



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 RECLOSEING RELAY
50 BF	BREAKER FAILURE RELAYING
50 51	NON-DIRECTIONAL INSTANTANEOUS AND TIME PHASE OVERCURRENT RELAY
50N 51N	NON-DIRECTIONAL INSTANTANEOUS AND TIME GROUND OVERCURRENT RELAY
51GB	NON-DIRECTIONAL TIME GROUND BACKUP OVERCURRENT RELAY
87T	TRANSFORMER DIFFERENTIAL RELAY
87 REF	TRANSFORMER RESTRICTED EARTH FAULT RELAY THIS RELAY SHALL BE INCORPORATED IN THE TRANSFORMER DIFFERENTIAL RELAY (87T)
27,59	UNDER/OVER VOLTAGE RELAY
90	AUTOMATIC VOLTAGE REGULATOR
87B	BUS DIFFERENTIAL RELAY-HIGH IMPEDANCE TYPE
95B	BUSBAR SUPERVISION RELAY FOR BUSWIRE SUPERVISION FOR 87B
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 OR 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

NOTES

- 115 kV. C/T RATIO
 $\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115$ V
200VA/0.5/1.5VF, 200VA/3P/1.5VF, SIMULTANEOUS BURDEN = 200 VA.
- 115 kV. CT RATIO
 $\frac{1200}{\sqrt{3}} / \frac{1000}{\sqrt{3}} / \frac{900}{\sqrt{3}} / \frac{800}{\sqrt{3}} / \frac{600}{\sqrt{3}} / \frac{400}{\sqrt{3}} / \frac{300}{\sqrt{3}} / \frac{200}{\sqrt{3}} / \frac{100}{\sqrt{3}} : 1/1/1/1$ A.
50VA/5P20, 50VA/0.5FSS, 50VA/5P20, 50VA/5P20
- 115 kV. IVT RATIO (02YP-01)
 $\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115$ V
50VA/0.2/1.5VF, 50VA/3P/1.5VF, SIMULTANEOUS BURDEN = 100 VA.
- 115 kV. CT RATIO (02YC-01)
 $\frac{1800}{\sqrt{3}} / \frac{1500}{\sqrt{3}} / \frac{1200}{\sqrt{3}} / \frac{900}{\sqrt{3}} / \frac{600}{\sqrt{3}} / \frac{300}{\sqrt{3}} : 1/1/1/1$ A.
50VA(1200/1A)/5P20, 20VA/0.5FSS, 20VA/5P20, 20VA/5P20
- 115 kV. IVT RATIO (02YP-01)
 $\frac{115,000}{\sqrt{3}} : \frac{115}{\sqrt{3}} / 115 // \frac{115}{\sqrt{3}} / 115$ V
50VA/0.2/1.5VF, 50VA/3P/1.5VF, SIMULTANEOUS BURDEN = 100 VA.
- 115 kV. CT RATIO (02YC-01)
 $\frac{1800}{\sqrt{3}} / \frac{1500}{\sqrt{3}} / \frac{1200}{\sqrt{3}} / \frac{900}{\sqrt{3}} / \frac{600}{\sqrt{3}} / \frac{300}{\sqrt{3}} : 1/1/1/1$ A.
50VA(1200/1A)/5P20, 20VA/0.5FSS, 20VA/5P20, 20VA/5P20
- 22 kV. VT. RATIO
 $\frac{22000}{\sqrt{3}} : \frac{110}{\sqrt{3}} / \frac{110}{\sqrt{3}}$ V
50VA/0.5/1.9VF, 50 VA/3P/1.9VF
- 22 kV. CT. RATIO
 $\frac{1800}{\sqrt{3}} / \frac{1500}{\sqrt{3}} / \frac{900}{\sqrt{3}} : 1/1/1$ A
20VA/0.5FSS, 20VA/5P20, 20VA/5P20
 $\frac{1800}{\sqrt{3}} / \frac{1500}{\sqrt{3}} / \frac{900}{\sqrt{3}} : 1/1$ A
20VA/0.5FSS, 20VA/5P20
 $\frac{1800}{\sqrt{3}} / \frac{1500}{\sqrt{3}} / \frac{900}{\sqrt{3}} : 1/1$ A
20VA/5P20, 20VA/5P20
 $\frac{600}{\sqrt{3}} / \frac{300}{\sqrt{3}} : 1/1$ A
20VA/0.5FSS, 20VA/5P20
 $\frac{600}{\sqrt{3}} / \frac{300}{\sqrt{3}} : 1/1$ A
20VA/0.5FSS, 20VA/5P20
- THE NEUTRAL GROUNDING RESISTORS (NGR) ARE INDICATED FOR FUTURE INSTALLATION.

10. SYNCHRONIZING SCHEMATIC

- 10.1 -YP-01 SHOWN THUS, REFER TO INCOMING IVT DESIGNATIONS.
- 10.2 BYP-01 SHOWN THUS REFERS TO RUNNING BUS CVT
- 10.3 #B ONLY ✓ SHOWN THUS, REFERS TO THE SECONDARY WINDING OF C/IVT FOR PHASE"B" AND USING FULL TAP WINDING 115V FOR SYNCHRONIZING SYSTEM WITH ONE END OF THE WINDING CONNECTED WITH COMMON GROUND BUS.
- 10.4 MANUAL SYNCHRONIZING BY SYNCHROSCOPE SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF METERING CORES FROM"PHASE B" FOR BOTH C/IVT'S.
- 10.5 AUTOMATIC SYNCHRONISM VERIFICATION BY SYNCHRO CHECK RELAY (25) SHALL UTILIZE INCOMING AND RUNNING SECONDARY VOLTAGES OF RELAYING CORES FROM"PHASE B" FOR BOTH C/IVT'S.
11. FOR NEW INSTALLATION, RELAYS SHALL BE DOUBLE MAIN PROTECTION RELAY (MAIN1&2) AND DIFFERENT PRODUCT/MANUFACTURER.

SCOPE OF ADDITIONAL WORK (คพฉ.1)

SCOPE OF ADDITIONAL WORK (คพฉ.2)

REFERENCE DRAWING

SINGLE LINE DIAGRAM.....DWG NO. FA1-011/61065

DEA-M

กองออกแบบสถานีไฟฟ้า ฝ่ายงานสถานีไฟฟ้า	การไฟฟ้าส่วนภูมิภาค	ใช้แบบแบบ -
ผู้เขียน ธีรชัย ผู้สำรวจ ธีรชัย วิศวกร ธีรชัย	ผู้ว่าการ (แนบ)	ถูกแทน โดยแบบ -
หัวหน้าแผนก วรวิทย์ ผู้อำนวยการกอง ผู้อำนวยการฝ่าย (แนบ)	สถานีไฟฟ้าเคชอูตม จ.อุบลราชธานี มิเตอร์ และ รีเลย์ไดอะแกรม	เขียนเสร็จวันที่ 11 ก.ย. 2561
รองผู้ว่าการวิศวกรรม	DET UDOM SUBSTATION METERING AND RELAYING DIAGRAM	แก้ไขแบบวันที่ -
		ชนิดเป็น -
		มาตรฐาน -
		แบบเลขที่ FA4-011/61053
		แผ่นที่ 1 ของจำนวน 1 แผ่น