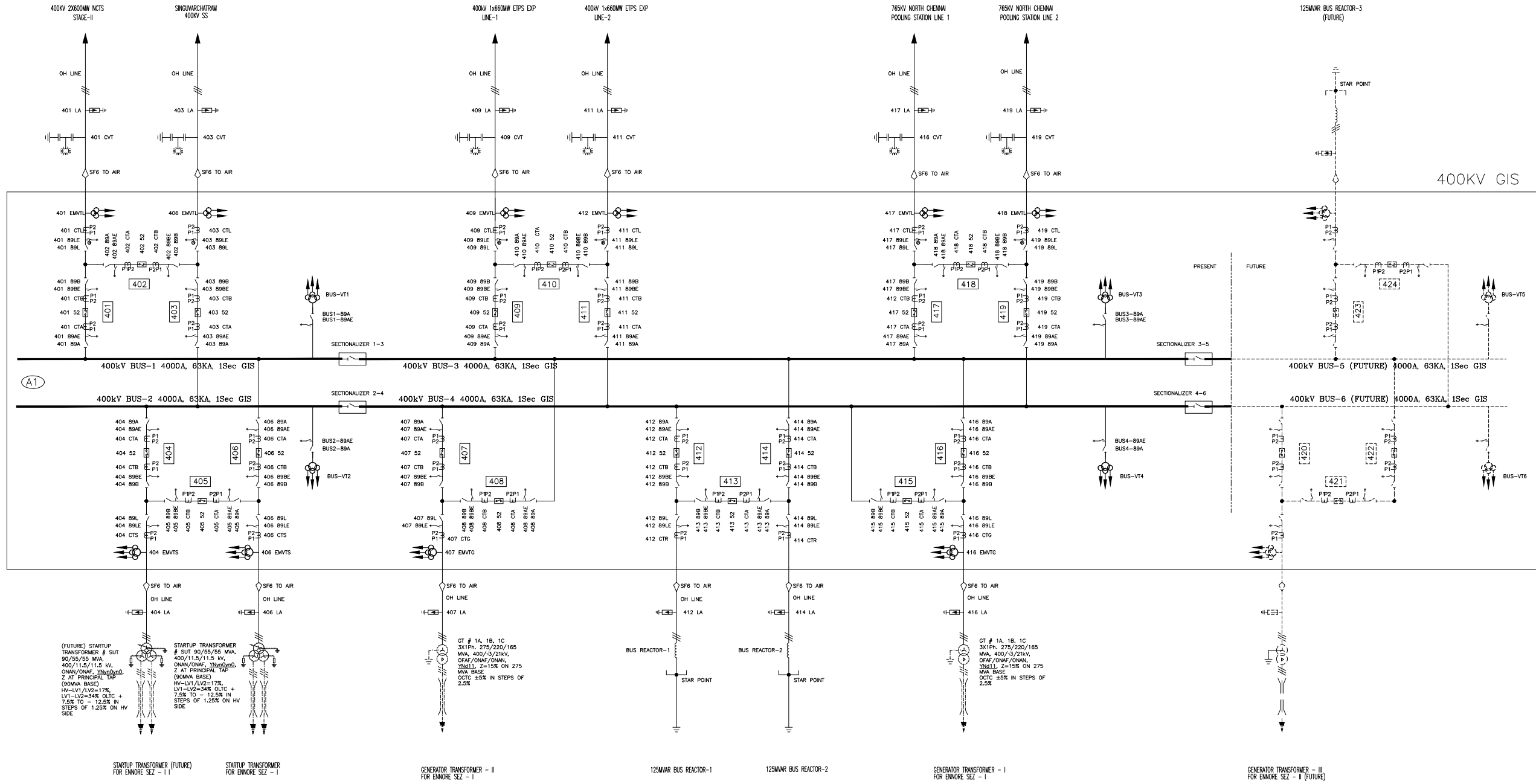


FIRST ANGLE PROJECTION ( ALL DIMENSIONS ARE IN MM. )

DRAWING No. TB-1-378-510-001



(FUTURE) STARTUP TRANSFORMER # SUT 90/55/55 MVA, 400/11.5/11.5 KV, ONAN/ONAF, 2 AT PRINCIPAL TAP (90MVA BASE), HV-LV1=34%, OLTC + 7.5% TO - 12.5% IN STEPS OF 1.25% ON HV SIDE

STARTUP TRANSFORMER (FUTURE) FOR ENNORE SEZ - I

STARTUP TRANSFORMER (FUTURE) FOR ENNORE SEZ - II

GENERATOR TRANSFORMER - II FOR ENNORE SEZ - I

125MVAR BUS REACTOR-1

125MVAR BUS REACTOR-2

GENERATOR TRANSFORMER - I FOR ENNORE SEZ - I

GENERATOR TRANSFORMER - III FOR ENNORE SEZ - II (FUTURE)

REMARK - (1.) BAY SEQUENCING (WITHIN BUS SECTION) IS PROVISIONAL AND WILL BE FINALISED DURING DETAILED ENGINEERING OF GIS  
(2.) PLEASE REFER DRAWING NUMBER PE-DG-412-565-E001, ELECTRICAL SLD FOR AUX POWER DISTRIBUTION FOR INTERFERECE,

400 kV INDOOR GIS		
S.NOS.	DESCRIPTION	SYMBOLS
1.	CIRCUIT BREAKER, 2000 A (3-Ph)	
2.	DISCONNECTING SWITCH, MOTORISED 2000 A (3-Ph)	
3.	EARTH SWITCH, MOTORISED 2000A (3-Ph)	
4.	FAST ACTING EARTHSWITCH, MOTORISED, 2000A (3-Ph)	
5.	CURRENT TRANSFORMER, 2000 A (1-Ph)	
6.	400 KV BUS EMTV (1-Ph)	
7.	400 KV EMTV FOR LINE (1-Ph)	
8.	400 KV BUS EMTV FOR GT (1-Ph)	

400 kV OUTDOOR EQUIPMENT				
S.NOS.	DESCRIPTION	SYMBOLS	QTY	
1.	SURGE ARRESTOR 360KV, 20ka, CLASS-III		36	
2.	BUS REACTOR (125MVAR)		02	
3.	SF6 TO AIR BUSHING		36	
4.	400 KV LINE CVT		18	

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED
03	07.02.17	APPROVED	02	07.02.17	APPROVED
ZONE: EMTV UPDATED REACTOR RATING UPDATED			ZONE: REVISED AS PER LETTER 31/08/15 AND SUBSEQUENT MOM DATED 20/01/17. SUBJECT TO TECHNO-COMMERCIAL SETTLEMENT.		

ADDITIONAL INFORMATION W.O.No. 84007	आह्वक/परियोजना का नाम NAME OF CUSTOMER/PROJECT TAMILNADU GENERATION AND DISTRIBUTION CORPORATION 400KV GIS AT 2X660MW ENNORE SEZ PROJECT CHENNAI																				
STATUS OF DRAWING -	CONSULTANT DESEIN CONSULTING ENGINEERS, NEW DELHI																				
DISTRIBUTION OF PRINTS	<table border="1"> <tr> <td>श्री एच ई एल</td> <td>भारत हेवी इलेक्ट्रिकल्स लिमिटेड</td> <td>डिजाइन / नाम</td> <td>हस्ता./SIGN.</td> <td>दि./DATE</td> </tr> <tr> <td></td> <td>पारिषद व्यापार समूह</td> <td>RKP/BA</td> <td>-Sd-</td> <td>29.01.15</td> </tr> <tr> <td></td> <td>BHARAT HEAVY ELECTRICALS LTD.</td> <td>VK/SKS</td> <td>-Sd-</td> <td></td> </tr> <tr> <td></td> <td>TRANSMISSION BUSINESS GROUP</td> <td>RS</td> <td>-Sd-</td> <td>02.02.15</td> </tr> </table>	श्री एच ई एल	भारत हेवी इलेक्ट्रिकल्स लिमिटेड	डिजाइन / नाम	हस्ता./SIGN.	दि./DATE		पारिषद व्यापार समूह	RKP/BA	-Sd-	29.01.15		BHARAT HEAVY ELECTRICALS LTD.	VK/SKS	-Sd-			TRANSMISSION BUSINESS GROUP	RS	-Sd-	02.02.15
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	TRANSMISSION BUSINESS GROUP	RS	-Sd-	02.02.15																	
REV. 01 28.05.15 ALTERED RKP/BA CHECKED VK/SKS APPROVED RS	<table border="1"> <tr> <td>डिपार्ट. TBEM</td> <td>अनुपात / SCALE</td> <td>कार्ड कोड</td> <td></td> </tr> <tr> <td>कोड 422</td> <td>1:8 (NTS)</td> <td>CARD CODE</td> <td></td> </tr> </table>	डिपार्ट. TBEM	अनुपात / SCALE	कार्ड कोड		कोड 422	1:8 (NTS)	CARD CODE													
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शीर्षक/TITLE SINGLE LINE DIAGRAM OF 400KV GIS SUBSTATION		हार्डग.क./DRAWING NO. TB-1-378-510-001																			
पृष्ठ क्र./SHEET No. 1		अगला पृष्ठ/NEXT SHEET 2																			

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COMPUTER DRG. PATH NAME :

REF. DRG. No.  
SIGN. & DATE  
INVENTORY No.

DRAWING No. TB-1-378-510-001

**FOR LINE DIAMETER EXCLUDING CTB**

TYPE - CTA (LINE), CTA (TIE), CTB (TIE)

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V) at all Taps	Max. Ie at Vk/2	Acc Class	Purpose
1	2000-1000-500/1	-	200Rct + 500V	30 mA	PS	Protection
2	2000-1000-500/1	-	200Rct + 500V	30 mA	PS	Protection
3	2000-1000-500/1	10 VA	-	-	0.2S ISF<5	BCU / Metering

TYPE - CTL

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V) at all Taps	Max. Ie at Vk/2	Acc Class	Purpose
1	2000-1000-500/1	10 VA	-	-	0.2S ISF<5	Tariff Metering
2	2000-1000-500/1	10 VA	-	-	0.2S ISF<5	Tariff Metering

**FOR ALL OTHER DIAMETERS (INCLUDING CTB OF LINE DIAMETER)**

TYPE - CTA (BR), CTB (BR), CTA (TIE), CTB (TIE), CTA (ST), CTB(ST), CTA (GT), CTB (GT) & CTB (LINE)

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V) at all Taps	Max. Ie at Vk/2	Acc Class	Purpose
1	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection
2	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection
3	2000-1000-500/1	10 VA	-	-	0.2S ISF<5	BCU / Metering

TYPE - CTG

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V) at all Taps	Max. Ie at Vk/2	Acc Class	Purpose
1	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection
2	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection

TYPE - CTS

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V) at all Taps	Max. Ie at Vk/2	Acc Class	Purpose
1	2000-1000-500/1	10 VA	-	-	0.2S ISF<5	Metering
2	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection

TYPE - CTR

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V) at all Taps	Max. Ie at Vk/2	Acc Class	Purpose
1	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection
2	2000-1000-500/1	-	63Rct + 130V	30 mA	PS	Protection

**Summary of Core Details of Bushing CTs: 125 MVAR Bus Reactor:**

400kV Bus Reactor (Line Side)

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V)	Max. Ie	Max Rct	Acc Class	Purpose
1	200/1	-	200V	40mA at KPV/4	1 Ohms	PS	SPARE
2	200/1	-	200V	40mA at KPV/4	1 Ohms	PS	Protection
3	200/1	-	200V	40mA at KPV/4	1 Ohms	PS	Protection
4	200/1	10 VA	200V	-	-	1	BCU / Metering

400kV Bus Reactor (Neutral Side) (CT placed before Neutral)

Core No.	RATIO	Output Burden at lowest Tap (VA)	Min KPV (V)	Max. Ie	Max Rct	Acc Class	Purpose
1	200/1	-	200V	30 mA at KPV/4	1 Ohms	PS	Protection
2	2000-1000-500/1	-	1000-500-250V	8-15-30 mA at KPV/2	10 -5 - 2.5 Ohms	PS	Protection
3	2000-1000-500/1	-	1000-500-250V	8-15-30 mA at KPV/2	10 -5 - 2.5 Ohms	PS	Protection

**ELECTRICAL SYSTEM PARAMETERS**

01.	SYSTEM VOLTAGE	400 kV
02.	RATED FREQUENCY	50 Hz
02.	HIGHEST SYSTEM VOLTAGE	420 kV
03.	LIGHTNING IMPULSE W/S VOLTAGE	1425 kVp
04.	SWITCHING IMPULSE W/S VOLTAGE	a) 1575kVp (BETWEEN PHASES) b) 900(+345) (ACROSS ISOLATING DISTANCE)
	RATED ONE MINUTE POWER FREQUENCY W/S VOLTAGE	a) 650KV rms (BETWEEN LIVE TERMINALS AND EARTH) b) 815KV rms (ACROSS ISOLATING DISTANCE)
06.	FAULT LEVEL (1 SEC.)	63 KA
07.	SYSTEM NEUTRAL GROUNDING	SOLIDLY EARTHED
08.	CREEPAGE DISTANCE	Min. 31 mm / kV

**Summary of winding Details of 400kV line CVT**

400 kV CVT, 4400 pF, 3 windings

WINDING	RATIO	ACCURACY CLASS	Rated Burden (VA)	PURPOSE
1	400 kV/√3/110V/√3	3P	50	PROTECTION
2	400 kV/√3/110V/√3	3P	50	PROTECTION
3	400 kV/√3/110V/√3	0.2	50	METERING

**Simultaneous Burden of 100 VA**

Summary of Core Details of 400kV BUS EMVT

WINDING	RATIO	ACCURACY CLASS	Rated Burden (VA)	PURPOSE
1	400 kV/√3/110V/√3	3P	100	PROTECTION
2	400 kV/√3/110V/√3	0.2	100	METERING
3	400 kV/√3/110V/√3	0.2	100	METERING

**Summary of Core Details of 400kV tariff EMVT for lines**

WINDING	RATIO	ACCURACY CLASS	Rated Burden (VA)	PURPOSE
1	400 kV/√3/110V/√3	0.2	100	METERING
2	400 kV/√3/110V/√3	0.2	100	METERING

**Summary of Core Details of 400kV EMVT for gt**

WINDING	RATIO	ACCURACY CLASS	Rated Burden (VA)	PURPOSE
1	400 kV/√3/110V/√3	3P	100	PROTECTION
2	400 kV/√3/110V/√3	0.2	100	METERING
3	400 kV/√3/110V/√3	0.2	100	METERING

**NOTE:**

- RATING OF BUS REACTOR SHALL BE SUBJECT TO FINALIZATION OF COMMERCIAL SETTLEMENT.
- CT & VT DETAILS (PARAMETERS & NUMBER OF CORES) ARE SUBJECT TO CHANGE # AS PER (GIS & REACTOR) MANUFACTURER'S RECOMMENDATIONS

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REF. DRG. No.

SIGN. & DATE

INVENTORY No.

REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED	REV.	DATE	ALTERED / CHECKED / APPROVED
02	07.02.17	APPROVED RS	01	28.05.15	APPROVED RS			

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