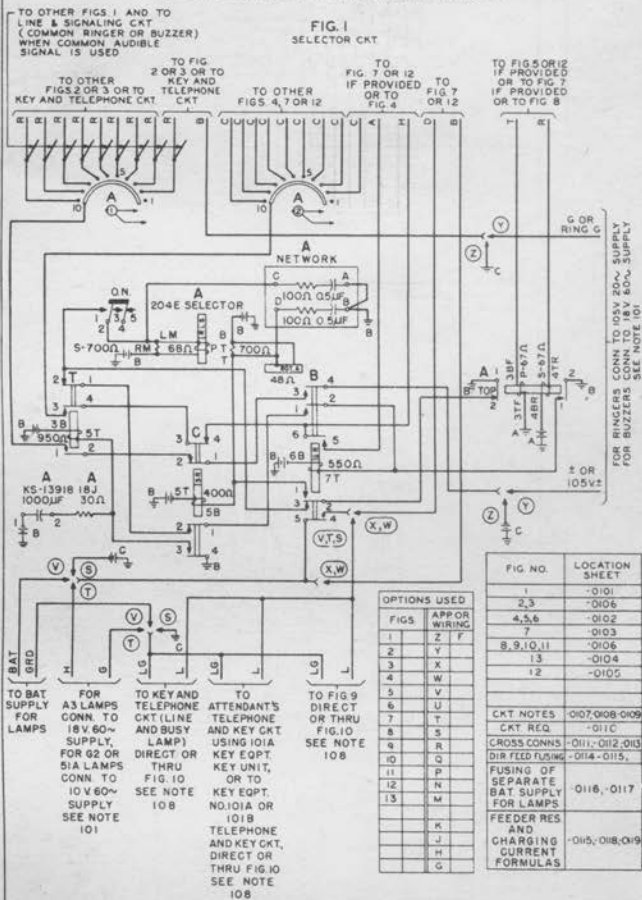


KEY TELEPHONE SYSTEM NO. 1A OR 1A1
INTERCOMMUNICATING LINE CIRCUIT

FIG. 1
SELECTOR CKT



SD-69199-0101

PRINTED IN U.S.A.

SD-69199-01

155. 2-D

KEY TELEPHONE SYSTEM NO.1A OR 1A1
INTERCOMMUNICATING LINE CIRCUIT

TCI Library www.telephonecollectors.info

20	1	DWG. 155.
20	1	C.D. 155.

FIG. NO.	LOCATION SHEET
1	-0101
2,3	-0106
4,5,6	-0102
7	-0103
8,9,10,11	-0106
13	-0104
12	-0105
CXT NOTES	-0107,0108-0109
CXT REQ	-011C
CROSS CONNS	-0111,-0112,-0113
DIR FEED FUSING	-0114 -0115,
FUSING OF SEPARATE BAT SUPPLY FOR LAMPS	-0116,-0117
FEEDER RES AND CHARGING CURRENT FORMULAS	-0115,-0118,0119

TO KEY AND TELEPHONE CKT (PICK UP KEY)
OR TO ATTENDANT'S TELEPHONE AND KEY
CKT. USING IOIA KEY EQUIPMENT KEY UNIT

FIG. 4
AUTOMATIC CUT-OFF
CONTROL CKT.
FOR KEY TELEPHONE
SYSTEM NO. 1A

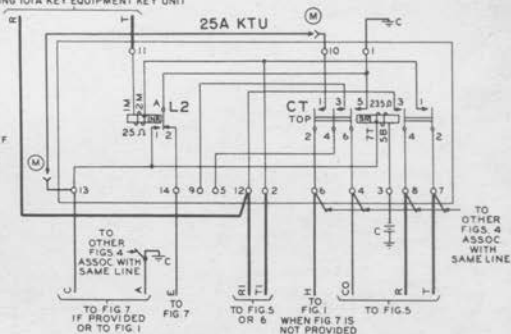


FIG. 5
STATIONS CUT-OFF
CKT.
FOR KEY TELEPHONE
SYSTEM NO. 1A

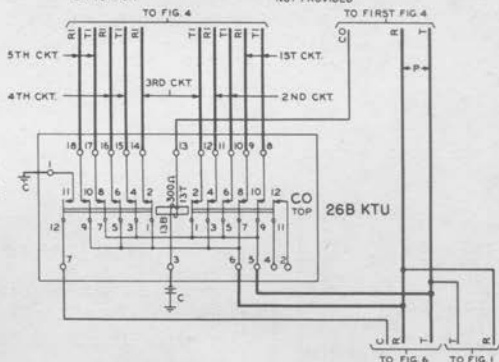
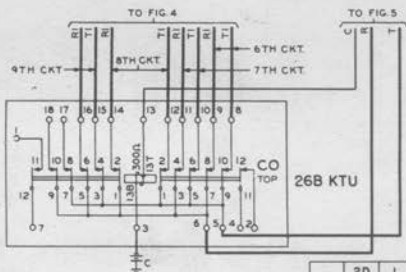


FIG. 6
AUXILIARY
STATIONS CUT-OFF
CKT.
FOR KEY TELEPHONE
SYSTEM NO. 1A



SD-69199-0102

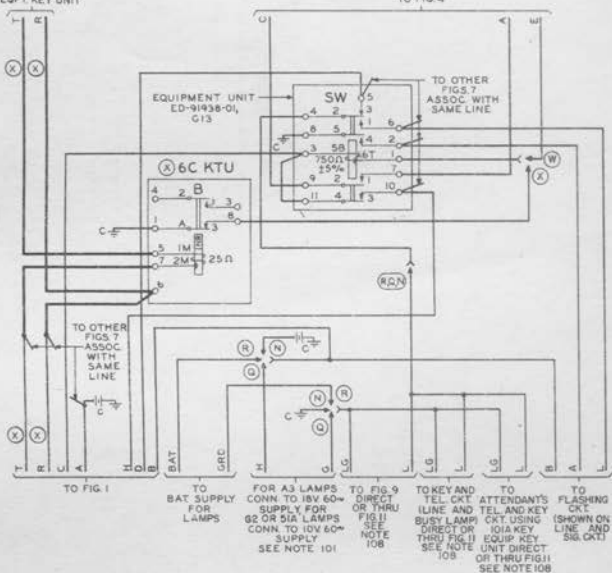
PRINTED IN U.S.A.

2D	1	DWG. 155.
2D	1	C.D. 155.

TO KEY AND TEL.
CKT. (PICK-UP KEY),
OR TO ATTENDANT'S
TEL. AND KEY CKT.
USING IOIA KEY
EQPT. KEY UNIT

FIG. 7
SIGNAL CKT. FOR
FLASHING LINE LAMP
FOR KEY TEL. SYS. NO. 1A

TO FIG. 4



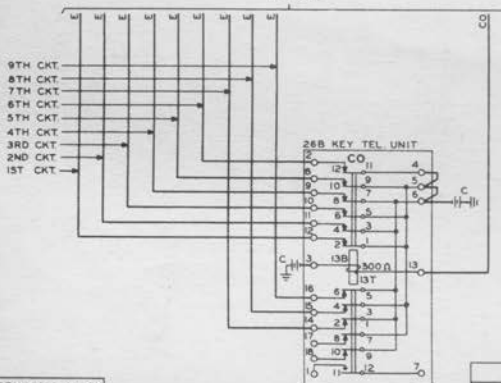
SD-69199-0103

PRINTED IN U.S.A.

2D	I	DWG. 155.
2D	I	C.D. 155.

FIG. 13
STATIONS CUT-OFF CKT.
FOR KEY TEL. SYS. NO. 1A1

TO FIG. 12



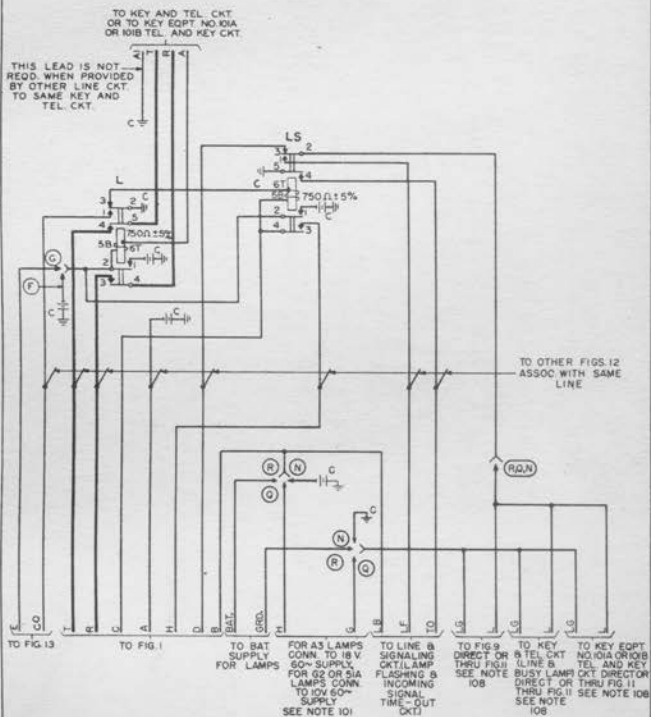
SD-69199-0104

PRINTED IN U.S.A.

2D	1	DWG. 155.
2D	1	C.D. 155.

FIG. 12

SIGNAL CKT. FOR FLASHING
LINE LAMP AND AUTOMATIC
CUT-OFF CONTROL CKT. FOR
KEY TEL. SYS. NO. 1A1



SD-69199-0105

PRINTED IN U.S.A.

2D	I	DWG. ISS.
2D	I	C.D. ISS.

FIG. 2
BUZZER CKT.

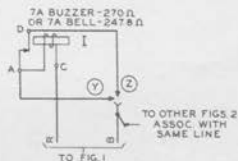


FIG. 3
RINGER CKT.

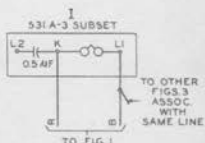
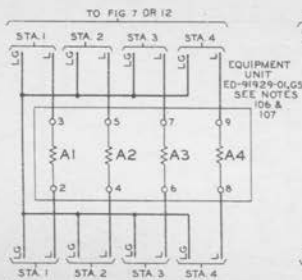
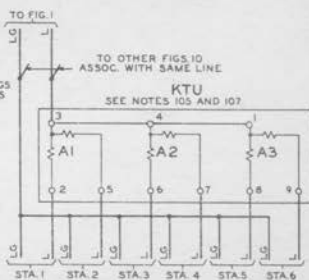


FIG. 11
LAMP RESISTANCE CKT.
WHEN FLASHING LAMP FEATURE
IS PROVIDED



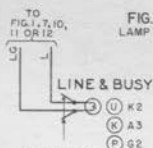
TO FIG. 9, TO KEY AND TEL. CKT. (LINE AND BUSY LAMP), TO ATTENDANT'S TEL. AND KEY CKT. USING IOIA KEY EQPT. KEY UNIT, OR TO KEY EQPT. NOIOIA OR IOIB TEL. AND KEY CKT. SEE NOTE 108

FIG. 10
LAMP RESISTANCE CKT.
WHEN FLASHING LAMP FEATURE
IS NOT PROVIDED



TO FIG. 9, TO KEY AND TEL. CKT. (LINE AND BUSY LAMP), TO ATTENDANT'S TEL. AND KEY CKT. USING IOIA KEY EQPT. KEY UNIT, OR TO KEY EQPT. NOIOIA OR IOIB TEL. AND KEY CKT. SEE NOTE 108

FIG. 9
LAMP CKT.



TO OTHER FIGS. 9 ASSOC. WITH SAME LINE WHEN CONN. DIRECTLY TO FIG. 1

TO OTHER KEY AND TEL. CKTS. (PICK-UP KEYS), ATTENDANT'S TEL. AND KEY CKTS. USING IOIA KEY EQPT. KEY UNIT, OR KEY EQPT. NO IOIA OR IOIB TEL. AND KEY CKTS.

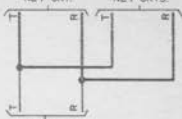


FIG. 8
NO AUTOMATIC CUT-OFF
NOR FLASHING LINE LAMPS

SD-69199-0106

PRINTED IN U.S.A.

2D	1	DWG. 155.
2D	1	C.D. 155.

CIRCUIT NOTES:

101. (A) THE DC BATTERY SUPPLY FOR THIS CIRCUIT MAY BE FROM CENTRAL OFFICE, BUILDING OR LOCAL BATTERY OR FROM THE 20 VOLT DC SUPPLY OF POWER UNIT J86731A, LIST 1 OR LIST 4. WHEN CENTRAL OFFICE OR BUILDING BATTERY IS USED, A COMMON BATTERY FEED MAY BE FURNISHED FOR BATTERIES DESIGNATED "A", "B" AND "C", OR SEPARATE BATTERY FEEDS MAY BE FURNISHED, ONE FOR BATTERIES DESIGNATED "A" AND "B" AND ONE FOR BATTERY DESIGNATED "C". THE MAXIMUM ALLOWABLE FEEDER RESISTANCE CAN BE COMPUTED FROM FORMULAS NO. 1, NO. 2 AND NO. 3. WHEN THE POWER UNIT J86731A, LIST 1 OR LIST 4 IS USED, THE BATTERY AND GROUND DESIGNATED "A" SHALL BE CONNECTED TO THE 20 V DC TALK TERMINALS "B" AND "G", AND THE BATTERIES AND GROUNDS DESIGNATED "B" AND "C" SHALL BE CONNECTED TO THE 20V DC SIG. TERMINALS "B" AND "G".
- (B) THE 18 VOLT 60 CYCLE SUPPLY FOR THIS CIRCUIT MAY BE FROM OUTPUT OF K95714, L1, L2 OR L3 TRANSFORMER (SHOWN ON THE LINE AND SIGNALING CIRCUIT), FROM 18 VOLT 60 CYCLE SUPPLY OF POWER UNIT J86731A, LIST 1 OR LIST 4 (18 V. 60~ TERMINALS "4" AND "G"), OR (ON EXISTING INSTALLATIONS) FROM 16 VOLT 60 CYCLE SUPPLY OF COPPER OXIDE RECTIFIER J86205A, LIST 1.
- (C) THE 10 VOLT 60 CYCLE SUPPLY FOR THIS CIRCUIT MAY BE FROM OUTPUT OF 393A TRANSFORMER (SHOWN ON THE LINE AND SIGNALING CIRCUIT) OR FROM 10 VOLT 60 CYCLE SUPPLY OF POWER UNIT J86731A, LIST 1 OR LIST 4 (10V. 60~ TERMINALS "1" AND "G").
- (D) THE 105 VOLT 20 CYCLE SUPPLY FOR THIS CIRCUIT MAY BE FROM RINGING SUPPLY THROUGH RINGING FEEDER LAMP (SHOWN ON THE LINE AND SIGNALING CIRCUIT) OR FROM 105 VOLT 20 CYCLE SUPPLY OF POWER UNIT J86731A, LIST 4 (107B FREQ. GEN. OUT TERMINALS "2" AND "G").
102. WHEN FIG. 102 OR 103 SHOWN IN THE BATTERY FEEDER FUSING DATA IS USED
- (A) PROVIDE ONE 2 AMP. CIRCUIT FUSE FOR BATTERY DESIGNATED "A".
- (B) PROVIDE ONE 2 AMP. CIRCUIT FUSE FOR BATTERY DESIGNATED "B".
- (C) PROVIDE ONE 2 AMP. CIRCUIT FUSE FOR BATTERY DESIGNATED "C".

CIRCUIT NOTES (CONT.):

103.

FEATURE OR OPTION			PROVIDE		
			FIGS.	APP OR WIR.	QUANTITY
SELECTOR CKT.			1		1 PER LINE
AUDIBLE SIGNAL	BUZZER OR BELL	WITH DC SUPPLY WITH AC SUPPLY	2	Z Y	1 PER STATION
	RINGER USED WITH 105 VOLTS 20 CYCLE SUPPLY		3	Y	1 PER STATION
AUTOMATIC CUT-OFF OF STATIONS FOR KEY TEL SYS. NO. 1A	AUTOMATIC CUT-OFF CONTROL CKT.		4		1 PER STATION
	STATIONS CUT-OFF CKT.		5		1 PER LINE
	AUXILIARY STATIONS CUT-OFF CKT-FOR USE WHEN TOTAL NO. OF STATIONS EXCEEDS 5		6		1 PER LINE
WITHOUT FLASHING LINE LAMPS				M	
AUTOMATIC CUT-OFF OF STATIONS WITHOUT FLASHING LINE LAMPS FOR KEY TEL SYS. NO. 1A	AUTOMATIC CUT-OFF CONTROL CKT.		12	G	1 PER STATION
	STATIONS CUT-OFF CKT.		13		1 PER LINE
FLASHING LINE LAMPS FOR KEY TEL SYS. NO. 1A	SIGNAL CKT. FOR FLASHING LINE LAMPS	WITH AUTOMATIC CUT-OFF OF STATIONS	7	W	1 PER STATION
		WITHOUT AUTOMATIC CUT-OFF OF STATIONS		X	
FLASHING LINE LAMPS FOR KEY TEL SYS. NO. 1A	SIGNAL CKT. FOR FLASHING LINE LAMPS	WITH AUTOMATIC CUT-OFF OF STATIONS	12	W, G	1 PER STATION
		WITHOUT AUTOMATIC CUT-OFF OF STATIONS		W, F	
	STATIONS CUT-OFF CKT.		13	W, G	1 PER LINE
LAMP CKT. FOR LAMP IN INDICATOR	WITH 14-28 VOLT SUPPLY		9	K	
	WITH 10 VOLT 60 CYCLE SUPPLY			P	1 PER STATION
	WITH 47.5-50 VOLT SUPPLY			U	
NO AUTOMATIC CUT-OFF OF STATIONS NOR FLASHING LINE LAMPS			8		1 PER LINE
WHEN DC SUPPLY IS USED FOR LAMPS IN KEY TEL SETS, OR WHEN 47.5-50 VOLT SUPPLY IS USED FOR LAMPS IN INDICATORS OR LAMPS IN 101A OR 101B KEY EQUIPMENTS	WITH FLASHING LINE LAMPS		11		1 PER 4 STATIONS PER LINE
	WITHOUT FLASHING LINE LAMPS		10		1 PER 6 STATIONS PER LINE
LAMPS IN INDICATORS ONLY	WITH FLASHING LINE LAMPS	14-28V DC SUPPLY		N	
		475-50V DC SUPPLY		R	
		AC SUPPLY		Q	
	WITHOUT FLASHING LINE LAMPS	14-28V DC SUPPLY		S	
		475-50V DC SUPPLY		V	
LAMPS IN TEL SETS AND INDICATORS	WITH FLASHING LINE LAMPS	AC SUPPLY		T	
		DC SUPPLY		R	
		AC SUPPLY		Q	
	WITHOUT FLASHING LINE LAMPS	DC SUPPLY		V	
		AC SUPPLY		T	

SD-69199-0108

PRINTED IN U.S.A.

2D DWG. ISS.

2D C.D. ISS.

CIRCUIT NOTES (CONT):

104. TO OBTAIN SOMEWHAT LONGER LIFE IN INSTALLATIONS WITH HIGH AVERAGE VOLTAGE, THE TELEPHONE COMPANY MAY REPLACE A3 LAMPS WITH A1 LAMPS PROVIDING THE ILLUMINATION FROM THE A1 LAMPS IS SATISFACTORY.

105.	TYPE OF BATTERY SUPPLY	TYPE OF KEY TEL. UNIT TO PROVIDE IN FIG.10	RI VALUE FOR FORMULA NO.4
FOR 51A LAMPS	LOCAL BATTERY 8 CELLS 14-20V.	22F 19RX RES. $210\Omega / 210\Omega$	51 Ω
	9 CELL BLDG. BATTERY 16-22V.	22G 19AH RES. $240\Omega / 240\Omega$	82 Ω
	10 CELL BLDG. BATTERY 18-24V.	22H 19PG RES. $290\Omega / 290\Omega$	91 Ω
	11 CELL BLDG. BATTERY 20-26V.	22J 19DS RES. $350\Omega / 350\Omega$	90 Ω
	12 OR 13 CELL BLDG. OR CENT. OFF. BATTERY 22-26V.	22J 19DS RES. $350\Omega / 350\Omega$	125 Ω
	23 CELL CENT. OFFICE BATTERY 475-50V. REGULATED	22K 19BA RES. $900\Omega / 900\Omega$	279 Ω
FOR K2 LAMPS	23 CELL CENT. OFFICE BATTERY 475-50V. REGULATED	22J 19DS RES. $350\Omega / 350\Omega$	279 Ω

106.	TYPE OF BATTERY SUPPLY	TYPE OF RES. TO PROVIDE IN EQPT UNIT OF FIG.11	RI VALUE FOR FORMULA NO.4
FOR 51A LAMPS	LOCAL BATTERY 8 CELLS 14-20V.	18FD RES. 210Ω	51 Ω
	9 CELL BLDG. BATTERY 16-22V.	18AD RES. 240Ω	82 Ω
	10 CELL BLDG. BATTERY 18-24V.	18DF RES. 290Ω	91 Ω
	11 CELL BLDG. BATTERY 20-26V.	18AS RES. 350Ω	90 Ω
	12 OR 13 CELL BLDG. OR CENT. OFF. BATTERY 22-28V.	18AS RES. 350Ω	125 Ω
	23 CELL CENT. OFFICE BATTERY 475-50V. REGULATED	18FB RES. 900Ω	279 Ω
FOR K2 LAMPS	23 CELL CENT. OFFICE BATTERY 475-50V. REGULATED	18AS RES. 350Ω	279 Ω

107. IF MORE THAN 36 LAMPS ARE PROVIDED DUPLICATE BATTERY FEEDS SHALL BE USED.

108. WHEN THREE OR MORE STATIONS ARE LOCATED NEAR EACH OTHER, THE "L" AND "LG" LEADS FOR THESE STATIONS FROM FIG.10 OR 11 MAY BE CONNECTED TO COMMON "L" AND "LG" LEADS AT APPARATUS BOX TO SERVE THESE STATIONS, PROVIDED THE TOTAL RESISTANCE OF COMMON "L" AND "LG" LEADS DOES NOT EXCEED 10 OHMS (WHICH IS THE MAXIMUM TOTAL RESISTANCE FOR SINGLE "L" AND "LG" LEADS) DIVIDED BY THE NUMBER OF STATIONS IN THE GROUP.

14-28V.

SD-69199-0110										3 PAGES		CIRCUIT REQUIREMENTS										A
KEY TELEPHONE SYSTEM NO.1A OR 1A1-INTERCOMMUNICATING LINE CKT. WITH DIAL SEL. OF STATIONS													DWG. ISS.									
APPARATUS					MECH. REQ.			CIRCUIT PREPARATION				TEST SET PREP.	SEE TEST NOTE NO.	DIRECT CURRENT FLOW REQ.						REMARKS		
DESIG.	CODE	OPTION	CKT. FIG.	RESID.		BSP FIG.	CONT. PRESS.	ARM. TRVL.	BLOCK OR INSULATE	TEST CLIP DATA				TEST WDG.	TEST FOR	AFTER SOAK	TEST	READJ.				
										CONN. BAT.	CONN. GRD.					MA	MA	MA				
MAGNETS																						
A	204E SEL.		I										I	ROT.	O		330	300				
													1B(B)	GRD.	2/3	ROT	O	365	335			
									2B(B)		3B(B)	GRD.	4	RLS	O		165	150				
RELAYS																						
A	UA131		I			144/101	H	35		BF (A)	TR (A)	M		P/S	O		19.5	18.5				
										BF (A)	TR (A)	M		P/S	R		4.8	5.1				
B	Y320		I			238/203	H	47	2T (A)		T (B)	GRD.			O	FS	20	19				
									2T (A)		T (B)	GRD.			H	FS	3.5	3.3				
									2T (A)		T (B)	GRD.			R	FS	1.1	1.2				
C	Y319		I			224/188	SPL.	SPL.					5/6		O	FS	23.5	22	ARM. TRVL. 35			
													6		H	FS	2	1.9				
													6		R	FS	1.2	1.3				
											B (C)	GRD.	2		O	495	275	255				
											B (C)	GRD.	2		H	495	24	22.5				
											B (C)	GRD.	2		R	495	9.3	9.8				

TEST NOTES:

1. FOR (ROT) MAGNET ALONE.

2. FOR CKT. COMB. OF (ROT) MAGNET AND (C) RELAY.

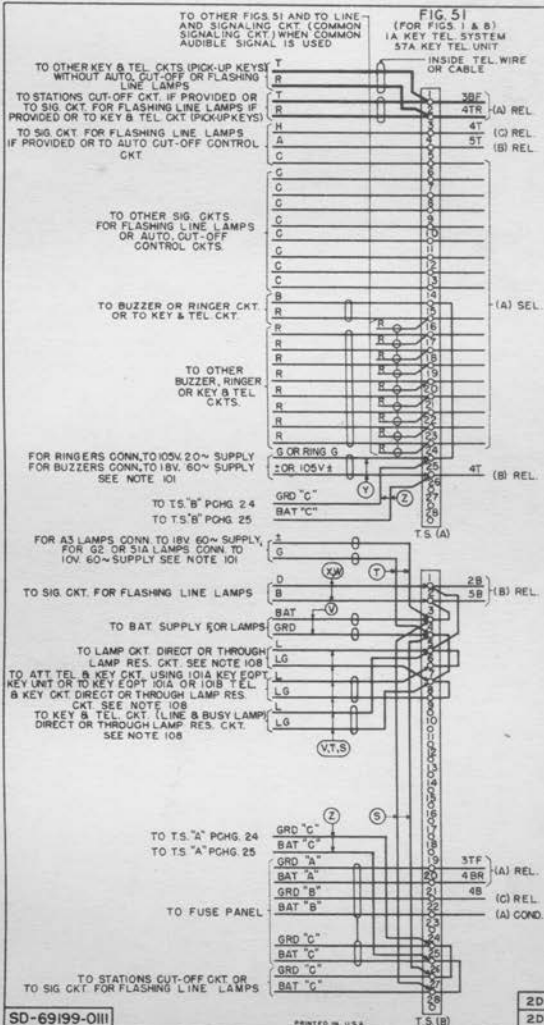
3. ROTARY MAGNET SHALL STEP THE WIPER ONE COMPLETE STEP.

4. MOVE SEL. OFF NORMAL BEFORE TESTING (RLS) MAGNET.

5. CONTACTS MAKE 6 READJ., 4 TEST, MIN. TENSION IT, 3T AND 1B 10 READJ., 8 TEST.

6. FOR RELAY WDG. ALONE.

[illegible]



SD-69199-0111

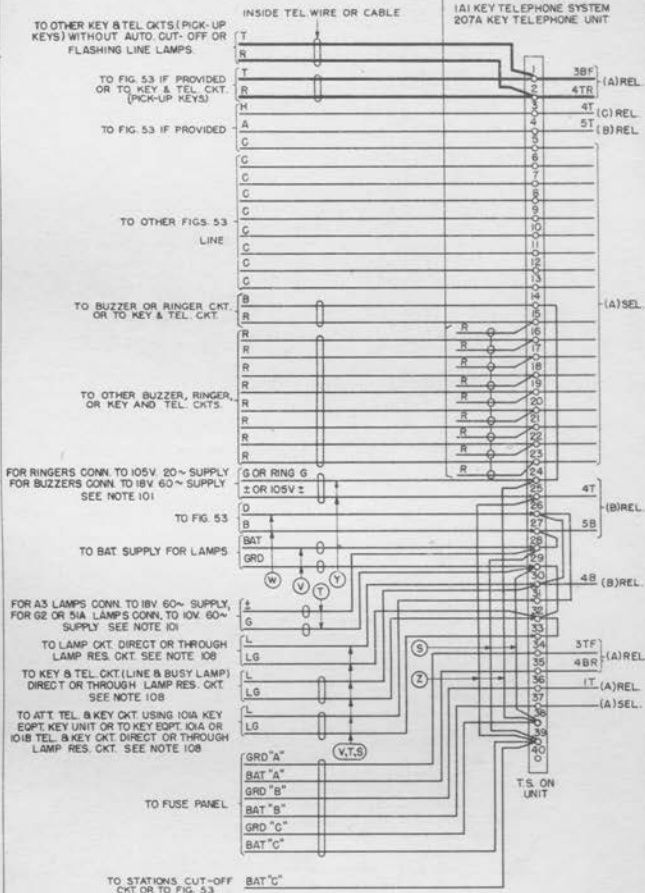
PRINTED IN U.S.A.

2D	1	DWG. ISS.
2D	1	C.D. ISS.

TO OTHER FIGS. 52 AND TO LINE
AND SIGNALING CKT. (COMMON
SIGNALING CKT) WHEN COMMON
AUDIBLE SIGNAL IS USED

FIG. 52

(FOR FIGS. 1 AND 8)
1A1 KEY TELEPHONE SYSTEM
207A KEY TELEPHONE UNIT



SD-69199-0112

PRINTED IN U.S.A.

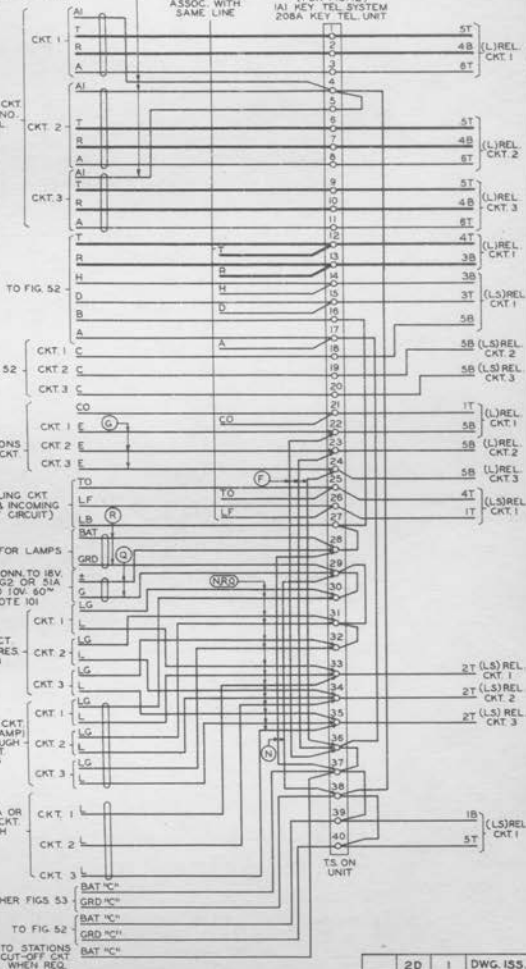
2D	I	DWG ISS.
2D	I	C.D. ISS.

NOT REQ. WHEN PROVIDED—
BY OTHER LINE. CKT. TO SAME
KEY AND TEL. CKT.

TO OTHER
FIGS. 53
ASSOC. WITH
SAME LINE

FIG. 53
(FOR FIG. 12)
1A1 KEY TEL. SYSTEM
20BA KEY TEL. UNIT

TO KEY AND TEL. CKT.
OR TO KEY EQPT. NO.
101A OR 101B TEL.
AND KEY CKT.



20	1	DWG. 155.
20	1	C.D. 155.

SD-69199-0113

PRINTED IN U.S.A.

FOR CENTRAL OFFICE OR BUILDING BATTERY
METHOD OF FUSING DIRECT FEEDERS
FOR ALL EQUIPMENT EXCEPT LAMPS IN SYSTEMS
HAVING LAMPS IN KEY TELEPHONE SETS

FIG.101
SEE NOTE A
SH-0115

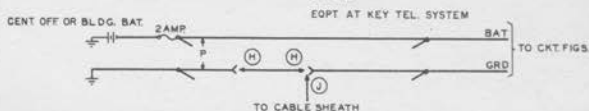


FIG.102
SEE NOTE A
SH-0115

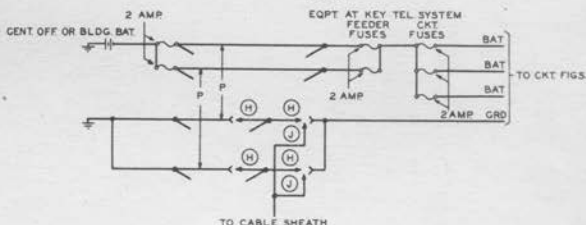
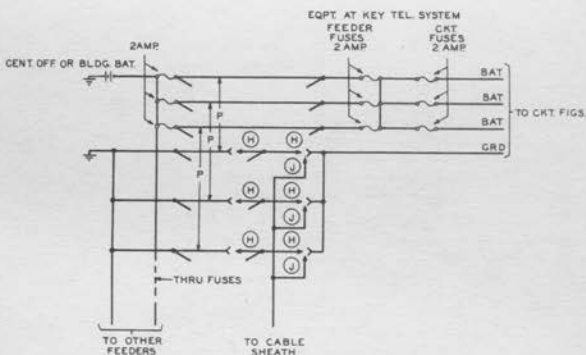


FIG.103
SEE NOTE A
SH-0115



SD-69199-0114

PRINTED IN U.S.A.

	2D	I	DWG. ISS.
	2D	I	C.D. ISS.

FORMULA NO. 6

(COMMON BATTERY FEED FOR BATTERIES "A," "B" AND "C")

$$\frac{\text{MAXIMUM CURRENT WHICH MAY BE SUPPLIED OVER BATTERY FEED}}{\text{MAXIMUM VOLTAGE OF BATTERY (SEE TABLE NO. 1)}} = \frac{\text{APPROXIMATE RESISTANCE OF FEEDERS} + \frac{18}{A1 + B1 \text{ (SEE TABLE NO. 2) }}}{0.47}$$

FORMULA NO. 7

(SEPARATE BATTERY FEED FOR BATTERIES "A" AND "B")

$$\frac{\text{MAXIMUM CURRENT WHICH MAY BE SUPPLIED OVER BATTERY FEED}}{\text{MAXIMUM VOLTAGE OF BATTERY (SEE TABLE NO. 1)}} = \frac{\text{APPROXIMATE RESISTANCE OF FEEDERS} + \frac{18}{A1 + B1 \text{ (SEE TABLE NO. 2) }}}{0.47}$$

FORMULA NO. 8

(SEPARATE BATTERY FEED FOR BATTERY "C")

$$\frac{\text{MAXIMUM CURRENT WHICH MAY BE SUPPLIED OVER BATTERY FEED}}{\text{MAXIMUM VOLTAGE OF BATTERY (SEE TABLE NO. 1)}} = \frac{\text{APPROXIMATE RESISTANCE OF FEEDERS} + \frac{14}{A2 + B2 + C2 \text{ (SEE TABLE NO. 3) }}}{0.47}$$

NOTE A (FOR ALL EQUIPMENT EXCEPT LAMPS IN SYSTEMS HAVING LAMPS IN KEY TELEPHONE SETS)

FEATURE OR OPTION			PROVIDE		
			FIGS.	APP. OR WIR.	QUANTITY
WHEN THE MAXIMUM CURRENT WHICH MAY BE SUPPLIED OVER A BATTERY FEED (COMMON BATTERY FEED FOR BATTERIES "A," "B" AND "C," SEPARATE BATTERY FEED FOR BATTERIES "A" AND "B," OR SEPARATE BATTERY FEED FOR BATTERY "C") DOES NOT EXCEED 1.6 AMPS. (SEE FORMULA NO. 6, 7 OR 8) AND THE FUSES AT THE CENT. OFF. OR BUILDING BATTERY ARE	READILY ACCESSIBLE	101		1 PER BATTERY FEED	
	NOT READILY ACCESSIBLE AND THE FEEDER RESISTANCE IS	NOT OVER 14 OHMS	102		1 PER BATTERY FEED
		OVER 14 OHMS	101		1 PER BATTERY FEED
WHEN THE MAXIMUM CURRENT WHICH MAY BE SUPPLIED OVER A BATTERY FEED (COMMON BATTERY FEED FOR BATTERIES "A," "B" AND "C," SEPARATE BATTERY FEED FOR BATTERIES "A" AND "B," OR SEPARATE BATTERY FEED FOR BATTERY "C") EXCEEDS 1.6 AMPS. (SEE FORMULA 6, 7 OR 8) WHETHER THE FUSES AT THE CENTRAL OFFICE OR BUILDING BATTERY ARE OR ARE NOT READILY ACCESSIBLE, A 2 AMP FUSE IS REQUIRED FOR EACH 1.6 AMPS OF MAXIMUM CURRENT WHICH MAY BE SUPPLIED OVER THE BATTERY FEED			103		1 PER BATTERY FEED
FOR METALLIC RETURN (METALLIC RETURN SHALL ALWAYS BE PROVIDED WHEN THE BATTERY IS NOT LOCATED IN THE SAME BUILDING AS THE KEY TELEPHONE SYSTEM OR WHEN IT IS LOCATED IN THE SAME BUILDING AND IT IS CHARGED OVER METALLIC RETURN FEEDERS)				H	
FOR CABLE SHEATH RETURN (CABLE SHEATH RETURN SHALL ONLY BE USED WHEN THE BATTERY IS LOCALLY GROUNDED AND LOCATED IN THE SAME BUILDING AS THE KEY TELEPHONE SYSTEM)				J	

BATTERY SUPPLY FOR LAMPS FOR SYSTEMS WITH LAMPS IN KEY TELEPHONE SETS METHOD OF FUSING

FIG. 201
SEE NOTE B
SH-0117

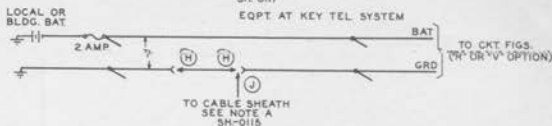


FIG. 202
SEE NOTE B
SH-0117

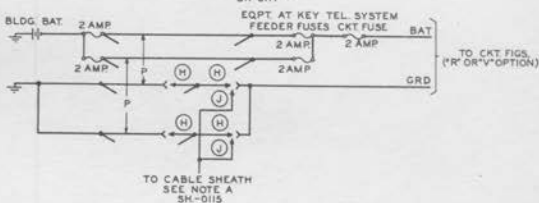
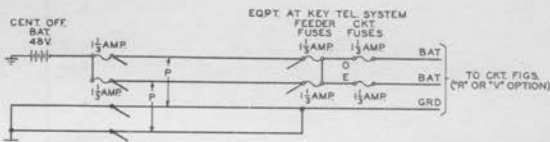


FIG. 203
SEE NOTE B
SH-0117



FIG. 204
SEE NOTE B
SH-0117



SD-69199-0116

PRINTED IN U.S.A.

2D	I	DWG. 133.
2D	I	C.D. 133.

NOTE B (FOR LAMPS IN SYSTEMS WITH LAMPS IN KEY TELEPHONE SETS) THE BATTERY SUPPLY FOR THE LAMPS OF THIS CIRCUIT AND OF THE KEY TELEPHONE SETS ASSOCIATED WITH THIS CIRCUIT, MAY BE FUSED IN ACCORDANCE WITH FIG. 201, 202, 203 OR 204, OR IN ACCORDANCE WITH A SIMILAR FIG. ON THE LINE AND SIGNALING CIRCUIT. IN THIS LATTER CASE, THE TOTAL NUMBER OF LAMPS FOR BOTH CIRCUITS SHALL BE CONSIDERED IN DETERMINING THE QUANTITY OF FIGURES TO BE PROVIDED.

FEATURE OR OPTION			PROVIDE	
			FIGS.	APP. OR WIR. QUANTITY
FOR 24V. BATTERY SUPPLY	FOR BUILDING BATTERY, 9, 10, 11, 12 OR 13 CELLS - WHEN THE FUSES AT THE BUILDING BATTERY ARE (PROVIDES FOR A MAXIMUM OF 36 LAMPS - SEE NOTE 107)	READILY ACCESSIBLE	201	1 PER 9 FIGS. 11 OR 6 FIGS. 10
		NOT READILY ACCESSIBLE	202	1 PER 9 FIGS. 11 OR 6 FIGS. 10
	FOR LOCAL BATTERY, 8 CELLS (PROVIDES FOR A MAXIMUM OF 36 LAMPS - SEE NOTE 107) 2 AMP. FUSE TO BE LOCATED AT BATTERY		201	1 PER 9 FIGS. 11 OR 6 FIGS. 10
FOR 48V. BATTERY SUPPLY	WHEN THE NUMBER OF LAMPS IN THE SYSTEM IS 24 OR LESS AND THE FUSES AT THE CENTRAL OFFICE ARE	READILY ACCESSIBLE	203	1 PER 6 FIGS. 11 OR 4 FIGS. 10
		NOT READILY ACCESSIBLE AND THE FEEDER RESISTANCE IS	204 8" 0" FUSE	1 PER 6 FIGS. 11 OR 4 FIGS. 10
	WHEN THE NUMBER OF LAMPS IN THE SYSTEM IS NOT MORE THAN 48 NOR LESS THAN 25 (EACH FUSE FOR MAXIMUM OF 6 FIGS. 11 OR 4 FIGS. 10)	OVER 38 OHMS	203	1 PER 6 FIGS. 11 OR 4 FIGS. 10
			204 8" 0" 8" E" FUSES	1 PER 12 FIGS. 11 OR 8 FIGS. 10

FOR CENTRAL OFFICE OR BUILDING BATTERY METHOD OF COMPUTING DIRECT FEEDER RESISTANCE

FORMULA NO. 1

(COMMON BATTERY FEED FOR BATTERIES "A" "B" AND "C" - MAXIMUM ALLOWABLE RESISTANCE IN DIRECT FEEDERS TO MAINTAIN A MINIMUM OF 18 VOLTS AT THE EQUIPMENT)

$$\text{RESISTANCE OF FEEDERS} = \frac{\text{FEEDER VOLTAGE DROP (SEE TABLE NO. 1)}}{A1 + B1 \text{ (SEE TABLE NO. 2)}}$$

FORMULA NO. 2

(SEPARATE BATTERY FEED FOR BATTERIES "A" AND "B" - MAXIMUM ALLOWABLE RESISTANCE IN DIRECT FEEDERS TO MAINTAIN A MINIMUM OF 18 VOLTS AT THE EQUIPMENT)

$$\text{RESISTANCE OF FEEDERS} = \frac{\text{FEEDER VOLTAGE DROP (SEE TABLE NO. 1)}}{0.47}$$

FORMULA NO. 3

(SEPARATE BATTERY FEED FOR BATTERY "C" - MAXIMUM ALLOWABLE RESISTANCE IN DIRECT FEEDERS TO MAINTAIN A MINIMUM OF 14 VOLTS AT THE EQUIPMENT)

$$\text{RESISTANCE OF FEEDERS} = \frac{\text{FEEDER VOLTAGE DROP (SEE TABLE NO. 1)}}{A2 + B2 + C2 \text{ (SEE TABLE NO. 3)}}$$

TABLE NO. 1

VOLTAGE SOURCE	VOLTAGES AT CENT. OFF. OR BLDG. BAT.		FEEDER VOLTAGE DROP	
	MAX.	MIN.	FOR FORMULA NO. 1 OR 2	FOR FORMULA NO. 3
NON-REG. 24V. CENT. OFF. SUPPLY				
(A) 11 CELL MAIN BAT.	28	20	2	6
(B) DERIVED FROM 48V. BAT. THRU C.E.M.F. CELLS SINGLE STEP VOLTAGE CONTROL	28	20	2	6
(C) DERIVED FROM 12 CELL BAT. FLOATED FROM 48V. BAT.	28	21	3	7
REG. 24 V. CENT. OFF. SUPPLY				
(A) 12 CELL TAP ON 24 CELL MAIN BAT.	25	21	3	7
(B) 12 CELL TAP ON 23 CELL MAIN BAT.	26	23	5	9
(C) DERIVED FROM 48V. BAT. THRU C.E.M.F. CELLS MULTI-STEP VOLTAGE CONTROL	26	22	4	8
BLDG. BAT. CONTINUOUS CHARGE				
(A) 10 CELLS	24	18	0	4
(B) 11 CELLS	26	20	2	6
(C) 12 CELLS	28	22	4	8
BLDG. BAT. VOLTAGE CONTROL OF CHARGE				
(A) 10 CELLS	23	18	0	4

A1 = SEE FOLLOWING

TABLE NO. 2

KEY TEL. SYS.	FEATURES PROVIDED		REMARKS	VALUE OF A1
	AUTOMATIC CUT-OFF	FLASHING LAMPS		
IA OR IAI	NO	NO		0.47
IA	NO	YES		0.47
IA	YES	NO	5 OR LESS STATIONS	0.63
IA	YES	NO	OVER 5 STATIONS	0.69
IA	YES	YES	5 OR LESS STATIONS	0.65
IA	YES	YES	OVER 5 STATIONS	0.71
IAI	NO	YES		0.49
IAI	YES	NO		0.55
IAI	YES	YES		0.55

B1 = 0.035 X NO. OF A3 LAMPS FIG. 9 (DC OPERATION)

A2 = SEE FOLLOWING

TABLE NO. 3

KEY TEL. SYS.	FEATURES PROVIDED		REMARKS	VALUE OF A2
	AUTOMATIC CUT-OFF	FLASHING LAMPS		
IA OR IAI	NO	NO		0
IA	NO	YES		0.02
IA	YES	NO	5 OR LESS STATIONS	0.17
IA	YES	NO	OVER 5 STATIONS	0.22
IA	YES	YES	5 OR LESS STATIONS	0.19
IA	YES	YES	OVER 5 STATIONS	0.24
IAI	NO	YES		0.04
IAI	YES	NO		0.09
IAI	YES	YES		0.09

B2 = 0.035 X NO. OF A3 LAMPS FIG. 9 (DC OPERATION)

C2 = 0.056 FOR BELLS OR BUZZERS FIG. 2 (DC OPERATION)

SD-69199-0118 PRINTED IN U.S.A.

2D	1	DWG. ISS.
2D	1	C.D. ISS.

FOR LOCAL BATTERY OR BUILDING BATTERY OR FOR
DIRECT FEEDER RESISTANCE FROM 48 V. CENTRAL OFFICE BATTERY
METHOD OF COMPUTING FEEDER RESISTANCE FOR SEPARATE BATTERY SUPPLY FOR LAMPS
MAXIMUM ALLOWABLE RESISTANCE IN FEEDERS TO MAINTAIN 7 VOLTS AT LAMPS
(MAXIMUM RESISTANCE OF LAMP LEADS "L" AND "LG" = 10Ω) (SEE NOTE 107)

FORMULA NO. 4

$$\text{RESISTANCE OF FEEDERS} = \frac{R1 (\text{SEE NOTE 105 OR 106})}{\text{TOTAL NUMBER OF LAMPS IN SYSTEM}}$$

FOR 10V. AC SUPPLY

MAXIMUM ALLOWABLE RESISTANCE IN LEADS FROM APPARATUS CABINET TO
10V AC SUPPLY (MAXIMUM RESISTANCE OF LAMP LEADS "L" AND "LG" = 25Ω)

FORMULA NO. 5

$$\text{RESISTANCE OF LEADS} = \frac{1/5 (\text{MAX. LEAD VOLTAGE DROP})}{.035 \times \text{NO. OF 51A LAMPS} + .044 \times \text{NO. OF G2 LAMPS}}$$

FORMULA NO. 9

MAXIMUM CURRENT
WHICH MAY BE REQ'D. = .042 X NO. OF 51A LAMPS + .052 X NO. OF G2 LAMPS
FROM 10V. AC SUPPLY

FOR LOCAL BATTERY
18 VOLTS

METHOD OF COMPUTING CHARGING RATE OF LOCAL BATTERY,
BATTERY FEEDER RESISTANCE AND FUSING

FORMULA NO. 10 (SEE TABLE NO. 4)

$$\text{BATTERY CHARGING CURRENT (FOR 6 BUSY HOURS PER DAY)} = \frac{6(A3+B3)}{24} \times \frac{1.25 \times \text{NUMBER OF WORKING DAYS PER WEEK}}{7}$$

TABLE NO. 4

A3=SEE FOLLOWING

FEATURES PROVIDED				VALUE OF A3
KEY TEL. SYS.	AUTOMATIC CUT-OFF	FLASHING LAMPS	REMARKS	
1A OR 1A1	NO	NO		.007
1A	NO	YES		.007
1A	YES	NO	5 OR LESS STATIONS	.018
1A	YES	NO	OVER 5 STATIONS	.021
1A	YES	YES	5 OR LESS STATIONS	.018
1A	YES	YES	OVER 5 STATIONS	.021
1A1	NO	YES		.010
1A1	YES	NO		.013
1A1	YES	YES		.013

B3=.002 X NUMBER OF LAMPS (DC OPERATION)

FORMULA NO. 11

$$\text{RESISTANCE OF CABLE FEEDERS} = \frac{6 \text{ VOLTS}}{\text{BATTERY CHARGING CURRENT (FORMULA NO. 10)}}$$

(WHEN 24V. BATTERY FEEDERS ARE USED TO CHARGE 18V. KEY TEL. SYSTEM BATTERY)

FORMULA NO. 12

$$\text{RESISTANCE OF CABLE FEEDERS} = \frac{30 \text{ VOLTS}}{\text{BATTERY CHARGING CURRENT (FORMULA NO. 10)}}$$

(WHEN 48V. BATTERY FEEDERS ARE USED TO CHARGE 18V. KEY TEL. SYSTEM BATTERY)

FUSING NOTE FOR LOCAL BATTERY (FUSES TO BE LOCATED AT THE BATTERY)

- (A) PROVIDE ONE 2 AMP FUSE FOR BATTERIES DESIGNATED "A" AND "B".
- (B) PROVIDE ONE 2 AMP FUSE FOR BATTERY DESIGNATED "C".
- (C) WHEN LAMPS IN KEY TEL. SETS ARE PROVIDED, BATTERY FOR THE LAMPS (IN INDICATORS AND KEY TEL. SETS) SHALL BE FUSED WITH THE BATTERY FOR THE OTHER LAMPS IN THE KEY TEL. SYSTEM.