

NOTES

1. EACH RELAY LINE TERMINAL SHALL UTILIZE A LINE CURRENT DIFFERENTIAL RELAY OR A DISTANCE RELAY AS A DOUBLE MAIN PROTECTION WITH PILOT TRIPPING SCHEME FOR PROTECTION OF 115 kV LINE AGAINST BOTH PHASE AND GROUND FAULTS AS FOLLOWS :

FOR 115 kV INCOMING LINE, A LINE CURRENT DIFFERENTIAL RELAY AND DISTANCE RELAY SHALL BE USED WITH A DEDICATED FIBER–OPTIC CABLE AS A MAIN PROTECTION. THE DEDICATED FIBER–OPTIC CABLE SHALL BE USED AS A COMMUNICATION LINK TO PERMIT HIGH SPEED THREE–POLE INTERTRIPPING OF THE BREAKERS AT BOTH ENDS OF THE LINE. THE RECLOSURE FOR BOTH LINE CURRENT DIFFERENTIAL RELAY AND DISTANCE RELAY ZONE #1 SHALL BE DONE THROUGH A SYNCHRO–CHECK RELAY.

FOR 115 kV OUTGOING LINE CURRENT DIFFERENTIAL RELAY, A DISTANCE RELAY SHALL BE USED AS A MAIN PROTECTION WITH PILOT TRIPPING SCHEME. THE ZONE #1 SHALL BE USED FOR HIGH SPEED THREE–POLE TRIPPING AND RECLOSING. THE RECLOSURE SHALL BE DONE THROUGH A SYNCHRO–CHECK RELAY.

FOR ZONE#2 AND ZONE #3, OF EACH DISTANCE RELAY, THERE SHALL BE FURNISHED WITH A TIMING RELAY WITH TWO SEPARATE TIMING UNITS THAT WILL PROVIDE TIME–DELAYED TRIP FOR ZONE#2 AND ZONE #3.

THE MAIN PROTECTION FOR BOTH 115 kV LINES, THERE SHALL BE LINE CURRENT DIFFERENTIAL RELAY, DISTANCE AND DIRECTIONAL PHASE AND GROUND OVERCURRENT RELAYS FOR PHASE AND GROUND FAULT PROTECTION FOR BOTH TYPES OF THE 115 kV LINES. EACH PHASE AND GROUND RELAY SHALL BE PROVIDED WITH A PROVISION OF VOLTAGE–POLARIZED DIRECTIONAL UNIT.
2. BREAKER TRIP FOR CB FAIL (TIME DELAY) VIA BUSBAR PROTECTION TRIP BY GOOSE AND AUXILIARY TRIPPING AND LOCKOUT RELAY (86B) TO TRIP AND BLOCK CLOSING OF ALL BREAKERS WHICH CONNECTED TO THAT MAIN BUS.
3. ALL PROTECTIVE TRIPPING FUNCTION ENERGIZES BOTH TRIP COILS OF 115 kV. CIRCUIT BRAEAKERS.
4. THE CONTRACTOR SHALL PROVIDE ALL AUXILIARY EQUIPMENT AND ACCESSORIES TO COMPLETE THE ABOVE FUNCTION.
5. TRANSFORMER INTERNAL PROTECTIVE DEVICES REFER TO THE FOLLOWING DEVICES AS FOLLOWS :

5.1 BUCHHOLZ RELAY STAGE 2 TRIP
5.2 TRANSFORMER PRESSURE RELIEF DEVICE
5.3 TRANSFORMER OIL TEMP. TRIP
5.4 OLTC DIVERTER SWITCH PRESSURE RELIEF DEVICE
5.5 OLTC DIVERTER SWITCH SUDDEN OIL FLOW
5.6 TRANSFORMER WINDING TEMP. TRIP
6. FOR BUSBAR DIFFERENTIAL RELAY (87B) AND AUXILIARY TRIPPING AND LOCKOUT RELAY (86B) OF BUSBAR PROTECTION. ANALOG INPUT, AUXILIARY TRIPPING AND BLOCKING CONTACTS FOR FUTURE INSTALLATION OF 115kV. SWITCHGEAR SHALL BE PROVIDED.

		PROTECTIVE DEVICE AND THEIR DESINATIONS																
		115–22 kV.TRANSFORMER–TP3						115 kV. LINE TO SAMUT SAKON 4 SUBSTATION						115–22 kV.TRANSFORMER–TP2				
		MAIN1 & MAIN2					MAIN1 & MAIN2						MAIN1 & MAIN2					
		TP3 INTERNAL PROTECTIVE DEVICES	TP3 TRANSFORMER DIFFERENTIAL RELAY WITH RESTRICTED EARTH FAULT RELAY	TP3 115 kV. SIDE PHASE & GROUND OVERCURRENT RELAY	TP3 OVERCURRENT GROUND BACKUP RELAY	TP3 BREAKER FAILURE RELAYING	DISTANCE RELAY, PHASE&GROUND ZONE #1	DISTANCE RELAY, PHASE&GROUND ZONE #2	DISTANCE RELAY, PHASE&GROUND ZONE #3	DIRECTIONAL PHASE&GROUND OVERCURRENT RELAY	LINE BREAKER FAILURE RELAYING	UNDER/OVER VOLTAGE RELAYS		TP2 INTERNAL PROTECTIVE DEVICES	TP2 TRANSFORMER DIFFERENTIAL RELAY WITH RESTRICTED EARTH FAULT RELAY	TP2 115 kV. SIDE PHASE & GROUND OVERCURRENT RELAY	TP2 OVERCURRENT GROUND BACKUP RELAY	TP2 BREAKER FAILURE RELAYING
LOCATION OF DEVICE (PNL.NO.)		TCP3&TPP3					LCP3&LRP3						TCP2&TPP2					
DEVICE NO.		TP3 DEVICES	87T 87REF	50 51 50N 51N	51 GB	50 BF	21–1 21N–1	21–2 21N–2	21–3 21N–3	67 67N	50 BF	27 59		TP2 DEVICES	87T 87REF	50 51 50N 51N	51 GB	50 BF
AUXILIARY TIMING RELAY																		
AUXILIARY TRIPPING RELAY		86T1&86T2				86B 86BF					86B 86BF			86T1& 86T2				86B 86BF
TRIPPING RELAY CHARACTERISTICS		HS ER		HS ER		HS ER					HS ER			HS ER		HS ER		HS ER
OPERATION TARGET/AUDIBLE ALARM		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y
FUNCTION OF DEVICE	0BYB–01					T _{L1}	SEE NOTE 2				T _{L1}	SEE NOTE 2						T _{L1}
	01YB–01																	
	02YB–01																	
	03YB–01																	
	04YB–01													T _L		T _L		T _{L1}
	05YB–01						T _R	T	T	T	T _{L1}							
	06YB–01	T _L		T _L		T _{L1}												
	TRIP ALL BUS NO.1 BREAKERS					T _{L1}	SEE NOTE 2				T _{L1}	SEE NOTE 2						T _{L1}
	TRIP ALL BUS NO.2 BREAKERS					T _{L1}					T _{L1}							T _{L1}
	1BVB–01																	
	2BVB–01													T _L		T _L		T _{L1}
	3BVB–01	T _L		T _L		T _{L1}												

LEGEND	EXPLANATION
Y	YES
HS	HIGH SPEED
ER	ELECTRICAL RESET
SR	SELF RESET
T _R	3–POLE TRIP AND RECLOSE
T	3–POLE TRIP– NO RECLOSING
T _L	3–POLE TRIP AND LOCKOUT
T _{L1}	3–POLE TRIP AND LOCKOUT (TRIP VIA GOOSE)

TCP3 & TPP3	LCP3 & LRP3	TCP2 & TPP2	LCP2 & LRP2	TCP1 & TPP1	LCP1 & LRP1	BCP	BZP
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RCC3	RCC2	RCC1
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SWING RACK TYPE CONTROL AND PROTECTIVE RELAY PANEL
BZP – BUS ZONE PROTECTION PANEL
BCP – BUS CONTROL PANEL
TPP – TRANSFORMER PROTECTION PANEL
TCP – TRANSFORMER CONTROL PANEL
LRP – LINE RELAY PROTECTION PANEL
LCP – LINE CONTROL PANEL
RCC – REMOTE CONTROL CABINET OF POWER TRANSFORMER

REFERENCE DRAWING

– SINGLE LINE – METERING AND RELAYING DIAGRAM.....DWG NO. FA4–011/64057

THS–P		
กองออกแบบสถานีไฟฟ้าฝ่ายงานสถานีไฟฟ้า	การไฟฟ้าส่วนภูมิภาค	ใช้แทนแบบ _____ ถูกแทนโดยแบบ _____
ผู้เขียน _____ วิศวกร	ผู้ว่าการ _____ (แทน)	เขียนเสร็จวันที่ 30 ก.ย 64
ผู้สำรวจ _____ วิศวกร		แก้แบบวันที่ _____
หัวหน้าแผนก _____ วิศวกร	สถานีไฟฟ้าท่าทราย 1 จังหวัดสมุทรสาคร ฟังก์ชันการทำงานของอุปกรณ์ป้องกัน	มิติเป็น _____
ผู้อำนวยการกอง _____ (แทน)		มาตรฐาน _____
ผู้อำนวยการฝ่าย _____ (แทน)	THA SAI 1 SUBSTATION SAMUT SAKHON PROVINCE PROTECTIVE DEVICE FUNCTION	แบบเลขที่ FA4–011/64058
รองผู้อำนวยการวิศวกรรม _____		แผ่นที่ 1 ของจำนวน 4 แผ่น