITIALS	NAME

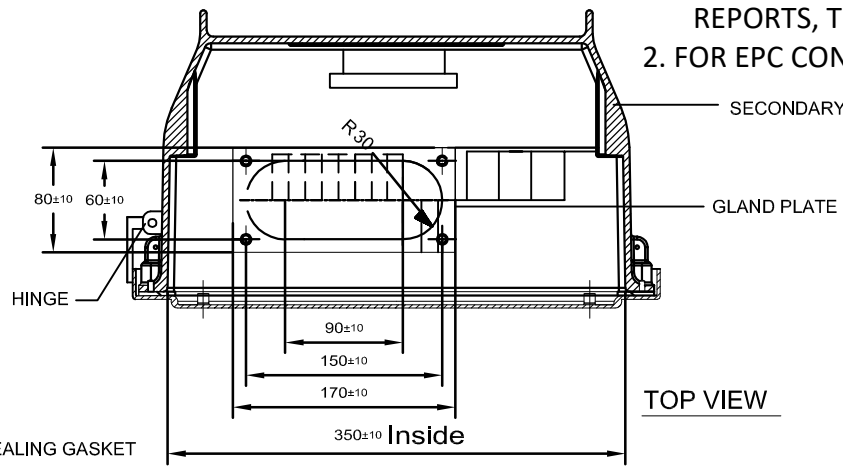
ALL DIMS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB		<b>CG Power and Industrial Solutions Limited</b> S1 - DIVISION, AMBAD, NASHIK
	CHD	HARI		
	APPD	USS		

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NO	REVISION	SIGN	DATE
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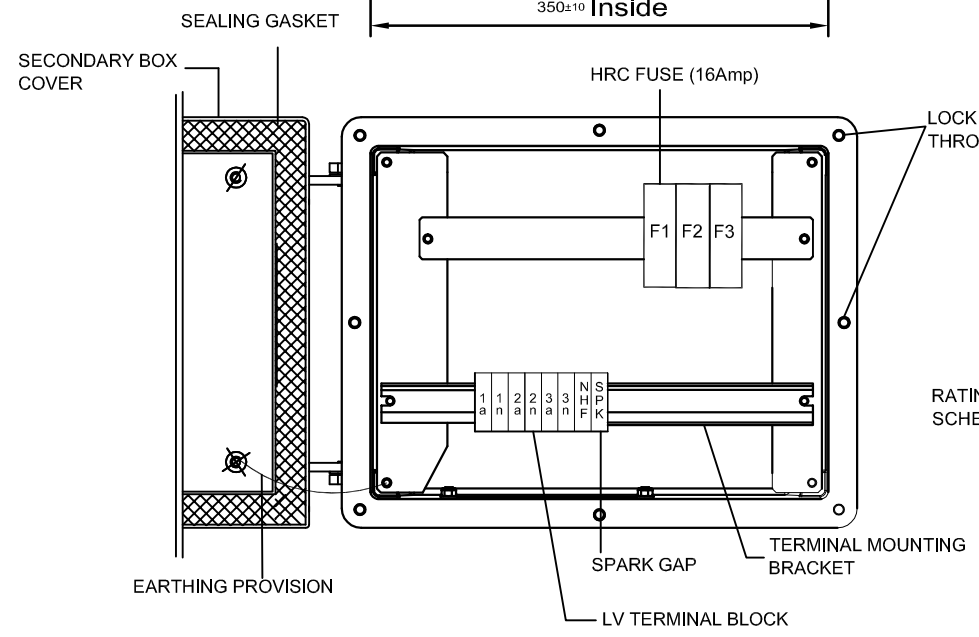
DATE : 24.07.2023	DRG.NO: 3-CAD 10587	REV 0
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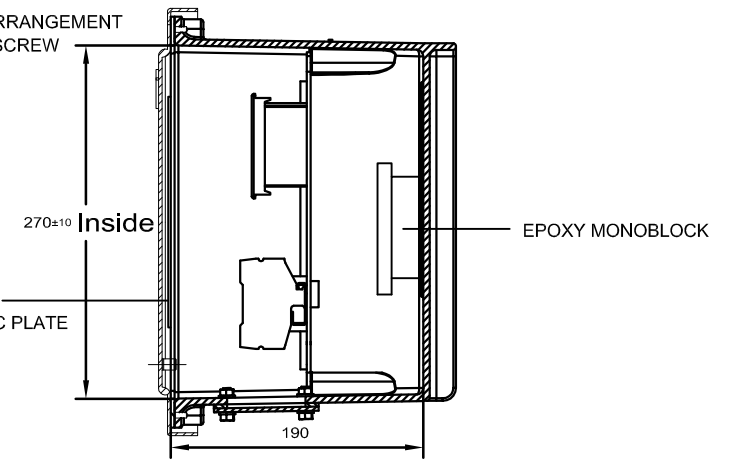


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TOP VIEW



FRONT VIEW



SIDE VIEW

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	
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 10588	
		REV 0	



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

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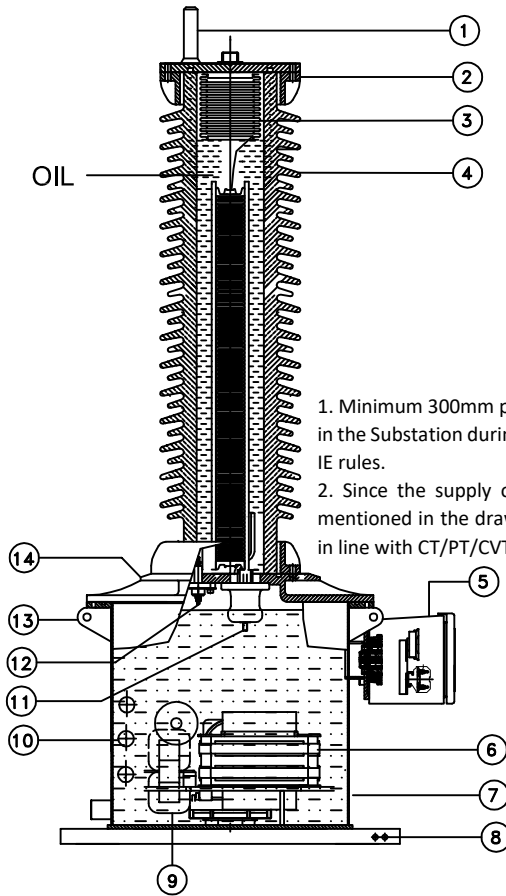
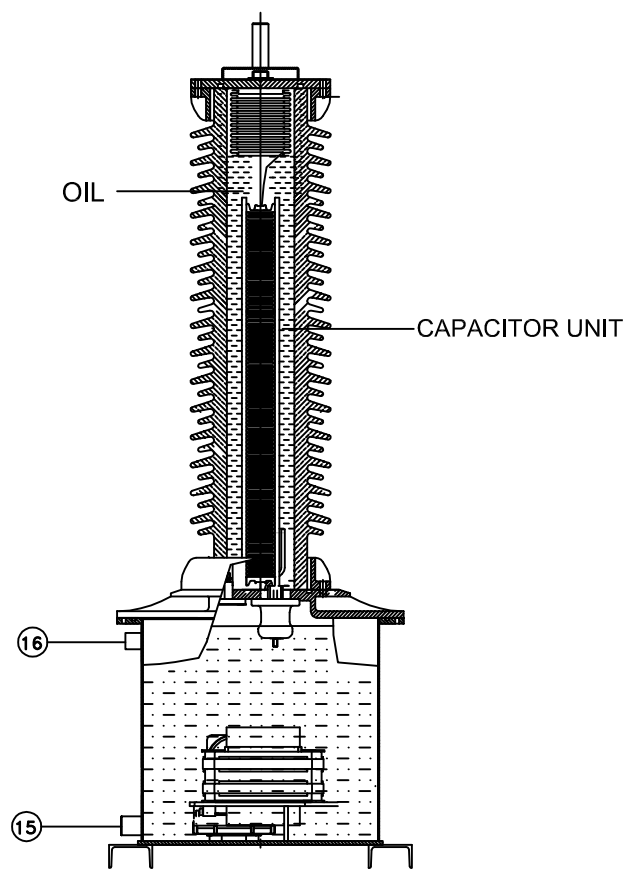
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DRG.NO: 3-CAD 10589

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2. FOR EPC CONTRACTS ONLY



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

- 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.
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## 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> SECTIONAL VIEW FOR 145kV 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
<b>CG Power and Industrial Solutions Limited</b> S1 - DIVISION, AMBAD, NASHIK		DRG.NO: 3-CAD 10589	
		DATE : 24.07.2023	

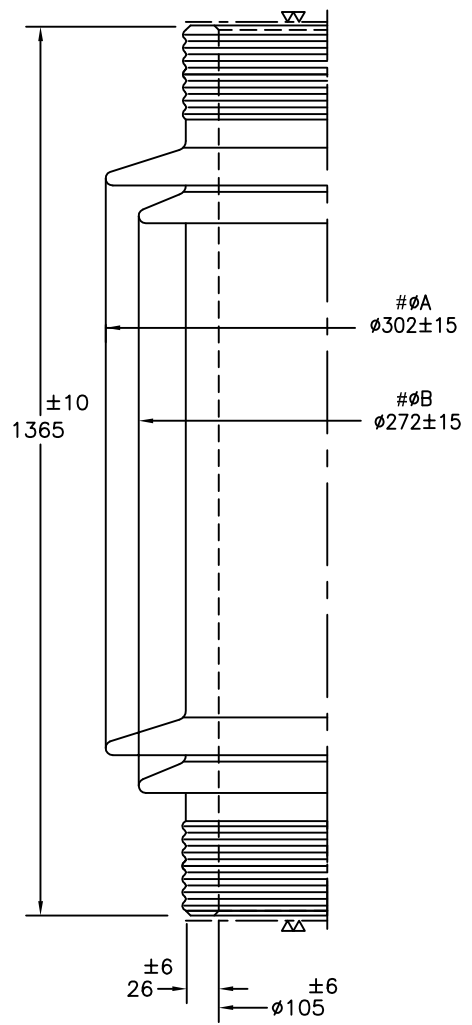
NO	REVISION	SIGN	DATE
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DRG.NO: 3-CAD 10590

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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 = 4495 mm
- \* CANTILEVER LOAD OF PORCELAIN = 350 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.:	TITLE : <b>STANDARD DRAWING</b>	
	SPEC.:	PORCELAIN INSULATOR	
THIRD ANGLE PROJECTION			
SCALE: NTS	INITIALS	NAME	
ALL DIMNS. IN MM. UNLESS OTHERWISE SPECIFIED.	ORG	NSB	 <b>CG Power and Industrial Solutions Limited</b> S1 - DIVISION, AMBAD, NASHIK
	CHD	HARI	
	APPD	USS	
DRG.NO: 3-CAD 10590		REV	0
DATE : 24.07.2023			

2			
1			
NO	REVISION	SIGN	DATE

8435819/2024/EEMRT-ENE51

CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 145 kV 4400 pF CVT (31 mm/kV)	Document No. S1/CV/T/688/R1
		Date : 09/01/2024
		Page 1 of 4

## 145kV SINGLE PHASE CAPACITOR VOLTAGE TRANSFORMER

Sl. No	Description	Units	145kV
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: 145/650/50
3	Rated voltage		
a)	Nominal (phase voltage)	(kVrms)	132 / $\sqrt{3}$
b)	Maximum (phase voltage)	(kVrms)	145 / $\sqrt{3}$
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	(Vrms)	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	25/07/2023	First time issue
2	1	09/01/2024	Corona extinction/ inception changed to Corona inception /extinction

Prepared By  
Hari Baskhar.SApproved By  
Uday Sanvatsarkar

Drawing approval subject to valid vendor registration

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS  
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Chief Engineer/Projects  
APTRANSCO/VS/Vijayawada.

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CG Power and Industrial Solutions Limited S1 Division, A-3, MIDC, Ambad, Nashik	Guaranteed Technical Particulars 145 kV 4400 pF CVT (31 mm/kV)	Document No. S1/CV/T/688/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)	650
18	250/2500 μsec switching surge withstand voltage	(kV peak)	NA
19	1 minute dry power frequency withstand test voltage	(kVrms)	275
20	Creepage distance (min) (with tolerance positive side)	(mm)	4495 (min)
21	Radio interference voltage	μV	Less than 1000 microvolt
22	Corona inception/ extinction voltage	(kVrms)	120/92
23	Rated total thermal burden	VA	300
24	Capacitance		
a)	Primary capacitance (C1)	(pF)	4930 Nominal
b)	Secondary capacitance (C2)	(pF)	40930 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.

Drawing approval subject to valid vendor registration

#### Revision Status:

Sr. No.	Revision No.	Date	Description Of Revision
1	0	25/07/2023	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

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

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<b>CG Power and Industrial Solutions Limited</b> <b>S1 Division,</b> <b>A-3, MIDC, Ambad, Nashik</b>	<b>Guaranteed Technical Particulars</b> <b>145 kV 4400 pF CVT</b> <b>(31 mm/kV)</b>	<b>Document No. S1/CV/T/688/R1</b>
		<b>Date : 09/01/2024</b>
		<b>Page 3 of 4</b>

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)	650 ± 100
b)	Width	(mm)	860 ± 100
c)	Height	(mm)	2200 ± 100
d)	Gross Weight	kg	350 ± 10%
33	Value of pressure for sealing test	(kg/cm2)	1.1
34	Weight of oil and the standard to which it conforms		
a)	In capacitor unit	kg	Oil Mass: 5 ± 10% IEC 60867 (2022)
b)	In measuring unit	kg	Oil Mass: 32 ± 10% IEC 60296 (2012)
35	Total weight	kg	Total Mass: 245 ± 10% Total Oil Mass : 37 ± 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.**

Drawing approval subject to valid vendor registration

**Revision Status:**

Sr. No.	Revision No.	Date	Description Of Revision
1	0	25/07/2023	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**

NOTE: 1. DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS  
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 145 kV 4400 pF CVT (31 mm/kV)	Document No. S1/CV/T/688/R1
		Date : 09/01/2024
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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 $\delta$	< 0.002
47	Seismic Acceleration (Horizontal + Vertical)	g	0.3
48	No. of terminals in terminal box		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	1365 +/- 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	102 for complete CVT.

Chief Engineer/Projects  
APTRANSCO/VS/Vijayawada

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