

CHECKED DURING ACCEPTANCE TESTS.

5645369/2022/EEMRT-ENE51



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.

FOR EPC CONTRACTS ONLY

CLIENT : TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED, VIJAYAWADA

CONTRACTOR :

PO.NO. :

Drawing approval subject to valid vendor registration

PROJECT :

LIST OF DRAWINGS FOR 220kV/4400pF CAPACITOR VOLTAGE TRANSFORMER (CCV-245)

SL.No.	DRAWING NUMBER	DESCRIPTION OF DRAWING
01	GTP REV.00	GUARANTEED TECHNICAL PARTICULARS
02	712-B-3277 REV.00	OUTLINE DIAGRAM
03	713-B-3443 REV.00	NAME PLATES
04	714-B-4135 REV.00	SECTIONAL VIEW Chief Engineer Planning & Power Systems
05	716-B-4104 REV.00	DETAILS OF SECONDARY TERMINAL BOX APTransco
06	723-B-1206 REV.00	PORCELAIN HOUSING

Note: Drawing Approval subject to valid type test reports to be checked during acceptance tests

PRPD:

Raghul

09.11.21

CHKD:

Sangith

09.11.21

APPRD:

Mayank

09.11.21

ISO : -----

! CONTENTS OF THE DRAWING SHALL NOT BE MODIFIED WITHOUT PRIOR INTIMATION TO GE. REQUIRED CHANGES, IF ANY, SHALL BE HIGHLIGHTED OR MARKED AND COMMUNICATED TO GE FOR NECESSARY ACTION

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5645369/2022/EEMRT-ENE51



**GUARANTEED TECHNICAL PARTICULARS
FOR 220kV/4400pF C.V.T (CCV-245)**

SHEET 01 OF 04

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1.	GENERAL Drawing approval subject to valid vendor registration		
a)	Name of Manufacturer	GE T&D INDIA LIMITED	
b)	Manufacturer's Type designation	CCV 245	
c)	Standard applicable	IEC-61869-1&5/60358	
d)	Rated voltage Un(kV)	220 $\sqrt{3}$ kV rms	
e)	i)Number of secondaries	Three	
	ii)Voltage ratio	220000/ $\sqrt{3}$ / 110/ $\sqrt{3}$	
f)	Rated frequency(Hz)	50 Hz	
g)	Type of Installation	Outdoor Pedestal Mounting	
2.	GUARANTEED RATINGS		
a)	Winding	I	II
b)	Rated output of each secondary winding(VA)	50 VA	50 VA
c)	Accuracy class	3P	0.2
d)	Total simultaneous burden(VA)	100 VA for 0.2 CL @ 50Hz	
e)	Thermal burden(VA)	750 VA	
f)	Rated Voltage factor		
	i)Continuous	1.2 Un	
	ii)30 seconds	1.5 Un	
	iii)5 seconds	Not Applicable	
g)	Capacitance		
	i)For carrier frequency coupling(pF)	4400 pF +10%, -5%	
	ii)Of high voltage capacitor C1(pF)	4812 pF +10%, -5%	
	iii)of intermediate voltage capacitor C2(pF)	46268 pF +10%, -5%	
h)	Natural frequency of coupling(kHz)	> 500 kHz	
i)	Self tuning frequency of CVT(kHz)	> 500 kHz	
j)	Band width(kHz)	40 - 500 kHz	
k)	Temperature rise over ambient Temperature at 50 Deg. C	55 Deg.C temperature rise over an ambient temperature of 50 Deg.C	

Chief Engineer
Planning & Power Systems

APTransco

PRPD. RAGHUL
09.11.21

CHKD. SANGITH
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**GUARANTEED TECHNICAL PARTICULARS
FOR 220kV/4400pF C.V.T (CCV-245)**

SHEET 02 OF 04

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l)	One minute power frequency test voltage of secondary winding(kV rms)	3 kV rms
m)	One minute power frequency test voltage of H.F terminal(kV rms)	4 kV rms (Weather proof)
n)	One minute power frequency test voltage of capacitance(kV rms)(dry)	460 kV rms
o)	1.2/50 micro second impulse withstand test voltage of capacitor(kVp)	±1050 kVp Chief Engineer Planning & Power Systems
p)	250/2500 micro second switching surge withstand test voltage of capacitor(wet)(kVp)	APTransco Not Applicable as per IEC
q)	Corona extinction voltage	156 kV rms (min.)
r)	Max. radio interference voltage at 156 kV (frequency between 0.5 MHz to 2 MHz.)	≤ 500 μV
s)	Rated voltage of surge arrester connected at the secondary of CVT	350 Volts across the secondary of the EMU
t)	Min. creepage distance between phase to ground(mm)	6125 mm
u)	Seismic acceleration	0.3g horizontal
v)	System neutral earthing	Effectively earthed
3)	CONSTRUCTIONAL DETAILS	
a)	Overall Dimensions	
	i)Overall height(mm)	2930 ±100
	ii)Height upto top of terminal pad from mounting plane(mm)	3065 ±100
	iii)Diameter and length of terminal pad (mm)	Height of terminal pad 135 x 95
iv)Material of terminal pad	Aluminium Alloy	

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APPD. MAYANK
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**GUARANTEED TECHNICAL PARTICULARS
FOR 220kV/4400pF C.V.T (CCV-245)**

SHEET 03 OF 04

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v)	Mounting dimensions and diameter of mounting holes	4 Nos. 20x23 Slotted holes at 450 x 450 mm. spacing.
vi)	Diameter of insulator (mm)	I.D - 135 (shed)
b)	Total weight (kg)	410 kgs. (Approx.)
c)	Quantity of oil (kgs.)	22 kgs. FOR CAPACITOR UNIT (Approx.) 40 kgs. FOR EMU (Approx.)
d)	Whether CVTs are hermetically sealed. if so, how?	Yes, By NBR/SILICON Gaskets
e)	Details of dielectric for CVD	Paper, Film, oil dielectric
f)	Standard to which oil conforms generally	IEC-60296 FOR EMU IEC-60867 FOR CAPACITOR UNIT
g)	Minimum clearance between phases recommended(mm)	2100 mm. (Min.)
h)	Minimum center to center spacing recommended(mm)	2100 mm. (Min.)
i)	Minimum distance from nearby earthed objects (mm)	2413 mm. (Min.)
j)	Tan delta value of capacitor unit	<0.002
k)	Value of stray capacitance and conductance	300 +5% Cn & 50 Micro Siemens
l)	IP Protection for Terminal Box	IP-55 AS PER IEC-60947-1:2004
m)	Insulation Class	Class "A"
n)	Standard Frequency range for Accuracy & Protection class	Measuring accuracy calss-99% to 101% Protective accuracy calss-96% to 102%
o)	HF Series Resistance	< 40 Ohms
p)	Partial discharge	<10pC @ Um, <5pC @ 1.2Um/√3 As per IEC-61869-1&5
r)	Cantilever strength of Insulator	350 kgs (min.)

**Chief Engineer
Planning & Power Systems
APTransco**

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

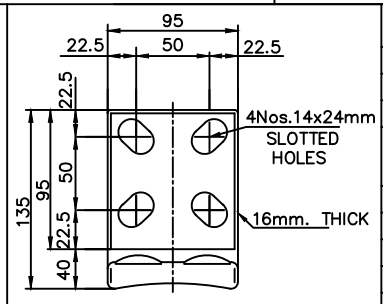
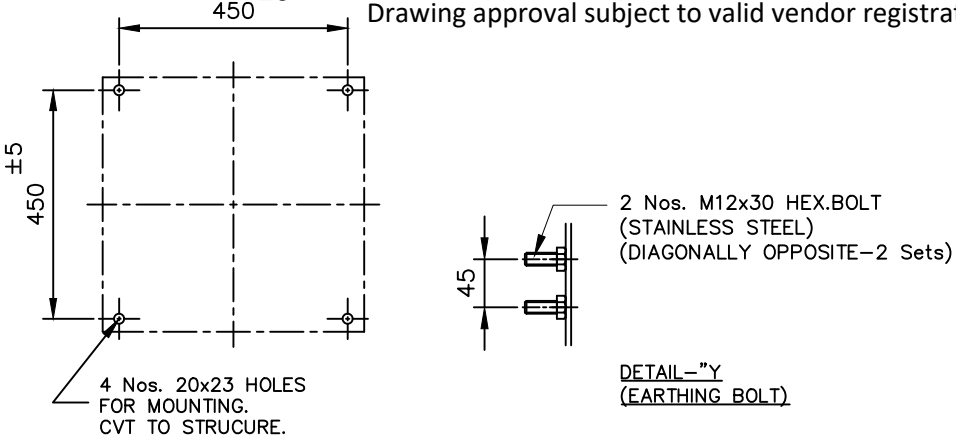
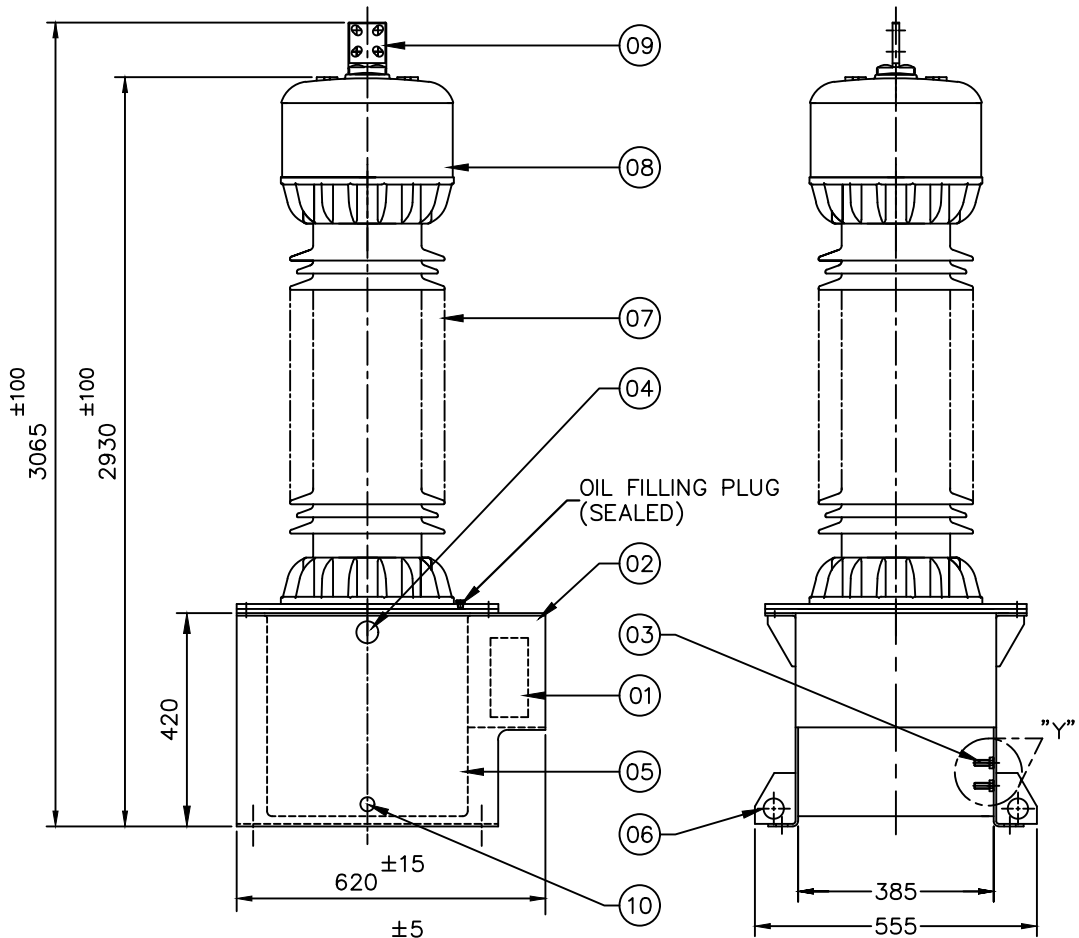
PRPD.	RAGHUL 09.11.21	CHKD.	SANGITH 09.11.21	APPD.	MAYANK 09.11.21
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DETAILS OF LINE TERMINAL

Sl.No.	DESCRIPTION	MATERIAL	26 Y.
01	CVT NAME PLATE	STAINLESS STEEL	1564
02	SECONDARY TERMINAL BOX	M.S	1
03	EARTH BOLT (M12)	STAINLESS STEEL	4
04	OIL LEVEL INDICATOR (PRISMATIC TYPE)	AL. & GLASS	1
05	E.M.U TANK	M.S	1
06	LIFTING EYE (Ø40 HOLE)	M.S	4
07	PORCELAIN INSULATOR	PORCELAIN	1
08	SHIELD	ALUMINIUM	1
09	H.V. TERMINAL (PAD TYPE)	ALUMINIUM	1
10	OIL DRAIN PLUG	M.S & BRASS	1

- NOTES :-
- NOMINAL CREEPAGE DISTANCE - 6125 mm.
 - OIL QUANTITY :-
22 kgs. FOR CAPACITOR UNIT (IEC-60867) SYNTHETIC OIL
40 kgs. FOR EMU (IEC-60296) MINERAL OIL
 - WEIGHT OF CVT : 410 kgs.
 - WEIGHTS INDICATED ARE APPROXIMATE
 - FINISH ELECTRO MAGNETIC UNIT TANK AS FOLLOWS:-
TANK SHALL BE HOT DIP GALVANISED AND ALL EXPOSED MILD STEEL PARTS SHALL BE HOT DIP GALVANISED
 - GENERAL TOLERANCE WILL BE APPLICABLE AS PER ISO 2768 WHERE TOLERANCE IS NOT INDICATED.
 - MAKE OF INSULATOR : BHEL/IEC/MODERN/LILING HUAXIN
 - INSULATION CLASS : 'A'

TECHNICAL DETAILS:-

01. APPLICABLE STANDARD	IEC-61869-1&5,60358
02. RATED VOLTAGE	220 kV/√3
03. HIGHEST SYSTEM VOLTAGE	245 kV
04. H.V. TEST VOLTAGE	460 kV rms for 1 Min.
05. IMPLUSE TEST VOLTAGE	1050 kVp
06. RATED FREQUENCY	50Hz
07. "HF" CAPACITANCE	4400 pF
08. PRIMARY CAPACITANCE C1	4812 pF
09. SECONDARY CAPACITANCE C2	46268 pF
10. RIV at 156 kV	≤ 500 μV

NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN. Raghu	09.11.21	OUTLINE DIAGRAM OF 220 kV/4400 pF C.V.T (CCV-245)	REF. ----
CHD. Sangith	09.11.21		
APPD. Mayank	09.11.21		



DRG. No. 712-B-3277
REV. No. 00

REVISION	DESCRIPTION

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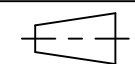
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NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN. Raghul	09.11.21	NAME PLATES FOR 220 kV/4400 pF C.V.T (CCV-245)	REF. -----
CHD. Sangith	09.11.21		 
APPD. Mayank	09.11.21		DRG. No. 713-B-3443



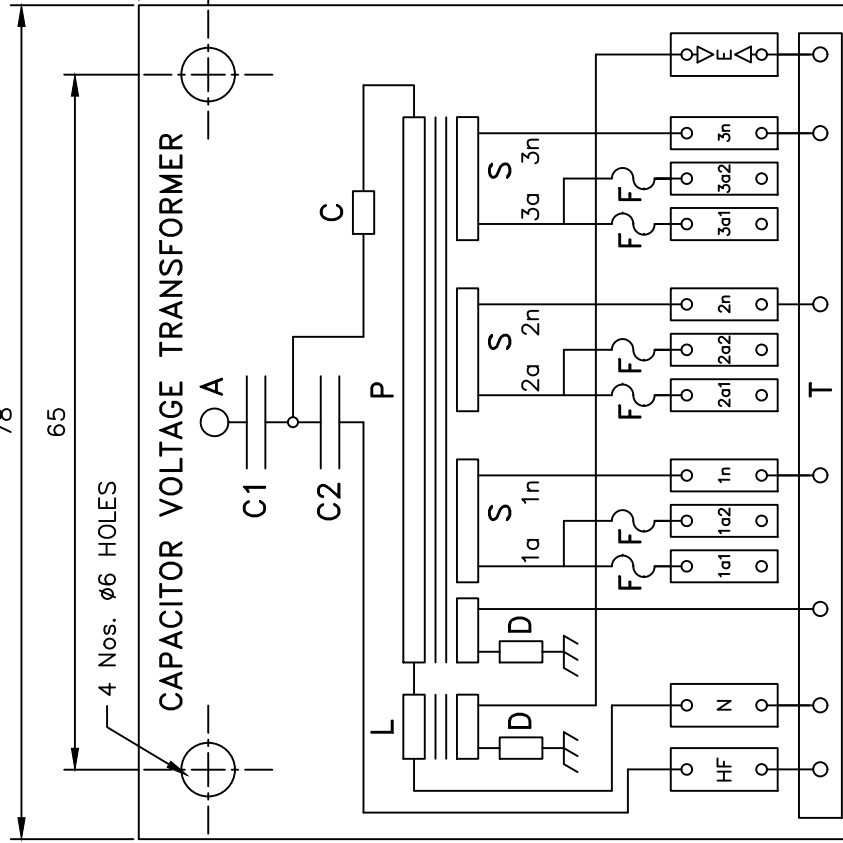
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NOTES

1. WEIGHT INDICATED IN NAME PLATES ARE APPROXIMATE.
2. MATERIAL OF NAME PLATE - STAINLESS STEEL (0.5 mm.THICK) FOR OUTDOOR PROOF
3. GENERAL TOLERANCE WILL BE APPLICABLE AS PER ISO 2768 WHERE TOLERANCE IS NOT INDICATED
4. YEAR & SL. No. TO BE PRINTED AT THE TIME OF MANUFACTURE
5. FUSE RATING SUBJECT TO CHANGE DURING DETAILED ENGINEERING

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A : H.V.Terminal	WEIGHT	410 kg.
C : Carrier blocking device	YEAR	
L : Reactor	SL.No.	
E : Voltage limiter device		
P : Transformer Primary		
S : Transformer Secondary		
D : Damping device		
N : Low voltage terminal of the EMU		
HF : Low voltage terminal of the CC		
T : Ground terminal		
F : Fuse		

Standards	: IEC-61869-1&5/60358
Type	: CCV 245
Total burden simultaneous	: 100VA for 0.2 CI@50Hz
Thermal burden	: 750 VA
Rated voltage	: 220kV/√3
Highest system voltage	: 245kV
Insulation level	: 460kV/1050kVp
Rated frequency	: 50 Hz
Nominal intermediate voltage	: 21kV/√3
Voltage factor	: 1.2cont. 1.5-30Sec
Nominal Capacitance	: 4400 pF (+10%, -5%)
Primary Capacitance C1	: 4812 pF (+10%, -5%)
Secondary Capacitance C2	: 46268 pF (+10%, -5%)

Connection	Ratio	Burden	Accuracy class
1a-1n	220000/√3/110/√3V	50 VA CI	3P
2a-2n	220000/√3/110/√3V	50 VA CI	3P
3a-3n	220000/√3/110/√3V	50 VA CI	0.2

CAUTION :-
HF TERMINAL MUST BE EARTHED IF NOT USED FOR CARRIER TRANSMISSION. 'N' TERMINAL SHOULD ALWAYS BE EARTHED.
GROUNDING : EFFECTIVELY EARTHED

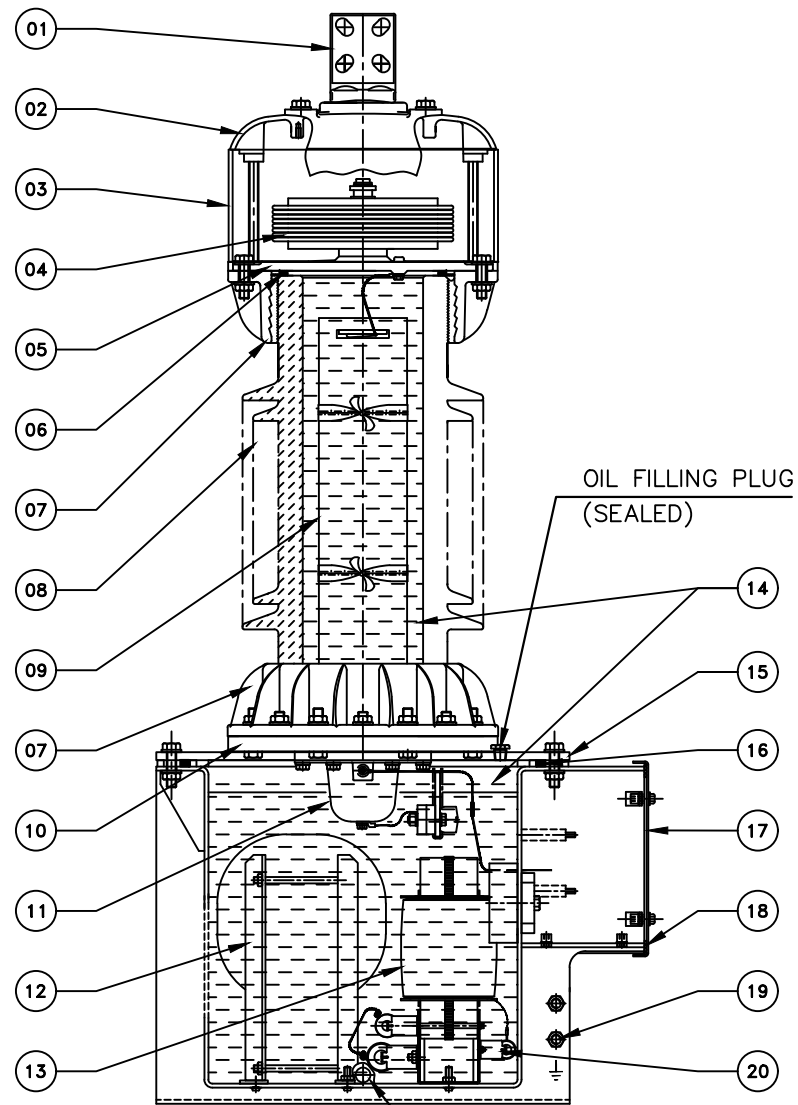


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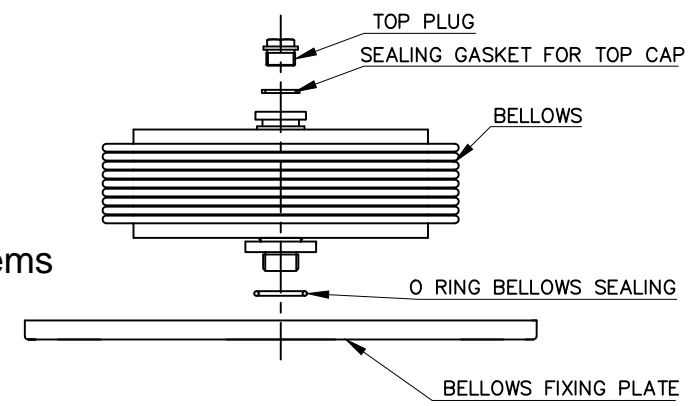
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Sl.No.	DESCRIPTION	28
01	H.V. TERMINAL PAD (ALUMINIUM)	564
02	H.V. TERMINAL PLATE	
03	SHIELD	
04	BELLOW	
05	BOTTOM PLATE FOR BELLOW	
06	GASKET FOR PORCELAIN TO PLATE	
07	END FLANGE	
08	PORCELAIN INSULATOR	
09	CAPACITOR STACK ASSEMBLY	
10	BOTTOM PLATE FOR STACK ASSEMBLY	
11	L.V. BUSHING	
12	TRANSFORMER ASSEMBLY	
13	REACTOR ASSEMBLY	
14	OIL	
15	TANK COVER PLATE	
16	GASKET FOR TANK	
17	SECONDARY TERMINAL BOX	
18	GASKET FOR SECONDARY TERMINAL BOX	
19	EARTH BOLT	
20	DAMPING CIRCUIT	
21	OIL DRAIN PLUG	



DETAILS OF BELLOW

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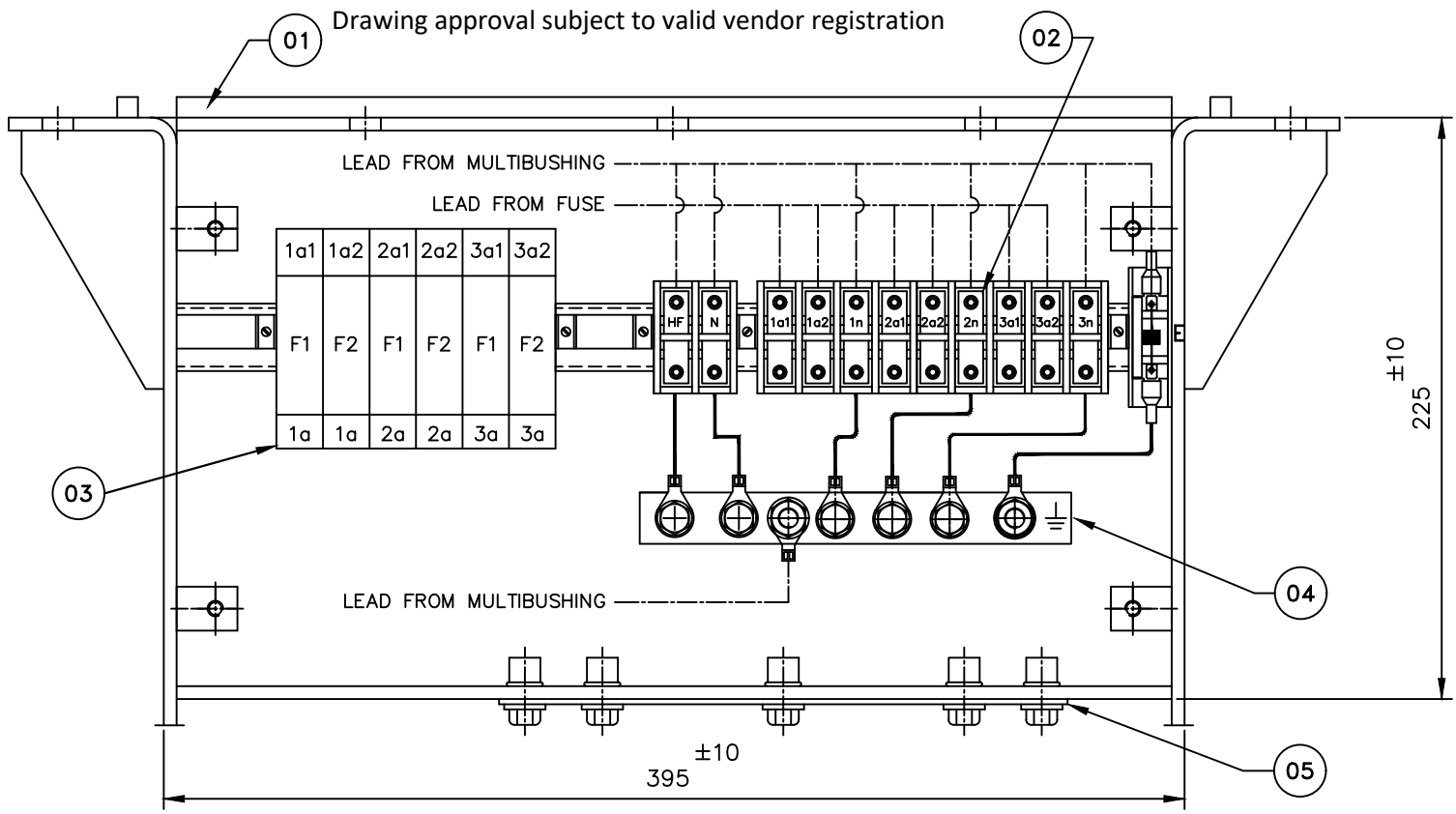
1) Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators in the substation during foundation works to ensure safe live to ground clearances as per IE rules.

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.

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REVISION	DESCRIPTION
It.	

DRN.	Raghu	09.11.21	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED. SECTIONAL VIEW OF 220 kV/4400 pF C.V.T (CCV-245)	SCALE : NTS.
CHD.	Sangith	09.11.21		REF. ----
APPD.	Mayank	09.11.21		
GE T&D India Limited			DRG. No. 714-B-4135	REV. No. 00



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NOTES: -

1. F1 & F2 - 6 Amps FUSE
2. HF - LOW VOLTAGE TERMINAL OF THE CC
3. N - LOW VOLTAGE TERMINAL OF THE EMU
4. E - VOLTAGE LIMITER DEVICE
5. ENCLOSURE PROTECTION CLASS OF SECONDARY TERMINAL BOX CONFORM TO IP-55 AS PER IEC-60947-1-2004
6. 3 Nos. 3/4 Inch CABLE GLAND (UNDER SCOPE OF GE T&D SUPPLY)

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Planning & Power Systems
APTransco

SI.No.	DESCRIPTION	QTY.
01	TANK ASSEMBLY	1
02	CONNECTOR ASSEMBLY	1
03	FUSE	6
04	GROUNDING STRIP	1
05	CABLE GLAND PLATE	1

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE

CHECKED DURING ACCEPTANCE TESTS.

REVISION	DESCRIPTION	NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN.		Raghul	09.11.21	DETAILS OF SECONDARY TERMINAL BOX FOR 220 kV/4400 pF C.V.T (CCV-245)	REF. ----
CHD.		Sangith	09.11.21		
APPD.		Mayank	09.11.21		



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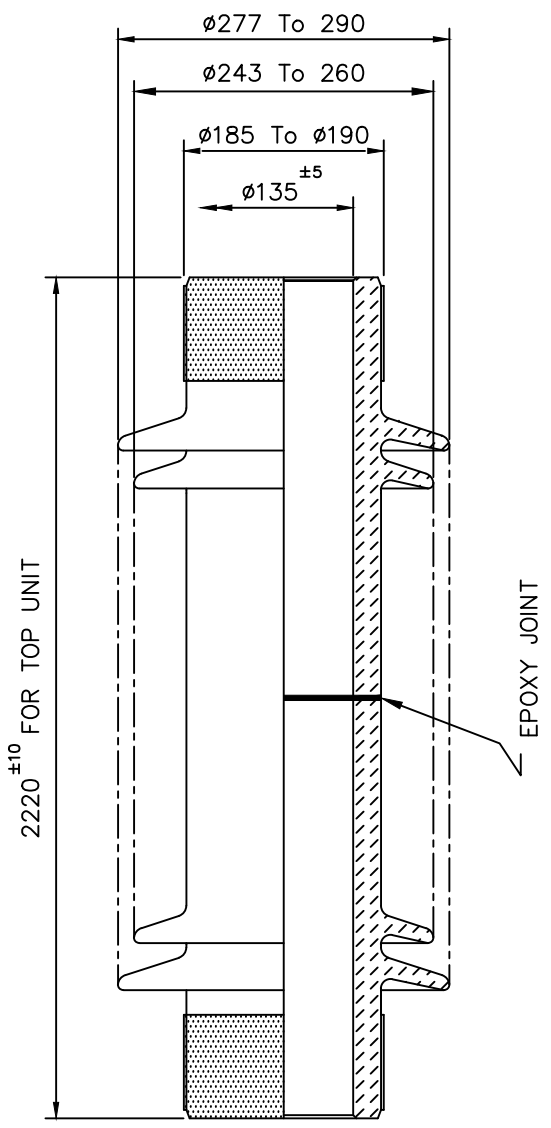
DRG. No.
716-B-4104
REV. No. 00

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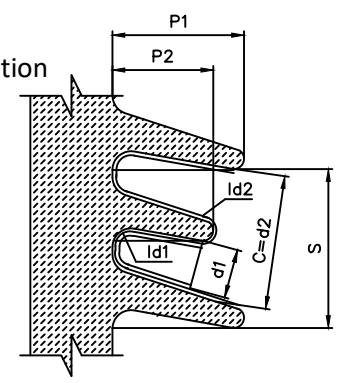
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SHED PARAMETERS AS PER IEC:815-1986	SHED PARAMETERS OF OFFERED PORCELAIN	IEC REQUIREMENTS
1.DISTANCE BETWEEN SHED-C	≥ 30 mm	≥ 30 mm
2.RATIO BETWEEN SPACING AND SHED OVERHANG (S/P1)	≥ 0.8	≥ 0.8
3.RATIO BETWEEN CREEPAGE DISTANCE AND CLEARANCE ld_1/d_1	< 5	< 5
4.RATIO BETWEEN CREEPAGE DISTANCE AND CLEARANCE ld_2/d_2	< 5	< 5
5.DIFFERENCE BETWEEN TWO CONSECUTIVE SHED OVERHANGS P1-P2	≥ 15	≥ 15
6.CREEPAGE FACTOR	< 4	< 4
7.PROFILE FACTOR	> 0.7	> 0.7

NOTES:

- NOMINAL CREEPAGE DISTANCE : 6125 mm
- APPLICABLE STANDARD IEC-62155 / IEC-60815
- MAKE OF INSULATOR : BHEL/IEC/MODERN/LILING HUAXIN
- GENERAL TOLERANCE : $\pm(0.04d+1.5)$ mm. WHEN "d" IS < 300 mm. $\pm(0.025d+6)$ mm. WHEN "d" IS >300 mm. WHERE "d" IS THE DIMENSION IN mm.
- ONE EPOXY JOINT (Maximum)



DETAILS OF SHED PROFILE
FOR INFORMATION ONLY

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

REVISION	DESCRIPTION
It.	

BE	NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN.	Raghul	09.11.21	PORCELAIN HOUSING OF 220 kV/4400 pF C.V.T (CCV-245)	REF. ----
CHD.	Sangith	09.11.21		
APPD.	Mayank	09.11.21		

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723-B-1206
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