

SHEET INDEX

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CIRCUIT NOTES:

DESIG	FUSE AMP	POTENTIAL	QUANTITY	
	F250	250V (INPUT)	2 PER RECTIFIER	SEE NOTES 203
A, B	FN25	600V (INPUT)	2 PER RECTIFIER	
CHG	FN150	-48V (OUTPUT)	1 PER RECTIFIER	
CHG ALM	70G	-48V (OUTPUT)	1 PER RECTIFIER	
CONTR	70D	-48V (OUTPUT)	1 PER RECTIFIER	

FEATURE OR OPTION	PROVIDE		QUANTITY
	APP FIG.	APP OR WRG	
CONSTANT VOLTAGE -48V 100 AMP PER KS-20493, L21 RECTIFIER FOR CHARGING 24 CELL BATTERY PLANTS 208/240 VAC VERSION	1	Z	ONE PER RECTIFIER
CONSTANT VOLTAGE -48V 100 AMP PER KS-20493, L22 RECTIFIER FOR CHARGING 24 CELL BATTERY PLANTS 480 VAC VERSION	1	Y	ONE PER RECTIFIER
208 VAC INPUT		Z, T	
240 VAC INPUT		Z, V	
480 VAC INPUT		Y	

CIRCUIT NOTES (CONT):

RECORD OF FIGURES, WIRING AND APPARATUS CHANGES						
CHANGED ON ISS	IF JOB RECORDS DO NOT SPECIFY	THIS OPTION WAS FURN	SEE NOTE	USE IN CIRCUIT		
				STD	A&M	MD
3B	R OR S	S	304	R		S
	P OR Q	Q	305	P		Q
	M OR N	N		M		N
	J OR K	K		J		K
4B	F OR G	G	306	F		G
	D OR E	E	107, 307	D		E
	B OR P	P		B		P
	ZA OR A	A	308	ZA		A
5B	ZC OR ZB	ZB	309	ZC		ZB
	ZE, ZR OR F, ZD	F, ZD	310, 311	ZE, ZR	F	71
	ZG OR ZF	ZF		ZG		ZF
	ZI, ZO OR ZH	ZH	106, 311	ZI, ZO		ZH
6AC	ZK OR ZJ	ZJ	108,	ZK		ZJ
	ZL	NONE	109,	ZL		NONE
	ZM OR ZN	ZN	312	ZM		ZN
	ZT OR ZO	ZO		ZT		ZO
7B	ZP OR ZQ	ZQ	313	ZP		ZQ
	ZS OR ZR	ZR	314, 315	ZS		ZR

104. Z-OPTION RECTIFIERS ARE SHIPPED FROM THE FACTORY WITH THE MAIN TRANSFORMER, T1 AND THE DC POWER SUPPLY TRANSFORMER, T3 CONNECTED FOR 240V INPUT. FOR 208V INPUT INSTALLATIONS, RECONNECT TRANSFORMERS T1 AND T3 PER THE TABLE BELOW.

(T1) MAIN TRANSFORMER CONNECTIONS FOR 208V OR 240V INPUT

NOMINAL AC INPUT	ABSOLUTE AC VOLTAGE RANGE	T1 TERM. 2 TO ST3 TERM.	T1 TERM. 3 TO ST3 TERM.	OPTION
208	186-221	T3	T2	Z, T
240	216-253	T2	T3	Z, V

T(3) DC POWER SUPPLY TRANSFORMER CONNECTION FOR 208V OR 240V INPUT

NOMINAL AC INPUT	ABSOLUTE AC VOLTAGE RANGE	BROWN WIRE TO T3 TERM.	OPTION
208	186-221	2	Z, T
240	216-253	3	Z, V

105. TAPS 10-13 ON (T1) ARE FOR FACTORY ADJUSTMENT WHICH COMPENSATES FOR COMPONENT TOLERANCES IN TANK CIRCUITRY.
106. IF PLANT REQUIRES RECTIFIER GND FOR RFA ALARM, INSTALLER SHALL CONNECT TO TERMINAL 8 OF PLANT CONTROL DISCONNECT CONNECTOR (J1). ON RECTIFIERS EQUIPPED WITH ZI-OPTION AND ZO OR ZP-OPTIONS, IF PLANT REQUIRES RFA ALARM LOOP-CLOSURE, INSTALLER SHALL DISCONNECT (CUT OUT) RED JUMPER WIRE (RECTIFIER GND) BETWEEN STAND-OFF TERMINALS B2-C2 ON CPS, ALARM CIRCUITS BOARD, AND CONNECT PLANT CONTROL LEADS RFA AND RFA-RTN TO TERMINALS 8 AND 12 OF PLANT CONTROL DISCONNECT CONNECTOR (J1).
107. WHEN RECTIFIERS EQUIPPED WITH B- AND D-OPTIONS ARE CONNECTED TO AN EXTERNAL CHARGE FUSE AND VOLTAGE ADJUST PANEL PER ED-12313-30, INSTALLER SHALL STRAP OUT THE FINE ADJ VOLT, R40 RHEOSTAT BY CONNECTING A 22GA, SOLID WIRE BETWEEN TERMINALS 1-2 ON R40.
108. ZK-OPTION (FAST WALK-IN RESET), ZL-OPTION (OVERVOLTAGE SHUTDOWN) AND ZN-OPTION (REMOTE RECYCLE) MUST BE FURNISHED WHEN RECTIFIER IS USED IN THE 151A POWER PLANT (J66872A) FOR NO. 3 ESS. (SEE NOTE 312.)
109. WHEN USED IN POWER PLANTS FOR ESS AND FOR NORMAL FLOAT AND CHARGE OPERATION IN OTHER PLANTS, JUMPER ON CM1 SHALL BE CONNECTED TO TP2. WHEN END CELL AND 2.30 VOLTS PER CELL CHARGING IS REQUIRED, DISCONNECT JUMPER FROM TP2 AND CONNECT TO TP1. RESTORE TO TP2 WHEN CHARGING IS COMPLETED.

SUPPORTING INFORMATION

CATEGORY	NO.
CIRCUIT PACK SCHEMATICS	SD-82030-01
MFR TEST REQUIREMENTS	L-502497
PLANT SPECIFICATIONS	J-86470 J-86471 J-87261
BSP OPERATING METHODS	169-745-301
BSP TROUBLE LOCATING	169-745-311

NOTICE - NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT.

SD-81999-01

1M99

POWER SYSTEMS

AT&T CO
STANDARDRECTIFIER CIRCUIT
FERRORESONANT TYPE
48VDC 100AMPAUTOMATIC REGULATION
KS-20493

2

SD-81999-01-1
8 SHEETSBELL TELEPHONE LABORATORIES
INCORPORATED

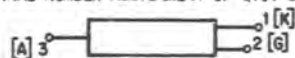
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EQUIPMENT NOTES:

201. WIRE SIZES SHALL BE AS SHOWN ON LATEST ISSUE OF T-81999-90.
202. EACH DC OUTPUT TERMINAL IS ARRANGED TO ACCOMMODATE ONE, 1/0 AWG CABLE LUG PER KS-15977, L5 OR APPROVED EQUIVALENT.
203. FUSES DESIGNATED FN SHALL BE OF THE MULTIPLE ELEMENT (TIME DELAY) TYPE.
204. PLANT CONTROL DISCONNECT, J1 CONNECTOR FURNISHED BY SUPPLIER AND SHIPPED ATTACHED TO P1 CONNECTOR. J1 CONNECTOR WILL ACCEPT NO. 16 AWG SOLID COPPER WIRE.
205. FRAME GROUNDING SHALL BE IN ACCORDANCE WITH SECTION 802-001-180.
206. INPUT AC FEEDERS CONNECT TO CABLE LUGS FURNISHED ON THE AC INPUT CONTACTOR (ST3). LUGS (SADDLE-TYPE) WILL ACCEPT CLASS B STRANDED NO. 6 TO NO. 14 AWG COPPER WIRE. ON EQUIPMENT MANUFACTURED TO ISSUES 1-48 OF THIS DRAWING, LUGS (SCREW-TYPE) WILL ACCEPT CLASS B STRANDED NO. 4 TO NO. 14 AWG COPPER WIRE.

INFORMATION NOTES:

301. UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
CAPACITANCE VALUES ARE IN MICROFARADS.
VALUES PRECEDED BY THE SYMBOL + (PLUS) OR - (MINUS) ARE IN VOLTS.
302. INFORMATION IN BRACKETS [] IS FOR REFERENCE ONLY.
303. THE TERMINAL NUMBER ASSIGNMENT OF Q1.1 OR Q1.2 THYRISTOR IS:



304. ONLY Z-OPTION RECTIFIERS, SERIAL NUMBERS 1 TO (AND INCLUDING) 251 MANUFACTURED WITH S-OPTION.
305. ONLY Z-OPTION RECTIFIERS, SERIAL NUMBERS 1 TO INCLUDING 251 MANUFACTURED WITH Q,N AND K-OPTIONS.
306. ONLY Z-OPTION RECTIFIERS, SERIAL NUMBERS 1 TO (AND INCLUDING) 224 AND Y-OPTION RECTIFIERS, SERIAL NUMBERS 1 TO (AND INCLUDING) 15 FURNISHED WITH G-OPTION EXTENDER BOARD.
307. B-AND D-OPTIONS FURNISHED BEGINNING WITH THE FOLLOWING SERIAL NUMBER RECTIFIERS. FOR FIELD RETRO FIT, A MOUNTING ADAPTER (LPC P/N 3314-101) IS FURNISHED WITH D-OPTION.

RECTIFIER OPTION	SERIAL NUMBER
Z	890
Y	139

308. ZA-OPTION FURNISHED BEGINNING WITH THE FOLLOWING SERIAL NUMBER RECTIFIERS.

RECTIFIER OPTION	SERIAL NUMBER
Z	225,291,336,347 TO 350, 402,403,431,432,451, 453 TO 456,458 TO 464,466, 467,473 TO 476,479 TO 488, 664 AND UP.
Y	16 TO 24,98 AND UP

309. ZC-OPTION FURNISHED BEGINNING WITH THE FOLLOWING SERIAL NUMBER RECTIFIERS.

RECTIFIER OPTION	SERIAL NUMBER
Z	890
Y	139

310. J1 CONNECTOR ON ZE-OPTION CP5, EXTENDER CIRCUIT BOARD IS EQUIPPED WITH A POLARIZING KEY TO PREVENT IMPROPER INSERTION OF CIRCUIT BOARDS CP1-CP4. ONLY ZA-OPTION CP2, ZE-OPTION CP1 AND CP4, AND ZI-OPTION CP3 CIRCUIT BOARDS ARE EQUIPPED WITH AN INDEXING SLOT WHICH ALLOWS MATING WITH ZE-OPTION CP5 CIRCUIT BOARD. HOWEVER, ALL CP1-CP4 CIRCUIT BOARDS WILL MATE WITH G AND F-OPTION EXTENDER BOARDS.

311. ZI,ZG,ZE,ZO AND ZR-OPTIONS FURNISHED BEGINNING WITH THE FOLLOWING SERIAL NUMBER RECTIFIERS.

RECTIFIER OPTION	SERIAL NUMBER
Z	1580
Y	225

312. ZK,ZL,ZN AND ZT - OPTIONS FURNISHED BEGINNING WITH THE FOLLOWING SERIAL NUMBER RECTIFIERS. FOR FIELD RETROFIT: PROVIDE KS-20493,L102 FAST WALK-IN RESET KIT FOR ZK-OPTION, KS-20493,L103 OVERVOLTAGE SHUTDOWN KIT FOR ZL-OPTION AND KS-20493,L104 REMOTE RECYCLE KIT FOR ZN-OPTION.

RECTIFIER OPTION	SERIAL NUMBER
Z	2425
Y	262

WHEN ZN-OPTION IS ADDED TO EXISTING RECTIFIERS, THE CP3 CIRCUIT PACK SHALL BE MODIFIED TO PROVIDE SURFACE WIRED CONNECTIONS FROM THE SPARE MAKE CONTACTS OF THE HV RELAY TO FINGERS 6 AND 7.

WHEN ZL-OPTION OVER VOLTAGE SHUTDOWN CIRCUIT, IS FURNISHED, REMOVE ZO-OPTION F3 FUSE AND PROVIDE ZI-OPTION F3 FUSE.

313. CPS ALARM CIRCUITS PACK PER KS-20618, L8 WAS PREVIOUSLY DESIGNATED ZI-OPTION AND CP1 PULSE CIRCUITS PACK PER KS-20618,L6 WAS PREVIOUSLY DESIGNATED ZE-OPTION ON ISSUE 58 OF THIS DRAWING.

INFORMATION NOTES (CONT):

314. ZP AND ZS OPTIONS FURNISHED BEGINNING WITH THE FOLLOWING SERIAL NUMBER RECTIFIERS. FOR FIELD RETROFIT OF ZP-OPTION, PROVIDE KS-20493,L101 RFA INHIBIT KIT.

RECTIFIER OPTION	SERIAL NUMBER
Z	2425
Y	262

315. KS-20618,L13 (CP3) CIRCUIT PACKS PER ZP-OPTION HAVING AN 05-7 DATE OF MANUFACTURE ARE 1/4 INCH SHORTER THAN NORMAL TO ALLOW USE OF THESE CIRCUIT PACKS. THE CIRCUIT PACK RETAINER IS EQUIPPED WITH SPACERS FASTENED BY 3/4 INCH NYLON BOLTS. WHEN REPLACING CP3 WITH A CIRCUIT PACK OF NORMAL LENGTH, REMOVE THE SPACERS BY REMOVING THE 3/4 INCH NYLON BOLTS. REPLACE THE NYLON BOLTS AND RETAIN SPACERS FOR POSSIBLE FUTURE USE.

OPTION INDEX

APP OR WRG	LOCATION	APP OR WRG	LOCATION
Z	APP. FIG. 1, 3C0,3D0,3E0, 3B1,3B2,3C2,3D2,4G1,7F1		
Y	APP. FIG. 1, 3B0,3D0,3E0, 3B1,3B2,3D2,4G1,7F1		
V	3D2,4G1,3C2,7F1		
T	3D2,4G1,7F1		
S	APP. FIG. 1, 4C3,4C4,4D7		
R	4C4,4D7		
Q	APP. FIG. 1, 3G7		
P	APP. FIG. 1, 3G7		
N	APP. FIG. 1, 3E7		
M	APP. FIG. 1, 3F7		
K	APP. FIG. 1, 4B7		
J	APP. FIG. 1, 4B7		
G	APP. FIG. 1, 4G8		
F	APP. FIG. 1, 4G6		
E	APP. FIG. 1, 3F8		
D	APP. FIG. 1, 3F8		
B	APP. FIG. 1, 3G7		
A	APP. FIG. 1, 3E5		
ZA	APP. FIG. 1, 3E6		
ZB	4B2		
ZC	APP. FIG. 1, 4B2,4D8,7D1		
ZD	APP. FIG. 1, 3D4,3F7,3C5,4E3		
ZE	APP. FIG. 1, 4E3, 3E4,4G6		
ZF	APP. FIG. 1, 3A5,3D3, 3B6,3D4		
ZG	APP. FIG. 1, 3A5,3B6,3D3, 3B5,3D4,3E3		
ZH	APP. FIG. 1, 4A5, 4C7, 7C1		
ZI	APP. FIG. 1, 4C7, 7C1		
ZJ	3E6,3H6,3H5,4C7,7C1		
ZK	APP. FIG. 1, 3E6,3G6, 3H5,4G3,4C7,3H4,3H6,7C1		
ZL	APP. FIG. 1, 3D8,3G0, 4A6,4A7,4E7		
ZM	4E4,4C5		
ZN	APP. FIG. 1, SHEET 4,7B1		
ZO	APP. FIG. 1, 4E2,4F2,4E4, 4D5,4A6		
ZP	APP. FIG. 1, 4E2,4F2,4D4, 4E4,4D5,4G6		
ZQ	APP. FIG. 1, 7B7		
ZR	APP. FIG. 1, 3C5		
ZS	APP. FIG. 1, 3C6		
ZT	APP. FIG. 1, 3B7		

SD-81999-01-2

RECTIFIER CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

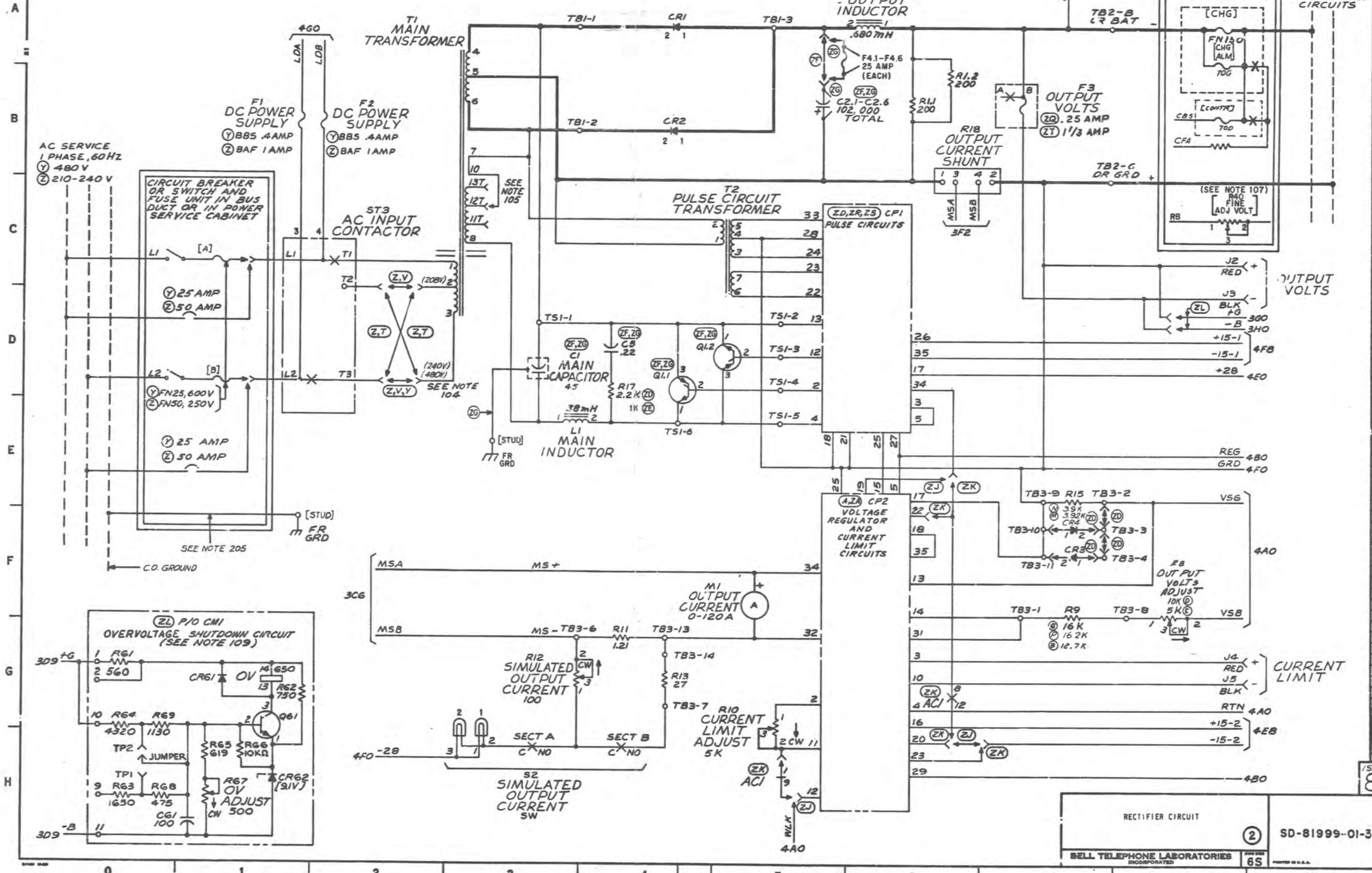
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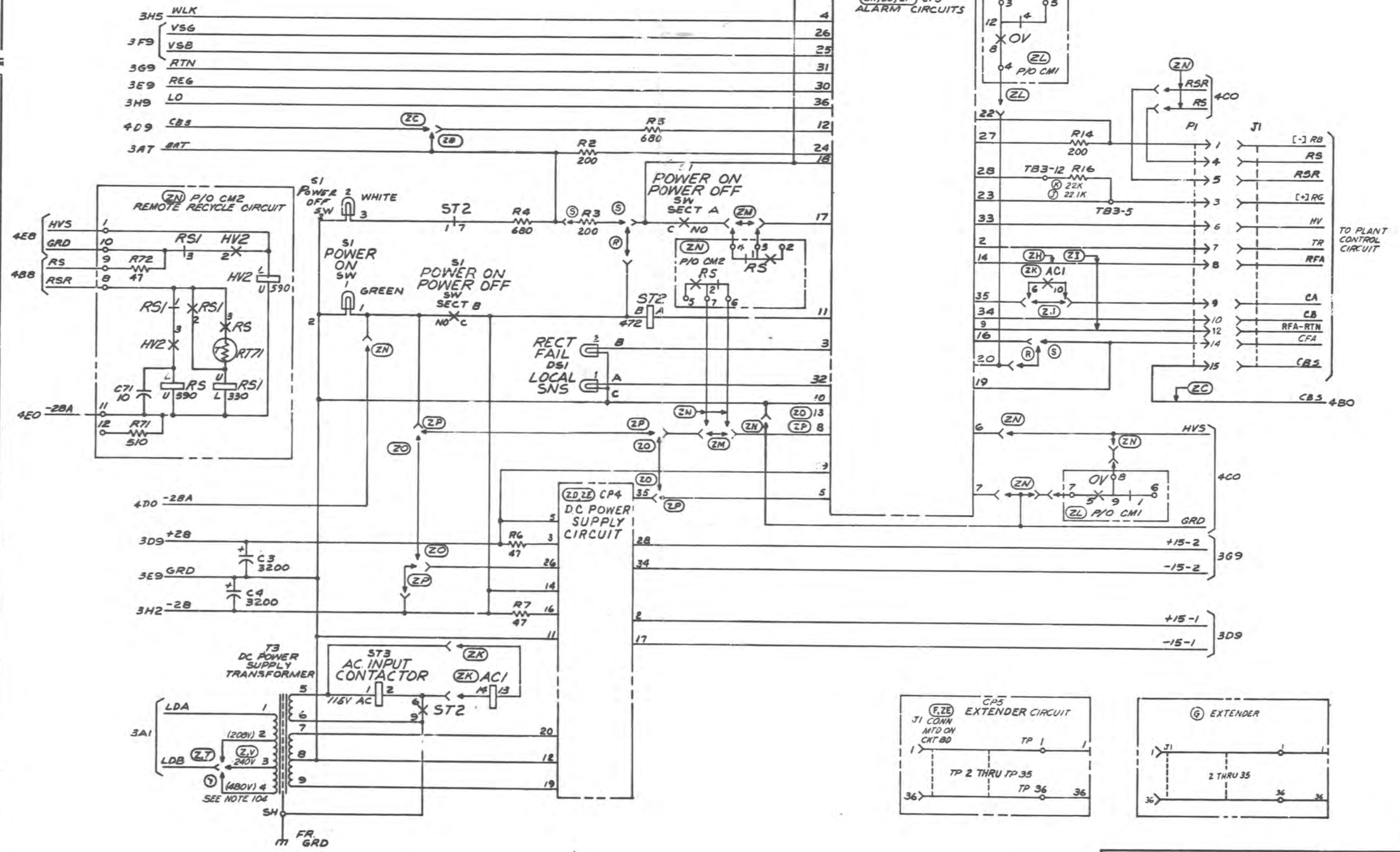
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PART OF FSI



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PART OF FS 1



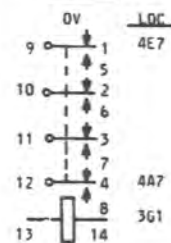
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PART OF APP FIG. 1

CIRCUIT PACK		OPTION	CODE
DESIG	LOC		
CP1	3C6	ZD ZR ZS	KS-20618, L1 KS-20618, L6 (SEE NOTE 313) KS-20618, L11
CP2	3E6	A ZA	KS-20618, L2 KS-20618, L7
CP3	4A6	ZH ZO ZP	KS-20618, L3 KS-20618, L8 (SEE NOTE 313) KS-20618, L13 (SEE NOTE 315)
CP4	4I4	ZD ZE	KS-20618, L4 KS-20618, L9
EXTENDER CP5 (EXTENDER)	4G8 4G6	G F ZE	LORAIN 4233-312 KS-20618, L5 KS-20618, L10

CIRCUIT MODULE		CODE
DESIG	LOC	
(ZL) CM1	3G0, 4A7, 4E7	LORAIN 4863-773

RELAY

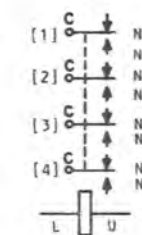


CODE			
MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
POTTER- BRUMFIELD KH17D11-24	C.P. CLARE CP1Q11D2000	2543-642	COIL: 24V DC CONTACTS: 30V DC, 3 AMP, 4C

CM1 PIN NO.	LOC	DESIG	LOC	OPTION	CODE		
					MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
1	3G0				CAPACITOR		
2	3G0						
3	4A7	C61	3H0		SPRAGUE 40D107G015004	2731-144	100, 25V DC
4	4A7				CALLINS 7-75ASD100-15-1		
5	4A7				MALLORY TTX101U015COR1P		
6	4E7						
7	4E7						
8	4E7						
9	3H0				DIODE		
10	3G0	LR61	3G1		G.E. CO. 1N5059 GEN. INSTRUMENTS 1N4305	2812-223	
11	3H0						
		CR62	3H1		UNITRODE CENTRALAB ITT FAIRCHILD	2835-543	9.1V, 1W
					IN 4739		
					RESISTOR		
		R61	3G0		I.R.C., DALE, MEMCOR, WARD-LEONARD, OHMITE	2651-536	560, 6.5W
		R62	3G1			2651-540	750, 6.5W
		R63	3H0		I.R.C. CEC	2635-635	1650±1%, 1W
		R64	3G0		DALE MFF-1/2	2635-657	4320±1%, 1W
		R65	3H1		WARD-LEONARD WLC70	2635-620	619±1%, 1W
		R66	3H0		MEPCO-ELECTRA MFC OR MFB	2635-607	475±1%, 1W
		R67	3G0			2635-626	1130±1%, 1W
		R68	3H1		ALLEN BRADLEY Eb I.R.C. GBT-1/2 STACKPOLE RC-20 OHMITE OE	2615-287	10KΩ±10%, 1/2W
					RHEOSTAT		
		R67	3H1		BECKMAN 72XWR500 I.R.C. 76-70-500	2675-111	500, 1/2W
					TRANSISTOR		
		Q61	3G1		R.C.A. MOTOROLA FAIRCHILD	2N1711	2841-100

CIRCUIT MODULE		CODE
DESIG	LOC	
(ZH) CM2	4C1, 4C4	LORAIN 4338-328

RELAY



DESIG		HV2	RS	RS1
C.P. CLARE		LA0040D00	LA0040D00	LA0040C00
LORAIN		2543-416	2543-416	2543-414
RATING		4C, 590Ω	4C, 590Ω	4C, 330Ω
OPTION				
		CONT ARR	LOC	CONT ARR
4		BM		BM
5		BM	4D0	BM
2		BM	4C1	BM
1		BM	BM	4C5
COIL		4C1	4D1	4D1

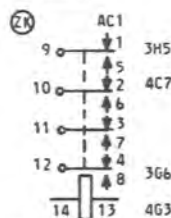
CM2 PIN NO.	LOC	DESIG	LOC	OPTION	CODE		
					MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
1	4C0				CAPACITOR		
2	4C5						
3	4C5	C71	4D0		SPRAGUE 430P10652	2715-297	10, 200V
4	4C5						
5	4C5						
6	4C5						
7	4C5				RESISTOR		
8	4C0	R71	4E0		MEMCOR LVAL-5 SPRAGUE 244E DALE CW-5-5 I.R.C. AS-5 WARD-LEONARD 5X	2651-877	510, 6.5W
9	4C0						
10	4C0						
11	4D0						
12	4E0	R72	4C0		ALLEN-BRADLEY Eb I.R.C. GBT-1/2 STACKPOLE RC-20 OHMITE OE	2615-231	47±10%, 1/2W
					THERMISTOR		
		RT71	4D1		VECTOR ELECTRONICS CO. 45H1	2676-221	50KΩ COLD

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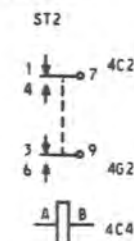
PART OF APP FIG. 1

RELAY



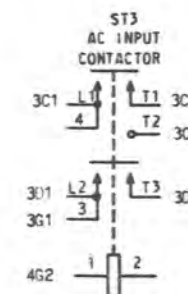
CODE			
MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
POTTER - BRUMFIELD KHX17A11-120	C.P. CLARE GP1Q11A6000	2546-482	COIL: 120V AC 30V DC 3 AMP, 4C

RELAY



CODE			
MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
PCT. R. BRUMFIELD KUP11055	SIGMA 6JR34-24DC-SC0	2543-615	24 VDC, 2C

RELAY, CONTACTOR



CODE			
MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
ARROW-HART & HEGEMAN ACC-420-8008		2561-317	120V AC 2 POLE

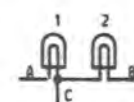
DESIG	LOC	OPTION	CODE			
			MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
CAPACITOR						
C1	3D3	(ZF)	SPRAGUE 201P3645 TP1	G.E. CO. 72F6601FB	2714-617	45, 440 VAC
		(ZG)	P300431	SANGAM 570-1619-02	2714-775	45, 550 VAC
C2, J-C2.6	3B5	(ZF)	SPRAGUE 320 5163		2731-379	17,000, 60VDC
		(ZG)	602D328	SANGAMC 570-1620-02	2731-377	17,000, 65VDC
C3	4F1		SPRAGUE 320322G040AC2B		2731-273	3200, 40 VDC
C4	4F1					
C5	3D4	(ZF)	SPRAGUE 196P224910S4	SANGAMC 5081K10224K	2713-619	.22, ±10% 1000 VDC
		(ZG)	P158688	G.E. CO. 28F5013G2	2714-518	.22, ±6% 600 VAC

CONNECTOR			
DESIG	P1	J1	
	CINCH MFG CO. P-315-AB PLUG (GOLD PLATED CONTACTS)	CINCH MFG CO. S-315-CCT-L EQUIPPED WITH NO. 120 HANDLE (GOLD PLATED CONTACTS)	
	LORAIN 2474-171	LORAIN 2475-179	
TERM.	LOC	OPTION	LOC
15	4D8	ZC	4D8
14	4D8		4D8
13			
12	4D7	ZI	4D7
11			
10	4C8		4C8
9	4C8		4C8
8	4C8	ZH, ZI	4C8
7	4C8		4C8
6	4C8		4C8
5	4B8	ZN	4B8
4	4B8	ZN	4B8
3	4B8		4B8
2			
1	4B8		4B8

SEE NOTE 204

DESIG	LOC	OPTION	CODE			
			MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
CONNECTOR, TEST JACK						
J2	3C8		AMPHENOL 35C-61001-01	UCIN'TE 119594-B-426	2471-413	RED
J3	3C8		350-61001-02	119594-C-426	2471-412	BLK
J4	3G8		350-61001-01	119594-B-426	2471-413	RED
J5	3G8		350-61001-02	119594-C-426	2471-412	BLK
DIODE						
CR1	3A4		WESTINGHOUSE	INTERNATIONAL RECTIFIER		200V, 150A
CR2	3R4		1N4588T	150KR20A	2814-222	200V, 150A
CR3	3F7	(ZD)	G.E. CO. 1N415A	1T&T CO. 1N415A	2811-303	25V, 150MA
CR4	3F7	(ZD)				
FUSE						
F1	3B2	(Y)	BUSSMAN BBS .4		2485-206	.4 AMP
		(Z)	BAF 1		2483-414	1 AMP
F2	3B1	(Y)	BBS .4		2485-206	.4 AMP
		(Z)	BAF 1		2483-414	1 AMP
F3	3B7	(Z)	W.E. CO. 70F		2486-243	.25 AMP
		(Z)	W.E. CO. 70A		2486-247	1-1/3 AMP
F4, J-F4.6	3A5	(ZG)	BUSSMAN QJD-25		2484-610	.25 AMP
INDUCTOR						
L1	3E3		LORAIN		4424-028	38mH
L2	3A6				4411-546	.680mH
JACK						
SEE CONNECTOR						

LAMP



CODE	SEE NOTE 1 (A)
DESIG	DS1
OPTION	
1	403
2	403

DESIG	LOC	OPTION	CODE			
			MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
METER						
M1	3F5		TRIPLETT 320G	WESTON INSTRUMENT 1931	2924-678	0-120 AMP SCALE AT 60MV ±1% AT 50MV
PLUG						
SEE CONNECTOR						
RHEOSTAT						
R8	3F8	(E)	CLAROSTAT 43	CTS 252LT	2683-275	5K, ±10%, 2W
		(D)	BOURNS 3507S-3-103	I.R.C. 8400-10K	2687-640	10K, ±5%, 2W
R10	3G5		CLAROSTAT 43	CTS 252LT	2683-275	5K, 2W
R12	3G3		CTS 252	CLAROSTAT 43	2683-343	100, 2W
RESISTOR						
R1.1	3B6		IRC 2D (25W)	DALE HL	2656-513	200 ±5%, 25W
R1.2	3B6			MEMCOR FR		
R2	4B3			WARD-LEONARD		
R3	4C3	(S)		SPRAGUE 58E		
				IRC 1 3/4 A12		
R4	4C3			SPRAGUE 10E		
R5	4B4			DALE HL		
				WARD-LEONARD		
R6	4E3			MEMCOR FR		
R7	4F3			IRC 2D (25W)		
				DALE HL		
				SPRAGUE 58E		
				MEMCOR FR		
				WARD-LEONARD		
R9	3F7	(Q)	IRC RG20	CORNING ELECTRIC C5	2637-235	16 K, ±5%, 5W
		(P)		WELWYN F20		
		(B)		IRC CEC	2635-682	16.2K, ±1%, 1W
				WARD-LEONARD WLC 70		
				TEXAS INST. MC 65D	2635-678	12.7K, ±1%, 1W

RECTIFIER CIRCUIT

2

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BELL TELEPHONE LABORATORIES
INCORPORATED

6S

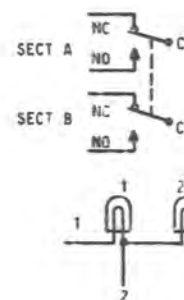
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PART OF APP FIG. 1

DESIG	LOC	OPTION	CODE			
			MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LORAIN PRODUCTS CO. PART NO.	RATING
RESISTOR(CONT)						
R11	3G4		IRC AS-2	OHMITE 995-5A OR 884-3 DALE CW-2C1 OR RS-2D-23 WARD-LEONARD 3X MEMCOR MVR-3.25 OR MAL-3 SPRAGUE 280E OR 242E	2664-181	1.21, ±1%, 3W
R13	3G4		ALLEN-BRADLEY EB	IRC GBT 1/2 STACKPOLE RC20 OHMITE OE IRC 2D(25W)	2615-225	27, ±10%, 5W
R14	4B7		OHMITE 270-25	DALE HL WARD-LEONARD MEMCOR FR SPRAGUE 58E	2656-513	200, ±5%, 25W
R15	3E7	(N)	IRC RG20	CORNING ELECTRIC C5 WELWYN F20	2637-205	3.9K ±5%, 5W
	3E7	(M)	DALE MFF 1/2	IRC CEC WARD LEONARD WLC 70 TEXAS INST MC 650	2635-655	3.92K ±1%, 1W
R16	4B7	(K)	IRC RG20	CORNING ELECTRIC C5 WELWYN F20	2637-241	22K ±5%, 5W
	4B7	(J)	DALE MFF 1/2	IRC CEC WARD LEONARD WLC 70 TEXAS INST MC 650	2635-687	221K ±1%, 1W
R17	3D4	(ZD) (ZE)	OHMITE 995-10A	IRC AS-10 DALE CW-10-4 WARD-LEONARD 10X MEMCOR MVR11, LVAL-10 SPRAGUE 282E, 247E	2652-499 2652-488	2.2K ±5%, 11W 1K, ±5%, 11W
SHUNT						
R18	3B6		DAYSTROM 41207	EMPRO HA-100-50	2982-712	100A, 50mV

SWITCH

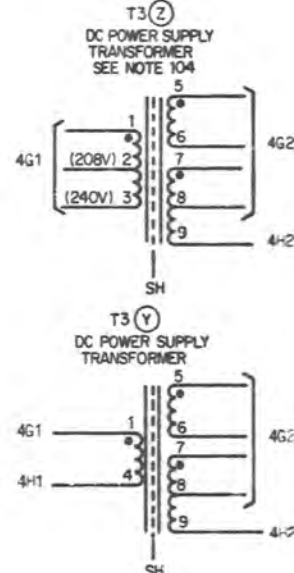
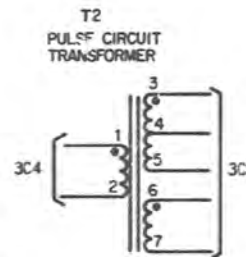
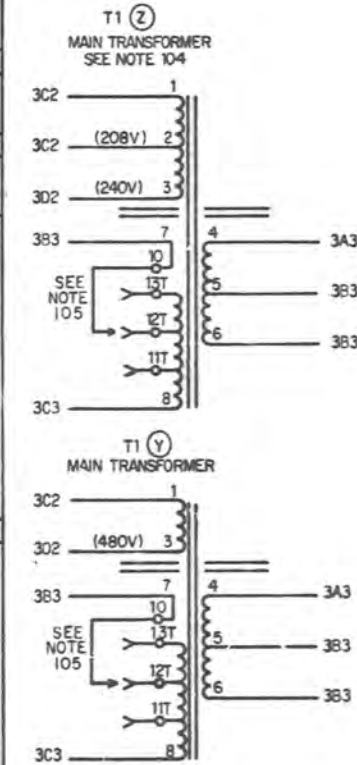


CODE	SEE NOTE 1	
	(B)	(C)
DESIG	S1	S2
OPTION	A	4B4 3H3
	B	4C3 3H4
LAMP	1	4C2 3H3
	2	4B2 3H3

			CODE			
DESIG	LOC	OPTION	MFR & MFR NO.	ALTERNATE MFR & MFR NO.	LOPAIN PRODUCTS CO. PART NO.	RATING
TRANSFORMER						
T1	3A2	(Y)	LORAIN		4521-536	
		(Z)			4521-531	
T2	3C5	(Y)	LORAIN		4457-503	
T3	4F1	(Y)	LORAIN		4472-515	
		(Z)			4473-509	
THYRISTOR						
Q1.1	3D4	(ZF)	RCa 2N690	INTERNATIONAL RECTIFIER GENERAL ELECTRIC NATIONAL ELECTRONICS WESTINGHOUSE 2N690	2862-142	THYRISTOR 600V, 16A
Q1.2	3D5					
		(ZG)	G.E. CO. C147M	NATIONAL ELECTRONICS NL-57BM INTERNATIONAL RECTIFIER 50RCS60	2864-041	THYRISTOR 600V, 40A

TERMINAL BOARD

DESIG	TB-1	TB-2	TB-3	TS-1
CODE	LORAIN 4342-031	LORAIN 4343-093	LORAIN 4353-020	LORAIN 2463-476
OPTION				
TERM.	LOC	LOC	LOC	LOC
14			3G4	
13			3G4	
12			4B7	
11			3F7	
10			3F7	
9			3E7	
8			3F6	
7			3G4	
6			3G3	3E4
5			4C7	3E5
4			3F7	3D5
3	3A5		3F7	3D5
2	3B3		3E7	3D5
1	3A3		3F7	3D5
GRD		3B7		
BAT		3A7		



NOTES:

- OBTAIN FROM MASTER SPECIALTIES CO., GARDENA, CALIF.:
(A) 80EA1C14F2(W)J2LIN16 RECT FAIL/LOCAL SNS (LORAIN P/N 2584-410)
(B) 90EA1C4F14J2(GW)L2N1R16 POWER ON/POWER OFF (LORAIN P/N 2526-415)
(C) 90EA1C2F14J1(W)LIN1R14 SIMULATED OUTPUT CURRENT (LORAIN P/N 2526-41)
LAMPS FOR ABOVE ASSEMBLIES ARE G.E. CO. TYPE 3B7 (LORAIN P/N 2581-206)

RECTIFIER CIRCUIT

(2)

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BELL TELEPHONE LABORATORIES
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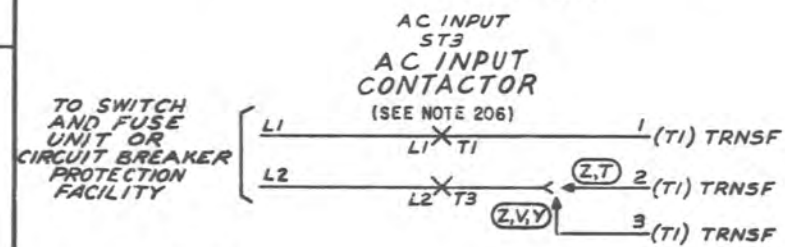
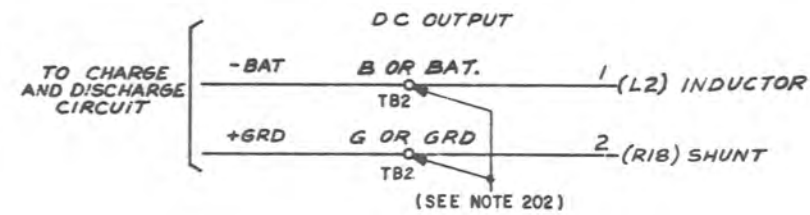
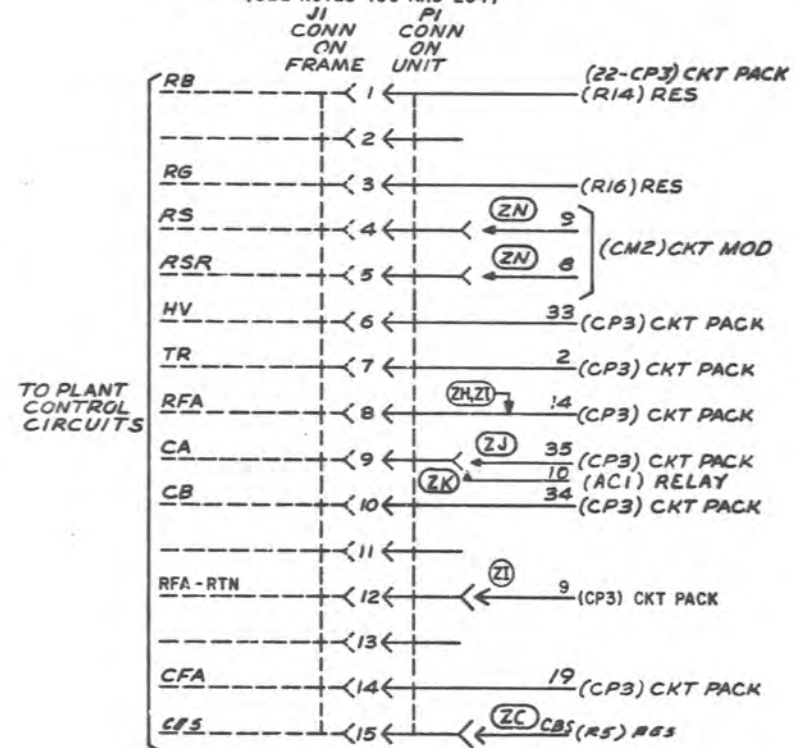
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CAD 1
(FOR APP FIG. 1)
PLANT CONTROL DISCONNECT
(SEE NOTES 106 AND 204)



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