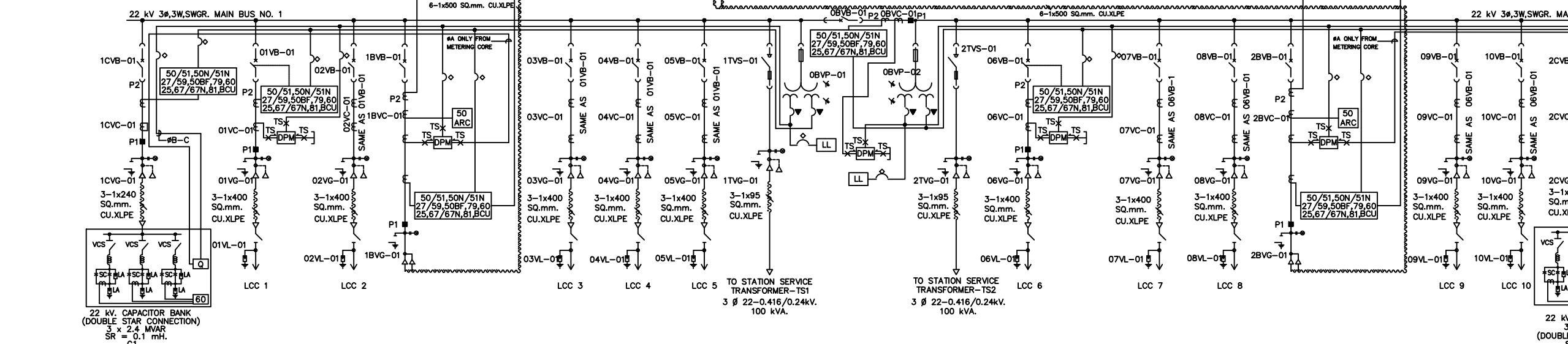


DEVICES	EXPLANATION
21, 21N	DISTANCE TIME-STEP PHASE AND GROUND DISTANCE RELAY
67	DIRECTIONAL PHASE OVERCURRENT RELAY
67N	DIRECTIONAL GROUND OVERCURRENT RELAY
25	SYNCHROCHECK RELAY
79	AUTOMATIC RECLOSING RELAY
50 BF	BREAKER FAILURE RELAY
50 S1	NON-DIRECTIONAL INSTANTANEOUS AND TIME PHASE OVERCURRENT RELAY
50N S1N	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)
87B	BUS DIFFERENTIAL RELAY, HIGH IMPEDANCE TYPE
95B	BUSBAR SUPERVISION RELAY FOR BUS WIRE SUPERVISION FOR 87B
27.59	UNDER/OVER VOLTAGE RELAY
90	AUTOMATIC VOLTAGE REGULATOR
50 ARC	ARC DETECTOR RELAY FOR ARC PROTECTION SYSTEM
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 VOLT METER
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
◇	FOR 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



NOTES

1. 115 kV. IVT RATIO

$$\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115 \text{ V}$$
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
500/200/100 : 1A - FOR HIGH SIDE TRANSFORMER BUSHING CT
3. 22 kV. VT. RATIO

$$\frac{22000}{\sqrt{3}} : \frac{110}{\sqrt{3}} / \frac{110}{\sqrt{3}} \text{ V}$$
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
- 50VA/0.2/1.5VF , 50VA/3P/1.5VF, SIMULTANEOUS BURDEN =100 VA.

20VA/5P20, 20VA/0.5FS5, 20VA/5P20, 20VA/5P20
20VA/5P20
20VA/0.5FS5, 30VA/5P20, 30VA/5P20
20VA/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%
50VA/0.5/1.9VF , 50VA/3P/1.9VF
20VA/5P20 , 20VA/0.5FS5 , 20VA/5P20 , 20VA/5P20
20VA/0.5FS5 , 20VA/5P20
20VA/5P20 , 20VA/0.5FS5
20VA/5P20 , 20VA/5P20
20VA/0.5FS5 , 20VA/5P20
20VA/0.5FS5 , 20VA/5P20
***PARTICULAR REQUIREMENT FOR ALL 5P20 CLASS CT's
CURRENT RATIO ERROR AT 100% OF RATED CURRENT < 0.5%
5. THE NEUTRAL GROUNDING RESISTORS (NGR) ARE INDICATED FOR FUTURE INSTALLATION.

6. SYNCHRONIZING SCHEMATIC
6.1 0-Y-P-0- SHOWN THUS, REFER TO INCOMING IVT DESIGNATIONS.
6.2 0BYP-0- SHOWN THUS REFERS TO RUNNING BUS IVT
6.3 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.
6.4 MANUAL SYNCHRONIZING BY SYNCHROSCOPE SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF METERING CORES FROM"PHASE B" FOR BOTH IVT'S.
6.5 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.
7. EACH DIGITAL POWER METER (DPM) SHALL BE COMMUNICATED WITH AUTOMATIC METER READING (AMR) APPLICATION SERVER VIA SWITCH NETWORK.
8. AUXILIARY CURRENT TRANSFORMERS SHOWN THUS, SHALL BE AS PARTS OF THE BUS DIFFERENTIAL RELAYS.

9. THE DEDICATED PROTECTION RELAY FOR 22 kV SWITCHGEAR SHALL BE STANDARDIZED WHICH CAN BE EITHER USED FOR INCOMING, OUTGOING FEEDERS, OR CAPACITOR BANK FEEDERS.
10. FOR 115KV SYSTEM, RELAYS SHALL BE DOUBLE MAIN PROTECTION RELAY(MAIN1&2) AND DIFFERENT PRODUCT/MANUFACTURER.
11. NETWORK TOPOLOGY OF SUBSTATION CONTROL AND PROTECTION SYSTEM IS TOPOLOGY 1

OUT OF SCOPE

การไฟฟ้าส่วนภูมิภาค		ใช้แบบ _____
ผู้เขียน _____		ถูกแทนโดยแบบ _____
ผู้ตรวจสอบ _____ (แทน)		เขียนเสร็จวันที่ 24 พ.ค. 64
วิศวกร _____		แก้แบบวันที่ _____
หัวหน้าแผนก _____		มติเป็น _____
ผู้อำนวยการกอง _____		มาตราส่วน _____
ผู้อำนวยการฝ่าย _____ (แทน)		
รองผู้อำนวยการวิศวกรรม _____		
สถานีไฟฟ้าแหลมฉบัง 3 จ.ชลบุรี		แบบเลขที่ FA4-011/64039
CHON BURI PROVINCE		แผ่นที่ 1 ของจำนวน 1 แผ่น
METERING AND RELAYING DIAGRAM		