



NOTES

1. 115 kV. IVT RATIO	$\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115$ V	50VA/0.2/1.5VF , 50VA/3P/1.5VF, SIMULTANEOUS BURDEN =100 VA.
2. 115 kV. CT RATIO	1800/1500/1200/900/600/300 : 1/1/1/1 A. – FOR LINE BAY 1800/1500/1200/900/600/300 : 1 A. – FOR TRANSFORMER BAY (CORE 1) 400/300/200 : 1/1/1 A. – FOR TRANSFORMER BAY (CORE.2-4) 1800/1500/1200/900/600/300 : 1/1/1 A – FOR BUS COUPLER BAY	20VA/5P20,20VA/0.5F55,20VA/5P20,20VA/5P20 20VA/5P20 20VA/0.5F55,30VA/5P20, 30VA/5P20 20VA/5P20, 20VA/5P20, 20VA/5P20 ***PARTICULAR REQUIREMENT FOR ALL 5P20 CLASS CT's CURRENT RATIO ERROR AT 100% OF RATED CURRENT < 0.5% 20VA/5P20 50VA/0.5/1.9VF , 50VA/3P/1.9VF
3. 22 kV. VT. RATIO	$\frac{22000}{\sqrt{3}} : \frac{110}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ V	50VA/0.5/1.9VF , 50VA/3P/1.9VF
4. 22 kV. CT. RATIO	1800/1500/900 : 1/1/1/1 A – FOR INCOMING BREAKER 1800/1500/900 : 1/1 A – FOR TIE BREAKER 1800/900 : 1/1 A – FOR LOW SIDE TRANSFORMER BUSHING CT 1800/900 : 1/1 A – FOR NEUTRAL TRANSFORMER BUSHING CT 600/300 : 1/1 A – FOR OUTGOING 22 KV. 600/300 : 1/1 A – FOR CAPACITOR BANK	20VA/5P20 , 20VA/0.5F55 , 20VA/5P20 , 20VA/5P20 20VA/0.5F55 , 20VA/5P20 20VA/5P20 , 20VA/5P20 20VA/0.5F55 , 20VA/5P20 20VA/0.5F55 , 20VA/5P20 ***PARTICULAR REQUIREMENT FOR ALL 5P20 CLASS CT's CURRENT RATIO ERROR AT 100% OF RATED CURRENT < 0.5%

REFERENCE DRAWING

– SINGLE LINE DIAGRAM DWG. NO. FA2-011/63014

- THE NEUTRAL GROUNDING RESISTORS (NGR) ARE INDICATED FOR FUTURE INSTALLATION.
- SYNCHRONIZING SCHEMATIC
 - 0-YB-0- SHOWN THUS, REFER TO INCOMING IVT DESIGNATIONS.
 - 0BYB-0- SHOWN THUS REFERS TO RUNNING BUS IVT
 - 0B ONLY – SHOWN THUS, REFERS TO THE SECONDARY WINDING OF IVT FOR PHASE "B" AND USING FULL TAP WINDING 115V FOR SYNCHRONIZING SYSTEM WITH ONE END OF THE WINDING CONNECTED WITH COMMON GROUND BUS.
 - MANUAL SYNCHRONIZING BY SYNCHROSCOPE SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF METERING CORES FROM "PHASE B" FOR BOTH IVT'S.
 - AUTOMATIC SYNCHRONISM VERIFICATION BY SYNCHRO CHECK RELAY (25) SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF RELAYING CORES FROM "PHASE B" FOR BOTH IVT'S.
 - EACH DIGITAL POWER METER (DPM) SHALL BE COMMUNICATED WITH AUTOMATIC METER READING (AMR) APPLICATION SERVER VIA SWITCH NETWORK.
 - THE MAIN-1 PROTECTION RELAY AND THE MAIN-2 PROTECTION RELAY WHICH ARE REFERRED ON THIS DRAWING SHALL BE FROM DIFFERENT MANUFACTURER.
 - AUXILIARY CURRENT TRANSFORMERS SHOWN THUS, SHALL BE AS PARTS OF THE BUS DIFFERENTIAL RELAYS.
 - THE DEDICATED PROTECTIVE RELAY FOR 22 kV. SWITCHGEAR SHALL BE STANDARDIZED WHICH CAN BE EITHER USED FOR INCOMINGS, BUS COUPLER, OUTGOINGS OR CAPACITOR BANKS FEEDERS.

DEVICES	EXPLANATION
21, 21N	DISTANCE TIME-STEP PHASE AND GROUND DISTANCE RELAY
67, 67N	DIRECTIONAL PHASE AND GROUND OVERCURRENT RELAY
27,59	UNDER/OVER VOLTAGE RELAYS
25	SYNCHROCHECK RELAY
79	AUTOMATIC RECLOSING RELAY
50BF	BREAKER FAILURE RELAY
50, 51	NON-DIRECTIONAL INSTANTANEOUS AND TIME PHASE OVERCURRENT RELAY
50N, 51N	NON-DIRECTIONAL INSTANTANEOUS AND TIME GROUND OVERCURRENT RELAY
51GB	NON-DIRECTIONAL GROUND BACKUP OVERCURRENT RELAY
87T	TRANSFORMER DIFFERENTIAL RELAY
87REF	TRANSFORMER RESTRICTED EARTH FAULT RELAY THIS RELAY SHALL BE INCORPORATED IN THE TRANSFORMER DIFFERENTIAL RELAY (87T)
90	AUTOMATIC VOLTAGE REGULATOR
87B1, 87B2	BUS DIFFERENTIAL RELAYS – LOW IMPEDANCE TYPE
95B1, 95B2	BUS BAR SUPERVISION RELAY FOR BUSWIRE SUPERVISION FOR 87B1 AND 87B2
81	UNDER FREQUENCY RELAY
60	CAPACITOR CURRENT UNBALANCE SENSING RELAY
Q	POWER FACTOR CONTROLLER
DPM	DIGITAL POWER METER
DIM	DISTRIBUTED I/O MODULE (PROVIDED IN CSCS)
V METER	DIGITAL VOLTMETER
SS	SYNCHRONIZING SWITCH,3-POSITION,AUTO-OFF-MAN
L	SYNCHRONIZING LAMP
V	VOLTMETER
F	FREQUENCY METER
S	SYNCHROSCOPE
LL	LINE INDICATING LAMP
TS	CURRENT TEST SWITCH
TS	POTENTIAL TEST SWITCH
▲	LOCATED IN THE SWITCHYARD JUNCTION BOX
●	LOCATED IN THE CONTROL AND RELAY BOARD
▼	LOCATED IN THE 22 kV SWITCHGEAR JUNCTION BOX
◇	LOCATED IN 22 kV SWITCHGEAR CONTROL PROTECTIVE CIRCUITS
⏏	WYE CONNECTED CT OF SECONDARY WINDING
⏏	DELTA CONNECTED CT OF SECONDARY WINDING (IF ANY)
⏏	TRANSFORMER BUSHING CT OF SECONDARY WINDING, WYE CONNECTED FOR PHASE OR NEUTRAL
BCU	BAY CONTROL UNIT
	BUS GAS BUFFER MODULE (FOR DE ENERGIZING ONLY)ONE BUS DURING EXTENSION

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กองออกแบบสถานีไฟฟ้า ฝ่ายงานสถานีไฟฟ้า	การไฟฟ้าส่วนภูมิภาค	ใช้แบบ _____ ถูกแทน โดยแบบ _____ เขียนเสร็จวันที่ 3 มีค. 2563 แก้ไขวันที่ _____ มีมติเป็น _____ มาตรฐาน _____
ผู้เขียน _____ ศุภชัย ผู้สำรวจ _____ วิศวกร _____ หัวหน้าแผนก วรรณวิทย์ ผู้อำนวยการกอง _____ ผู้อำนวยการฝ่าย _____ (แทน)	ผู้ว่าการ _____ (แทน) สถานีไฟฟ้าอ้อมใหญ่ 4 จ. นครปฐม มิเตอร์และรีเลย์ไดอะแกรม	
รองผู้ว่าการวิศวกรรม _____	OM YAI 4 SUBSTATION METERING AND RELAYING DIAGRAM	แบบเลขที่ FA4-011/63023 แผ่นที่ 1 ของจำนวน 1 แผ่น