

NOTES

1. 115 kV IVT RATIO

$\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / \frac{115}{\sqrt{3}} // \frac{115}{\sqrt{3}} / \frac{115}{\sqrt{3}} \text{ V}$
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 (CORE 1)

400/300/200 : 1/1/1 A – FOR TRANSFORMER BAY (CORE 2-4)

500/200/100 : 1 A – FOR HIGH SIDE TRANSFORMER BUSHING CT
3. 22 kV VT RATIO

$\frac{22,000}{\sqrt{3}} : \frac{110}{\sqrt{3}} // \frac{110}{\sqrt{3}} \text{ V}$
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
5. THE NEUTRAL GROUNDING RESISTORS (NGR) ARE INDICATED FOR FUTURE INSTALLATION.

6. SYNCHRONIZING SCHEMATIC

6.1 –YP-01 SHOWN THUS, REFER TO INCOMING IVT DESIGNATIONS.

6.2 OBYP-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 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 PROTECTION SYSTEM, RELAY 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 INCOMINGS, BUS COUPLER, 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/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%
-
-
- | 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 | 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 |
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- MTS COMPACT SWITCHGEAR
(MTS = MIXED TECHNOLOGY SWITCHGEAR)

FUTURE
- REFERENCE DRAWING
SINGLE LINE DIAGRAM.....DWG NO. FA1-011/63014
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|--|---|---|
| ออกแบบสถานไฟฟ้า
ฝ่ายงานสถานีไฟฟ้า | การไฟฟ้าส่วนภูมิภาค | ใช้แบบแบบ —
ถูกแทน โดยแบบ —
เขียนเสร็จวันที่ 27 ก.พ. 63
แก้ไขแบบวันที่ —
มีมติเป็น —
มาตรฐาน — |
| ผู้เขียน สิริพงศ์
ผู้สำรวจ —
วิศวกร สิริพงศ์
หัวหน้าแผนก วรวิทย์
ผู้อำนวยการกอง —
ผู้อำนวยการฝ่าย —
รองผู้อำนวยการวิศวกรรม — | ผู้ว่าการ (แทน)

สถานีไฟฟ้านครพนม 2 จ.นครพนม
มิเตอร์ และ รีเลย์ไดอะแกรม

NAKHON PHANOM 2 SUBSTATION
METERING AND RELAYING DIAGRAM | แบบเลขที่ FA4-011/63015
แผ่นที่ 1 ของจำนวน 1 แผ่น |