



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
50N	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)
87B1,87B2	BUSBAR SUPERVISION RELAY FOR BUS WIRE SUPERVISION FOR 87B1 AND 87B2
87L	LINE CURRENT DIFFERENTIAL RELAY
95B1,95B2	UNDER/OVER VOLTAGE RELAY
27,59	AUTOMATIC VOLTAGE REGULATOR
90	ARC DETECTOR RELAY FOR ARC PROTECTION SYSTEM
50 ARC	UNDER FREQUENCY RELAY
81	CAPACITOR CURRENT UNBALANCE SENSING RELAY
60	POWER FACTOR CONTROLLER
Q	DPM
DPM	DIM
DIM	V METER
V METER	SS
SS	L
L	V
V	F
F	S
S	LL
LL	TS
TS	TS
TS	▲
▲	●
●	▼
▼	◇
◇	WYE CONNECTED CT OF SECONDARY WINDING
WYE CONNECTED CT OF SECONDARY WINDING	Δ
Δ	TRANSFORMER BUSHING CT OF SECONDARY WINDING, WYE CONNECTED FOR PHASE OR NEUTRAL
TRANSFORMER BUSHING CT OF SECONDARY WINDING, WYE CONNECTED FOR PHASE OR NEUTRAL	BCU
BCU	

NOTES

1. 115 kV. IVT RATIO

$\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115 \text{ V}$

50VA/0.2/1.5VF, 50VA/3P/1.5VF (SIMULTANEOUS BURDEN 100 VA)
2. 115 kV. CT RATIO

2000/1500/1200/800/500/300 : 1/1/1/1 A (02YC-03, 03YC-03, 03YC-01, 04YC-03, 04YC-01, 05YC-01)

20VA/5P20 FOR RELAYING
20VA/0.5Fs5 FOR METERING
***PARTICULAR REQUIREMENT FOR ALL 5P20 CLASS CT's
CURRENT RATIO ERROR AT 100% OF RATED CURRENT < 0.5%
3. 115 kV. CT RATIO

2000/1500/1200/800/500/300 : 1/1/1/1/1/1 A (02YC-02, 03YC-02, 04YC-02, 05YC-02)

20VA/5P20 FOR RELAYING
20VA/0.5Fs5 FOR METERING
***PARTICULAR REQUIREMENT FOR ALL 5P20 CLASS CT's
CURRENT RATIO ERROR AT 100% OF RATED CURRENT < 0.5%
4. A LINE CURRENT DIFFERENTIAL RELAY FOR INCOMING LINE SHALL BE USED WITH AN OPTICAL FIBER CABLE (FO) AND REMOTE I/O MODULE (RIO) AS A COMMUNICATION LINK AND SHALL BE DIRECTLY CONNECTED TO THE JOINT BOX (PROVIDED BY EGAT) AT EGAT SUBSTATION.

5. SYNCHRONIZING SCHEMATIC

5.1. 0-Y-P-0- SHOWN THUS, REFER TO INCOMING IVT DESIGNATIONS.

5.2. 0BY-P-0- SHOWN THUS REFERS TO RUNNING BUS IVT FOR BUS No.1 OR No.2

- 5.3. 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.
- 5.4. MANUAL SYNCHRONIZING BY SYNCHROSCOPE SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF METERING CORES FROM "PHASE B" FOR BOTH IVT'S.
- 5.5. 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.
6. FOR 115 kV SYSTEM PROTECTION, RELAYS SHALL BE DOUBLE MAIN PROTECTION RELAY (MAIN1&2) AND DIFFERENT PRODUCT/MANUFACTURER.
7. ALL PROTECTIVE TRIPPING FUNCTION ENERGIZED BOTH TRIP COILS OF 115 kV CIRCUIT BREAKER.
8. NETWORK TOPOLOGY OF SUBSTATION CONTROL AND PROTECTION SYSTEM IS TOPOLOGY 1

REFERENCE DRAWING

SINGLE LINE DIAGRAM.....DWG NO. GOA-62222

PE&C

POWER ENGINEERING & CONSULTANT

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PROVINCIAL ELECTRICITY AUTHORITY
200 Ngamwongwan Road, Chatuchak, Bangkok, Thailand

PEA APPROVE		ENGINEERING CERTIFICATION	
SIGNATURE		SIGNATURE	
NAME		NAME	นิกร เจริญสุข
DATE		LICENCE No. (EXPIRE DATE)	วฟก.1190 (18 มิ.ค. 2566)

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สถานีไฟฟ้าคลองแวง จ.สงขลา	????????	????
มิตร และวิไลโดยเนกรม	????????	NONE
KHLONG NGAE SUBSTATION, SONGKHLA PROVINCE	????????	GOA-62228
METERING AND RELAYING DIAGRAM	??????	???????? 2 ???