LEGEND

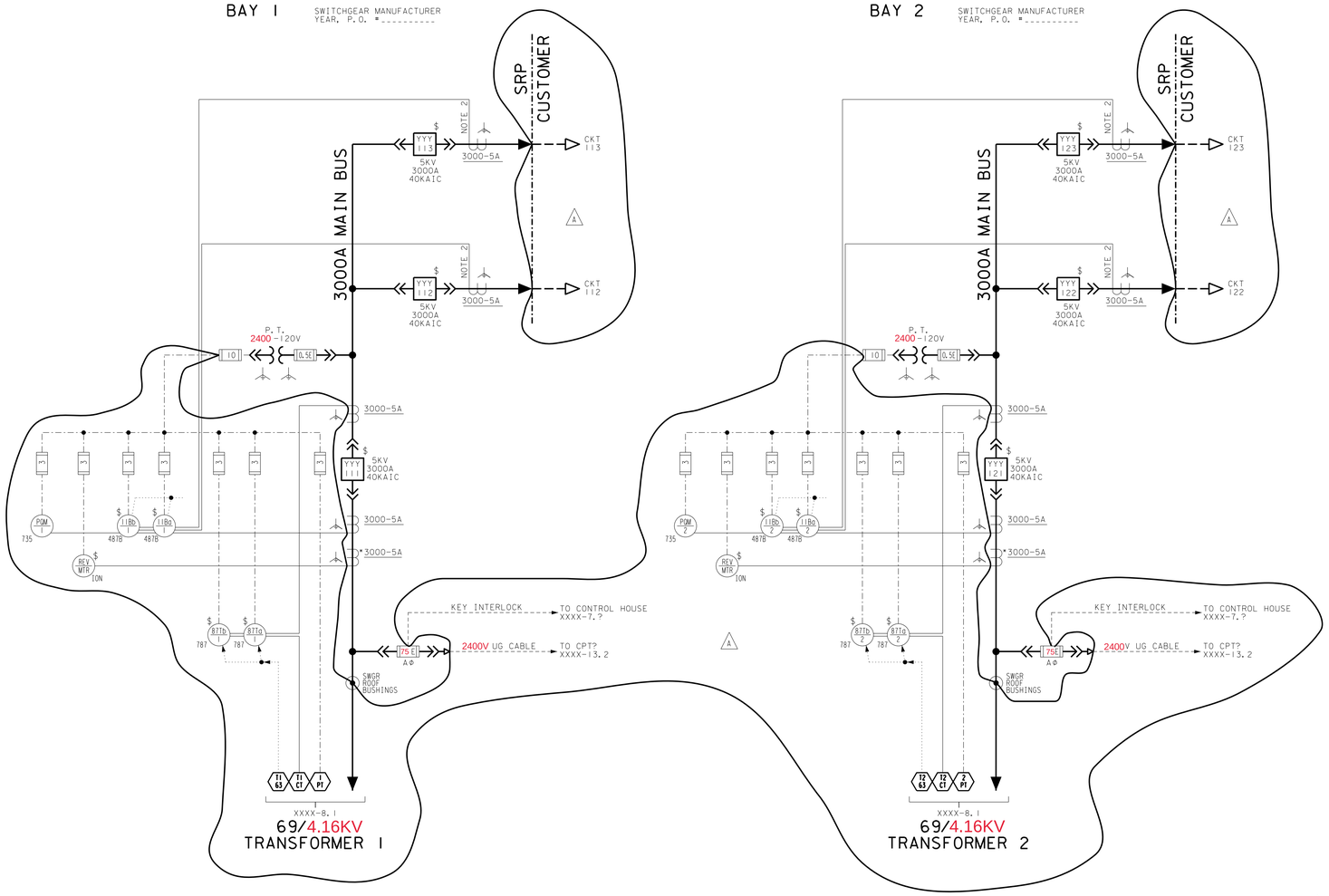
DEVICE/ FUNCTION NO.	DESCRIPTION	MFR	TYPE	LOCATION OR BAY
11B	BAY PROTECTION RELAY	SEL	487B	
87T	TRANSFORMER DIFFERENTIAL RELAY	SEL	787	
PQM	POWER QUALITY METER	SEL	735	
$	SUPERVISORY CONTROL AND INDICATION OR TELEMETRY			

RELAY SYSTEMS

RELAY	DESCRIPTION
87T	TRIPS/BLOCKS CLOSE ON 69KV T.P. AND 12KV MAIN FOR XFMR FAULT (86P OR 87 - VIRTUAL LO) TRIPS/BLOCKS CLOSE ON 69KV T.P. AND 12KV FEEDER BKRS FOR LOW-SIDE BF (50BF - VIRTUAL LO) TRIPS 12KV MAIN BKR FOR TRANSFORMER OVERLOAD (51) TRIPS 12KV FEEDER BREAKERS FOR UNDERFREQUENCY (81) ALL TRIPPING AND BLOCK CLOSING IS TO 11B VIA 61850, OR VIA OUT403 DURING COMMUNICATIONS FAILURE OPERATES 69KV T.P. (SUPY CONTROL) PROVIDES REMOTE ALARMS, INDICATION, AND STATUS
11B	TRIPS/BLOCKS CLOSE ON 12KV MAIN AND FEEDER BKRS FOR BUS FAULT (87 - VIRTUAL LO) TRIPS MAIN FOR ANY FEEDER BREAKER FAILURE (50BF - NO LOCKOUT) TRIPS 12KV FEEDER BREAKERS (50,51) OPERATES 12KV MAIN AND FEEDER BREAKERS (SUPY CONTROL) PROVIDES REMOTE ALARMS, INDICATION, AND STATUS

BREAKER TRIPS

BREAKER	TRIP INITIATED BY
YYY111	11Ba, 11Bb, 87Ta, 87Tb 1 1 1 1
YYY112 YYY113	11Ba, 11Bb 1 1
YYY121	11Ba, 11Bb, 87Ta, 87Tb 2 2 2 2
YYY122 YYY123	11Ba, 11Bb 2 2



NOTES:

1. CTS WITH NO NUMBER UNDER THE LINE ARE SINGLE RATIO TYPE
2. CT POLARITY IS INVERTED IN 11B SETTINGS FOR BUS DIFFERENTIAL CALCULATIONS
3. * - METERING ACCURACY INSTRUMENT TRANSFORMER
4. (A) - INDICATES EQUIPMENT EXTERNAL TO SWITCHGEAR

REFERENCE DRAWINGS:

12.47KV BAY 1 XFMR AND UNITS 1-2 THREE LINE DIAG. ____ SK-AMP-9.6
12.47KV BAY 1 UNITS 3-4 THREE LINE DIAGRAM _____ SK-AMP-9.7

PHASE ROTATION

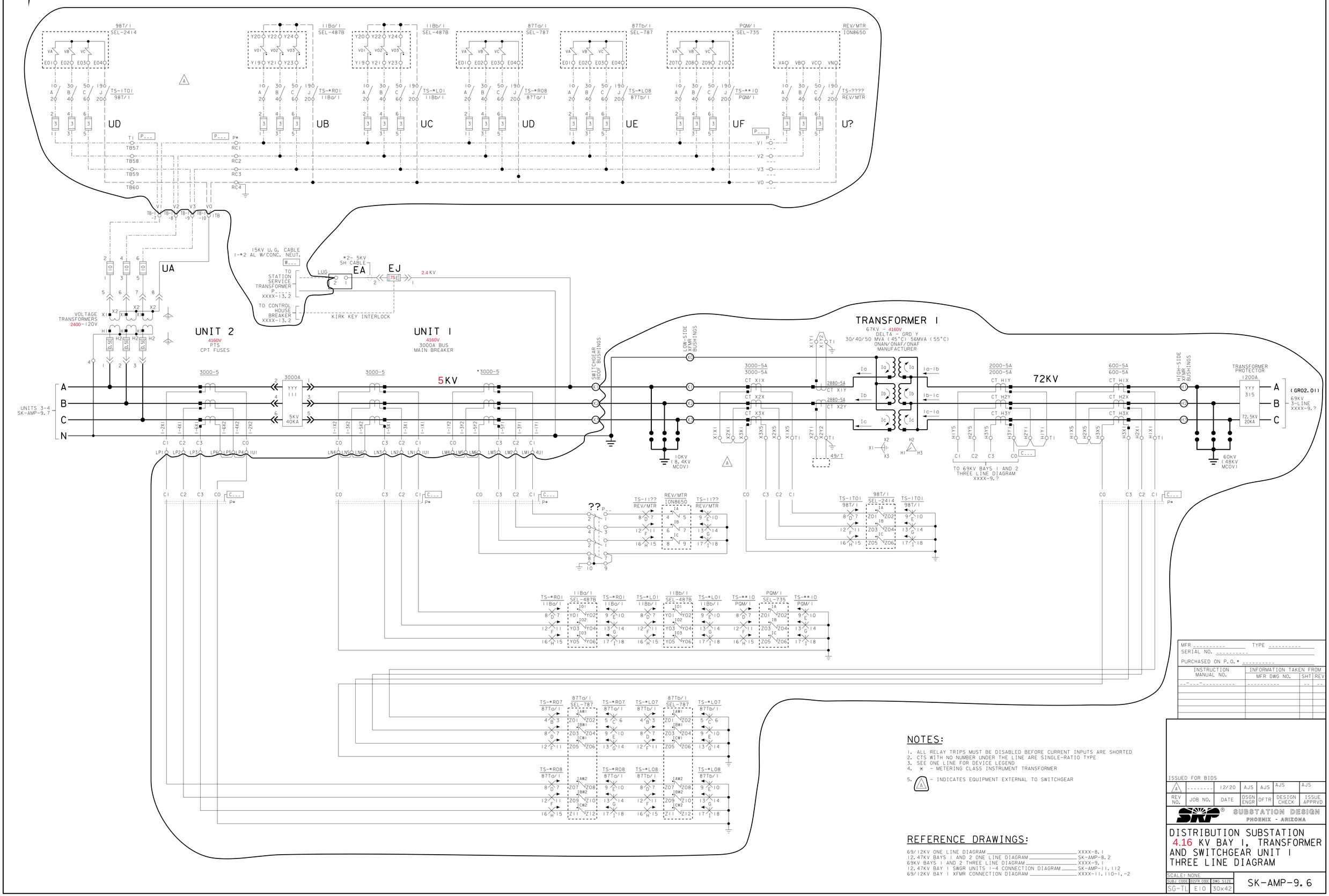
ISSUED FOR BIDS

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

SRP® SUBSTATION DESIGN PHOENIX - ARIZONA

DISTRIBUTION SUBSTATION
4.16 KV BAYS 1 AND 2
ONE LINE DIAGRAM
?E - ?S

SCALE: NONE			
SUBJ CODE	DISTR CODE	DWG SIZE	SK-AMP-8.2
OL	E8	30x42	



NOTES:

1. ALL RELAY TRIPS MUST BE DISABLED BEFORE CURRENT INPUTS ARE SHORTED
2. CTS WITH NO NUMBER UNDER THE LINE ARE SINGLE-RATIO TYPE
3. SEE ONE LINE FOR DEVICE LEGEND
4. * - METERING CLASS INSTRUMENT TRANSFORMER
5. (A) - INDICATES EQUIPMENT EXTERNAL TO SWITCHGEAR

REFERENCE DRAWINGS:

69/12KV ONE LINE DIAGRAM	XXXX-8.1
12.47KV BAYS 1 AND 2 ONE LINE DIAGRAM	SK-AMP-8.2
69KV BAYS 1 AND 2 THREE LINE DIAGRAM	XXXX-9.1
12.47KV BAY 1 SWGR UNITS 1-4 CONNECTION DIAGRAM	SK-AMP-11.112
69/12KV BAY 1 XFMR CONNECTION DIAGRAM	XXXX-11.110-1,-2

MFR _____ TYPE _____
SERIAL NO. _____
PURCHASED ON P.O.# _____

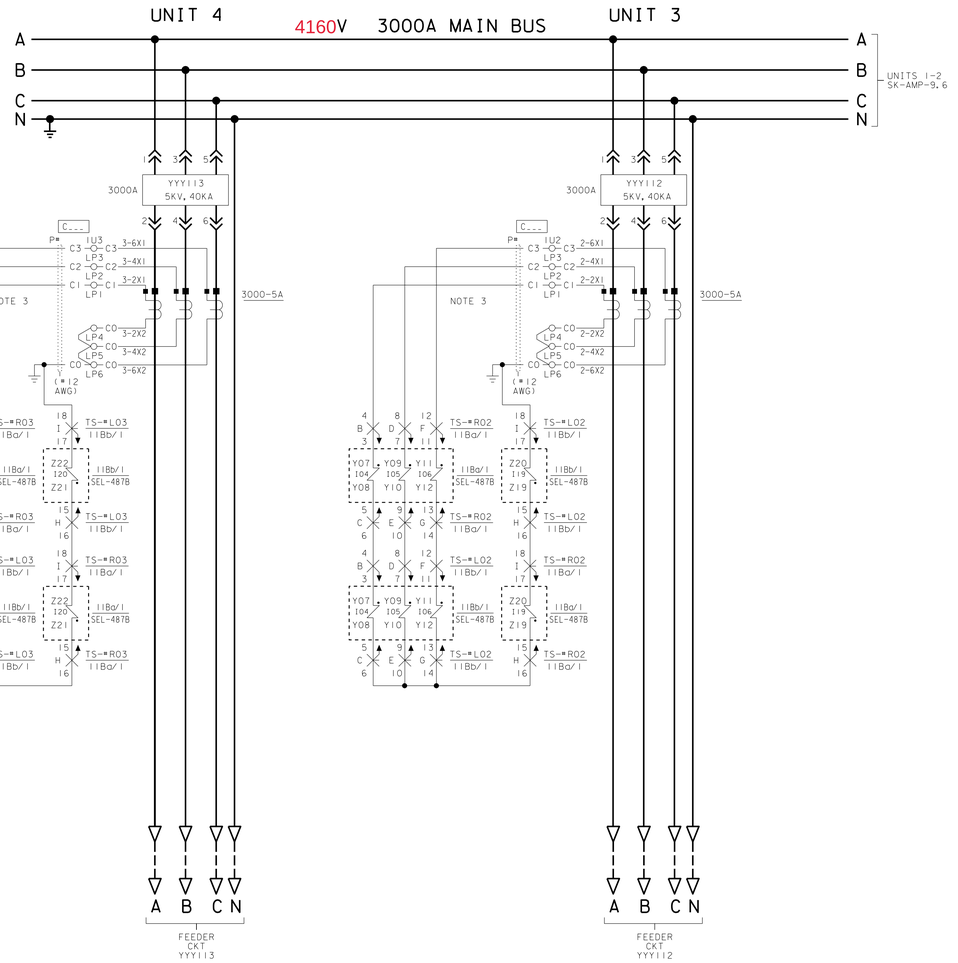
INSTRUCTION MANUAL NO.	INFORMATION TAKEN FROM MFR DWG NO.	SHT	REV
--"---"----------	---------	--	--

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
ISSUED FOR BIDS						
A	--------	12/20	AJS	AJS	AJS	AJS

SUBSTATION DESIGN
PHOENIX - ARIZONA

DISTRIBUTION SUBSTATION 4.16 KV BAY 1, TRANSFORMER AND SWITCHGEAR UNIT 1 THREE LINE DIAGRAM

SCALE: NONE			
SUBJ CODE	DISTR CODE	DWG SIZE	SK-AMP-9.6
SG-TL	E10	30x42	



NOTES:

1. ALL RELAY TRIPS MUST BE DISABLED BEFORE CURRENT INPUTS ARE SHORTED
2. CTS WITH NO NUMBER UNDER THE LINE ARE SINGLE-RATIO TYPE (TYP. FEEDER BREAKERS)
3. CT POLARITY IS INVERTED IN 11B SETTINGS FOR BUS DIFFERENTIAL CALCULATIONS
4. SEE ONE LINE FOR DEVICE LEGEND

REFERENCE DRAWINGS:

12.47KV BAYS 1 AND 2 ONE LINE DIAGRAM _____ SK-AMP-8.2
12.47KV BAY 1 XFMR AND SWGR UNITS 1-2 THREE LINE DIAG. ___ SK-AMP-9.6
12.47KV BAY 1 SWGR UNITS 1-4 CONNECTION DIAGRAM _____ SK-AMP-11.112

MFR _____ TYPE _____
SERIAL NO. _____
PURCHASED ON P.O.# _____

INSTRUCTION MANUAL NO.	INFORMATION TAKEN FROM MFR DWG NO.	SHT	REV
--"---"----------	----------	--	--

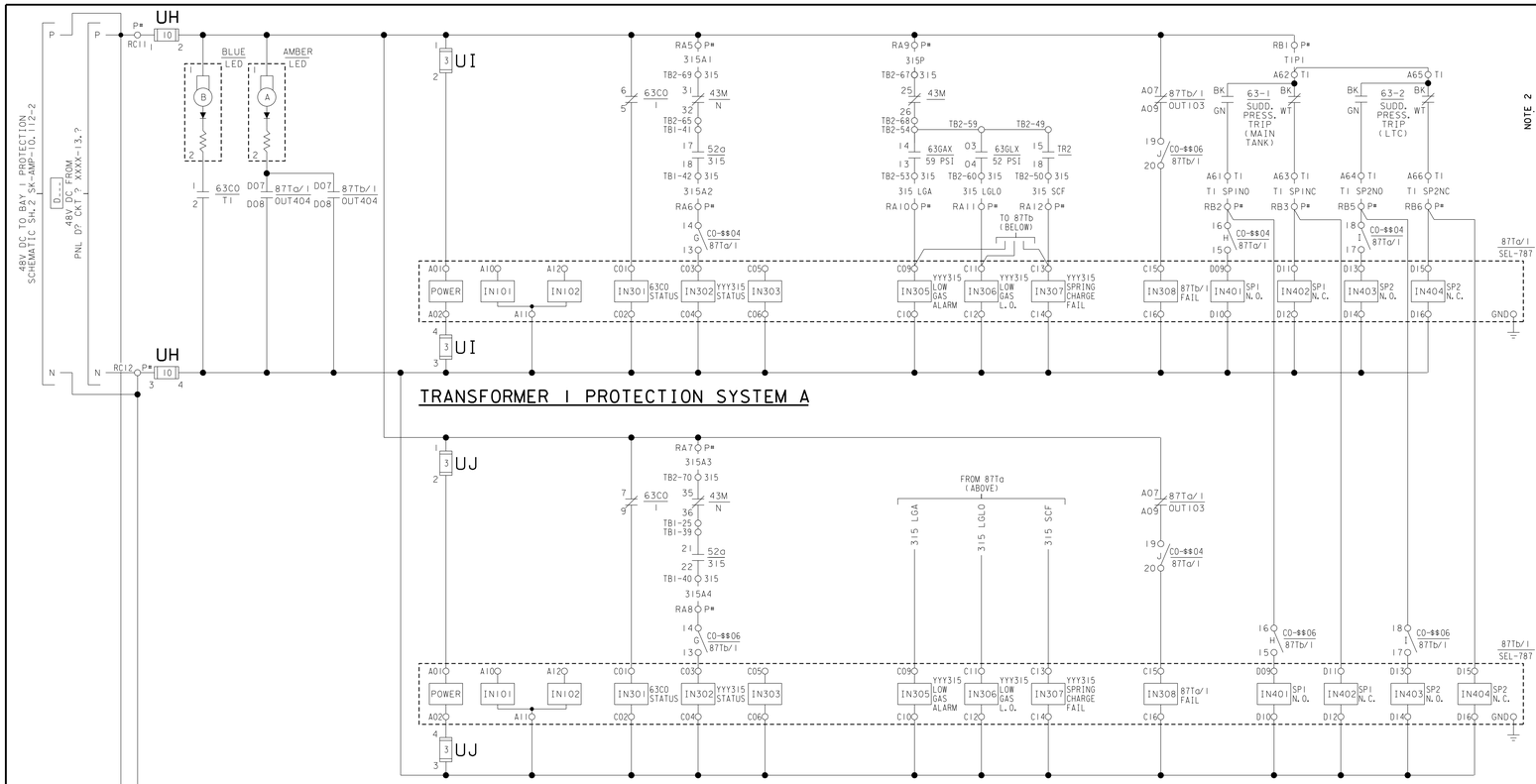
ISSUED FOR BIDS

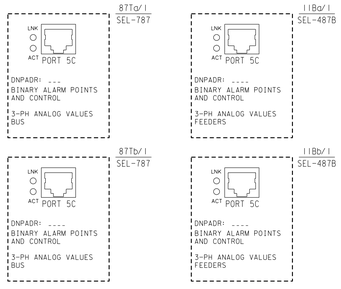
REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

SUBSTATION DESIGN
PHOENIX - ARIZONA

DISTRIBUTION SUBSTATION 4.16 KV BAY 1 SWITCHGEAR UNITS 2-3 THREE LINE DIAGRAM

SCALE: NONE			
SUBJ CODE	DISTR CODE	DWG SIZE	SK-AMP-9.7
SG-TL	E10	30x42	





BAY I CONTROL AND INDICATION
(DELIVERED VIA ETHERNET DNP CHANNELS)

87Ta/TI SEL-787 TRANSFORMER I DIFF.

INPUT/OUTPUT		ASSIGNMENT	CO-	BLADE	DRAWING
SLOT A					
A01 — A02	POWER				THIS DRAWING
A03 — A04	OUT101	315 PROT. OR (SCADA) TRIP	$$04	E	XXXX-10.111
A05 — A06	OUT102	315 (SCADA) CLOSE	$$04	F	XXXX-10.111
A07 — A08 / A09	OUT103	RELAY FAIL ALARM (TO 87Tb/I)	$$04	J	THIS DRAWING
A11 — A10 / A12	IN101 / IN102				
SLOT C					
C01 — C02	IN301	63C0 CUT-IN INDICATION			THIS DRAWING
C03 — C04	IN302	315 52A INDICATION	$$04	G	THIS DRAWING
C05 — C06	IN303				
C07 — C08	IN304	315 TRIP CIRCUIT MONITOR			XXXX-10.111
C09 — C10	IN305	315 LOW GAS ALARM			THIS DRAWING
C11 — C12	IN306	315 LOW GAS LOCKOUT			THIS DRAWING
C13 — C14	IN307	315 SPRING CHARGE FAIL			THIS DRAWING
C15 — C16	IN308	87Tb/I RELAY FAIL			THIS DRAWING
SLOT D					
D01 — D02	OUT401				
D03 — D04	OUT402				
D05 — D06	OUT403	TRIP DURING COMM FAIL (11Ba)	$$04	D	SK-AMP-10.112-2
D07 — D08	OUT404	SUDD. PR. STANDING TRIP INDICAT.			THIS DRAWING
D09 — D10	IN401	SUDD. PR. I TRIP INPUT (N.O.)	$$04	H	THIS DRAWING
D11 — D12	IN402	SUDD. PR. I TRIP INPUT (N.C.)			THIS DRAWING
D13 — D14	IN403	SUDD. PR. 2 TRIP INPUT (N.O.)	$$04	I	THIS DRAWING
D15 — D16	IN404	SUDD. PR. 2 TRIP INPUT (N.C.)			THIS DRAWING
COMMUNICATIONS BAYS					
10/100 BASE-T		ETHERNET - PORT 1A			XXXX-10.112-3
		ETHERNET - PORT 1B			
MM FIBER SERIAL		SERIAL - PORT 2			
		SERIAL - PORT 3			

PUSHBUTTON OPERATION:

1. UNLOCKING (PB4 - 3 SEC) ENABLES CONTROL VIA THE REST OF THE PUSHBUTTONS.
2. PUSHBUTTON 1 - SELECT A BREAKER (AT MOST SITES, THIS WILL ONLY BE THE T.P.I. FOR SITES WITH A TRANSFER BUS BREAKER, HOLD BUTTON FOR 3 SEC. TO SELECT.
3. PUSHBUTTON 2 - TOP AMBER LIGHT OF WILL INDICATE 43 LOCAL. NO LIGHT INDICATES 43 REMOTE.
   PUSHBUTTON 2 - BOTTOM AMBER LIGHT WILL MOMENTARILY ILLUMINATE TO INDICATE 81 RESET, ONCE BUTTON HAS BEEN HELD FOR 3 SECONDS AND RESET COMMAND IS SENT (UF LATCHED CONDITION MUST ALREADY EXIST).
4. AMBER LIGHT INDICATES RELAY IS UNLOCKED, UNDER NORMAL CONDITIONS, RELAY IS LOCKED (WHICH DE-ASSERTS ALL PUSHBUTTON LEDS).
5. FOR REDUNDANCY, BOTH THE A-SYSTEM AND B-SYSTEM RELAYS ARE CONTROLLED SIMULTANEOUSLY VIA THEIR OWN, AS WELL AS THE OTHER'S, PUSHBUTTONS.

PB1 YYY315
PB2 43 L/R (3 SEC) NOTE 1
PB3 TRIP/CLOSE
PB4 UNLOCK/LOCK (3 SEC) NOTE 3

0787EXIC3CDC75850630

87Tb/TI SEL-787 TRANSFORMER I DIFF.

INPUT/OUTPUT		ASSIGNMENT	CO-	BLADE	DRAWING
SLOT A					
A01 — A02	POWER				THIS DRAWING
A03 — A04	OUT101	315 PROT. OR (SCADA) TRIP	$$06	E	XXXX-10.111
A05 — A06	OUT102	315 (SCADA) CLOSE	$$06	F	XXXX-10.111
A07 — A08 / A09	OUT103	RELAY FAIL ALARM (TO 87Ta/I)	$$06	J	THIS DRAWING
A11 — A10 / A12	IN101 / IN102				
SLOT C					
C01 — C02	IN301	63C0 CUT-IN INDICATION			THIS DRAWING
C03 — C04	IN302	315 52A INDICATION	$$06	G	THIS DRAWING
C05 — C06	IN303				
C07 — C08	IN304	315 TRIP CIRCUIT MONITOR			XXXX-10.111
C09 — C10	IN305	315 LOW GAS ALARM			THIS DRAWING
C11 — C12	IN306	315 LOW GAS LOCKOUT			THIS DRAWING
C13 — C14	IN307	315 SPRING CHARGE FAIL			THIS DRAWING
C15 — C16	IN308	87Ta/I RELAY FAIL			THIS DRAWING
SLOT D					
D01 — D02	OUT401				
D03 — D04	OUT402				
D05 — D06	OUT403	TRIP DURING COMM FAIL (TO 11Bb)	$$06	D	SK-AMP-10.112-2
D07 — D08	OUT404	SUDD. PR. STANDING TRIP INDICAT.			THIS DRAWING
D09 — D10	IN401	SUDD. PR. I TRIP INPUT (N.O.)	$$06	H	THIS DRAWING
D11 — D12	IN402	SUDD. PR. I TRIP INPUT (N.C.)			THIS DRAWING
D13 — D14	IN403	SUDD. PR. 2 TRIP INPUT (N.O.)	$$06	I	THIS DRAWING
D15 — D16	IN404	SUDD. PR. 2 TRIP INPUT (N.C.)			THIS DRAWING
COMMUNICATIONS BAYS					
10/100 BASE-T		ETHERNET - PORT 1A			XXXX-10.112-3
		ETHERNET - PORT 1B			
MM FIBER SERIAL		SERIAL - PORT 2			
		SERIAL - PORT 3			

PUSHBUTTON OPERATION:

1. UNLOCKING (PB4 - 3 SEC) ENABLES CONTROL VIA THE REST OF THE PUSHBUTTONS.
2. PUSHBUTTON 1 - SELECT A BREAKER (AT MOST SITES, THIS WILL ONLY BE THE T.P.I. FOR SITES WITH A TRANSFER BUS BREAKER, HOLD BUTTON FOR 3 SEC. TO SELECT.
3. PUSHBUTTON 2 - TOP AMBER LIGHT OF WILL INDICATE 43 LOCAL. NO LIGHT INDICATES 43 REMOTE.
   PUSHBUTTON 2 - BOTTOM AMBER LIGHT WILL MOMENTARILY ILLUMINATE TO INDICATE 81 RESET, ONCE BUTTON HAS BEEN HELD FOR 3 SECONDS AND RESET COMMAND IS SENT (UF LATCHED CONDITION MUST ALREADY EXIST).
4. AMBER LIGHT INDICATES RELAY IS UNLOCKED, UNDER NORMAL CONDITIONS, RELAY IS LOCKED (WHICH DE-ASSERTS ALL PUSHBUTTON LEDS).
5. FOR REDUNDANCY, BOTH THE A-SYSTEM AND B-SYSTEM RELAYS ARE CONTROLLED SIMULTANEOUSLY VIA THEIR OWN, AS WELL AS THE OTHER'S, PUSHBUTTONS.

PB1 YYY315
PB2 43 L/R (3 SEC) NOTE 1
PB3 TRIP/CLOSE
PB4 UNLOCK/LOCK (3 SEC) NOTE 3

0787EXIC3CDC75850630

63C0 XFMR DEVICE PROT. CUT-OUT SWITCH

DECK	CONTACT	POSITIONS 1	POSITIONS 2	FUNCTION
1	1 — 2		X	IND LIGHT
	3	X		
2	6 — 4		X	IN SERVICE (TO 87Tq)
	5	X		
3	7 — 8		X	IN SERVICE (TO 87Tb)
	9	X		
4	12 — 10		X	SPARE
	11	X		

102604LQ
1=ENABLED
2=DISABLED

CONTACTS ON SCHEMATIC ARE SHOWN WITH SWITCH IN ENABLED POSITION

11Ba/I SEL-487B BAY I RELAY/CONTROL

NOTE 2

INPUT/OUTPUT		ASSIGNMENT	CO-	BLADE	DRAWING
I/O BOARD POSITION A					
A01 — A02	OUT101				
A03 — A04	OUT102				
A05 — A06	OUT103	111 PROT. OR (SCADA) TRIP	$$07	C	SK-AMP-10.113
A07 — A08	OUT104	111 (SCADA) CLOSE	$$07	D	SK-AMP-10.113
A09 — A10	OUT105	112 PROT. OR (SCADA) TRIP	$$08	A	SK-AMP-10.113
A12 — A11 / A13	OUT106	112 RECLOSE OR (SCADA) CLOSE	$$08	B	SK-AMP-10.113
A15 — A14 / A16	OUT107				
A18 — A17 / A19	OUT108	RELAY FAIL ALARM (TO 11Bb/I)	$$07	J	SK-AMP-10.112-2
A20 — A21	IN101	TRIP DURING COMM FAIL CH 1	$$07	A	SK-AMP-10.112-2
A22 — A23	IN102	TRIP DURING COMM FAIL CH 2			SK-AMP-10.112-2
A24 — A25	IN103				
A26 — A27	IN104	111 TRIP CIRCUIT MONITOR			SK-AMP-10.113
A28 — A29	IN105	111 BREAKER ALARM			SK-AMP-10.112-2
A31 — A30 / A32	IN106 / IN107	111 STATUS 52a	$$07	E	SK-AMP-10.112-2
I/O BOARD POSITION B					
B01 — B02	OUT201				
B03 — B04	OUT202	113 PROT. OR (SCADA) TRIP	$$08	E	SK-AMP-10.113
B05 — B06	OUT203	113 RECLOSE OR (SCADA) CLOSE	$$08	F	SK-AMP-10.113
B07 — B08	OUT204				
B09 — B10	OUT205				
B11 — B12	OUT206				
B13 — B14	OUT207				
B15 — B16	OUT208				
B17 — B18	IN201	112 TRIP CIRCUIT MONITOR			SK-AMP-10.113
B19 — B20	IN202	112 BREAKER ALARM			SK-AMP-10.112-2
B21 — B22	IN203	112 STATUS 52a	$$08	C	SK-AMP-10.112-2
B32	IN204 – IN210				
	IN211	113 STATUS 52a	$$08	G	SK-AMP-10.112-2
	IN212	113 BREAKER ALARM			SK-AMP-10.112-2
B33 — B34	IN213	113 TRIP CIRCUIT MONITOR			SK-AMP-10.113
B35 — B36	IN214				
B37 — B38	IN215				
B48	IN216 – IN220				
	IN221 – IN224				
I/O BOARD POSITION C					
C01 — C02	OUT301				
C03 — C04	OUT302				
C05 — C06	OUT303				
C07 — C08	OUT304				
C09 — C10	OUT305				
C11 — C12	OUT306				
C13 — C14	OUT307				
C15 — C16	OUT308				
C17 — C18	IN301				
C19 — C20	IN302				
C21 — C22	IN303				
C32	IN304 – IN312				
C33 — C34	IN313				
C35 — C36	IN314				
C37 — C38	IN315				
C48	IN316 – IN320				
	IN321 – IN322				
	IN323	PQM/I FAIL	$$07	I	SK-AMP-10.112-2
	IN324	RELAY FAIL FROM 11Bb/I			SK-AMP-10.112-2
COMMUNICATIONS BAYS					
10/100 BASE-T					
		ETHERNET - PORT 5C			THIS DRAWING
		ETHERNET - PORT 5D			
		SERIAL - PORT 1			
		SERIAL - PORT 2			
		SERIAL - PORT 3			
		IRIG-B			

PUSHBUTTON OPERATION:

1. UNLOCKING (PB12 - 3 SEC) ENABLES CONTROL VIA THE REST OF THE PUSHBUTTONS.
2. SELECT A BREAKER TO CONTROL (PB1 - PB3). AMBER LIGHT WILL INDICATE THE PRESENT SELECTION.
3. WITH A BREAKER SELECTED, PB7 CAN BE USED TO ENABLE/DISABLE FUNCTIONS FOR, OR TRIP/CLOSE THAT SPECIFIC BREAKER. AMBER LIGHT WILL INDICATE 43 LOCAL ONLY FOR THE BREAKER PRESENTLY SELECTED (WHICH HAS AMBER LIGHT ILLUMINATED).
4. UNDER NORMAL CONDITIONS, RELAY IS LOCKED WHICH DE-SELECTS ALL BREAKERS, DE-ASSERTING ALL PUSHBUTTON LEDS. TO SEE WHICH FUNCTIONS (PB7) ARE ENABLED/DISABLED FOR EACH BREAKER, SEE RELAY FRONT PANEL DISPLAY.
5. FOR REDUNDANCY, BOTH THE A-SYSTEM AND B-SYSTEM RELAYS ARE CONTROLLED SIMULTANEOUSLY VIA THEIR OWN, AS WELL AS THE OTHER'S, PUSHBUTTONS.

PB1 YYY111 SELECT
PB2 YYY112 SELECT
PB3 YYY113 SELECT
PB4
PB5
PB6
PB7 43 LOCAL/REMOTE
PB8 TRIP/CLOSE
PB9
PB10
PB11
PB12 UNLOCK/LOCK (3 SEC)

0487BIX4X52XCOXCH8MMXXX

11Bb/I SEL-487B BAY I RELAY/CONTROL

NOTE 2

INPUT/OUTPUT		ASSIGNMENT	CO-	BLADE	DRAWING
I/O BOARD POSITION A					
A01 — A02	OUT101				
A03 — A04	OUT102				
A05 — A06	OUT103	111 OC OR (SCADA) TRIP	$$01	C	SK-AMP-10.113
A07 — A08	OUT104	111 (SCADA) CLOSE	$$01	D	SK-AMP-10.113
A09 — A10	OUT105	112 PROT. OR (SCADA) TRIP	$$02	A	SK-AMP-10.113
A12 — A11 / A13	OUT106	112 RECLOSE OR (SCADA) CLOSE	$$02	B	SK-AMP-10.113
A15 — A14 / A16	OUT107				
A18 — A17 / A19	OUT108	RELAY FAIL ALARM (TO 11Bb/I)	$$01	J	SK-AMP-10.112-2
A20 — A21	IN101	TRIP DURING COMM FAIL CH 1	$$01	A	SK-AMP-10.112-2
A22 — A23	IN102	TRIP DURING COMM FAIL CH 2			SK-AMP-10.112-2
A24 — A25	IN103				
A26 — A27	IN104	111 TRIP CIRCUIT MONITOR			SK-AMP-10.113
A28 — A29	IN105	111 BREAKER ALARM			SK-AMP-10.112-2
A31 — A30 / A32	IN106 / IN107	111 STATUS 52a	$$01	E	SK-AMP-10.112-2
I/O BOARD POSITION B					
B01 — B02	OUT201				
B03 — B04	OUT202	113 PROT. OR (SCADA) TRIP	$$02	E	SK-AMP-10.113
B05 — B06	OUT203	113 RECLOSE OR (SCADA) CLOSE	$$02	F	SK-AMP-10.113
B07 — B08	OUT204				
B09 — B10	OUT205				
B11 — B12	OUT206				
B13 — B14	OUT207				
B15 — B16	OUT208				
B17 — B18	IN201	112 TRIP CIRCUIT MONITOR			SK-AMP-10.113
B19 — B20	IN202	112 BREAKER ALARM			SK-AMP-10.112-2
B21 — B22	IN203	112 STATUS 52a	$$02	C	SK-AMP-10.112-2
B32	IN204 – IN210				
	IN211	113 STATUS 52a	$$02	G	SK-AMP-10.112-2
	IN212	113 BREAKER ALARM			SK-AMP-10.112-2
B33 — B34	IN213	113 TRIP CIRCUIT MONITOR			SK-AMP-10.113
B35 — B36	IN214				
B37 — B38	IN215				
B48	IN216 – IN220				
	IN221 – IN224				
I/O BOARD POSITION C					
C01 — C02	OUT301				
C03 — C04	OUT302				
C05 — C06	OUT303				
C07 — C08	OUT304				
C09 — C10	OUT305				
C11 — C12	OUT306				
C13 — C14	OUT307				
C15 — C16	OUT308				
C17 — C18	IN301				
C19 — C20	IN302				
C21 — C22	IN303				
C32	IN304 – IN312				
C33 — C34	IN313				
C35 — C36	IN314				
C37 — C38	IN315				
C48	IN316 – IN320				
	IN321 – IN322				
	IN323	PQM/I FAIL	$$01	I	SK-AMP-10.112-2
	IN324	RELAY FAIL FROM 11Ba/I			SK-AMP-10.112-2
COMMUNICATIONS BAYS					
10/100 BASE-T					
		ETHERNET - PORT 5C			THIS DRAWING
		ETHERNET - PORT 5D			
		SERIAL - PORT 1			
		SERIAL - PORT 2			
		SERIAL - PORT 3			
		IRIG-B			

PUSHBUTTON OPERATION:

1. UNLOCKING (PB12 - 3 SEC) ENABLES CONTROL VIA THE REST OF THE PUSHBUTTONS.
2. SELECT A BREAKER TO CONTROL (PB1 - PB6). AMBER LIGHT WILL INDICATE THE PRESENT SELECTION.
3. WITH A BREAKER SELECTED, PB7 - PB11 CAN BE USED TO ENABLE/DISABLE FUNCTIONS FOR, OR TRIP/CLOSE THAT SPECIFIC BREAKER. AMBER LIGHT WILL INDICATE 43 LOCAL. GROUND RELAY IN, 79 IN OR 51GL (COLD LOAD) ENABLED, ONLY FOR THE BREAKER PRESENTLY SELECTED (WHICH HAS AMBER LIGHT ILLUMINATED).
4. UNDER NORMAL CONDITIONS, RELAY IS LOCKED WHICH DE-SELECTS ALL BREAKERS, DE-ASSERTING ALL PUSHBUTTON LEDS. TO SEE WHICH FUNCTIONS (PB7 - PB11) ARE ENABLED/DISABLED FOR EACH BREAKER, SEE RELAY FRONT PANEL DISPLAY.
5. FOR REDUNDANCY, BOTH THE A-SYSTEM AND B-SYSTEM RELAYS ARE CONTROLLED SIMULTANEOUSLY VIA THEIR OWN, AS WELL AS THE OTHER'S, PUSHBUTTONS.

PB1 YYY111 SELECT
PB2 YYY112 SELECT
PB3 YYY113 SELECT
PB4
PB5
PB6
PB7 43 LOCAL/REMOTE
PB8 TRIP/CLOSE
PB9
PB10
PB11
PB12 UNLOCK/LOCK (3 SEC)

0487BIX4X52XCOXCH8MMXXX

NOTES:

1. SEE ONE LINE FOR DEVICE LEGEND.
2. DO NOT USE OUTPUTS IO1-IO3 (POLARITY SENSITIVE) IN AC CIRCUITRY.
3. BEFORE PERFORMING MAINTENANCE ON 87T/I OR 11B/I DEVICES, REMOVE COMMUNICATIONS CABLING (EXPECT COMMUNICATIONS FAILURE ALARMING).

REFERENCE DRAWINGS:

12.47KV BAYS I AND 2 ONE LINE DIAGRAM ____ SK-AMP-8.2
12.47KV BAY I, XFMR AND SWGR UNITS 1-2 THREE LINE DIAG. ____ SK-AMP-9.6
12.47KV BAY I SWGR UNITS 3-4 THREE LINE DIAGRAM ____ SK-AMP-9.7
12.47KV BAY I SWGR BREAKERS 111-113 SCHEMATIC DIAGRAMS ____ SK-AMP-10.113
12.47KV BAY I SWGR AUX PWR AC AND DC SCHEMATIC DIAGRAM ____ SK-AMP-10.114
69KV TRANSFORMER PROTECTOR YYY315 CONNECTION DIAGRAM ____ XXXX-11.111
12.47KV BAY I SWGR UNITS 1-4 CONNECTION DIAGRAM ____ SK-AMP-11.112
69/12KV BAY I IPACS PANEL * CONNECTION DIAGRAM ____ XXXX-12.7

KEY

* _____ BAY NUMBER
_____ PANEL NUMBER (NUMBERS ONLY)
$$ _____ PANEL SWITCH NUMBER (USE LEADING 0 IF SINGLE DIGIT)
XXXX _____ DRAWING SERIES NUMBER
YYY _____ SITE SPECIFIC INFO
ZZZ _____ STATION CODE

ISSUED FOR BIDS

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

SRP SUBSTATION DESIGN PHOENIX - ARIZONA

DISTRIBUTION SUBSTATION 69/ 4.16 KV XFMR I AND BAY I PROTECTION AND CONTROL SCHEMATIC DIAGRAM, SH I

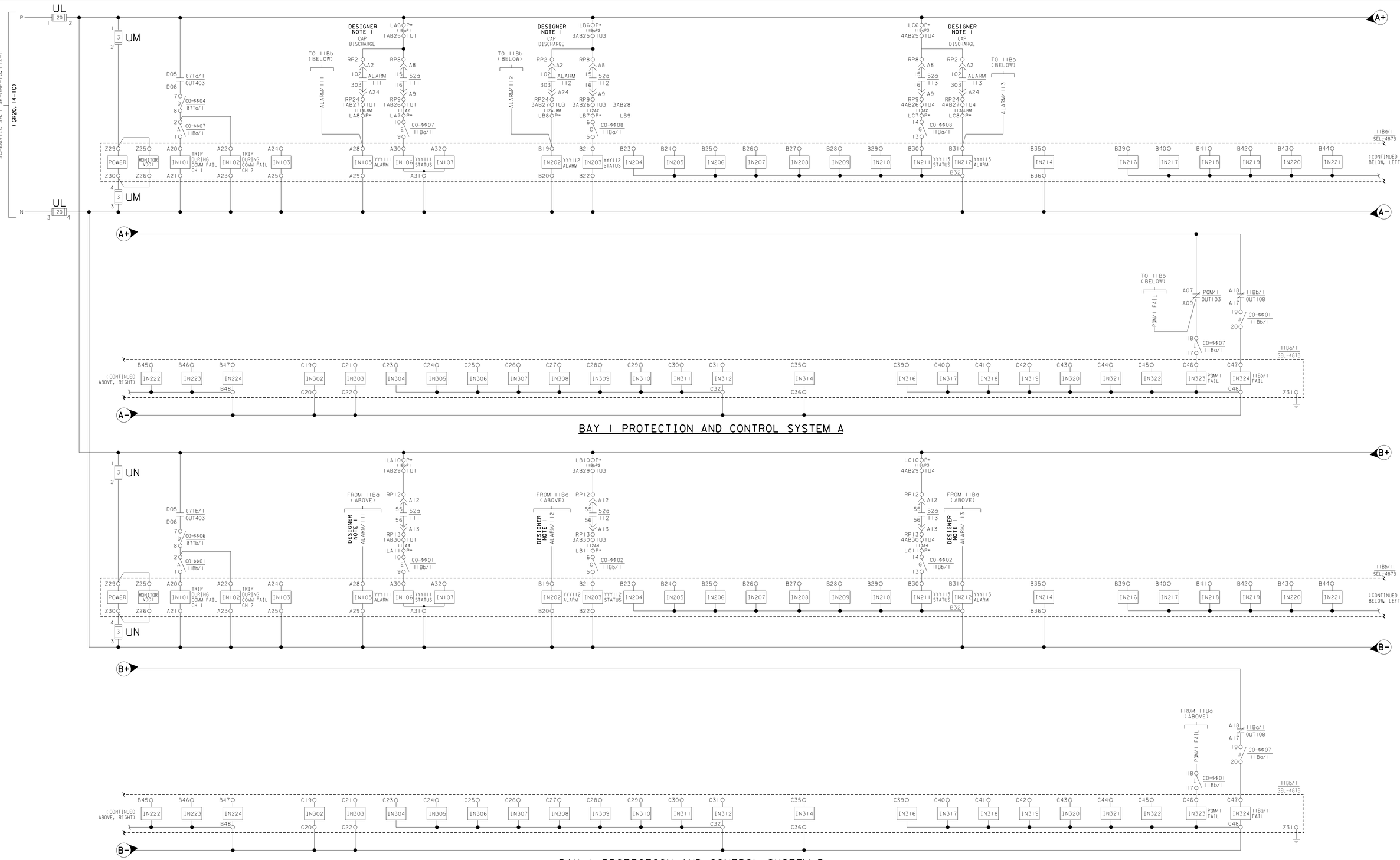
SCALE: NONE			
SUB-L CODE	DISTR CODE	DWG SIZE	SK-AMP-10.112-1
ME	E10	30x42	

REV	DATE	DESCRIPTION	BY	CHKD
1	11/2019	ADDED BAY LEVEL RTU, BKR-AND-HALF I/O	AJS	AJS
2	02/2020	ADDED 87T OUT403, COMM. LOSS TRIP	AJS	AJS
3	08/2020	REMOVED BAY-LEVEL RTU	AJS	AJS

FROM M: GR20.14-IC
DRAWN: AJS DATE 05/2019
CHK AJS APPROVAL AJS
FILE NAME GR2014-IC.DGN

SUBSTATION CONSTRUCTION STANDARD
SRP PROPRIETARY MATERIAL

48V DC TO BAY 1 PROTECTION SCHEMATIC SH. 1 SK-AMP-10.112-1
(GR20.14-1C)



BAY 1 PROTECTION AND CONTROL SYSTEM A

BAY 1 PROTECTION AND CONTROL SYSTEM B

NOTES:

1. SEE ONE LINE FOR DEVICE LEGEND.
2. BEFORE PERFORMING MAINTENANCE ON 87T/1 OR 11B/1 DEVICES, REMOVE COMMUNICATIONS CABLING (EXPECT COMMUNICATIONS FAILURE ALARMING).
3. THESE INPUTS (101-102) WILL ONLY CAUSE A TRIP IF BOTH ARE ASSERTED DURING A COMMUNICATIONS FAILURE CONDITION (AND 87T PROTECTIVE TRIP IS RECEIVED FOR 87, 86P, 81, 51, OR 50BF).

REFERENCE DRAWINGS:

12.47KV BAYS 1 AND 2 ONE LINE DIAGRAM	SK-AMP-8.2
12.47KV BAY 1, XFMR AND SWGR UNITS 1-2 THREE LINE DIAG.	SK-AMP-9.6
12.47KV BAY 1 SWGR UNITS 3-4 THREE LINE DIAGRAM	SK-AMP-9.7
12.47KV BAY 1 SWGR BREAKERS 111-113 SCHEMATIC DIAGRAMS	SK-AMP-10.113
12.47KV BAY 1 SWGR AUX PWR AC AND DC SCHEMATIC DIAGRAM	SK-AMP-10.114
69KV TRANSFORMER PROTECTOR YYY315 CONNECTION DIAGRAM	XXXX-11.111
12.47KV BAY 1 SWGR UNITS 1-4 CONNECTION DIAGRAM	SK-AMP-11.112
69/12KV BAY 1 IPACS PANEL * CONNECTION DIAGRAM	XXXX-12.?

DESIGNER NOTES:

1. WIRE IN EXTRA BREAKER ALARM (RP2 AND RP24) WHEN APPLICABLE, DEPENDING ON BREAKER TYPE (E.G. ABB AMVAC CAP DISCHARGE ALARM)

KEY

I	BAY NUMBER
*	PANEL NUMBER (NUMBERS ONLY)
ss	PANEL SWITCH NUMBER (USE LEADING 0 IF SINGLE DIGIT)
XXXX	DRAWING SERIES NUMBER
?	SITE SPECIFIC INFO
YYY	STATION CODE

ISSUED FOR BIDS

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
2	--------	12/20	AJS	AJS	AJS	AJS

SUBSTATION DESIGN
PHOENIX - ARIZONA

DISTRIBUTION SUBSTATION 4.16 KV BAY 1 PROTECTION AND CONTROL SCHEMATIC DIAGRAM, SH 2

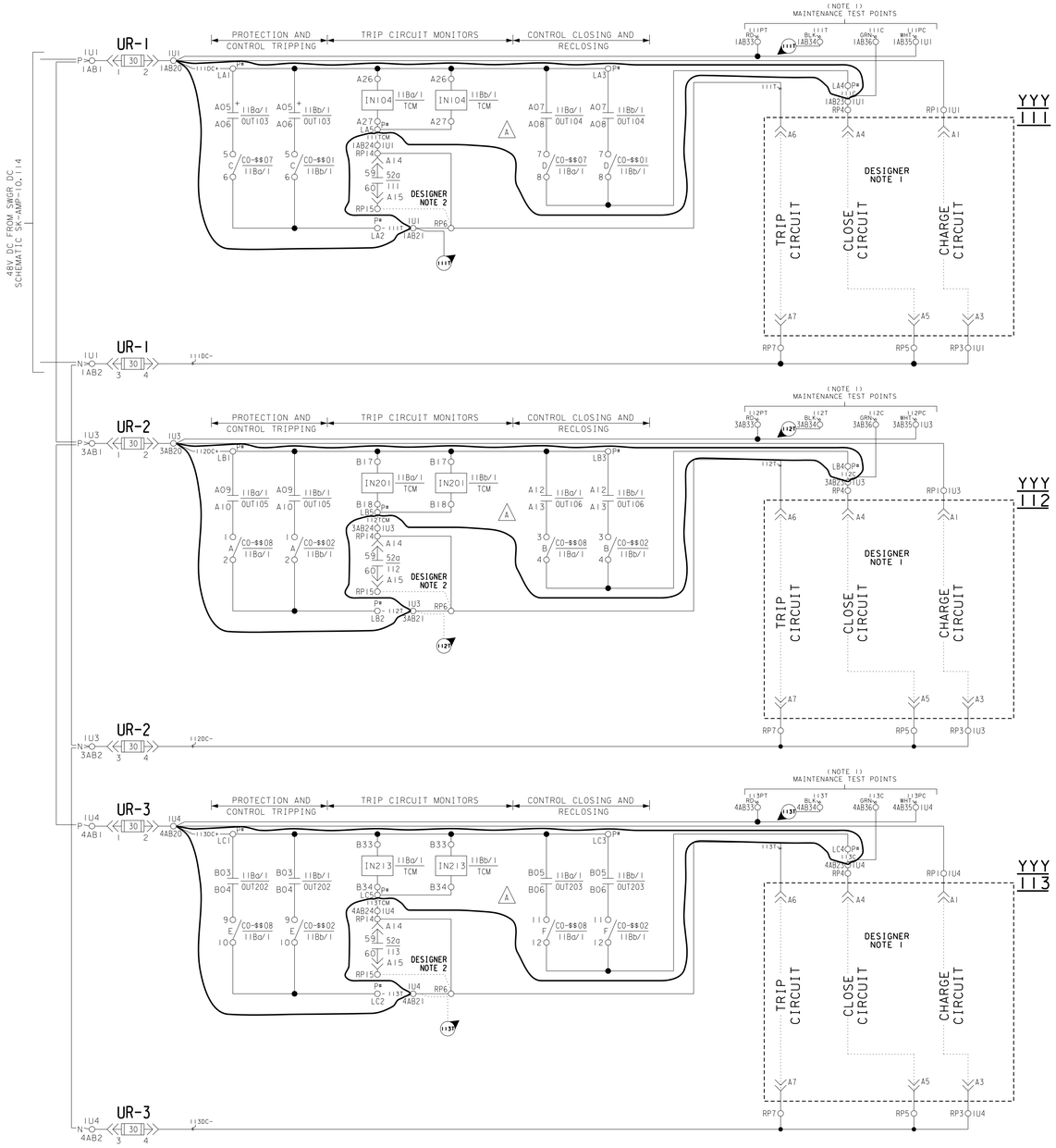
SCALE: NONE			
DUBU CODE	DISTR CODE	DWG SIZE	SK-AMP-10.112-2
ME	E10	30x42	

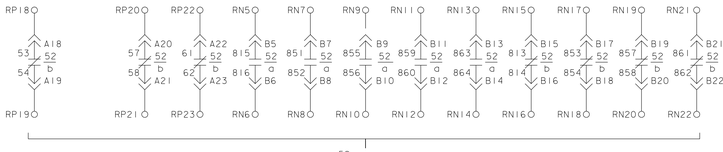
REV	DATE	DESCRIPTION	BY	CHKD
1	02/2020	ADDED IN101, 102 COMM. LOSS TRIP	AJS	AJS

SUBSTATION CONSTRUCTION STANDARD
PROPRIETARY MATERIAL

FDW NO. GR20.14-2C
DRAWN AJS | DATE 09/2019
CHK AJS | APPROVAL AJS
FILE NAME GR2014-2C.DGN

12KV IPACS, CH INSTALLATION 10-5.12-2 DF:GR2014-2C.DGN





DESIGNER NOTES:

1. INTEGRATED CIRCUIT BREAKER INTERNALS ARE NOT SHOWN. FOR OTHER TYPES, PLEASE SHOW INTERNAL CIRCUIT DIAGRAM.

2. FOR BREAKERS WITHOUT A 52a CONTACT TO BREAK THE TRIP COIL CIRCUIT WHEN IN THE OPEN POSITION (E.G. AMVAC), REMOVE JUMPERS BETWEEN RP6 AND RP14 AND CONNECT RP6 TO RP15.

CONTROL AND RELAYING LEGEND

11B MULTI-FUNCTION RELAY (O/C, UF). TYPE SEL-487B

BREAKER LEGEND

52a AUX SW CONTACT CLOSED WHEN BKR IS CLOSED
52b AUX SW CONTACT OPEN WHEN BKR IS CLOSED

NOTES:

1. SAFETY TEST TERMINALS INSTALLED AT INDICATED POINTS TO BE USED WITH TEMPORARILY CONNECTED BREAKER CONTROLS FOR MAINTENANCE TESTING.

2. INTEGRATED CIRCUIT BREAKER INTERNALS ARE NOT SHOWN (PLEASE SEE MANUFACTURER'S DRAWINGS).

3. (A) - INDICATES EQUIPMENT EXTERNAL TO SWITCHGEAR.

REFERENCE DRAWINGS:

12.47KV BAYS 1 AND 2 ONE LINE DIAGRAM ____ SK-AMP-8.2
12.47KV BAY 1 XFMR AND SWGR UNITS 1-2 THREE LINE DIAG. ____ SK-AMP-9.6
12.47KV BAY 1 SWGR UNITS 3-4 THREE LINE DIAGRAM ____ SK-AMP-9.7
69/12KV XFMR 1 AND BAY 1 PROT. AND CONTROL SCHEM. DIAG. ____ SK-AMP-10.112-1,-2
12.47KV BAY 1 SWGR AUX PWR AC AND DC SCHEMATIC DIAGRAM ____ SK-AMP-10.114
12.47KV BAY 1 SWGR UNITS 1-4 CONNECTION DIAGRAM ____ SK-AMP-11.112
69/12KV BAY 1 IPACS PANEL * CONNECTION DIAGRAM ____ XXXX-12.?

MFR _____ TYPE _____
SERIAL NO. _____
PURCHASED ON P.O.# _____

INSTRUCTION MANUAL NO.	INFORMATION TAKEN FROM: MFR DWG NO.	SHT	REV
--_---_----------	----------	--	--

KEY

*	BAY NUMBER
**	PANEL NUMBER (NUMBERS ONLY)
XXXX	PANEL SWITCH NUMBER (USE LEADING 0 IF SINGLE DIGIT)
?	DRAWING SERIES NUMBER
YYY	SITE SPECIFIC INFO
	STATION CODE

ISSUED FOR BIDS

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

SUBSTATION DESIGN
PHOENIX - ARIZONA

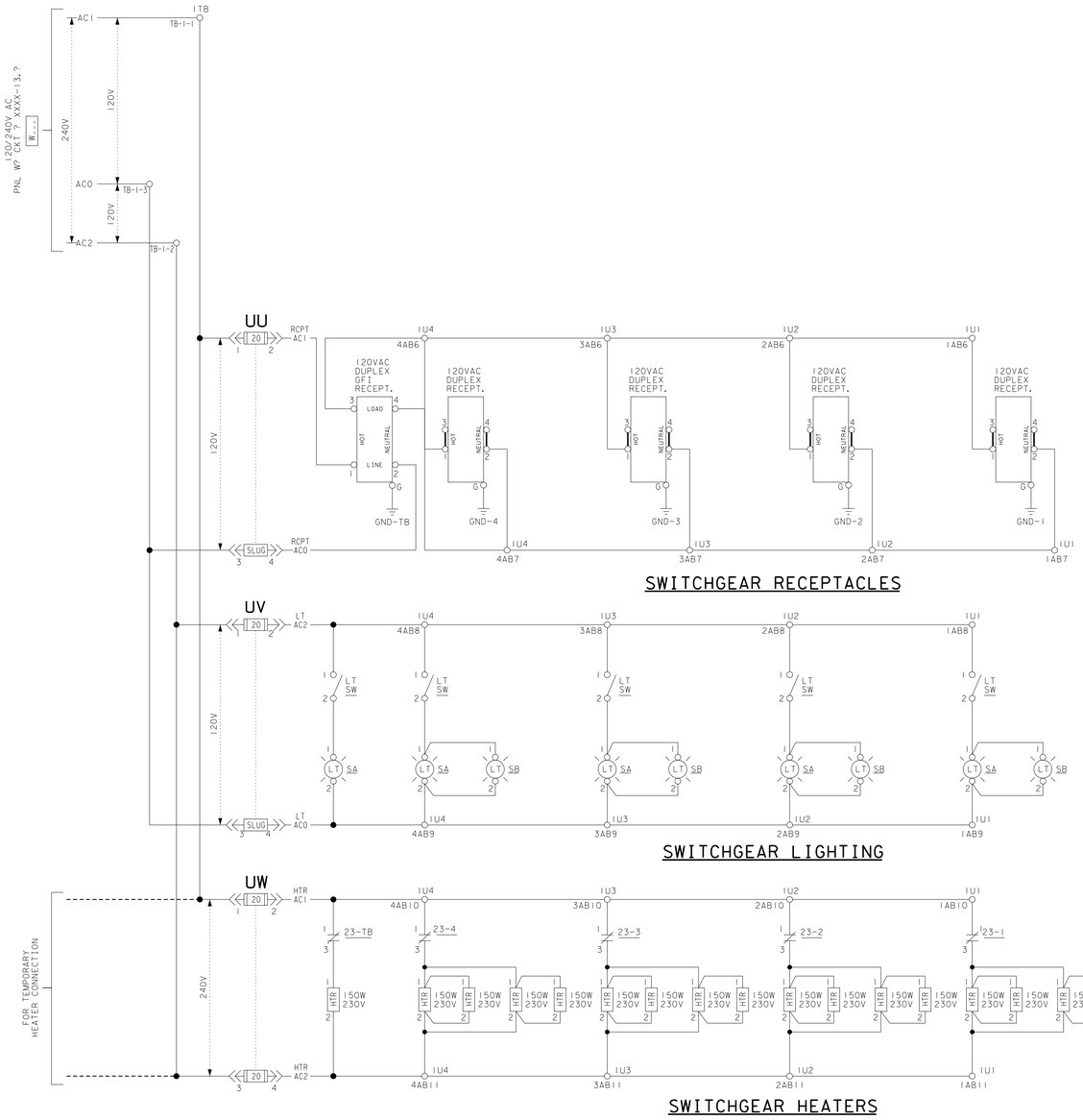
DISTRIBUTION SUBSTATION 4.16 KV BAY 1 SWITCHGEAR BREAKERS YYY111 - YYY113 SCHEMATIC DIAGRAMS

SCALE: NONE				
SUBJ CODE	DISTR CODE	DWG SIZE	SK-AMP-10.113	
SG-B	E10	30x42		

REV	DATE	DESCRIPTION	BY	CHKD
1	11/2019	MINOR CORRECTIONS	AJS	AJS

SUBSTATION CONSTRUCTION STANDARD
PROPRIETARY MATERIAL

FDW ID: GR20.15C
DRAWN: AJS 05/2019
CHKD: AJS
DGN: GR2015C.DGN

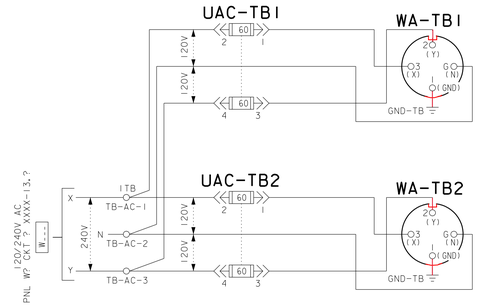


SWITCHGEAR RECEPTACLES

SWITCHGEAR LIGHTING

SWITCHGEAR HEATERS

SWITCHGEAR DC SCHEMATIC



SWITCHGEAR UTILITY OUTLETS

NOTES:

REFERENCE DRAWINGS:

69/12KV XFMR 1 AND BAY 1 PROT. AND CONTROL SCHEM. DIAG. SK-AMP-10.112-1,-2
12.47KV BAY 1 SWGR BREAKERS 111-113 SCHEMATIC DIAGRAMS SK-AMP-10.113
12.47KV BAY 1 SWGR UNITS 1-4 CONNECTION DIAGRAM SK-AMP-11.112
STATION SERVICE DC WIRING DIAGRAM XXXX-13.1
STATION SERVICE AC WIRING DIAGRAM XXXX-13.2

MFR _____ TYPE _____
SERIAL NO. _____
PURCHASED ON P.O.# _____

INSTRUCTION MANUAL NO.	INFORMATION TAKEN FROM MFR DWG NO.	SHT	REV
--"---"----------	---------	--	--

KEY
1 _____ BAY NUMBER
XXXX _____ DRAWING SERIES NUMBER
? _____ SITE SPECIFIC INFO

ISSUED FOR BIDS

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

SUBSTATION DESIGN
PHOENIX - ARIZONA

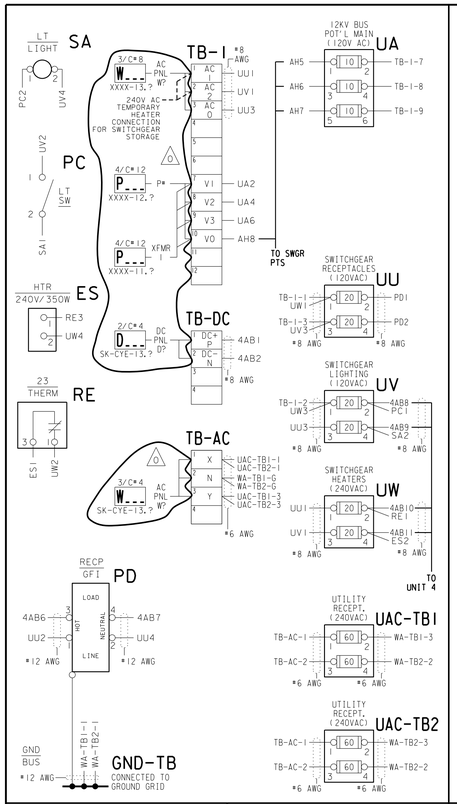
DISTRIBUTION SUBSTATION 4.16 KV BAY 1 SWITCHGEAR AUX POWER AC AND DC SCHEMATIC DIAGRAMS

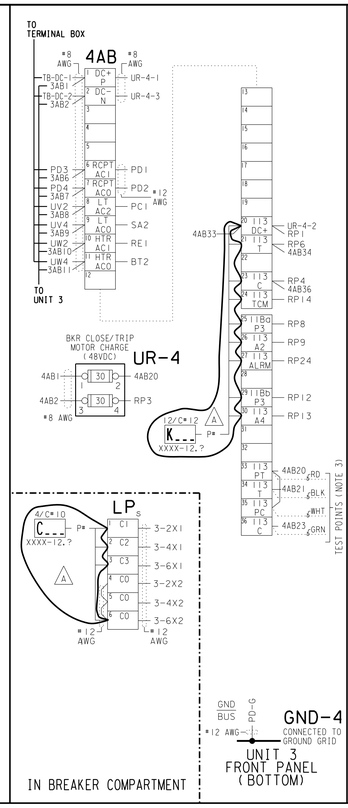
SCALE: NONE			
SUBJ CODE	DISTR CODE	DWG SIZE	SK-AMP-10.114
ME	E10	30x42	

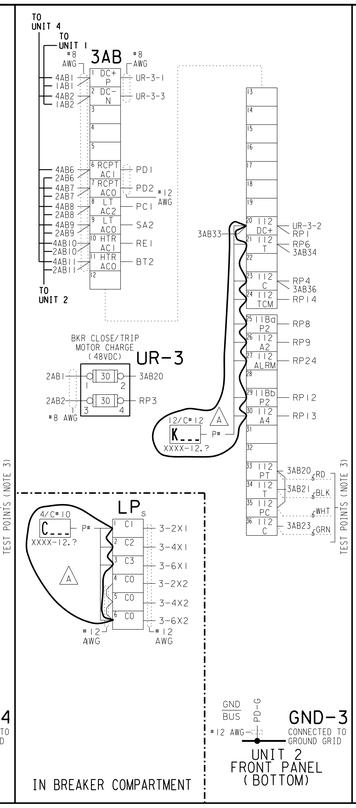
DESCRIPTION	BY	CHKD
RELOCATED SWGR TEST OUTLET	AJS	AJS

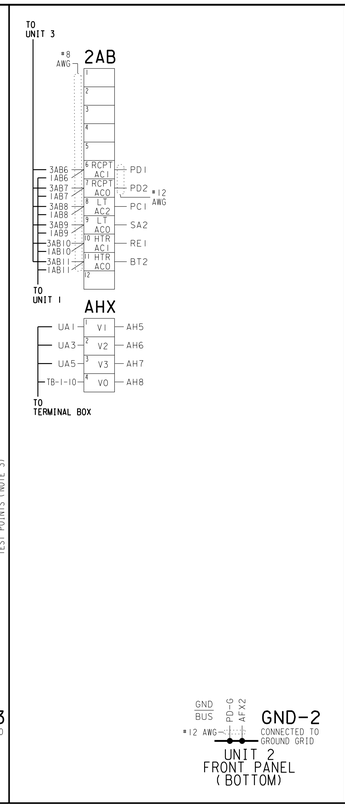
SUBSTATION CONSTRUCTION STANDARD
PROPRIETARY MATERIAL

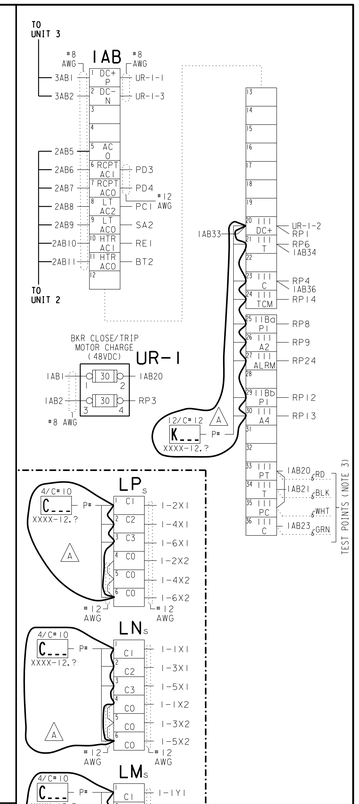
FDN NO.	GR20.16
DRAWN	AJS
DATE	05/2019
CHKD	AJS
DATE	12/2019
APPRVD	AJS
FILE NAME	GR2016.DGN

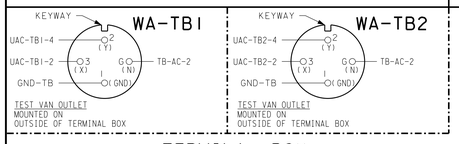












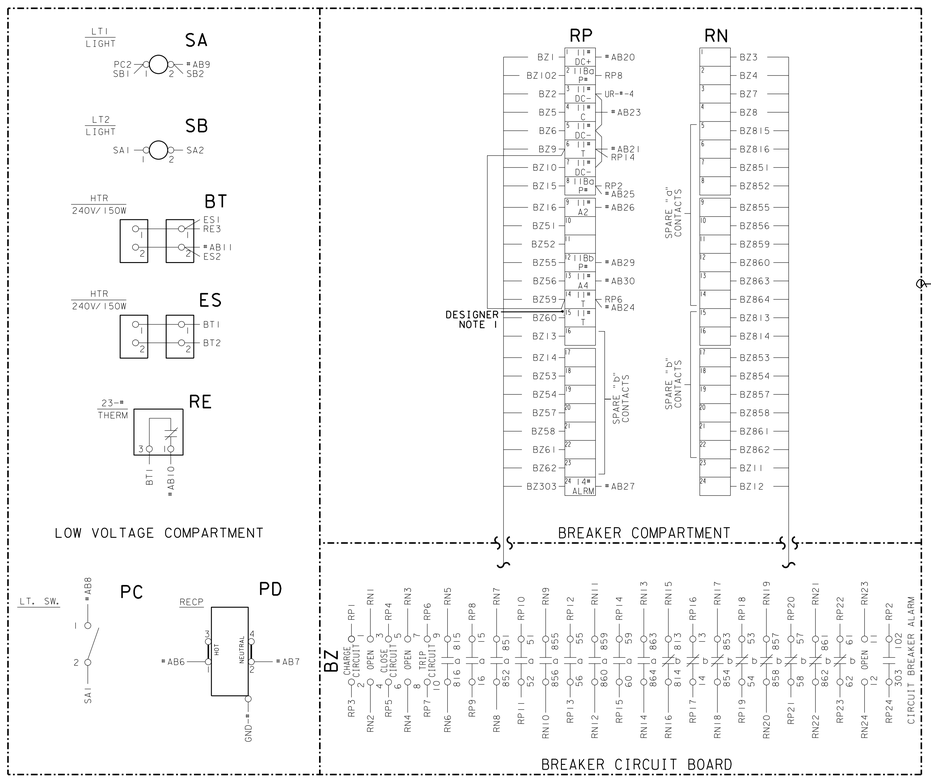
UNIT 4
LOW VOLTAGE COMPARTMENT

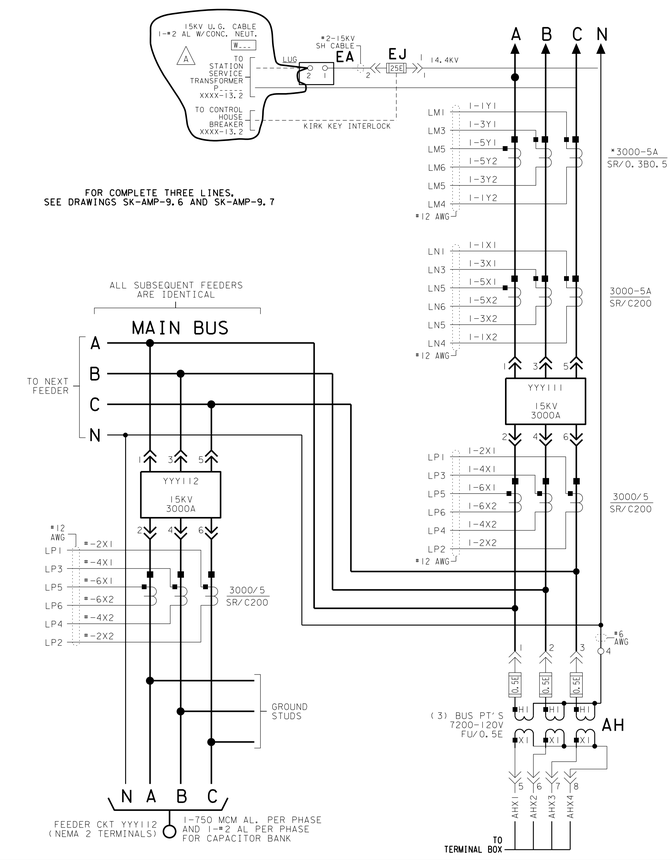
UNIT 3
LOW VOLTAGE COMPARTMENT

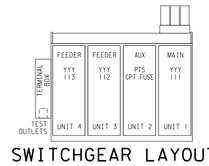
UNIT 2
LOW VOLTAGE COMPARTMENT

UNIT I
LOW VOLTAGE COMPARTMENT

TERMINAL BOX







SWITCHGEAR LAYOUT

DESIGNER NOTES:

1. FOR BREAKERS WITHOUT A 52A CONTACT TO BREAK THE TRIP COIL CIRCUIT WHEN IN THE OPEN POSITION (E.G. AMVAC), REMOVE JUMPER BETWEEN RP6 AND RP14 (11*TCM), AND CONNECT RP6 TO RP15 (11*T).

NOTES:

1. ALL INTERNAL PANEL WIRING (EXCEPT GROUND AND CT WIRING) SHALL BE AWG.#14, UNLESS OTHERWISE NOTED. ALL CT AND GROUND WIRING SHALL BE AWG.#12 MIN.

2. THE ONLY GFCI RECEPTACLE IS LOCATED IN TERMINAL BOX (OR FIRST POINT IN FROM AC SUPPLY). ALL OTHER SWITCHGEAR RECEPTACLES ARE LOADS, AND CIRCUIT TRIPS MUST BE RESET AT GFCI.

3. SAFETY TEST TERMINALS INSTALLED TO BE USED WITH TEMPORARILY CONNECTED BREAKER CONTROLS FOR MAINTENANCE TESTING.

4. * - METERING CLASS INSTRUMENT TRANSFORMER

5. (A) - INDICATES EQUIPMENT EXTERNAL TO SWITCHGEAR

REFERENCE DRAWINGS:

12.47KV BAYS 1 AND 2 ONE LINE DIAGRAM	SK-AMP-8.2
12.47KV BAY 1 XFMR AND SWGR UNITS 1-2 THREE LINE DIAG.	SK-AMP-9.6
12.47KV BAY 1 SWGR UNITS 3-4 THREE LINE DIAGRAM	SK-AMP-9.7
69/12KV XFMR 1 AND BAY 1 PROT. AND CONTROL SCHEM. DIAG.	SK-AMP-10.112-1,-2
12.47KV BAY 1 SWGR BREAKERS 111-113 SCHEMATIC DIAGRAMS	SK-AMP-10.113
69/12KV BAY 1 IPACS PANEL * CONNECITON DIAGRAM	XXXX-12.?

KEY

1	BAY NUMBER
*	PANEL NUMBER (NUMBERS ONLY)
XXXX	DRAWING SERIES NUMBER
?	SITE SPECIFIC INFO
YYY	STATION CODE

ISSUED FOR BIDS

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

REV	DATE	DESCRIPTION	BY	CHKD
1	12/2019	RELOCATED SWGR TEST OUTLET	AJS	AJS
2	04/2020	CORRECTED KEYWAY ON TEST OUTLET	AJS	AJS

SUBSTATION CONSTRUCTION STANDARD — PROPRIETARY MATERIAL

SUBSTATION DESIGN
PHOENIX - ARIZONA

MFR _____ TYPE _____
SERIAL NO. _____
PURCHASED ON P.O.# _____

INSTRUCTION MANUAL NO.	INFORMATION TAKEN FROM MFR DWG NO.	SHT	REV
--"---"----------	----------	--	--

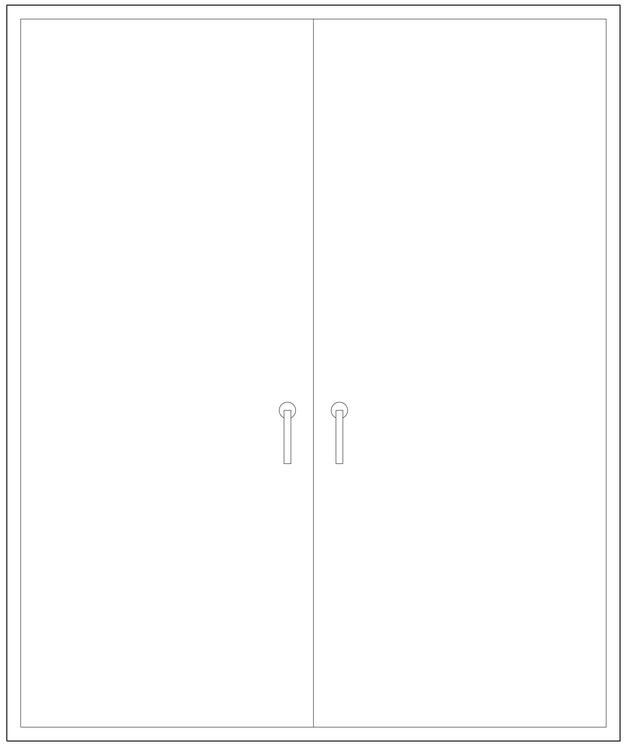
DISTRIBUTION SUBSTATION 4.16 KV BAY 1 SWITCHGEAR UNITS 1-4 AND TERM. BOX CONNECTION DIAGRAM

SCALE: NONE

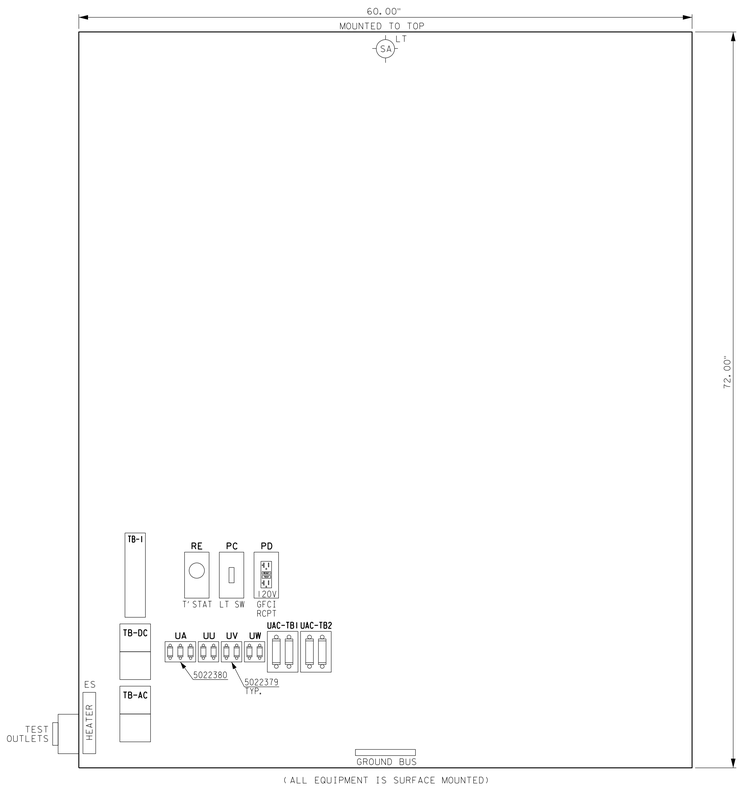
SUBJ CODE	DISTR CODE	DWG SIZE	
SG-B	E10	30x42	SK-AMP-11.112

FOR NO. GS20.15-IC | Drawn AJS | Ck'd AJS | File Name GS2015-IC.DGN

12KV IPACS, CH INSTALLATION 11-4.11-1 DF:GS2015-IC.DGN



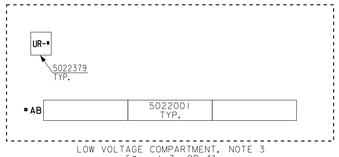
TERMINAL BOX (EXTERIOR)



(ALL EQUIPMENT IS SURFACE MOUNTED)

TERMINAL BOX (INTERIOR)

(LOCATIONS ARE APPROXIMATE)



LOW VOLTAGE COMPARTMENT, NOTE 3
[* = 1, 3, OR 4]

UNITS 1, 3, AND 4
CONTROL TERMINATIONS

FRONT VIEW

NOTES:

1. 5_____ DENOTES SRP MATERIAL NUMBERS

2. SWITCHGEAR MFR. SUPPLIED ITEMS (BREAKER TERMINAL BLOCKS, CT SHORTING BLOCKS, LIGHTING/RECPT./HEATING ITEMS) NOT SHOWN HERE.

3. ITEM LOCATIONS WILL VARY BY SWITCHGEAR MFR.

4. (A) – INDICATES CHANGES TO SWITCHGEAR AFTER RECEIPT

REFERENCE DRAWINGS:

12.47KV BAY 1 SWGR UNITS 1-4 CONNECTION DIAGRAM _____ SK-AMP-11.112
BAY 1 SWGR SWINGING NAMEPLATES _____ SK-AMP-12.112NP

SWITCHGEAR LAYOUT

KEY
1 _____ BAY NUMBER
XXXX _____ DRAWING SERIES NUMBER
? _____ SITE SPECIFIC INFO
YYY _____ STATION CODE

REV NO.	JOB NO.	DATE	DSGN ENGR	DFTR	DESIGN CHECK	ISSUE APPRVD
A	--------	12/20	AJS	AJS	AJS	AJS

ISSUED FOR BIDS

MFR _____ TYPE _____
SERIAL NO. _____
PURCHASED ON P.O.* _____

INSTRUCTION MANUAL NO.	INFORMATION TAKEN FROM MFR DWG NO.	SHT	REV
---'---'----------	----------	--	--

SRP® SUBSTATION DESIGN
PHOENIX - ARIZONA

DISTRIBUTION SUBSTATION 4.16 KV BAY 1 SWITCHGEAR SWINGING PANEL LAYOUT

SCALE: 2"=1'-0"

SUBSJ CODE	DISTR CODE	DWG SIZE	SK-AMP-12.110
SG	E10	30x42	