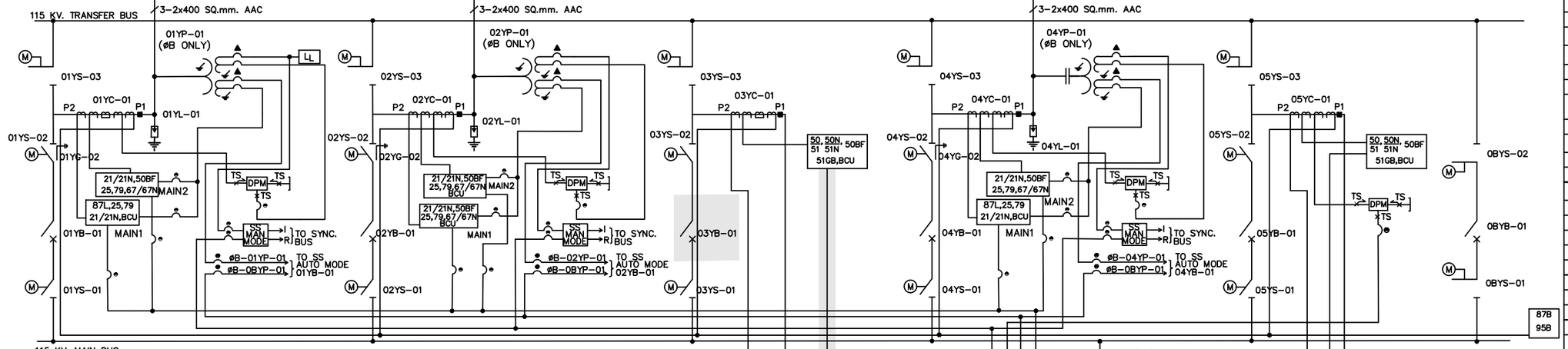
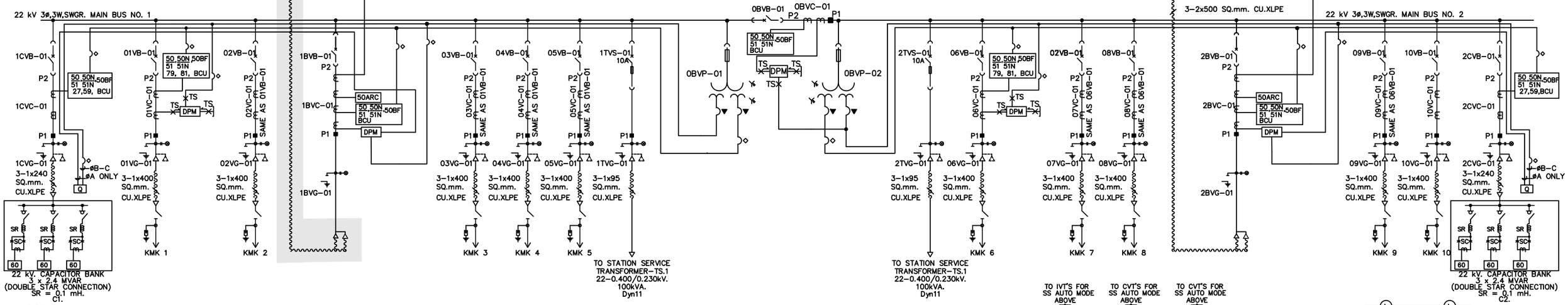
TDDP.2 KMK (ADD)

115 kV. LINE
TO AMATA B.GRIM POWER (RAYONG) 3,4 (SPP)

115 kV. LINE
TO NIKHOM PHATTHANA SUBSTATION

115 kV. LINE
TO BO WIN 1 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 |
| 50/51 | 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) |
| 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 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 |

## NOTES

1. 115 kV. VT RATIO

$\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115$ V. – FOR CVT — 200VA/0.5/1.5VF , 200VA/3P/1.5VF

$\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115$ V. – FOR IVT — 50VA/0.2/1.5VF , 50VA/3P/1.5VF

2. 115 kV. CT RATIO

1800/1200/900/600/300 : 1/5/5/1/1 A. – FOR LINE CT (01YC-01) — 20VA/5P20 , 30VA@600/1/0.2FS5 , 30VA@600/1/0.2FS5 , 20VA/5P20 20VA/5P20

1200/900/800/500/400/300 : 1/1/1/1 A. – FOR LINE CT (02YC-01) — 20VA/5P20 , 20VA/0.5FS5 , 20VA/5P20 , 20VA/5P20

1200/1000/900/800/600/500/400/300/200/100 : 1/1/1/1 A. – FOR TR. CT (03YC-01) (04YC-01) AND (05YC-01) — 20VA/5P20 , 20VA/0.5FS5 , 20VA5P20 , 20VA/5P20

500/200/100 : 1 A. – FOR HIGH SIDE TRANSFORMER BUSHING CT. — 20VA/5P20

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 | 20VA/5P20 , 20VA/0.5FS5 , 20VA/5P20 , 20VA/5P20 |
| 1800/1500/900 | : 1/1 A | – FOR TIE BREAKER | 20VA/0.5FS5 , 20VA/5P20 |
| 600/300 | : 1/1 A | – FOR OUTGOING 22 kV. | 20VA/0.5FS5 , 20VA/5P20 |
| 1800/1500/900 | : 1/1 A | – FOR LOW SIDE TRANSFORMER BUSHING CT. | 20VA/5P20 , 20VA/0.5FS5 |
| 1800/1500/900 | : 1/1 A | – FOR NEUTRAL BUSHING CT. | 20VA/5P20 , 20VA/5P20 |
| 600/300 | : 1/1 A | – FOR CAPACITOR BANK | 20VA/0.5FS5 , 20VA/5P20 |

5. THE NEUTRAL GROUNDING RESISTORS (NGR) ARE INDICATED FOR FUTURE INSTALLATION.
6. SYNCHRONIZING SCHEMATIC
   6.1 0-YP-01 SHOWN THUS, REFER TO INCOMING IVT OR CVT DESIGNATIONS.
   6.2 0BYP-01 SHOWN THUS REFERS TO RUNNING BUS IVT
   6.3 øB 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 IVT"S AND CVT"S.
   6.5 AUTOMATIC SYCHRONISM VERIFICATION BY SYNCHRO CHECK RELAY (25) SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF RELAYING CORES FROM"PHASE B" FOR IVT"S AND CVT"S.
7. EACH DIGITAL POWER METER (DPM) SHALL BE COMMUNICATED WITH AUTOMATIC METER READING (AMR) APPLICATION SERVER VIA SWITCH NETWORK.
8. FOR NEW INSTALLATION, 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

SCOPE OF ADDITIONAL WORK

REFERENCE DRAWING

SINGLE LINE DIAGRAM.....DWG NO. FA2-011/63113

KMK-M

| | | |
|---|---|---|
| กองออกแบบสถานีไฟฟ้า ฝ่ายงานสถานีไฟฟ้า | การไฟฟ้าส่วนภูมิภาค | ใช้แทนแบบ — |
| ผู้เขียน สิริพงศ์ | ผู้ว่าการ (แทน) | ถูกแทนโดยแบบ — |
| ผู้สำรวจ สิริพงศ์ | สถานีไฟฟ้าเขาไม้แก้ว จ.ชลบุรี (เพิ่มเติม) | เขียนเสร็จวันที่ 16 ต.ค. 63 |
| วิศวกร สิริพงศ์ | มิเตอร์ และ รีเลย์โดอะเกรม | แก้แบบวันที่ — |
| หัวหน้าแผนก วรเวช | KHAO MAI KAEO SUBSTATION (ADD BAY) | มิติเป็น — |
| ผู้อำนวยการกอง | METERING AND RELAYING DIAGRAM | มาตราส่วน — |
| ผู้อำนวยการฝ่าย | | แบบเลขที่ FA4-011/63117 |
| รองผู้ว่าการวิศวกรรม | | แผ่นที่ 1 ของจำนวน 1 แผ่น |