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[illegible]

SD-81613-01

CATEGORY	NO.
EQUIPMENT DWG	J86470E J86470F J86470G J86470P J86470AH J86470AD J86470AF J86470AH
EQUIPMENT DESIGN REQ'T	J86470
MAINTENANCE SPEC	167-217-301

1. WHEN CHANGES ARE MADE IN THIS DRAWING ONLY THOSE SHEETS AFFECTED WILL BE REISSUED.
2. THIS SHEET INDEX WILL BE REISSUED AND BROUGHT UP TO DATE EACH TIME ANY SHEET OF THE DRAWING IS REISSUED, OR A NEW SHEET IS ADDED.
3. THE ISSUE NUMBER ASSIGNED TO A CHANGED OR NEW SHEET WILL BE THE SAME ISSUE NUMBER AS THAT OF THE SHEET INDEX.
4. SHEETS THAT ARE NOT CHANGED WILL RETAIN THEIR EXISTING ISSUE NUMBER.
5. THE LAST ISSUE NUMBER OF THE SHEET INDEX IS RECOGNIZED AS THE LATEST ISSUE NUMBER OF THE DRAWING AS A WHOLE.

SD-81613-01

POWER SYSTEMS
100 TYPE PLANTS
CHARGE AND DISCHARGE CIRCUIT
— 0-800 AMP. POSITIVE
OR NEGATIVE 48 VOLTS
111A POWER PLANT

BELL TELEPHONE LABORATORIES
INCORPORATED

② SD-81613-01-A
12 SHEETS

ISSUE
17A

AT&TCO
STANDARD

1

A
B
C
D
E
F
G
H

APPARATUS INDEX

DESIG	LOCATION		
	FS	APP FIG.	EQUIP.
RELAY			
FA	3C7	1	
FAR-	4F1	3	
H	4B3	1	
HLV	3D7	1	
HV	4A4	1	
L	4B5	1	
RFA	3E7	1	
	4E1	3	
	3F8	1	

DESIG	LOCATION		
	FS	APP FIG.	EQUIP.
LAMPS			
ALM	4B8	2,3	
FA	3F7	1	
HLV	3F7	1	
RFA/RCA	3G7	1	

RESISTORS			
A	3B9	1	
ABSF	3F5	1	
FA1	3E5	1	
FA2	3D5	1	
FA-	3A5	1	
FFI	3D3	1	
FAL	3H4	1	

AMMETERS			
LOAD	3C3	1	

SHUNTS			
S	3D3	1	

CIRCUIT BREAKER			
CB-	4D8	4	

THERMISTORS			
H1	3E8	1	

CONNECTING BLOCK			
TST	3A9	1	

VOLTMETERS			
VOLTS	3G2	1	

DIODES			
ALM	3G7	3	
FA	3B7	1	
FAR	4G1	3	
FF	3F9	1	
HLV	3D7	1	
RFA	3F7	1	
RFR	4D1	3	

FUSES			
A	3G4	1	
ABS	3F4	1	
ABS ALM	3F4	1	
B	3G4	1	
C	3H4	1	
CONT	3F4	1	
D	3H4	1	
LOAD [ORIG DISCH]	3D4	1	
LOAD [SUPL DISCH]	3C4	1	
R	3E4	1	
RC1-12	3E3	1	
REG	3F3	1	
REG ALM	3F3	1	
TST	3E4	1	
VM	3F3	1	
VR	3F4	1	

LEAD INDEX

DESIG	FS LOC	CAD. LOC
ALM SENDING CKT		
ATA/SI(A)	3A6	CAD.1,8
ATC/SI(C)	3A6	
ATD/SI(D)	3A6	
ATF/SI(F)	3A6	

CHARGE BAY ASSEMBLY 100-400 AMP		
P-	4B8	CAD.1,8
G-	4B8	
HLV-	4D2	
RC-	4C9	
RFA	4C8	CAD.1,8
RG-	4C8	
TR-	4E3	
48V R	4C8	
A GRD	4C8	

DISCHARGE CKT			
H	3F6,3G6		CAD.3

NO. 1 ESS OFFICE ALARM CKT			
A	3I7		CAD.1,8
ABSO	3G5		
ABS1	3F5		
ABS2	3F5		
D	3A7		
FG	3A5		

OFFICE ALM CKT			
A/PMNV	3A8,4F6		CAD.1,8
ABS	3F5		CAD. 2
ABSF	3F5		
D/PMJV	3A8		CAD.1,8
DF/PMJ	3A8		
F/PMN	3A8,4F6		

POWER AUD ALM CKT			
A	3A8,3H5		CAD.1,8
B	3H5		
C	3H5		
D	3A8,3H5		
TR	3B2,4H6,5B2,5C6		

RECTIFIER CKT, 30 AMP			
B-	3E1	}	CAD.1,
G-	3E1		
HV-	3E1		
RC-	3E1		
RFA-	3E1		
RS-			

RECTIFIER CKT, 100 AMP, 3-PHASE		
B-	3A1	CAD. 1, /
G-	3A1	
HV-	3B1	
RC-	3C1	
RFA-	3B1	
RG-	3C1	
R-	3B1	/

DESIG	FS LOC	CAD. LOC
RECTIFIER CKT 400 AMP		
E-	5B2	CAD.7
G-	5B2	
HV-	5B2	
RFA-	5B2	
TR-	5B2	
RC-	5C2	
RG-	5C2	
HVB-	5C2	
HVG-	5C2	

RECTIFIER CKT 100 AMP, SINGLE-PHASE			
B-	5A6		CAD.1,8
G-	5B6		
HLV-	5B6		
RFA-	5C6		
TR-	5C6		
RC-	5B6		
RG-	5C6		
CBS-	5B4		
RB-	5B4		

NO. 4 ESS OFFICE ALARM CKT			
ABSO	3G5		CAD.1,8
FG	3A5		

OPTION INDEX (CONT)

APP OR WRG	LOCATION
ZF	APP FIG 1, CAD 1, 3B3, 3E3
ZG	APP FIG 1, CAD 1, 3B3, 3E3, 3F3, 3H3, 4A3
ZJ	4F6, 4G6
ZK	4F6, 4G6
ZL	CAD 1, 3G8
ZM	CAD 1, 8
ZN	3E4, 3F3, 3G3
ZO	APP FIG 1, CAD 1, 5, 8, 3F3, 4E1, 4H1
ZP	NOT USED
ZQ	
ZR	
ZS	
ZT	

OPTION INDEX

APP OR WRG	LOCATION
Y	SH3, 4C5, 4E1, 4G1, 3G7, CAD 1, 2, 4B3, 3F8
X	SH3, 4C5, 4G1, 4E1, 3G7, CAD 1, 2, 4B3, 3F8
V	CAD 1
U	APP FIG 1, 3E5, 4A4
T	CAD 4
S	APP FIG 2, 3, 3E5, 3G8, CAD 1, 5
R	APP FIG 1, 3, 3A4, 3C7, 3D7, 3E7, 4E1, 4F1
N	APP FIG 4
H	APP FIG 4
K	APP FIG 1
J	3G5, CAD 1
H	3F4, CAD 1
G	APP FIG 1, 3C3
F	APP FIG 1, 3C3
E	CAD 1
B	CAD 1
A	CAD 1
ZA	APP FIG 1, 3A3, 3E3, 3E8, 4F6, 4G6, 3F3, 3D3, 4B3, 4A3, 3G8
ZB	APP FIG 1, CAD 1, 3E3, 3F3, 3H3, 3E8, 4B3, 4F6, 4G6, 4A3, 3D3, 3G8
ZC	APP FIG 1, CAD 7, 3F3, 3H3, 5C2
ZD	4B8
ZE	APP FIG 1, 3E5, 3F7, 4B8

100 TYPE PLANTS
CHARGE & DISCHARGE CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

SD-81613-01-1

6S

PRINTED IN U.S.A.

ISSUE
17A

CIRCUIT NOTES:

DESIG	FUSE AMP	POTENTIAL	ONE PER
A		GRD	PLANT
BATTERY SYMBOL POLARITY VOLTAGE RANGE			
4b	-(MINUS) WITH $\ominus$	42-54V	
	+(PLUS) WITH $\oplus$	42-54V	

FEATURE OR OPTION	PROVIDE		
	APP FIG.	APP OR WRG	QUANTITY
+48 (NEGATIVE GROUNDED)	1	Y	
-48 (POSITIVE GROUNDED)	1	X	
ORIGINATING DISCHARGE CONTROL CIRCUIT		U	SEE NOTE 107
AUXILIARY DISCHARGE CONTROL CIRCUIT		T	
RELAY RACK VERSION		V	
CABINET VERSION		S	
CIRCUIT BREAKER PANEL (AT&T CO SPECIAL)	4		AS REQD
LOOP CLOSURE	NOT REQUIRED	A	ONE PER
ALARM CIRCUIT	REQUIRED	B	ALARM CKT

NETWORK VALUES		
NETWORK NO.	RESISTANCE IN OHMS	CAPACITANCE IN UF
1	510	0.5
	510	0.5

RECORD OF APP 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
4AC	R	NONE		R		
5D	H OR H	N		H		
6D	NOTE 116	NOTES 112 AND 115		NOTE 116		NOTES 112 AND 115
7B	K	NONE		K		
	H OR J	J	117	H, J		
	F OR G	F		F, G		
8B	E, B OR A	E		B, A		E
	ZA OR ZB	ZA		ZB		ZA
9B	ZC	NONE	121 & 122	ZC		
	ZD OR ZE	ZD		ZE		ZD
	ZF OR ZG	ZF	122, 123	ZG		ZF
	ZJ OR ZK	ZJ	123	ZK		ZJ
	ZL OR ZM	ZL	123, 124	ZM		ZL
	LAMP			M1		2Y
	DIODE		456B	446A, 446F		
	THERMISTOR		8E	1D		
13B	ZN OR ZO	ZN	125	ZO		ZN
14B	RESISTOR		KS-20289, L6C	KS-13492, L2		

CIRCUIT NOTES (CONT):

RECORD OF APP 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
16D	ZE OR ZT	ZE	205	ZT		ZE

105. PROVIDE GROUNDING AS COVERED IN BSP SECTION 802-001-180.

106. (A) FOR LEAD LENGTHS EXCEEDING TABLE VALUES, A LEAD SHALL BE CALCULATED FOR 1/2 VOLT LOOP DROP AT MAX CHARGE CAPACITY OF THE RECTIFIER.

$$VOLTAGE\ DROP = \frac{IKL}{CM} \quad \text{WHERE } K=17.4 \text{ FOR ALUMINUM } K=11.1 \text{ FOR COPPER. } I \text{ IS CURRENT IN AMPERES, } L \text{ IS LOOP LENGTH IN FEET AND CM IS CONDUCTOR CROSS SECTION IN CIRCULAR MILLS.}$$

(B) FOR LEAD LENGTHS EXCEEDING TABLE VALUES, B LEADS SHALL BE CALCULATED FOR 1/2 VOLT LOOP DROP AT THE ULTIMATE CHARGING CAPACITY.

RECTIFIER CAPACITY	A LEAD			
	COPPER		ALUMINUM	
	MIN SIZE	LOOP LG	MIN SIZE	LOOP LG
30 AMP	6	32 FT	2	63 FT
100 AMP	1/0	45 FT	2/0	38 FT
400 AMP	2-2/0	30 FT	2-350,000	50 FT

(C) THE C LEADS SHALL BE CALCULATED FOR CIRCUIT PEAK, WHERE THE CIRCUIT PEAK IS DEFINED AS THE BUSY HOUR LOAD TIMES 1.33 FOR VARIABLE LOADS AND IS EQUAL TO THE BUSY HOUR LOAD FOR FIXED LOADS.

ULTIMATE CHARGING CAPACITY	b LEAD			
	COPPER		ALUMINUM	
	MIN SIZE	LOOP LG	MIN SIZE	LOOP LG
100-250	350,000	54 FT	500,000	57 FT
251-400	500,000	50 FT	2-350,000	50 FT
401-600	2-350,000	45 FT	3-350,000	50 FT
601-800	3-350,000	60 FT	3-500,000	53 FT
801-1000	3-350,000	42 FT	3-750,000	64 FT

CALCULATIONS FOR CIRCUIT PEAK LOADS

ULT PEAK LOAD	C LEAD WITH BDFB OR EQ CEN				C LEAD WITHOUT BDFB			
	COPPER		ALUMINUM		COPPER		ALUMINUM	
	MIN SIZE	LOOP LG	MIN SIZE	LOOP LG	MIN SIZE	LOOP LG	MIN SIZE	LOOP LG
100-250	2-350,000	54 FT	2-500,000	57 FT	350,000	54 FT	500,000	57 FT
251-400	2-500,000	50 FT	2-750,000	54 FT	500,000	50 FT	2-350,000	57 FT
401-600	2-750,000	50 FT	3-750,000	53 FT	750,000	50 FT	3-350,000	50 FT
601-800	2-750,000	42 FT	3-750,000	40 FT	2-500,000	50 FT	3-500,000	53 FT

VOLTAGE DROP IN POWER BOARD INTERNAL WIRING MAY BE IGNORED.

BATTERY AND GROUND SUPPLY LEADS TO BDFB OR EQUIPMENT FUSE PANELS SHALL BE CALCULATED ON CIRCUIT PEAKS

SUMMARY OF MAXIMUM DISCHARGE LOOP DROP			
WITH BDFB	BAT $\leftarrow$ 1/4V $\rightarrow$ PBD $\leftarrow$ 1/2V $\rightarrow$ BDFB $\leftarrow$ 1/4V $\rightarrow$ FP OR EQ CEN		
WITHOUT BDFB	BAT $\leftarrow$ 1/2V $\rightarrow$ PBD $\leftarrow$ 1/2V $\rightarrow$ FP		

CIRCUIT NOTES (CONT):

107. U OPTION APPLIES WHEN THIS CIRCUIT IS THE ORIGINATING DISCHARGE CIRCUIT. WHEN THIS CIRCUIT IS USED AS AN AUXILIARY DISCHARGE CIRCUIT, USE T OPTION. SEE NOTE 102.

108. d LEAD SHALL HAVE AMPACITY FOR AVERAGE AMPERES PER BATTERY STRING OR 1/4 OF THE 8-HOUR AMPERE HOUR RATING OF THE CELL SIZE USED.

$$AVERAGE\ AMP = \frac{AMP\ LOAD\ (ULTIMATE)}{NO.\ OF\ STRINGS\ OF\ CELLS\ (ULTIMATE)}$$

THE FOLLOWING TABLE LISTS COPPER WIRE SIZES WITH THEIR AMPACITIES WHEN USED FOR d LEADS.

SIZE	CAPACITY	SIZE	CAPACITY
8	55 AMP	750,000	630 AMP
4	105 AMP		
2	140 AMP		
00	220 AMP		
4/0	295 AMP		
350,000	405 AMP		
500,000	500 AMP		

IN THIS TABLE, AMPACITY OF KS-5482-01 WIRE ON CABLE RACK IS BASED ON THE AVERAGE OF THE OPEN AND ENCLOSED NEC RATINGS.

109. RECTIFIER POLARITY OPTIONS SHALL BE FURNISHED TO MATCH PLANT POLARITY OPTIONS.

110. LEADS FROM DISCHARGE BUS IN INITIAL BAY TO SUPPLEMENTARY FUSE PANELS IN OTHER BAYS SHALL HAVE AT LEAST THE CURRENT CARRYING CAPACITY SHOWN IN NOTE 108 FOR THE CONNECTED PEAK LOADS. IN ADDITION, THE VOLTAGE DROP BETWEEN INITIAL BAY AND SUPPLEMENTARY FUSE PANELS SHALL BE SUBTRACTED FROM THE ALLOWED VOLTAGE DROP TO THE EQUIP. SEE PANELS.

111. FOR ESS APPLICATIONS, THE DISCHARGE LEAD BAR IS INSULATED FROM THE FRAMEWORK AND THE CO GROUND LEAD SHALL NOT BE CONNECTED TO THE DISCHARGE GROUND BUS AT THE POWER PLANT. A TEMPORARY CONNECTION BETWEEN THE DISCHARGE GROUND BAR AND THE FRAMEWORK IS FURNISHED WITH ESS PLANTS. IT SHALL BE REMOVED WHEN CONNECTION TO CO GROUND VIA DISCHARGE GROUND LEADS AND ESS PDF IS VERIFIED. (SEE NOTE 118).

112. SEE BSP AA367.120 (JB6470) FOR CALCULATING DISCHARGE LEAD VOLTAGE DROPS FOR ESS APPLICATIONS.

113. IN CABINET VERSION, S OPTION, CONNECT RFR1 LEAD TO THE LOWEST NUMBERED RFA LEAD FROM 1ST SUPL BAY AND REMOVE STRAP TO PRECEDING RFA TERMINAL. CONNECT RFR2 LEAD TO THE LOWEST NUMBERED RFA LEAD FROM THE 2ND SUPL BAY AND REMOVE STRAP TO PRECEDING RFA TERMINAL. (SEE CAD. 1).

114. WHEN THIS CIRCUIT IS USED FOR NO. 1 ESS:
(A) THE (ABS ALH) FUSE SHALL BE 70A AND A DUMMY FUSE INSERTED INTO THE (ABS) FUSE HOLDER.

(B) NO CONNECTION SHALL BE MADE TO ALARM CIRCUITS OTHER THAN THE ESS NO. 1 OFFICE ALARM CIRCUIT.

115. WHERE A POSITIVE 24 VOLT PLANT IS USED WITH A NEGATIVE 48 VOLT PLANT IN ESS, THE GROUND BUS BARS OF THE TWO PLANTS SHALL BE CONNECTED BY TWO 350,000 SIZE CABLES. IF THE TWO PLANTS ARE NOT LOCATED NEXT TO ONE ANOTHER USE LEAD SIZES IN TABLE BELOW, FOR LEAD LENGTHS EXCEEDING TABLE VALUES, THE L LEAD SHALL BE CALCULATED FOR 1/8 VOLT LOOP DROP AT 800 AMPERES.

L LEAD	
MIN SIZE	LOOP LENGTH IN FEET
750,000	10
2 - 750,000	21
3 - 750,000	31

116. SEE TYPICAL BATTERY DISTRIBUTING CIRCUIT FOR NO. 1 ESS (SD-81923-01) FOR CALCULATING BATTERY EQUIPMENT, CHARGING EQUIPMENT, CHARGE AND DISCHARGE LEADS WHEN THIS CIRCUIT IS USED AS PART OF A NO. 1 ESS POWER PLANT. INFORMATION INCLUDED IN SD-81923-01 SUPERSEDES NOTES 112 AND 115.

117. USE H OPTION WHERE ABSF LEAD IS NOT REQUIRED BY THE OFFICE ALARM CIRCUIT.

118. SMALL ELECTRONIC SWITCHING SYSTEMS MAY USE THIS PLANT IF GROUND BARS ARE INSULATED IN ACCORDANCE WITH ELECTRONIC SYSTEM GROUNDING PRACTICES (SEE NOTE 111).

119. (A) WHEN USED WITH CABLE JUNCTION STAND, SEE SD-81923-01 FOR POINT OF TERMINATION.

(B) WHERE SO DICTATED BY ECONOMICAL OR MECHANICAL CONDITIONS THE CHG BAT AND CHG GRD BUSES IN FS4 MAY BE OMITTED AND THE CHARGE LEADS RUN DIRECTLY FROM RECTIFIERS TO CABLE JUNCTION STAND.

CIRCUIT NOTES (CONT):

120. THE CAPACITY OF THE LARGEST RECTIFIER IN THE PLANT CAN NOT EXCEED TWO THIRDS OF THE MINIMUM PLANT LOAD IN AMPERES FOR ELECTRONIC SWITCHING OFFICES.

121. THE USE OF OPTION ZC, DESIRABLE IN ALL CASES, IS MANDATORY IN ELECTRONIC SWITCHING SYSTEMS APPLICATIONS. WITH RECTIFIER PER FS12, THE TWELFTH FUSE AND GROUND POSITIONS ARE REASSIGNED FOR CONNECTION OF HVB AND HVG WHEN APPLYING ZC OPTION.

122. MAXIMUM TOTAL RECTIFIER CAPACITY CONNECTED TO THE CHG. BUS BAR SHALL NOT EXCEED 1200 AMPERES.

123. PRIOR TO ISSUE 11B, ZG, ZK AND ZM OPTIONS WERE PART OF ZB OPTION.

124. WHEN B OPTION (LOOP CLOSURE) IS FURNISHED, ZM OPTION MUST ALSO BE FURNISHED.

125. PRIOR TO ISSUE 13B PART OF ZN OPTION WAS SHOWN AS PART OF ZB OPTION.

126. IF THESE RECTIFIERS ARE APPLIED IN A THREE-PHASE SYSTEM WITH THREE PHASE RECTIFIERS THE FULL LOAD KVA DRAWN BY SINGLE-PHASE RECTIFIERS SHOULD NOT EXCEED 20 PER CENT OF THE STANDBY RESERVE ENGINE KVA RATING.

EQUIPMENT NOTES:

201. UNLESS OTHERWISE SPECIFIED WIRE SHALL BE 22 GAUGE BH. WHEN STRANDED WIRE IS SPECIFIED USE KS-13385 WIRE.

202. BUS BARS SHOWN IN FS 3 AND FS 6 ARE PART OF BATTERY STAND EQUIPMENT AS COVERED IN JB7122.

203. FOR COMPUTED LEADS USE COPPER WIRE PER KS-5482-01 OR ALUMINUM WIRE PER KS-20189 PROVIDING EXISTING TERMINATION FACILITIES PERMIT.

204. WHEN RECTIFIERS ARE MOUNTED IN "FOUR-PACK" CHARGE BAYS, THE HV-AND RFA-LEADS SHALL RELATE TO THE LOWEST NUMBERED CHARGE UNIT IN THE BAY SINCE ONLY ONE EACH OF THE HV-AND RFA-LEADS ARE REQUIRED FOR EACH "FOUR PACK" CHARGE BAY. USE 456M CABLE FOR CONNECTIONS TO INDIVIDUAL RELAY MOUNTED RECTIFIERS AND 458M CABLES FOR CONNECTIONS TO "FOUR PACK" CHARGE BAYS.

205. MOUNT RESISTOR FAL AS CLOSE TO BUS BAR AS POSSIBLE.

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 SHOWN IN BRACKETS [] IS FOR REFERENCE ONLY.

303. LOW CONTACT SETTING OF HV RELAY MAY BE RAISED FOR LOWERED TO MEET LOCAL VOLTAGE ALARM REQUIREMENTS. IF NEW SETTING IS MORE THAN +3 PERCENT OF VALUE SHOWN IN CIRCUIT REQUIREMENTS TABLE, ERRATIC ACTION OF THE METER MAY BE INCURRED.

304. ALARM INDICATIONS:

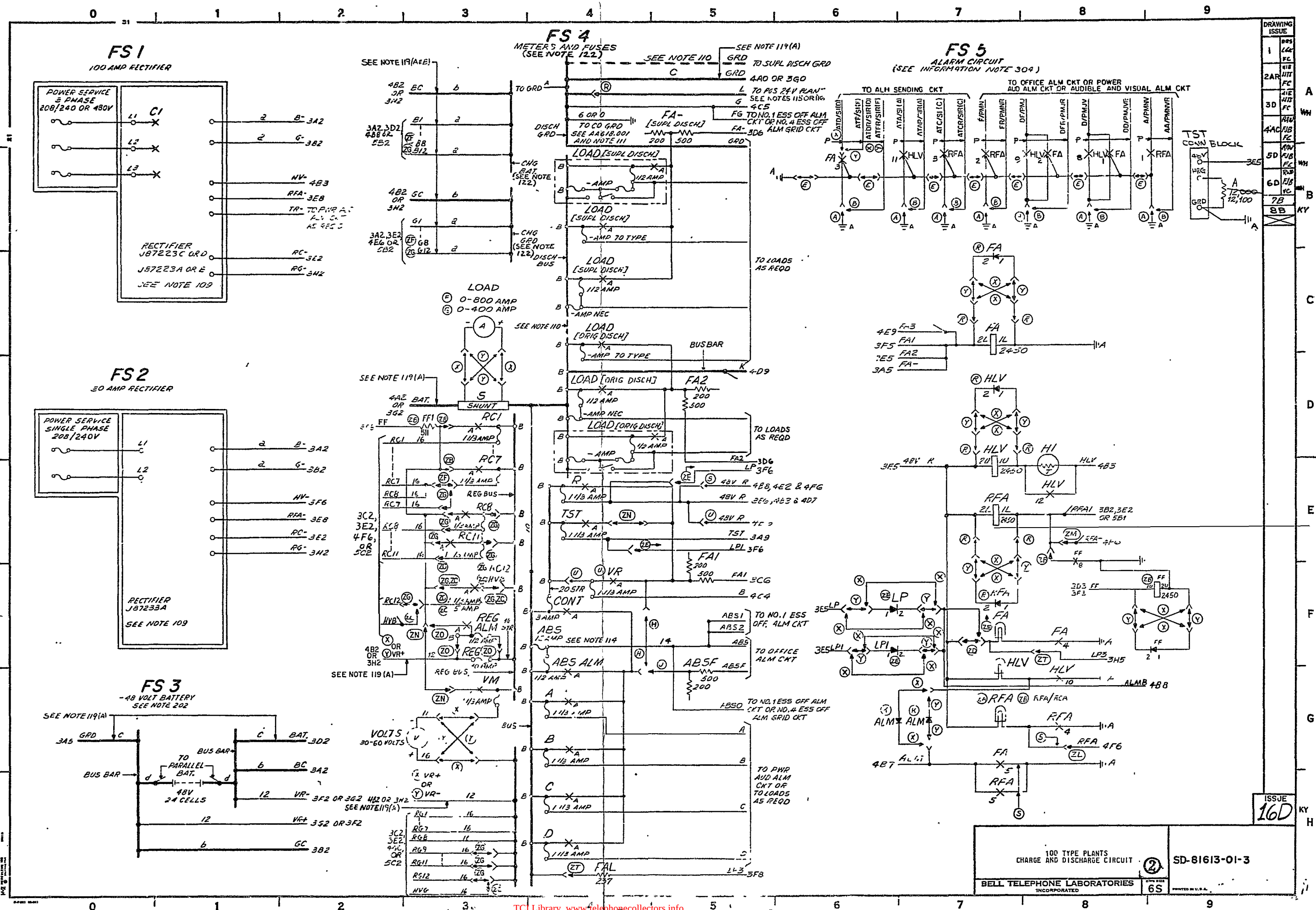
LEAD DESIG	CAUSE	TYPE OF ALARM
F/PHJ	RECTIFIER FAIL OR RC FUSE FAIL	MINOR AUDIBLE
A/PHJV	RECTIFIER FAIL OR RC FUSE FAIL	MINOR VISUAL
DF/PMJ	HIGH-LOW VOLTAGE AND FUSE ALM	MAJOR AUDIBLE
D/PHJV	HIGH-LOW VOLTAGE AND FUSE ALM	MAJOR VISUAL
ATA/SI(A)	HIGH-LOW VOLTAGE	MAJOR ALM
ATD/SI(D)	DISCH FUSE FAIL, CONTROL FUSE FAIL	MAJOR ALM
ATC/SI(C)	RECTIFIER FAIL OR RC FUSE FAIL	MINOR ALM

100 TYPE PLANTS
CHARGE & DISCHARGE CIRCUIT

BELL TELEPHONE LABORATORIES
INCORPORATED

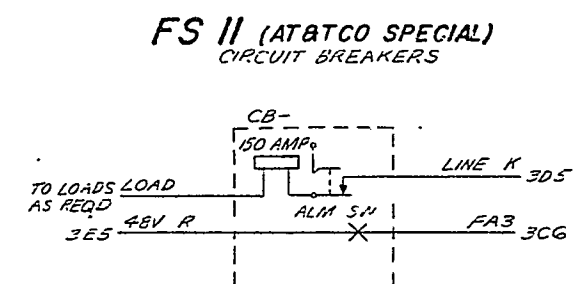
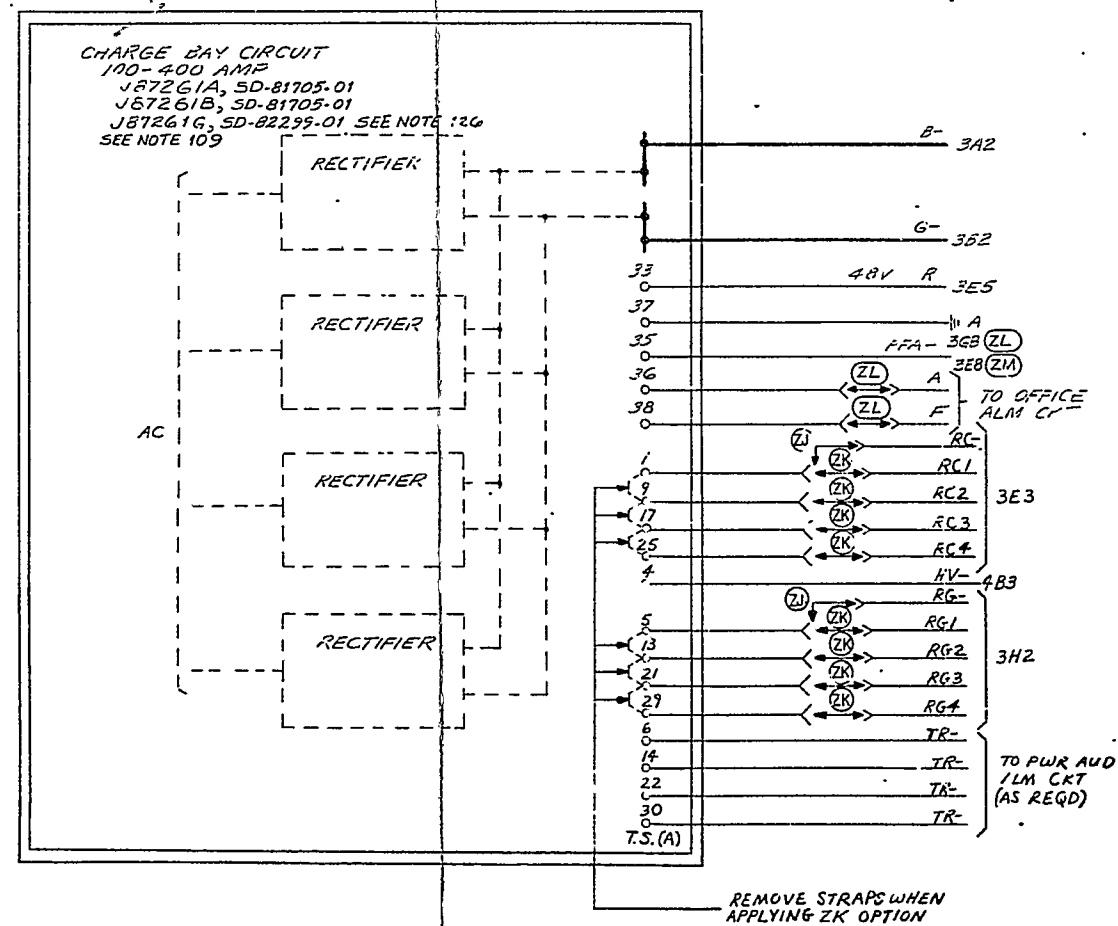
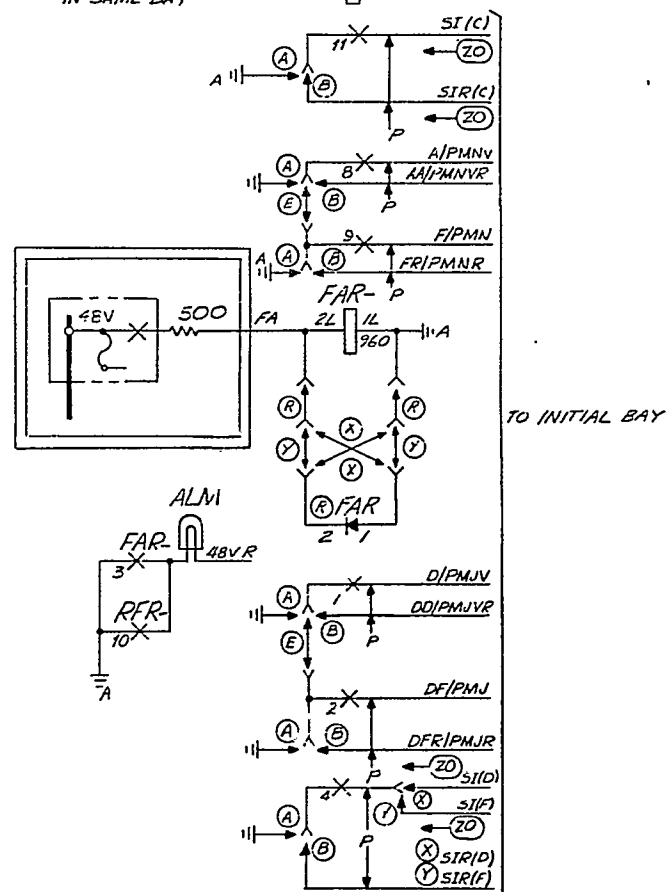
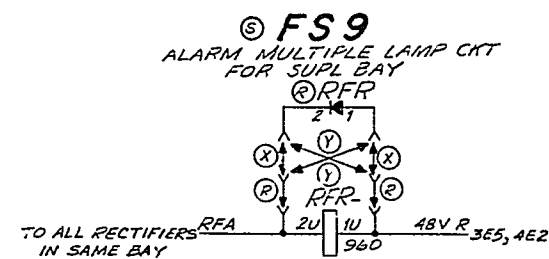
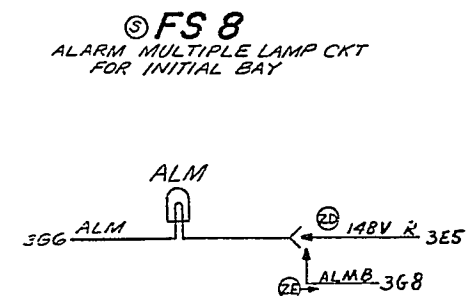
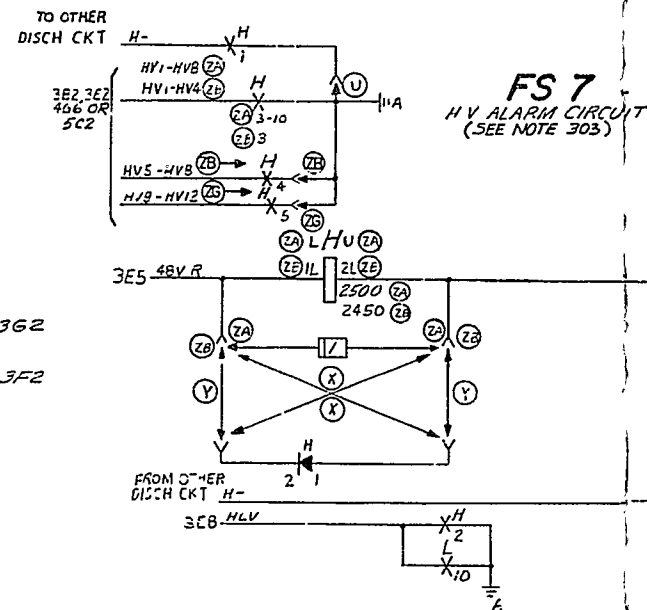
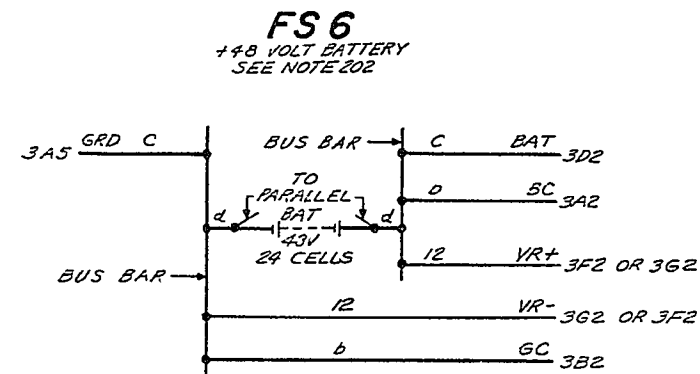
65

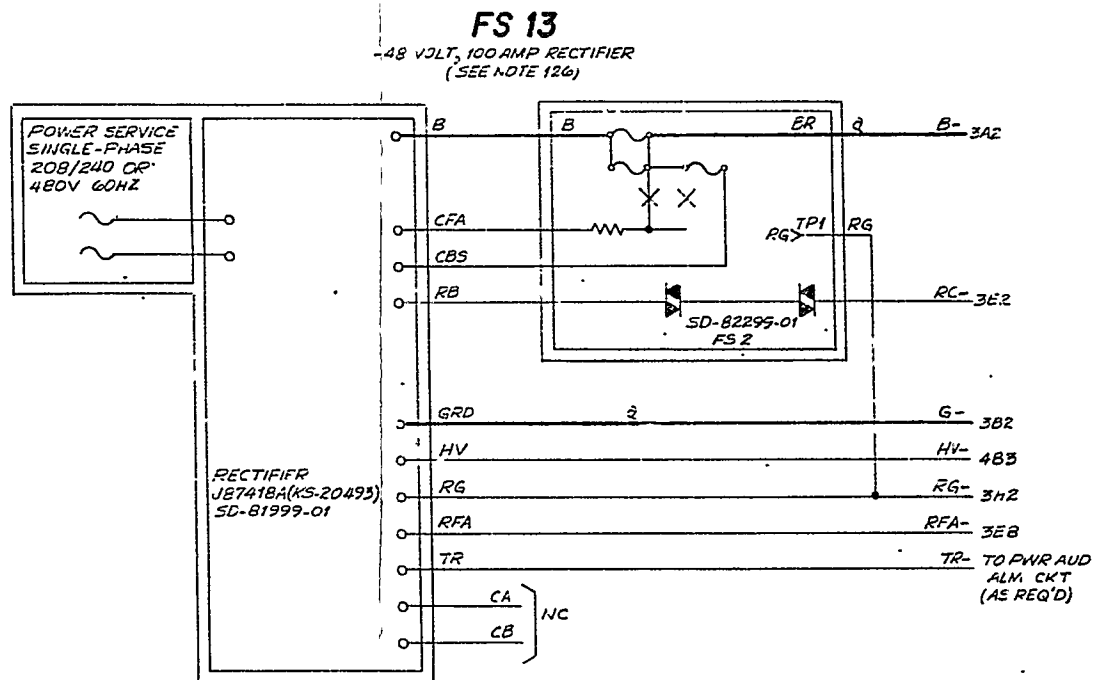
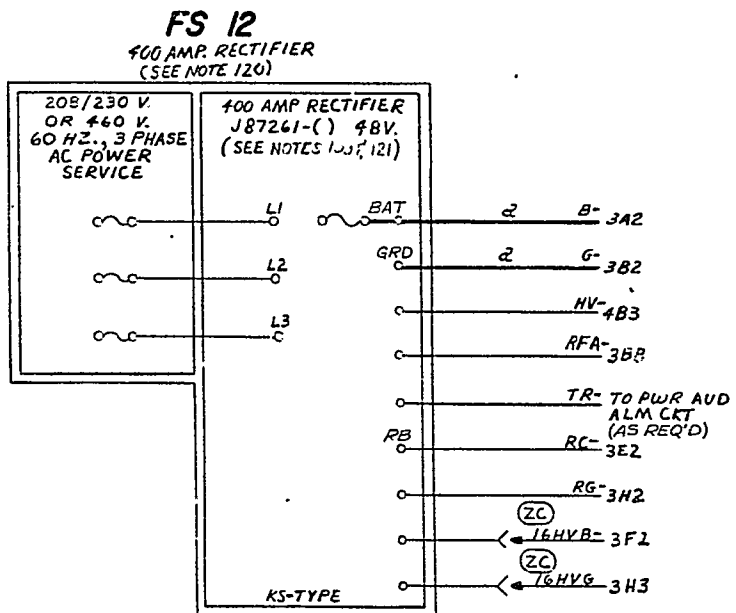
SD-81613-01-2



DRAWING		ISSUE
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4	16D	4
5	16D	5
6	16D	6
7	16D	7
8	16D	8
9	16D	9
10	16D	10
11	16D	11
12	16D	12
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78	16D	78
79	16D	79
80	16D	80
81	16D	81
82	16D	82
83	16D	83
84	16D	84
85	16D	85
86	16D	86
87	16D	87
88	16D	88
89	16D	89
90	16D	90
91	16D	91
92	16D	92
93	16D	93
94	16D	94
95	16D	95
96	16D	96
97	16D	97
98	16D	98
99	16D	99
100	16D	100

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100 TYPE PLANTS CHARGE AND DISCHARGE CIRCUIT		2	SD-81613-01-5
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APP FIG. 1

RELAY		FA		HLV		H		FF		L		RFA		DESIG	
CODE	OPTION	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CONT	LOC	CODE	OPTION
12														12	
11														11	
10														10	
9														9	
8														8	
7														7	
6														6	
5														5	
4														4	
3														3	
2														2	
1														1	
COIL														COIL	

RELAY		AMMETER		CONNECTING BLOCK	
DESIG	LOC	DESIG	LOC	DESIG	LOC
① HV	4A4	① LOAD	3C3	TST	3A9
	26DCE	② LOAD	3C3		55A

DIODE		LOC	CODE
DESIG			
① FA	3B7	446A	456B
② HL	3D7	446A	456B
③ RFA	3F7	446A	456B
④ ALM	3G7	446A	456B
⑤ LP	3E7	446E	456B
⑥ LPI	3E7	446E	456B
⑦ H	4B3	446A	456B
⑧ FF	3F8	446A	456B

FUSE		LOC	CODE
DESIG			
SEE NOTE 114	ABS	3G4	70A
	ABS ALM	3F4	70A
	B	3G4	70A
	C	3H4	70A
	CONT	3F4	70C
	D	3H4	70A
	HVB	3F3	70D
	LOAD		
	[ONIG DISCH]	3D4	KS-19392, L - OR NEC AND 70G ALM FUSE OR 70 TYPE AS REQD
	LOM		
	[SUPL DISCH]	3C4	KS-19392, L - OR NEC AND 70G ALM FUSE OR 70 TYPE AS REQD
	R	3E4	70A
	[7] RC1-7	3E3	70A
	[11 OR 12] RC1-12	3E3	70A
	[AS REQD]		
	REG	3F3	EXCS CERAMIC TUBE ABS, 10 AMP
	TST	3E4	70A
	VH	3F3	70A
	VR	3F4	70A
	[20] REG ALM	3F3	70G ALM FUSE

LAMP		
DESIG	LOC	CODE
②③ FA	3F7	24MI
HLV	3F7	24MI
RFA	3G7	24MI
⑦ FA	3F7	A2

NETWORK		
DESIG	LOC	CODE
① L	4B3	483D

RESISTOR		
DESIG	LOC	CODE
A	3B9	KS-12892, L2, L3, 100
ABSE	3F5	100C
FA1	3E5	100C
FA2	3D5	100C
FA-	3A5	100C
FF1	3D3	KS-8512, L3A, 511
⑦ FAL	3H4	KS-14603, L2AD, 237

SHUNT		
DESIG	LOC	CODE
S	3D3	KS-9442, L12

THERMISTOR		
DESIG	LOC	CODE
H1	3E8	7D-8E

VOLTMETER		
DESIG	LOC	CODE
	3G2	KS-16695, L1

APP FIG. 2

LAMP		
DESIG	LOC	CODE
ALM	4B8	24MI

APP FIG. 3

RELAY		FAR-		RFR-	
DESIG	CODE	CONT	LOC	CONT	LOC
12					
11					
10					
9					
8					
7					
6					
5					
4					
3					
2					
1					
COIL					

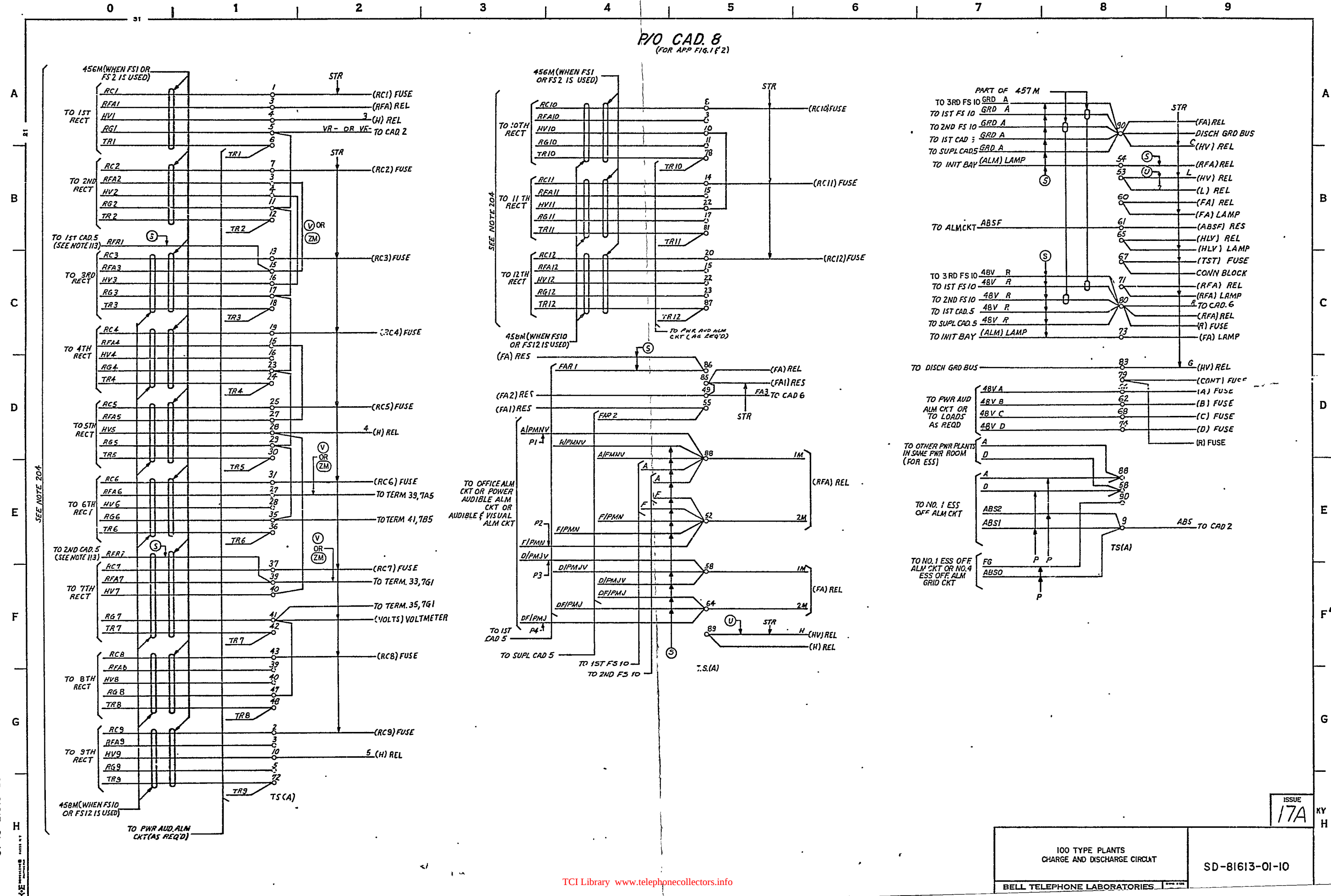
DIODE		
DESIG	LOC	CODE
① FAR	4G1	446A 456B
② RFR	4D1	446A 456B

LAMP		
DESIG	LOC	CODE
ALM	4B8	24MI

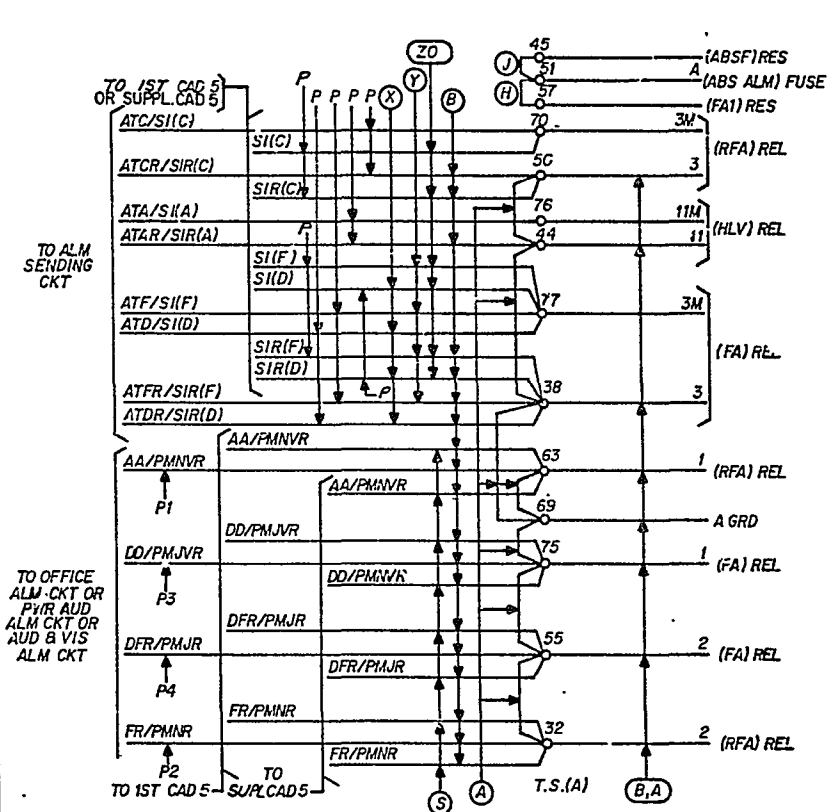
APP FIG. 4 (AT&T CO SPECIAL)

CIRCUIT BREAKER		
DESIG	LOC	CODE
CB-	4D8	① WESTINGHOUSE S023E5141 (150 AMP)
		② WESTINGHOUSE AB-DE-10W, TYPE F THERMAL TRIP ONLY, 2 POLE FRAME, PARALLEL CONNECTION, 150 AMP RATING, 50 VOLT OPERATION, ALARM SWITCH, REAR CONNECTING STUDS.

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P/O CAD 8



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13B

100 TYPE PLANTS CHARGE AND DISCHARGE CIRCUIT		②	SD-81613-01-11
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