

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

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 132kV/4400pF CAPACITOR VOLTAGE TRANSFORMER (CCV-145)

SL.No.	DRAWING NUMBER	DESCRIPTION OF DRAWING
01	GTP REV.00	GUARANTEED TECHNICAL PARTICULARS
02	712-B-3278 REV.00	OUTLINE DIAGRAM
03	713-B-3444 REV.00	NAME PLATES
04	714-B-4136 REV.00	SECTIONAL VIEW
05	716-B-4105 REV.00	DETAILS OF SECONDARY TERMINAL BOX
06	723-B-1205 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

Chief Engineer

Planning & Power Systems

APTransco

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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5645315/2022/EEMRT-ENE51



**GUARANTEED TECHNICAL PARTICULARS
FOR 132kV/4400pF C.V.T (CCV-145)**

SHEET 01 OF 03

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1.	GENERAL		
a)	Name of Manufacturer	GE T&D INDIA LIMITED	
b)	Manufacturer's Type designation	CCV 145	
c)	Standard applicable	IEC-61869-1&5/60358	
d)	Rated voltage Un(kV)	132 / $\sqrt{3}$ kV rms	
e)	i)Number of secondaries	Three	
	ii)Voltage ratio	132000/ $\sqrt{3}$ / 110/ $\sqrt{3}$	
f)	Rated frequency(Hz)	50 Hz	
g)	Type of Installation	Outdoor Pedestal Mounting	
2.	GUARANTEED RATINGS	Drawing approval subject to valid vendor registration	
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)	50 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	APTransco	
	i)For carrier frequency coupling(pF)	4400 pF +10%,-5%	
	ii)Of high voltage capacitor C1(pF)	5388 pF +10%,-5%	
	iii)of intermediate voltage capacitor C2(pF)	28624 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**

PRPD.	RAGHUL 09.11.21	CHKD.	SANGITH 09.11.21	APPD.	MAYANK 09.11.21
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5645315/2022/EEMRT-ENE51



**GUARANTEED TECHNICAL PARTICULARS
FOR 132kV/4400pF C.V.T (CCV-145)**

SHEET 02 OF 03

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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)	275 kV rms
o)	1.2/50 micro second impulse withstand test voltage of capacitor(kVp)	±650 kVp
p)	250/2500 micro second switching surge withstand test voltage of capacitor(wet)(kVp)	Not Applicable as per IEC
q)	Corona extinction voltage	105 kV rms (min.)
r)	Max. radio interference voltage at 92 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)	3625 mm
u)	Seismic acceleration	0.3g horizontal
v)	System neutral earthing	Effectively earthed
3)	CONSTRUCTIONAL DETAILS	
a)	Overall Dimensions	
	i)Overall height(mm)	2030 ±100 Chief Engineer
	ii)Height upto top of terminal pad from mounting plane(mm)	2165 ±100 Planning & Power Systems
	iii)Diameter and length of terminal pad (mm)	Height of terminal pad 135 x 95 APTransco
	iv)Material of terminal pad	Aluminium Alloy

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PRPD.	RAGHUL	CHKD.	SANGITH	APPD.	MAYANK
	09.11.21		09.11.21		09.11.21

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**GUARANTEED TECHNICAL PARTICULARS
FOR 132kV/4400pF C.V.T (CCV-145)**

SHEET 03 OF 03

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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)	340 kgs. (Approx.)
c)	Quantity of oil (kgs.)	14 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)	1300 mm. (Min.)
h)	Minimum center to center spacing recommended(mm)	1300 mm. (Min.)
i)	Minimum distance from nearby earthed objects (mm)	1720 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/ $\sqrt{3}$ As per IEC-61869-1&5
q)	Cantilever strength of Insulator	350 kgs (min.)

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Planning & Power Systems

APTransco

PRPD.

RAGHUL

09.11.21

CHKD.

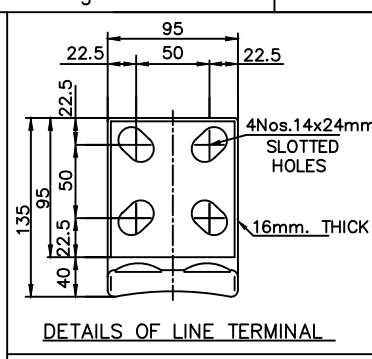
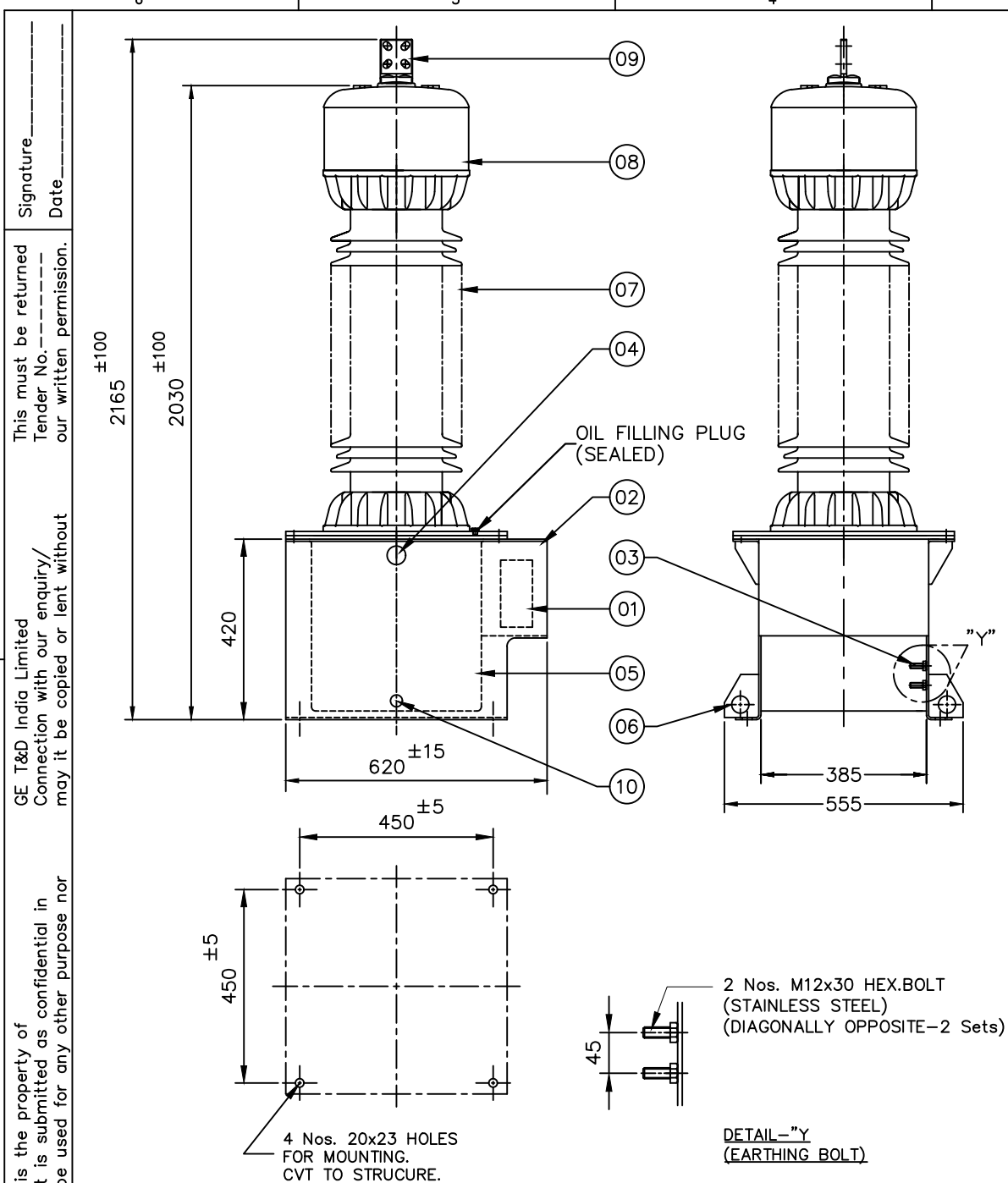
SANGITH

09.11.21

APPD.

MAYANK

09.11.21



Sl.No.	DESCRIPTION	MATERIAL	35 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 - 3625 mm.
- OIL QUANTITY :-
14 kgs. FOR CAPACITOR UNIT (IEC-60867) SYNTHETIC OIL
40 kgs. FOR EMU (IEC-60296) MINERAL OIL
- WEIGHT OF CVT : 340 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	132 kV/√3
03. HIGHEST SYSTEM VOLTAGE	145 kV
04. H.V. TEST VOLTAGE	275 kV rms for 1 Min.
05. IMPLUSE TEST VOLTAGE	650 kVp
06. RATED FREQUENCY	50Hz
07. "HF" CAPACITANCE	4400 pF
08. PRIMARY CAPACITANCE C1	5388 pF
09. SECONDARY CAPACITANCE C2	28624 pF
10. RIV at 92 kV	≤ 500 μV

NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN. Raghu	09.11.21	OUTLINE DIAGRAM OF 132 kV/4400 pF C.V.T (CCV-145)	REF. ----
CHD. Sangith	09.11.21		
APPD. Mayank	09.11.21		

Signature _____
Date _____

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It.	DESCRIPTION

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Planning & Power Systems
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DRG. No. 712-B-3278
REV. No. 00

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Signature _____ Date _____



Signature _____ Date _____

REVISION	DESCRIPTION

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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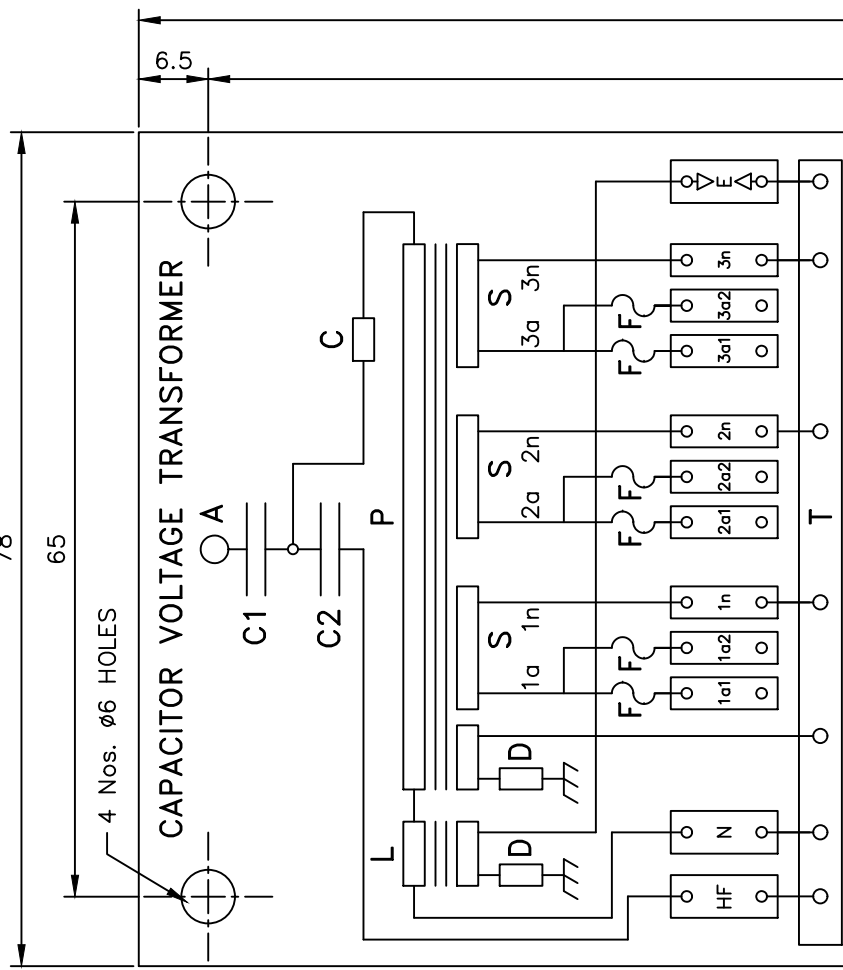
DRN.	NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
	Raghu	09.11.21	NAME PLATES FOR 132 kV/4400 pF C.V.T (CCV-145)	REF. ----
	Sangith	09.11.21		 
	Mayank	09.11.21		DRG. No. 713-B-3444



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A : H.V.Terminal	WEIGHT	340 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 145
Total burden simultaneous	: 50VA for 0.2 CI@50Hz
Thermal burden	: 750 VA
Rated voltage	: $132kV/\sqrt{3}$
Highest system voltage	: $145kV/\sqrt{3}$
Insulation level	: 275kV/650kVp
Rated frequency	: 50 Hz
Nominal intermediate voltage	: $21kV/\sqrt{3}$
Voltage factor	: 1.2cont. 1.5-30Sec
Nominal Capacitance	: 4400 pF (+10%, -5%)
Primary Capacitance C1	: 5388 pF (+10%, -5%)
Secondary Capacitance C2	: 28624 pF (+10%, -5%)

Connection	Ratio	Burden	Accuracy class
1a-1n	$132000/\sqrt{3}/110/\sqrt{3}V$	50 VA CI	3P
2a-2n	$132000/\sqrt{3}/110/\sqrt{3}V$	50 VA CI	3P
3a-3n	$132000/\sqrt{3}/110/\sqrt{3}V$	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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 713-B-3444/00

180
 159
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Date _____

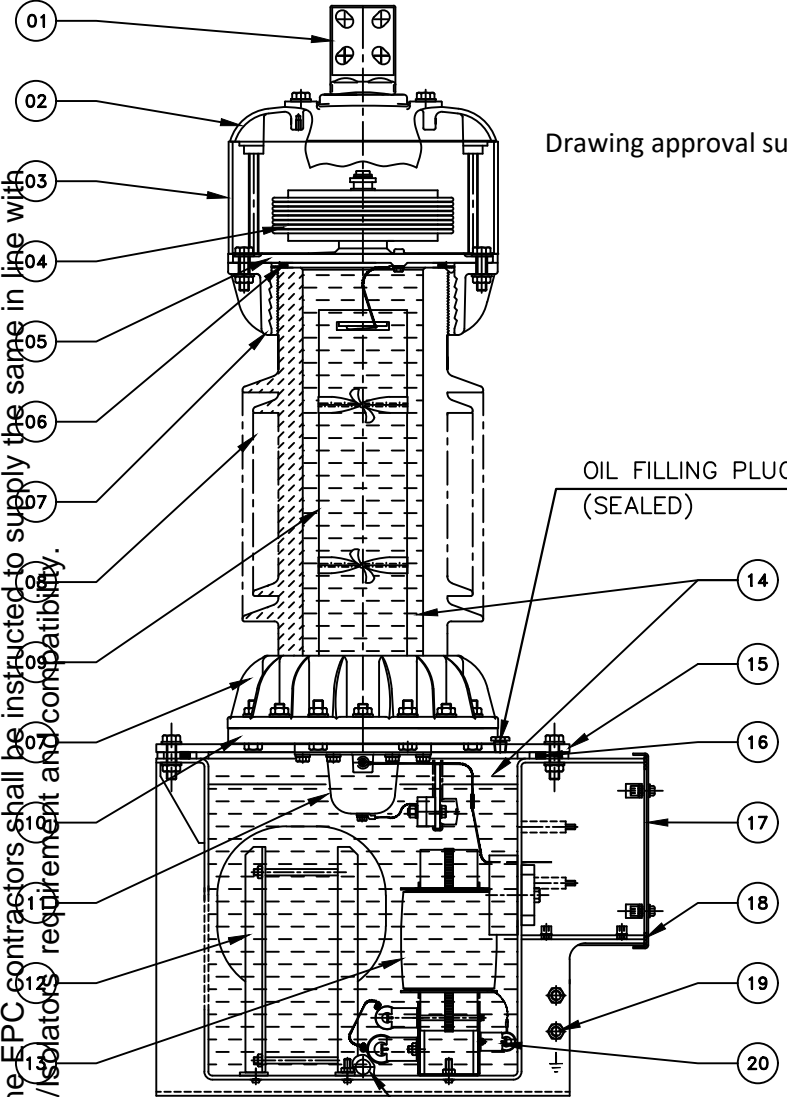
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1) Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators in the substation during
upgradation works to ensure safe live to ground clearances as per IE rules.

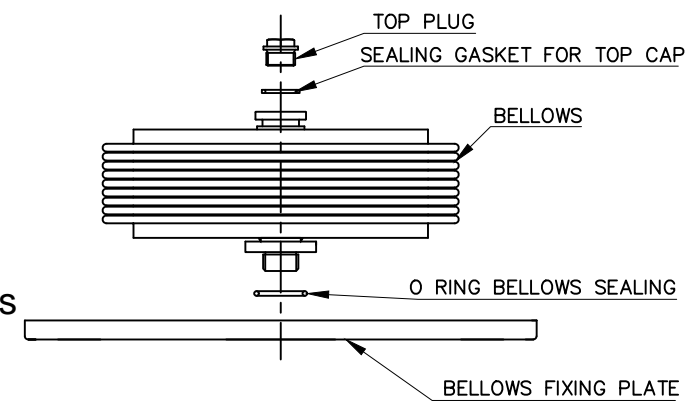
2) Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the
drawings, the EPC contractors shall be instructed to supply the same in line with
CT/PT/CVT/Isolators requirement and compatibility.



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Sl.No.	DESCRIPTION	37
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

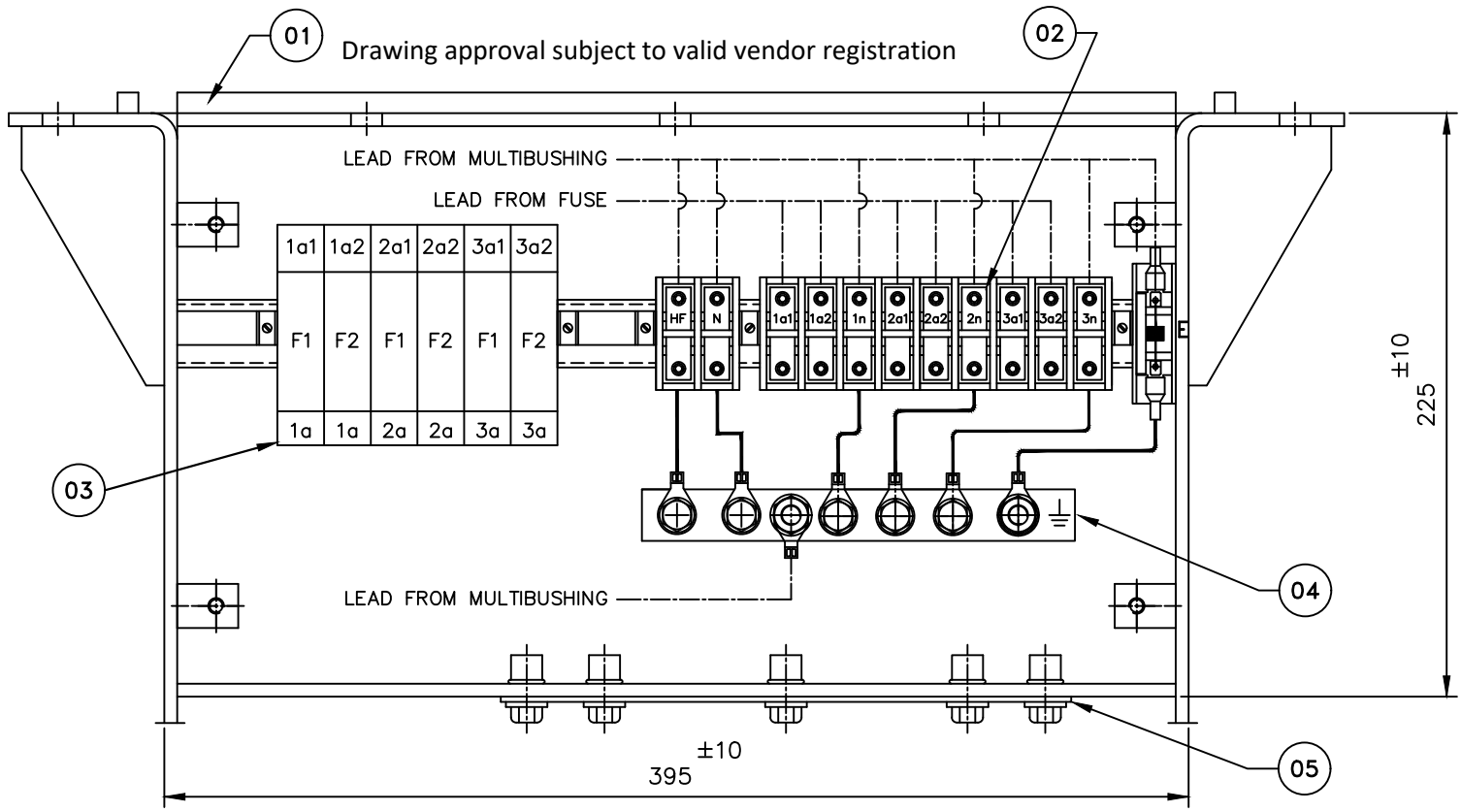
NOT A DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE

CHECKED DURING ACCEPTANCE TESTS.

NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN. Raghu	09.11.21	SECTIONAL VIEW OF 132 kV/4400 pF C.V.T (CCV-145)	REF. ----
CHD. Sangith	09.11.21		
APPD. Mayank	09.11.21		

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DRG. No.
714-B-4136
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)

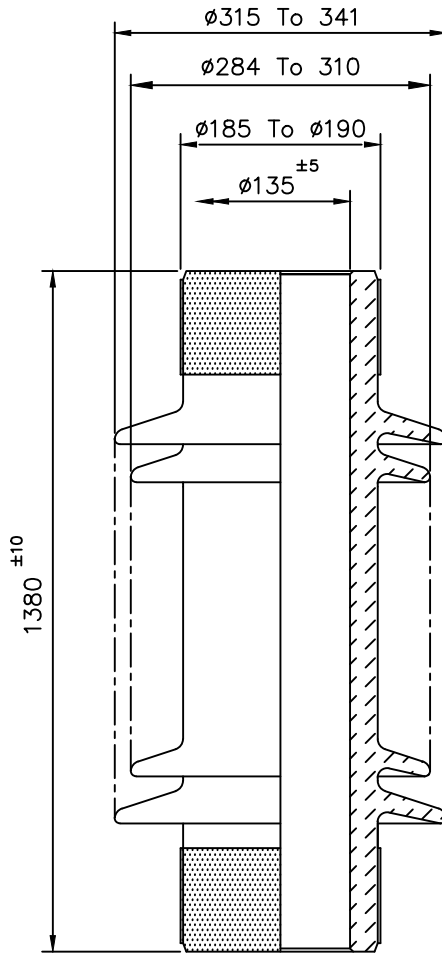
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Sl.No.	DESCRIPTION	QTY.
01	TANK ASSEMBLY	1
02	CONNECTOR ASSEMBLY	1
03	FUSE	6
04	GROUNDING STRIP	1
05	CABLE GLAND PLATE	1

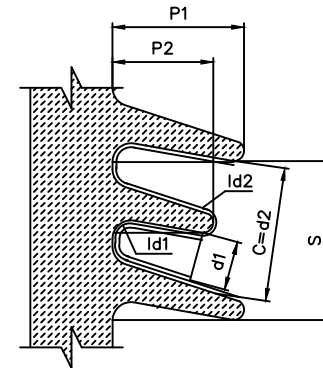
REVISION	DESCRIPTION
It.	

NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.	
DRN. Raghu	09.11.21		DETAILS OF SECONDARY TERMINAL BOX FOR 132 kV/4400 pF C.V.T (CCV-145)	REF. ----
CHD. Sangith	09.11.21			
APPD. Mayank	09.11.21			
GE T&D India Limited			DRG. No. 716-B-4105	
			REV. No. 00	

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



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DETAILS OF SHED PROFILE FOR INFORMATION ONLY

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 $Id1/d1$	< 5	< 5
4.RATIO BETWEEN CREEPAGE DISTANCE AND CLEARANCE $Id2/d2$	< 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 : 3625 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.

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Planning & Power Systems
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NAME	DATE	ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SPECIFIED.	SCALE : NTS.
DRN. Raghul	09.11.21	PORCELAIN HOUSING OF 132 kV/4400 pF C.V.T (CCV-145)	REF. ----
CHD. Sangith	09.11.21		
APPD. Mayank	09.11.21		DRG. No. 723-B-1205
GE T&D India Limited			REV. No. 00