

## NOTES

1. 115 kV. IVT RATIO  
 $\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} // \frac{115}{\sqrt{3}} / \frac{115}{\sqrt{3}} \text{ V}$
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 (CORE1)  
400/300/200 : 1/1/1 A. - FOR TRANSFORMER BAY (CORE2-4)
- 500/200/100 : 1 A. - 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  
600/300 : 1/1 A. - FOR OUTGOING 22 kV.  
1800/900 : 1/1 A. - FOR LOW SIDE TRANSFORMER BUSHING CT.  
1800/900 : 1/1 A. - FOR NEUTRAL BUSHING CT.  
600/300 : 1/1 A. - FOR CAPACITOR BANK
5. THE NEUTRAL GROUNDING RESISTORS (NGR) ARE INDICATED FOR FUTURE INSTALLATION.
6. SYNCHRONIZING SCHEMATIC  
6.1 0-Y-P-01 SHOWN THUS, REFER TO INCOMING IVT DESIGNATIONS.  
6.2 0-B-Y-P-01 SHOWN THUS REFERS TO RUNNING BUS IVT  
6.3 #B 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. FOR 115KV RELAYS SHALL BE DOUBLE MAIN PROTECTION RELAY (MAIN1&2) AND DIFFERENT PRODUCT/MANUFACTURER.
9. THE DEDICATED PROTECTION RELAY FOR 22 kV SWITCHGEAR SHALL BE STANDARDIZED WHICH CAN BE EITHER USED FOR INCOMING, BUS SECTION, OUTGOING FEEDERS OR CAPACITOR BANK FEEDERS.
10. NETWORK TOPOLOGY OF SUBSTATION CONTROL AND PROTECTION SYSTEM IS TOPOLOGY 1

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

\*\*\*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

20VA/5P20, 20VA/0.5FS5, 20VA/5P20, 20VA/5P20

20VA/0.5FS5, 20VA/5P20

20VA/0.5FS5, 20VA/5P20

20VA/5P20, 20VA/0.5FS5

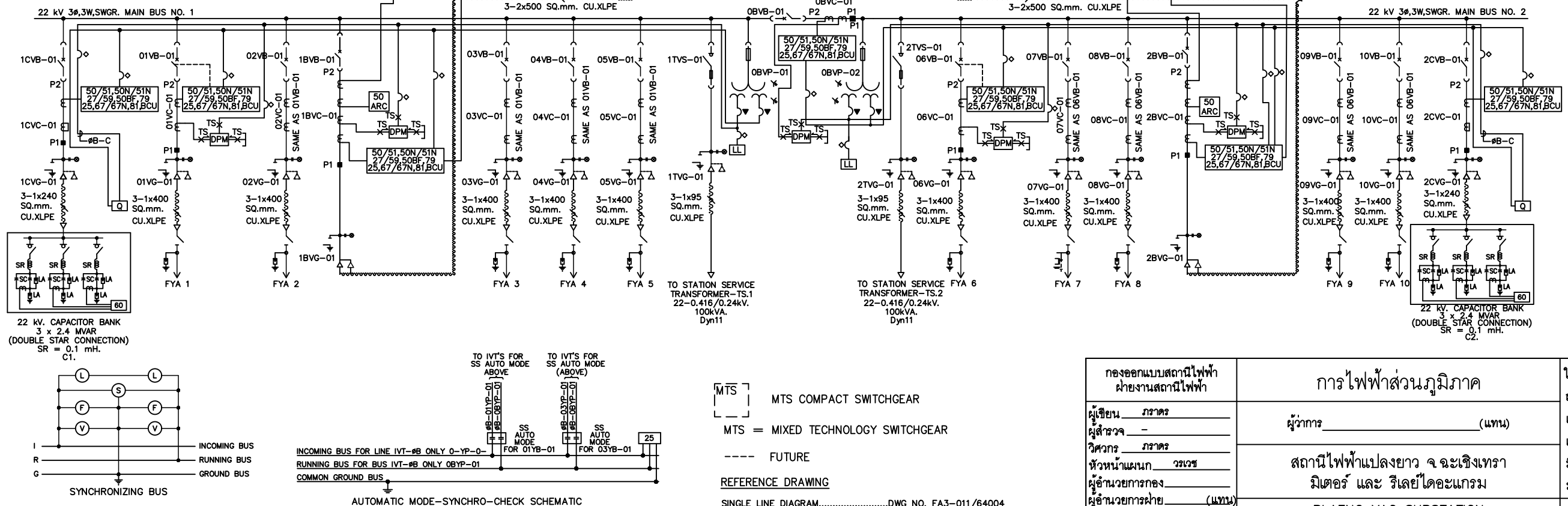
20VA/5P20, 20VA/5P20

20VA/0.5FS5, 20VA/5P20

\*\*\*PARTICULAR REQUIREMENT FOR ALL 5P20 CLASS CT'S  
CURRENT RATIO ERROR AT 100% OF RATED CURRENT < 0.5%

115 kV. LINE  
TO BAN PHO SUBSTATION

115 kV. LINE  
TO HUA SAMRONG SUBSTATION



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	NON-DIRECTIONAL INSTANTANEOUS AND TIME PHASE OVERCURRENT RELAY
51	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 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 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
◇	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

FYA-M

กองออกแบบสถานไฟฟ้า ฝ่ายงานสถานไฟฟ้า	การไฟฟ้าส่วนภูมิภาค	ใช้แทนแบบ -
ผู้เขียน วิศวกร	ผู้ว่าการ (แทน)	ถูกแทนโดยแบบ -
ผู้ตรวจ วิศวกร		เขียนเสร็จวันที่ 11 ม.ค. 64
หัวหน้าแผนก วิศวกรรม	สถานีไฟฟ้าแปลงยาว จ. ฉะเชิงเทรา	แก้แบบวันที่
ผู้อำนวยการกอง	มิเตอร์ และ รีเลย์ไดอะแกรม	มิตเป็น -
ผู้อำนวยการฝ่าย (แทน)		มาตรฐาน -
รองผู้อำนวยการวิศวกรรม	PLAENG YAO SUBSTATION CHACHOENGSAO PROVINCE METERING AND RELAYING DIAGRAM	แบบเลขที่ FA4-011/64005
		แผ่นที่ 1 ของจำนวน 1 แผ่น