

MOUNTING AND ALIGNING APPARATUS
"CU" TO "LA" (CUSHIONS THRU LAMPS)

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1. GENERAL

1.1 Scope

1.1.1 This section covers the requirements and methods for mounting and aligning apparatus classified alphabetically from "CU" to "LA" inclusive.

1.1.2 The requirements covered in this section should be followed except as modified by applicable specifications and drawings.

1.2 Precautions Against Personal Injury, Equipment Damage and Service Interruptions

1.2.1 The precautions to be taken against personal injury and to prevent damage to equipment and service interruptions are covered in this section with the associated operations. General precautions are covered in Handbook 0 and are to be observed at all times, as they apply to the particular operation being performed.)

1.3 Arrangement of Tools

1.3.1 Prior to starting operation covered by this section, the tools and other items required should be arranged at the work locations so as to minimize fatigue and inconvenience when handling.

1.4 Verification

1.4.1 Items for the verification of the equipment installed by the operations covered in this section are listed in Section 52V.

1.4.1.1 The items in Section 52V may also be used as a self-check guide when performing operations covered by this section.

2. INSTALLING EQUIPMENT

2.1 Tools

2.1.1 In addition to tools supplied in the general kits, the tools listed in Paragraph 2.12 may be required for the operations covered by this section.

2.1.2 Additional Tools

ED63343-01	Brackets, Maintenance (See Note 1)
553A	Extractor, Lamp
553C	Extractor, Lamp
R-4396	Fuse Designation Pin Holder
R-2120	Pliers, Long Nose (See Par. 10.1)
R-6854	Screwdriver, 3-1/2" Tap, 13/32" -28 (See Par. 12 .7, Note)
R-4300	Wrench, Set, Small Nuts and Bolts

NOTE: Used to support equipment units mounted on double-sided or back-to-back duct type bays when performing work operation on the normally inaccessible side of the unit. Method of using the brackets is covered in BSP 065-125-801. (Brackets and BSP may be borrowed from the operating company.)

3. CUSHIONS

3.1 1A, 2A and 4A cushions are assembled on switchboard cords in the shop directly below the cord end of the plug as shown in figure 1.

) This section includes material from BSP's 026-371-501, 800-610-154 and 032-325-801 Copyright, 1973, 1975 and 1978 respectively by the American Telephone and Telegraph Company

3.2 Where it is necessary to position a cushion, it can be accomplished by manipulating it in the desired direction with the fingers.

4. DRIVES

4.1 The 51 and 52-type drives should be mounted with the bushings, washers and special RHM screws furnished with the drives assembled as shown in Figure 2.

5. FACE EQUIPMENT - OTHER THAN SWITCHBOARDS

5.1 Strip-type jack, key and lamp socket mountings are sometimes mounted as "face equipment" at locations other than in switchboards, as for example the jack fields on duct-type frames in toll offices, and the jack, key and lamp panels on test frames. The requirements for face equipment in switchboards as covered in Handbook 8, Section 9A, should be followed as far as possible, for these equipments. On equipment where stile casings are not provided on both sides of the face equipment opening, the equipment should be dressed toward the stile strip away from the stile casings.

6. FASTENERS, CORD

6.1 Mount cord fasteners so that they are in alignment and, when on cord shelves, at right angles to the length of the cord shelf. Locate properly over the drillings so that the cord tips can be readily inserted.

7. FUSES

NOTE: The current standard 35 type alarm fuses shall be handled carefully so as to prevent depressing the fuse wire holding the spring on the front of the fuse to such an extent that the spring is bent beyond its elastic limit and allows the alarm spring to touch the alarm bar when the fuse is mounted. When the elastic limit is exceeded, an alarm is indicated even though the fuse is not blown. If it appears that the fuses have become damaged due to shipping or other improper handling, do not attempt to correct or adjust the spring tension on the job. See Section 14 of the Job Clerical Handbook for the disposition of defective material.

7.1 Indicator alarm type fuses (35 type) are divided into two classifications, namely, "regular" and "non-flashing" types. The non-flashing types differ from the regular types in that the fuse wire is protected by a glass (or porcelain) tube which restricts flashing during the operation of the fuse and prevents the operation of adjacent fuses. The equipment drawings specify the types of non-flashing fuses to be mounted on fuse panels. The following table lists fuses of both regular and non-flashing types.

<u>Regular</u>	<u>Non-flashing</u>	<u>Color</u>	<u>Rated Capacity (Ampere)</u>
35R		Yellow	0.180
	35S	Violet	
		(formerly Pink)	1/4
35F	35J	Red	1/2
35T		Tan	0.650
	35P	Brown	3/4
		(formerly Tan)	
35A	35K	White	1-1/3
35C	35L	Orange	2
35G	35M	Blue	3
35H	35N	Green	5

7.1.1 Non-flashing indicator alarm type fuses (35-Type) shall be used on all circuits 90 volts and higher except for 35R fuses, used in 130 volt DC plate battery supply circuits when this fuse is functioning as a nonflashing type.

7.2 Mount indicator alarm type fuses (35-type) and heat coils with the side mounting slot fastened to the potential supply side of the circuit to insure proper contact between the alarm bar and the alarm spring of the fuse or heat coil. In addition, where mounted horizontally they should be mounted with the side slot at the right or bottom, wherever practicable.

7.3 Mount nonalarm type fuse as follows:

7.3.1 Where mounted horizontally, mount with the side mounting slot of the fuse to the right and top of the fuse.

7.3.2 Where mounted vertically, mount with the side mounting slot of the fuse to the right and top of the fuse.

7.3.3 In most cases, the insertion of fuse caps can be facilitated by the R-3253 Nut Runner Wrench.

7.4 The rated capacity of a 70-type fuse with normal operating time characteristics can be determined by the solid color of the plastic indicating bead projecting beyond the cap. A slow-acting 70-type fuse will have a longitudinally striped bead with three strips of color separated by three strips of white; the identifying color used will be the same as that for the same capacity fuse with normal operating time characteristics. The following table lists the colors used to indicate the rated capacity of the 70-type fuse.

<u>Normal</u>	<u>Slow-Acting</u>	<u>Color</u>	<u>Rated Capacity (Ampere)</u>
70E or		Yellow	0.180
70E2			
70F or		Violet	1/4
70F2		(formerly Pink)	
	70K or 70K2	Violet & White	1/4
		(formerly Blue-Green)	

Normal	Slow-Acting	Color	Rated Capacity (Ampere)
70G or 70G2		Red	1/2
70H or 70H2		Red & White	1/2
		Brown (formerly Tan)	3/4
70A or 70A2		Brown&White	3/4
		White	1-1/3
70B or 70B2		Black&White	1-1/3
70C		Orange	2
70D5*		Blue	3
		Green with Black Stripe	5
	70P	Gray&White	0.100
	70R	Red & White	0.150

7.4.1 A small designation pin, having a head of solid color or a ring of color (eyelet), is required in mountings for 70-type fuses to designate the fuse capacity. The color of the fuse indicating bead should correspond to the color of the designated pin. A pin having a bead of solid color is used with a fuse having normal operating time characteristics while the ring of color (eyelet) indicates a slow-acting fuse.

7.4.2 An exception to Paragraph 7.4.1 exists for fuse panels on 770 PBX's. When the fuse panel contains only 1-1/3 AMP fuses, designation pins are not required, and the panel shall be stamped as specified in Handbook 39.

7.4.3 It shall be the responsibility of the installer to replace all missing capacity designation pins in the 70-type fuse blocks, and to make necessary replacement of designation pins when a change in rated capacity (amperes) is made.

7.4.4 For fuse positions which are assigned but not equipped, a designation pin shall be provided to indicate the capacity of the 70-type fuse to be installed when the circuit is activated. Designation pins need not be provided for fuse positions which are unassigned.

NOTE: Refer to Handbook 9, Section 362 for more information.

7.4.4.1 When working circuits are removed from service and the associated apparatus has been disconnected or removed, the applicable fuse position shall be equipped with a dummy fuse and the existing fuse designation pin (where 70-type fuses are employed) may be left in place, unless otherwise directed by specification, drawing, or an operating company directive.

7.4.5 When installing the KS-14174 Designation Pins into modular and individual type fuse blocks, the R-4396 Fuse Designation Pin Holder will be of assistance. The holder will retain the designation pin so that it can be aligned and inserted in the

fuse block. When it is necessary to remove a designation pin, the holder will attract the pre-loosened pins and prevent them from falling into the apparatus.

7.4.6 If the surface of the magnet on the R-4396 Fuse Designation Pin holder should become severely pitted, it can be repaired by pressing the magnet flatly upon a piece of emery paper and moving the holder in a figure eight motion. The emery paper should be placed on a flat surface for best results. The particles attached to the magnet, due to refinishing, should be wiped off intermittently. If the magnet is severely chipped or if the plastic shell is cracked, the holder should be discarded.

7.4.7 The following table is provided to aid the installer in ordering fuse caps for fuse blocks if ordering is required.

Fuse Block	Fuse Cap Piece Part No.	Quantity
18A	P-344900	1
19A	P-344900	1
20A	P-21E517	1
21A	P-344900	1
22A	P-11F667	16
22B	P-12F160	1
	P-11F667	15
23A	P-11F667	8
23B	P-12F160	1
	P-11F667	7
24A	P-11F667	8
24B	P-11F667	8
25A	P-11F667	8
26A	P-12F160	8
	P-11F667	8
27A	P-12F160	8
	P-11F667	8

7.5 Dummy Fuses such as the 63A and 64A shall be installed in all unused fuse and heat coil positions and in all fuse and heat coil positions associated with unequipped circuits on panels for new equipment and on additional panels for existing equipment including switchboards.

7.5.1 Mount 63A and 64A type dummy fuses in the same manner as the associated modular fuses, that is, place the dummy fuses so that the side slot is in the same relative positions as the side slot of alarm fuses mounted as outlined in Paragraph 7.2.

7.5.2 Where equipment has been removed and the circuit becomes "W.O.", dummy fuses should be installed in vacated fuse positions.

7.6 72-type dummy fuses shall be installed in 18-, 19-, 21-, and KS-type fuse blocks wherever 70-type fuses are omitted (except in certain cases on power equipment, see Handbook 18). 72-type dummy fuses shall also be installed in 20-type fuse blocks wherever glass tube type fuses are omitted.

7.6.1 The installation of 72-type dummy fuses in place of 70-type fuses shall be verified by running a finger across the fuse holder caps. A loose fuse cap indicates the absence of a fuse.

7.7 P-21E546 Neoprene Washers

7.7.1 For several years, P-21E564 Neoprene Washers were being placed in modular fuse block assemblies by the shop. Since May of 1971, the P-11F667 Fuse Cap has been shipped without the neoprene washer.

7.7.2 The following information shall be used for all fuse caps in determining whether or not neoprene washers are required.

- a. When activating a new circuit on an existing fuse panel or block equipped with neoprene washers on the fuse caps, the fuse caps do not need a neoprene washer; i.e., the washer can be removed if so desired.
- b. When activating a new circuit on an existing fuse panel or block not equipped with neoprene washers, no action shall be taken by the installer; i.e., a washer shall not be installed.

7.7.3 The modular fuse block cover was also redesigned in 1971 to contain antirotation protrusions that are molded into the cover. To prevent possible damage to the battery terminal of the fuse cap or the molded protrusions on the cover, it is important that the fuse cap be depressed fully before attempting to rotate it into position. The above also applies to removal of the fuse cap. This design change does not effect the use of the P-11F667 Fuse Cap which can be used with old or new design fuse blocks.

8. GUIDES AND SPRINGS, RELAY COVER

8.1 Refer to the section in Handbook 6, covering the adjusting procedure for the particular relay for specific methods and requirements for mounting relay cover guides and springs.

9. HOLDERS

9.1 Cord - Mount the cord holder in the circular opening on either side of the crossbar switch as follows. Firmly grasp the short straight portion of the cord holder with the long nose pliers. Insert the holder between the switch and the frame upright as shown in Figure 3. With the cord holder at an angle of approximately 45 degrees to the circular opening in the side of the crossbar switch, insert the first loop into the opening. Press downward and toward the switch until the entire loop including the bend adjacent to the pliers is inside the opening. Remove the pliers. Rotate the holder until the portion outside the hole is in the position nearest the front of the switch. In the final position, the spring will appear as shown in Figure 4. Remove the cord holder from the crossbar switch by grasping the short

straight portion of the cord holder at the outside of the switch with the long nose pliers. Press downward and outward until the cord holder is released from the switch. Then withdraw it from between the switch and the frame upright.

9.2 Fuse Record Book - Place metal bracket under the top cover of the book as shown on ED-90019-70 to avoid any possible service interruptions that might be caused by short circuits.

10. HOOKS, CORD (STRIP TYPE)

10.1 Mount cord hooks in alignment with each other and with the lower edge of the cord shelf.

11. JACKS (INDIVIDUALLY MOUNTED)

11.1 Mount individually mounted jacks of the 223, 227 and similar types with the springs in a vertical plane and with the mounting screw hole on top and the closed portions of the frame (side with code stamping) on the right as viewed from the terminal end of the jack, wherever possible. Frames of 410 type jacks should, however, be at the top or left. The frames of jacks mounted diagonally should also be at the top.

11.1.1 Where single screw mounted jacks are mounted in pairs back to back or where a C jack is used in a mounting designated for A jacks, etc., the above requirement does not apply.

11.1.2 A clearance of 11/64" minimum is required between the frames of jacks mounted adjacent to each other.

11.2 Twin jacks of the 482-type shall be mounted with the code marking at the left or top as seen from the terminal side.

12. KEYS

12.1 Before mounting key, make certain that the color of the key buttons agrees with Job Information.

12.2 Code markings are stamped near the front end of all types of keys except individually mounted push button or rotating button type keys.

12.2.1 Mount keys on keyshelves with the front end toward the front edge of the keyshelf.

12.2.2 When mounted in a vertical plane, as on panels, mount keys with the front end downward or to the right when viewed from the face of the panel.

12.2.3 When keys are mounted other than as covered in Paragraphs 12.2.1 and 12.2.2, conform to the direction of mounting specified on the equipment drawing.

12.3 Unless otherwise specified, space keys mounted in keyshelves so as to be evenly distributed over the space allocated.

12.4 Arrange two adjacent keys of a keyshelf, when associated with the answering and calling cord respectively, with the key to the left associated with the rear cord and the one to the right with the front cord.

12.5 Mount unchamfered individually mounted shell type keys so that the end of the keyshell is flush with the surface on which it appears. Mount chamfered key shells with the top of the shell projecting 1/16" above the keyshelf. A variation of 1/32" either way from these locations is permissible but variation between any two adjacent keys in the same panel should not exceed 1/32".

12.5.1 Keys may project as much as 3/32" beyond the mounting where the mounting is nominally 1/32" less than the shelf dimension of the key. An example is the 92-type key mounted in a 275-type lamp socket mounting.

12.6 Mount individually mounted keys having Jack type frameworks, such as the 547-type, where practicable, in the same manner as covered under "Jacks" in Paragraph 11.

12.7 Mount 223-D keys as follows:

NOTE: When it is necessary to tap a large number of fiber faced keyshelves, a 13/32" -28 tap, (which is special size,) is required. Obtain locally.

12.7.1 Drill a 3/8" hole in the woodwork. On fiber faced keyshelves, tap the hole with a 13/32" -28 tap.

12.7.2 Unscrew base of the key from the mounting bushing, being careful not to lose the spring and plunger in the base of the key.

12.7.3 Use the R-2872 Wrench for screwing the bushing into the hole.

12.8 Mount 498 and similar type keys so the arrows correspond to the equipment drawing.

13. LAMPS

13.1 Code of lamp should agree with wiring diagram.

13.1.1 Check the code number of several lamps from each box before inserting them into the socket.

13.1.2 When inserting lamps see that contact is made between lamps and springs in sockets. Use code 553A Lamp Extractor for removing 2-type switchboard lamps KS-14178L2 (neon type) lamps.

13.2 To reduce the time required to unpackage large quantities of switchboard lamps, a sealed edge of the cellophane container can be cut off with scissors perpendicular to the length of the lamps. A slight pressure on the lamp ends opposite the openings made will cause the lamps to be expelled.

Engineering Planning Manager
(Installation)

Attachment:
Figures 1-4.

Reason for Reissue:
Revised last line of Paragraph 7.5.1 to change reference from Paragraph 8.2 to Paragraph 7.2.

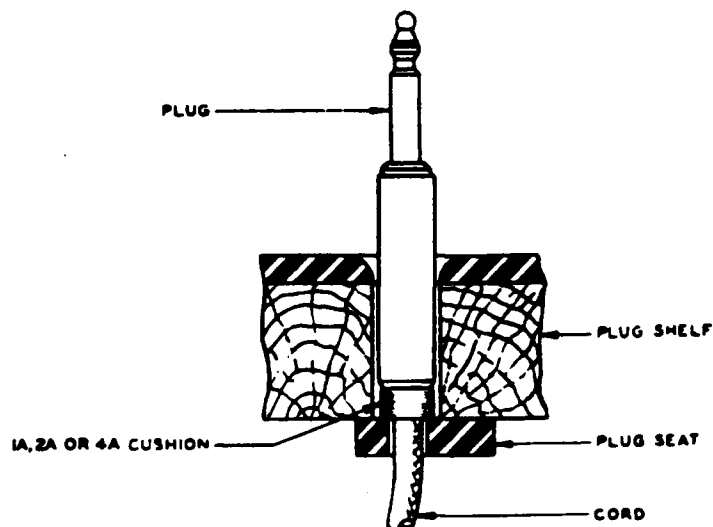


FIG. 1 POSITION OF 1A, 2A OR 4A CUSHION ON
SWITCHBOARD CORD
(PAR. 3.1) (BSP 800-610-154 FIG. 8)

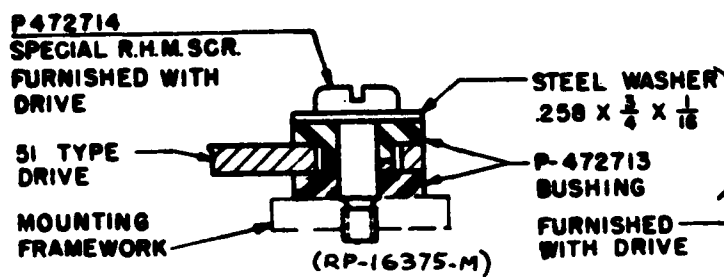


FIG. 2 MOUNTING OF 51-TYPE DRIVES
(PAR. 4.1)
(BSP 800-610-154 FIG. 9)

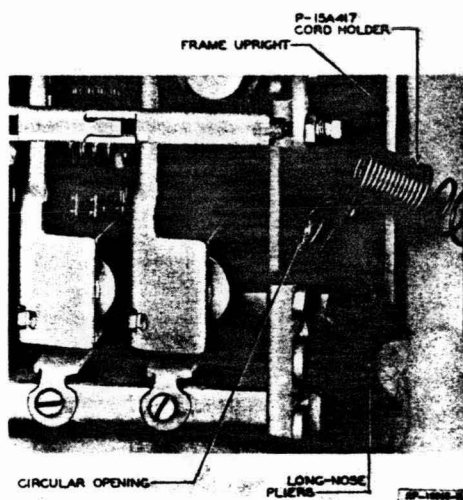


FIG. 3 ILLUSTRATING MOUNTING OF P-15A417
CORD HOLDER (PAR. 9.1)
(BSP 032-325-801 FIG. 1)

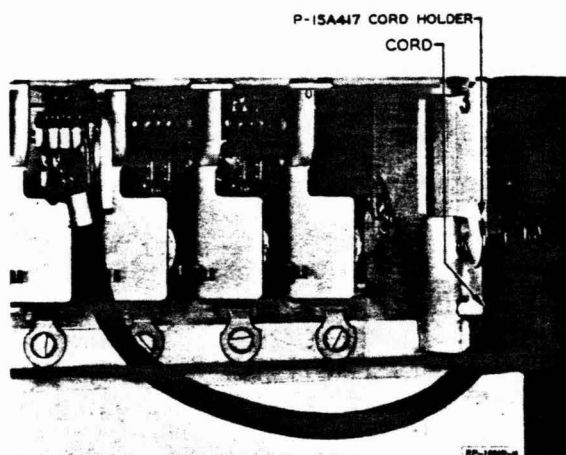


FIG. 4 ILLUSTRATING MOUNTING OF SERVICE
OBSERVING CORD USING P-15A417
CORD HOLDER
(PAR. 9.1))BSP 032-325-801 FIG. 2)