

## MAIN DISTRIBUTING FRAMES WARNING MARKERS AND GUARDS

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### 1. GENERAL

1.01 This section describes warning markers and guards and their use on main distributing frames.

1.02 This section is reissued for the following reasons:

- To add KS-16604 and AT-6798 (8- and 9-type) insulators in 5.02.
- To add KS-16604 insulators in 5.04 and 5.11.
- To add KS-21168 insulators in 5.06.
- To revise Fig. 11 to show KS-16604 insulator.
- To revise Fig. 14 to show KS-21168 insulator.

1.03 The various types of protector mountings and connectors on which warning markers and guards are used are described in Section 201-202-101.

### 2. PRECAUTIONS

2.01 If evidence is found or there is suspicion of abnormally high voltage conditions or contact between foreign potentials and central office

main frame terminations, the following precautions shall be observed.

- (a) Supervisor and test center are notified.
- (b) Other employees who may have occasion to work on the frame are notified.
- (c) All contact with associated frame terminations is avoided until authorized by the test center.
- (d) If the test center requests that heat coils or protector blocks be inspected, lineman's rubber gloves are worn and tools used as follows.

(1) On 300-type connectors, the KS-16567 tool is used to remove or replace the protector units.

(2) On 302- and 303-type protectors, molded handle of protector unit is used for removal.

(3) On other than 300-type connectors, the replaced 121-type protector, 302- or 303-type connectors, the KS-2827 heat coil pliers are used to remove and replace heat coils, and B long-nose pliers are used to remove and replace protector blocks.

*Note:* Insulating gloves shall be mechanically inspected immediately before they are used, in accordance with Section 075-141-501.

### 3. REMOVING AND REPLACING HEAT COILS, CARBON BLOCKS, AND PROTECTOR UNITS

3.01 The methods for removing and replacing heat coils, carbon blocks, or protector units are covered in Section 201-205-302.

### 4. WARNING MARKERS

4.01 Where abnormally high voltages are employed (such as breakdown tests), pairs subjected to high voltages shall be isolated from central office equipment and warning markers placed.

**4.02 A-Type Frame:** (An A-type frame is one having the heat coils and carbon blocks located away from the cable form, usually on the opposite side of the frame.) The cross-connection on the terminating strip is lifted and AT-6798 (red) insulators are placed over the lugs. Then a linen tag, such as Form E-1162 bearing the notation **breakdown test**, is attached to the lugs to warn that a breakdown test is in progress (Fig. 1.)

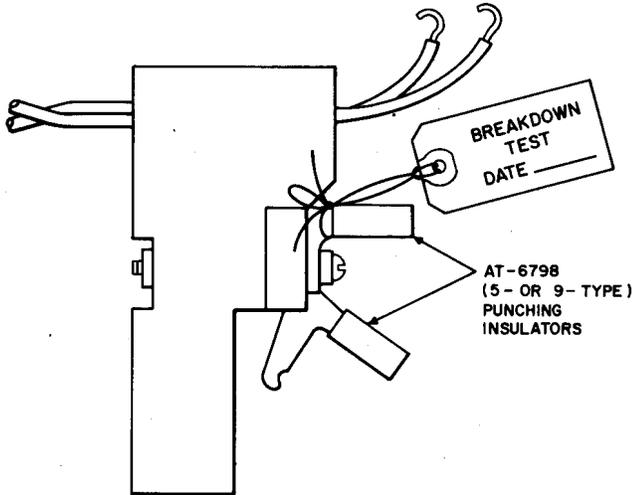


Fig. 1—Tagging Terminals and Using Insulators

**B-Type Frames Equipped With C50, 1177, 1268, or Similar Protectors**

**4.03** The heat coils and carbon blocks are removed and a B warning marker is installed as shown in Fig. 2. The wire terminations are inspected and, if a bared conductor rests on a lug, AT-6798 (7-type) terminal punching insulator is placed over the lug.

**4.04** If the high voltage is applied at a point other than the central office, the maintenance personnel stationed at the cable form should observe for a breakdown. The maintenance personnel should watch the form, and in the event that smoke or a spark is observed, the B warning markers should be removed immediately. This will short-circuit and ground the pair thereby indicating to the maintenance personnel applying the test that the fault has broken down and that further application of the test voltage is unnecessary. The marker should not be placed nor the pair restored to normal

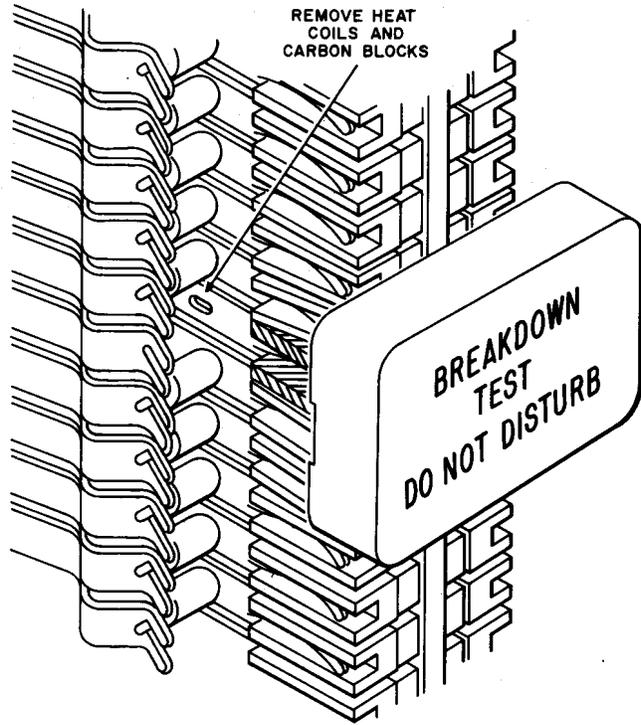


Fig. 2—B Warning Marker

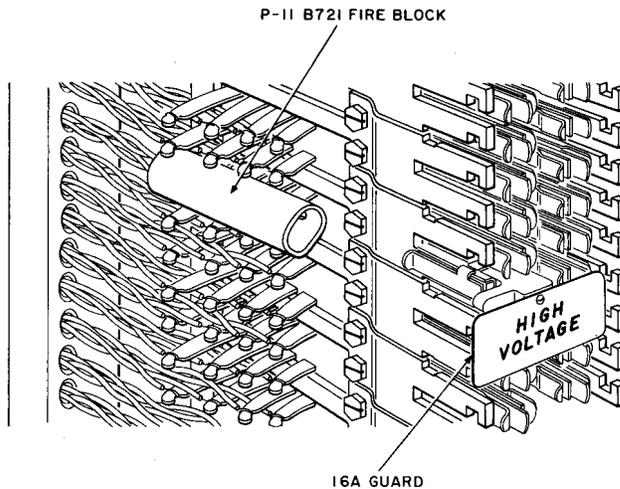
until notified by the test desk or cable locating bureau according to local instructions.

**Caution:** While the test voltage is being applied and when removing the B warning marker, contact with protectors or cabling should be avoided.

**B-Type Frames Equipped With 444-Type Jacks (301-Type Connector)**

**4.05** A P-11B721 fire block is installed over the terminal lugs, and then a 16A guard is placed in the jack of the cable pair to be tested as shown in Fig. 3. The 16A guard opens the contacts in the 444-type jack. The P-11B721 fire block prevents spreading of fire in the event arcing occurs. The block consists of an oval-shaped, semirigid, molded nylon tube approximately 2-1/2 inches long. A slot is provided along one edge to permit sliding the block over the lugs and bared conductors.

**4.06** If the high voltage is applied at a point other than the central office, the maintenance personnel stationed at the cable form should observe for a breakdown. The maintenance personnel



**Fig. 3—Protecting B-Type Frames With 444-Type Jacks (301-Type Connector)**

should watch the form, and in the event that smoke or a spark is observed, the person applying the voltage should be notified immediately.

**Caution:** *The 16A guard should not be removed.*

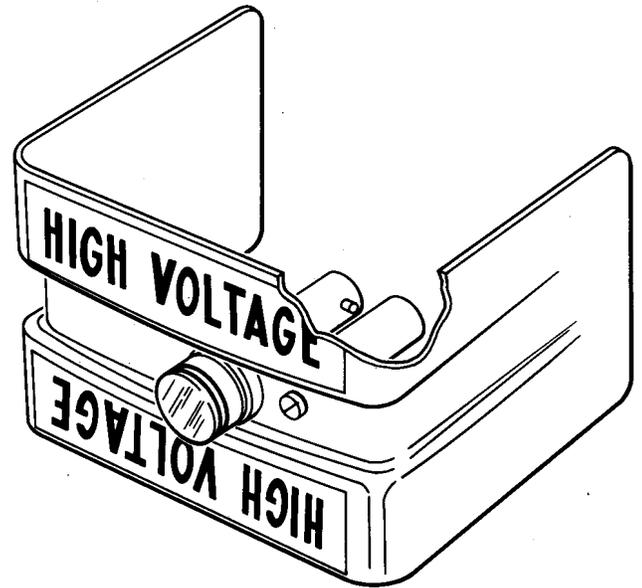
**4.07** The guard should not be removed until notified by the test desk or cable locating bureau according to local instructions.

**Caution:** *While the test voltage is being applied, contact with the protectors or cabling should be avoided.*

**4.08** If no evidence of breakdown is noted, the 16A guard should not be removed until notified by the test desk or cable locating bureau according to local instructions. If a fire block was installed at the time the 16A guard was placed on the pair, it should be removed when the guard is removed.

#### **B-Type Frames Equipped With 300-Type Connectors**

**4.09** A C warning marker should be installed on the pair as shown in Fig. 4. The C warning marker should not be removed or the pair restored to normal until notified by the test desk or cable locating bureau according to local instructions.



**Fig. 4—C Warning Marker**

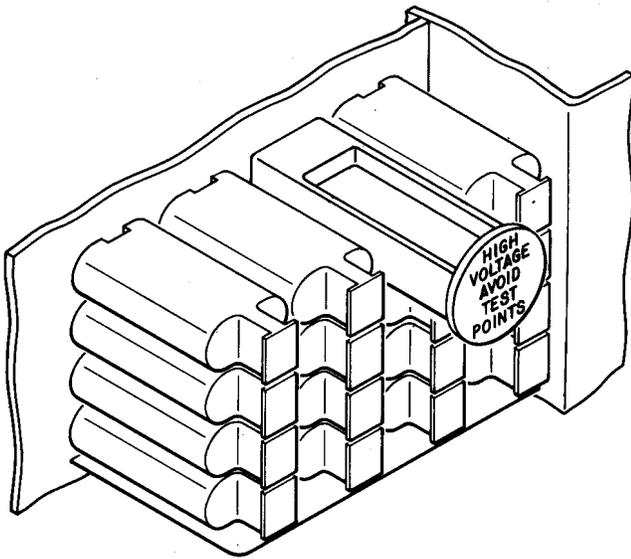
#### **Protector Frames Equipped With 302-Type or 303-Type Connector**

**4.10** The protector unit should be removed from its socket, and an E warning marker inserted in place of the protector as shown in Fig. 5. The marker is red plastic with white lettering and is equipped with prongs for socket mounting. On 302-type connectors an E warning sign (AT-8325) (Fig. 6) should be mounted from two wiring horns at the rear of the frame so that the sign covers the back of the 302- or 303-type connector. On 303-type connectors E-warning signs (AT-8325) should be mounted as follows:

On earlier version 303-type connectors (303A1 or 303B1) which have exposed terminals on the rear of the connector, two E-warning signs should be mounted, one on the left rear and one on the right rear as shown in Fig. 7A and 7B.

On the latest version 303-type connectors (303A2 or 303B2) which have plastic panels covering the rear terminals, the E-warning sign is not required.

The E-warning sign comes with cords for mounting which may be tied around the wiring horns, cross arm supports, cable stubs, ground bars, or through fanning strip holes whichever is most readily accessible.



**Fig. 5—E Warning Marker Installed on 302-Type Connector (Installed Similarly on 303-Type Connector)**

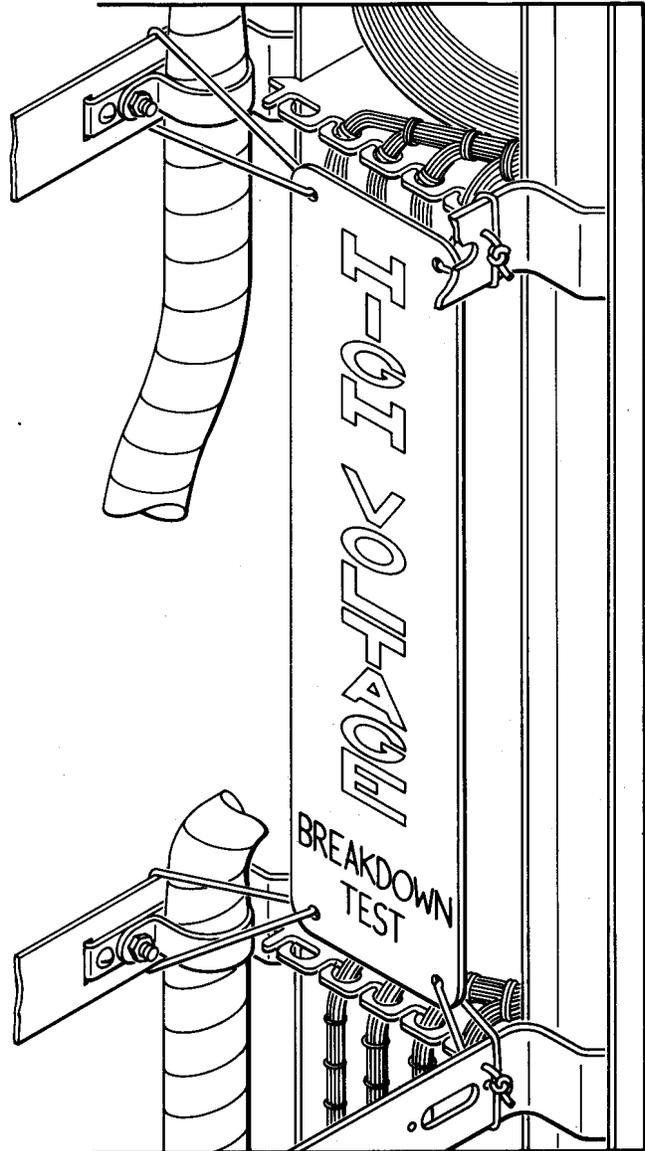
4.11 Warning markers and signs, blocks, caps, and tags should not be removed, or jumpers restored until notified by the test desk or cable locating bureau according to local instructions.

**5. GUARDS, INSULATORS, AND INDICATORS**

5.01 On main distributing frames, guards, insulators, and indicators are used to prevent service interruptions, equipment damage, and personal injury.

**Special Service Lines**

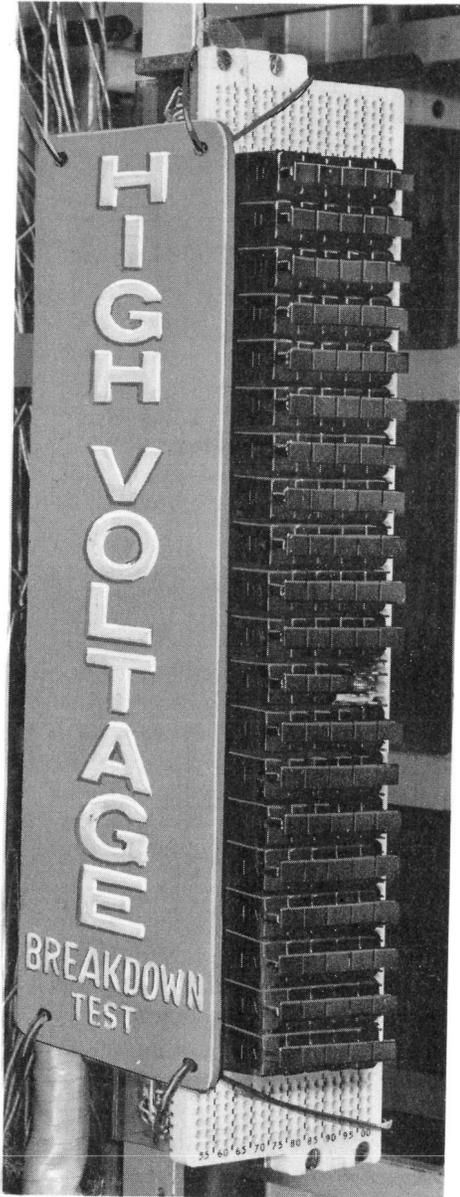
5.02 Special service lines should be designated on the vertical and horizontal side of the frame between the fanning strip and terminals by means of the KS-6660 or the KS-16847 L1 indicators (Fig. 8 and 9). Solder terminal punchings should be protected with the AT-6798 type 4 or 5 insulators and when there is a wire build-up, protection is obtained with the AT-6798 type 8 or 9 terminal punching insulators. Single wrapped terminal punchings should be protected with the KS-16604 L1, L2, or L3 insulators.



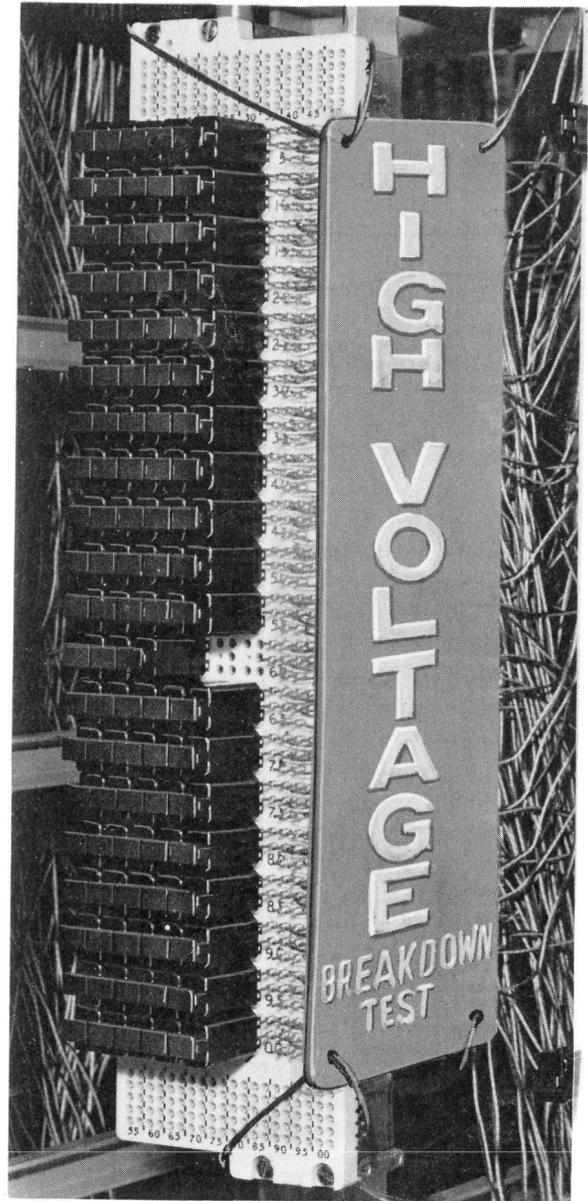
**Fig. 6—E Warning Sign Installed on Backside of 302-Type Connector (303-Type Connector Similar)**

**Frames Equipped With C50, 1177, 1268, or Similar Protector Mountings**

5.03 The KS-14539 guard (Fig. 10) should be placed to enclose the front portion of the heat coil and protector block springs. These guards are held in place by ridges on the inner surface which engage the heat coil springs. In addition to identifying important circuits, the color will serve as a marker to warn against accidental contact



A



B

**Fig. 7—E-Warning Signs Installed on 303-Type Connectors**

with the circuit involved and against removal of the heat coils and protector blocks during maintenance operations. When the KS-14539 plastic guard is used on a designated cable pair of a C-type protector upon which the cable number designation plate is mounted, the cable number designation plate is removed from the heat coil spring and is attached to a KS-14534 number plate holder. The number plate holder is mounted on the associated spring

assembly screw threads. The KS-14546 number plate remover may be used to remove the cable number designation plate from the heat coil spring.

**Frames Equipped With 300-type Connectors or Replaced With 121-Type Protector**

**5.04** The KS-16576 L5 and L6 designation plates (red), KS-16604 L1 terminal punching

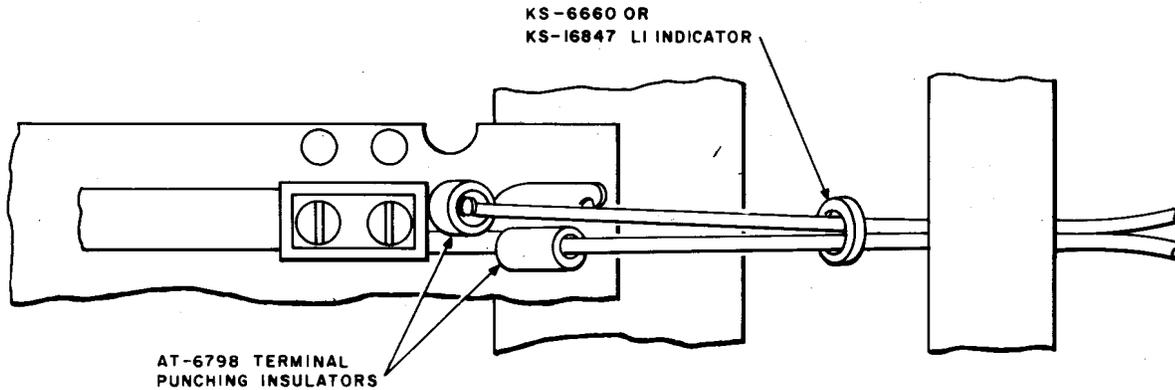


Fig. 8—Indicator and Terminal Punching Insulators on Protector Mounting

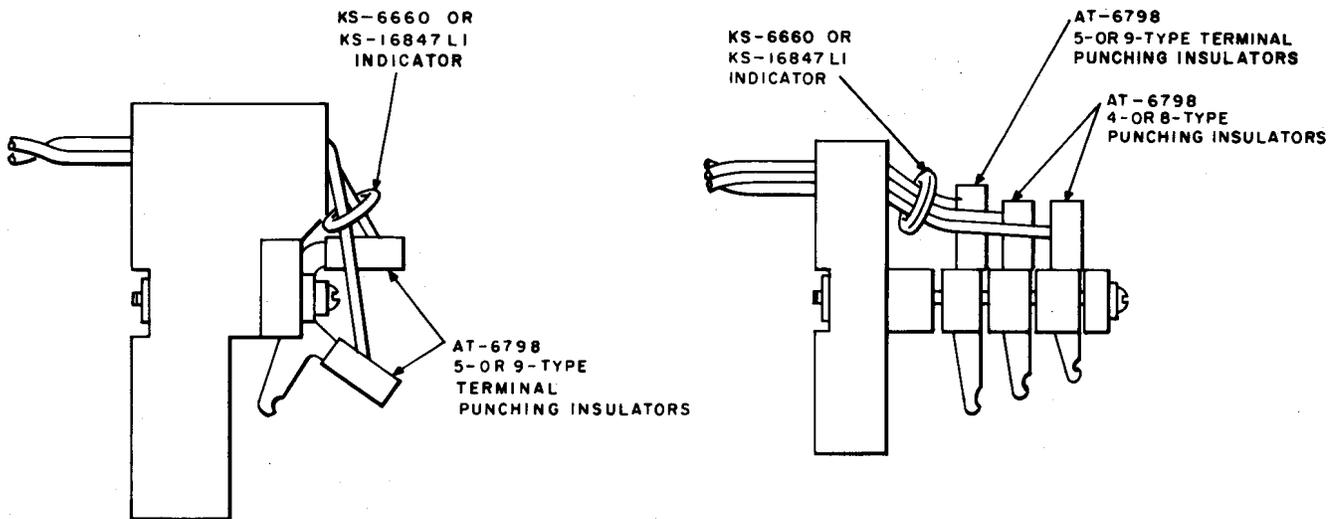


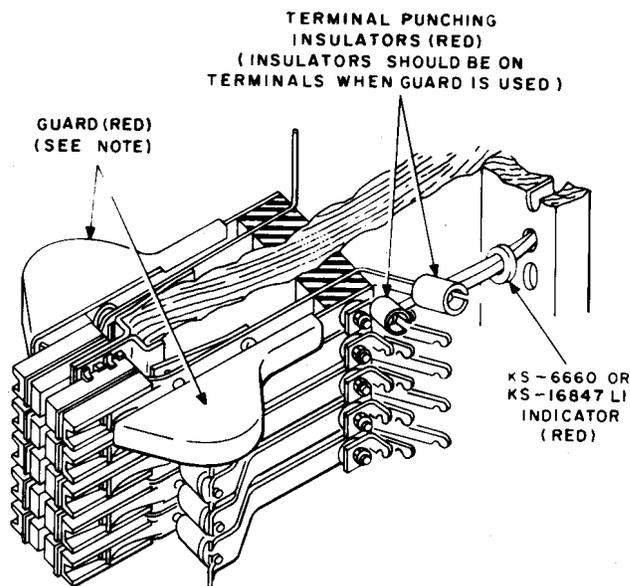
Fig. 9—Indicator and Terminal Punching Insulators on Terminal Strip

insulators (red) and the KS-6660 or KS-16847 L1 indicator (red) are used to protect special service lines on 300-type connectors (Fig. 11). The KS-16576 L5 designation plate is for use on the cross-connection side of the connector where a single cross-connection is connected to the terminals. If the connector has aluminum fingers, the designation plate should be slipped on with movement toward the front. On connectors with molded fingers, the designation plate should be slipped on with movement toward the rear. KS-16604 L1 terminal punching insulators are used where double wrapped (back-tapped) cross-connections are connected to the terminals. The KS-16576 L6 designation plate is for use on the test terminal side of the connector. The

P-16E564 red caps are used with the protector units to indicate a special line and to forestall accidental opening of the line.

#### Frames Equipped With 444-Type Jacks (301-Type Connector)

5.05 In addition to the KS-6660 or KS-16847 L1 indicators and AT-6798 (4- and 5-type) punching insulators, special circuits should be further protected by using a KS-20353 L1 guard which replaces the 12A and 12B guard. The KS-20353 L1 guard consists of a molded red thermoplastic material having a cavity on one side and a rectangular hole through the other side. Fig. 12



## NOTE

KS-14539 GUARD  
LIST NO.

5. (SUPERSEDES L1)
6. (SUPERSEDES L2)
7. (SUPERSEDES L3)
8. (SUPERSEDES L4)
- 9.

## PROTECTOR TYPE

1177  
C TYPE AFTER 1946  
1268, 1269  
C TYPE PRIOR TO 1946  
E

Fig. 10—KS-14539 Guard on Protector Mounting

shows the KS-20353 L1 guard, indicator, and insulators mounted on a 444-type jack.

## Frames Equipped With 302- and 303-Type Connectors

**5.06** On 302- and 303-type connectors, each jack associated with a special service line is designated by inserting a KS-14174 L7 designation pin (red) into the hole provided for this purpose and using a protector unit with a red case (Fig. 13). The red cased protectors are coded as follows:

- 3A3A, 4A3C, and 5A3D for use on 302-type connectors having gold plated terminals and used for ESS central offices only.
- 3A7A, 4A7C, and 5A7D for use on 303-type connectors and 302-type connectors used for common systems central offices.

**Note:** The protector units designed for the 302-type connectors have gold plated prongs

and should be used only on 302-type connectors in ESS offices. The protector units designed for 303-type connectors have solder plated terminals and may be used on 302-type connectors in common systems central offices.

On 303-type connectors the wire wrap terminals on the front of the connector associated with special service lines shall be protected with KS-21168 L1 terminal punching insulators (Fig. 14), and KS-6660 or KS-16487 L1 indicators shall be used on the cross-connection.

## KS-19478 L1 Guard for Test Terminal Field

**5.07** In order to prevent interference with special circuits, the KS-19478 L1 guard (Fig. 15) is used to cover the test terminals on the test terminal field of 302- and 303-type connectors.

## ESS Type Frames Equipped With 66- or 78-Type Connecting Blocks

**5.08** On frames equipped with 66G, 66H, or 78A1 or 78B1 (quick connect) connecting blocks, terminals associated with special service lines are protected and identified by the use of C or D clip-terminal insulators. The C or D clip-terminal insulators are used as follows:

C clip-terminal insulator for 66G or 78A1 connecting blocks (Fig. 16)

D clip-terminal insulator for 66H or 78B1 connecting blocks (Fig. 17).

## Shields for Horizontal Terminal Strips

**5.09** The 37-type terminal shields (Fig. 18) may be used in cases where a number of special circuits appear on adjacent rows of terminals on one or more horizontally mounted terminal strips. These shields do not relieve the requirement for individual terminal protection provided by 4- or 8- and 5- or 9-type insulators. The 37-type terminal shields may also be used on horizontally mounted terminal strips where experience has indicated that a high incidence of trouble has resulted from solder and wire clippings. The shield code numbers include the associated hinges. Additional wire hinges per P-467763 may be obtained when required. The 37-type shields (Fig. 18) may be installed by springing the wire hinges sufficiently to grip the base of the terminal strip at the proper holes.

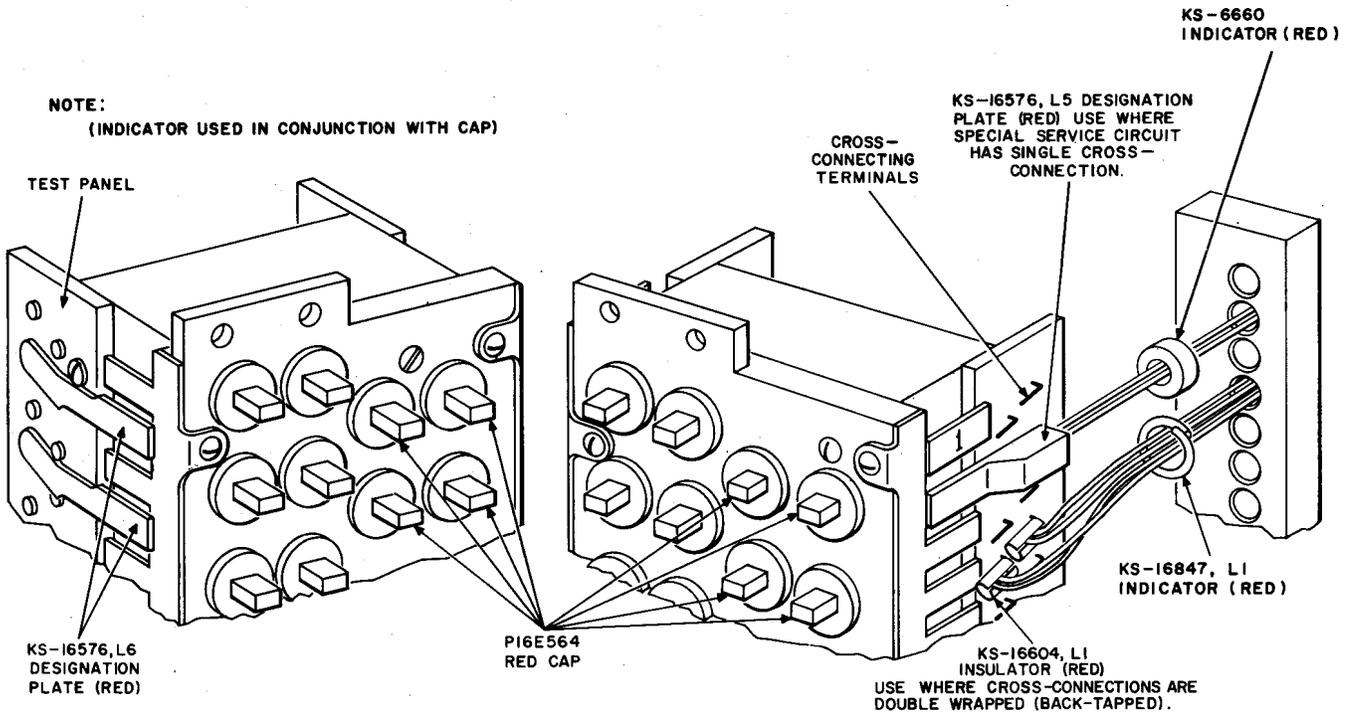


Fig. 11—Protection of Special Lines—300-Type Connector or Replaced 121-Type Protector

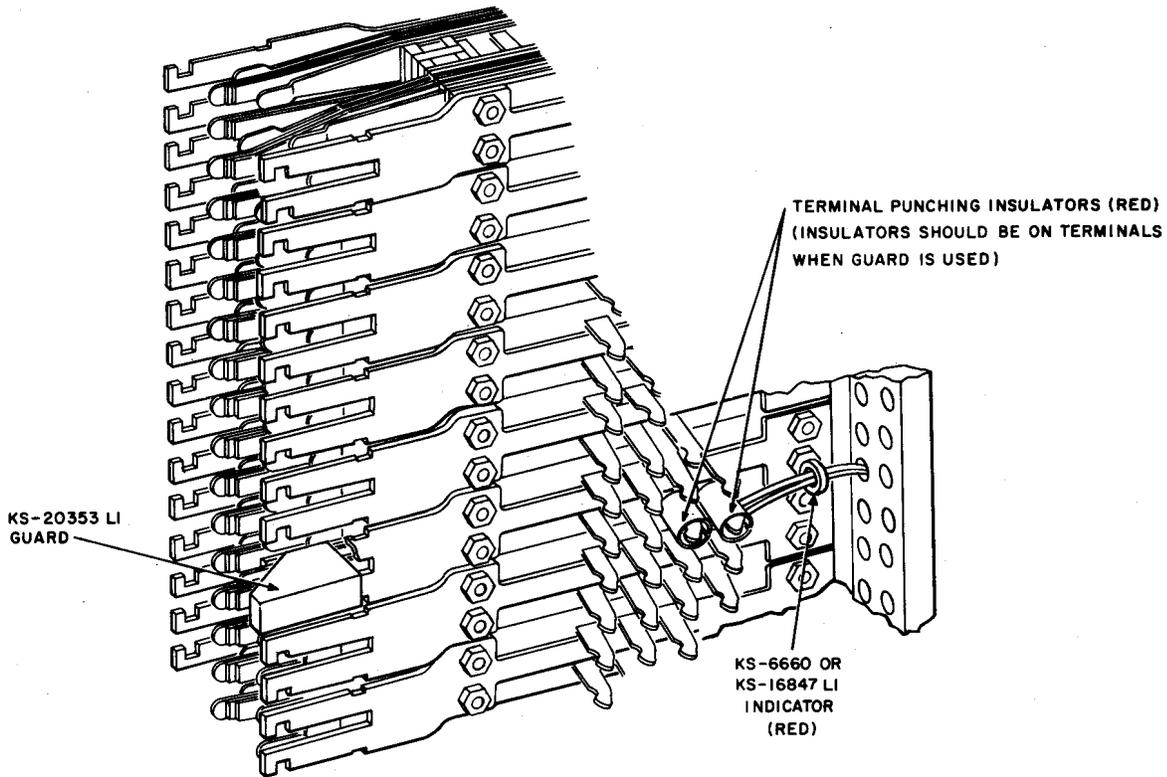
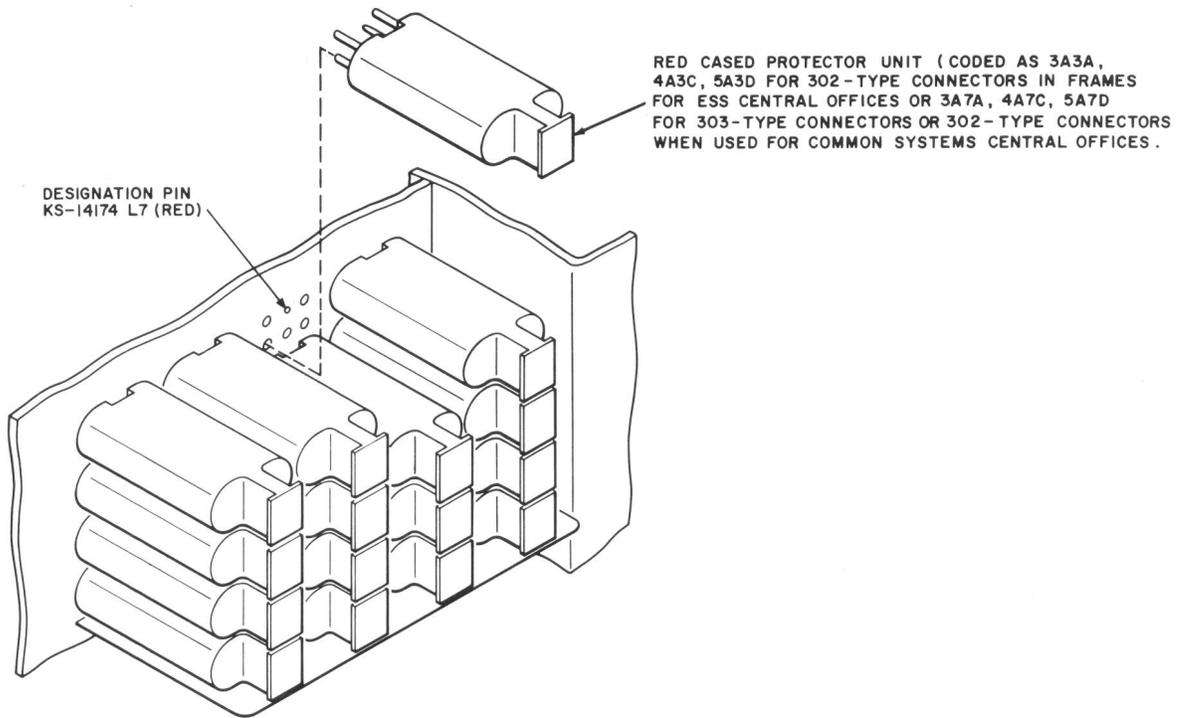
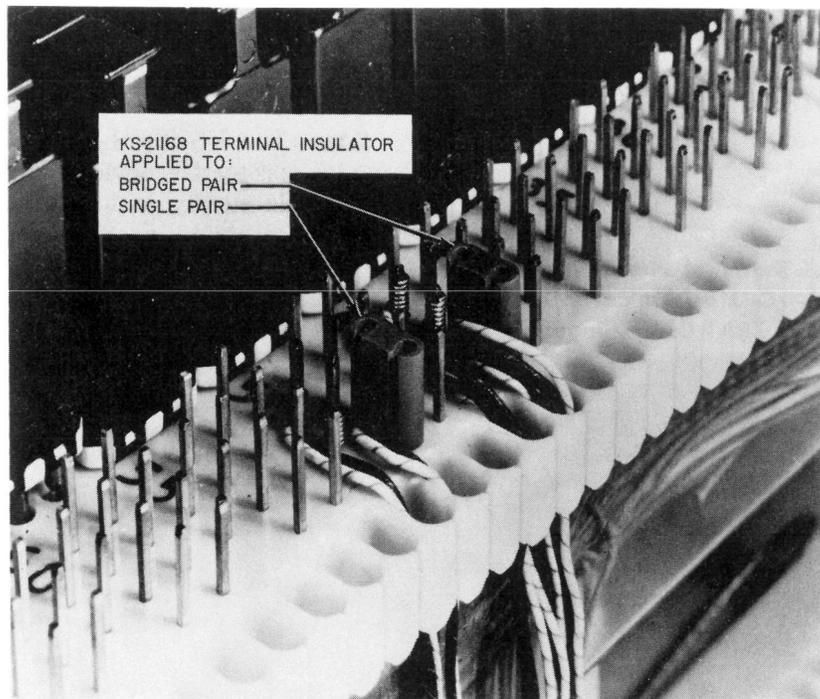


Fig. 12—KS-20353 L1 Guard on 444-Type Jack (301-Type Connector)



**Fig. 13—Use of KS-14174 Designation Pin and Red Cased Protector Unit for 302-Type Connector (303-Type Connector Similar)—Special Service Lines**



**Fig. 14—Protection of Terminal Punchings—Special Service Lines—300-Type Connectors**



Fig. 15—KS-19478 L1 Guard

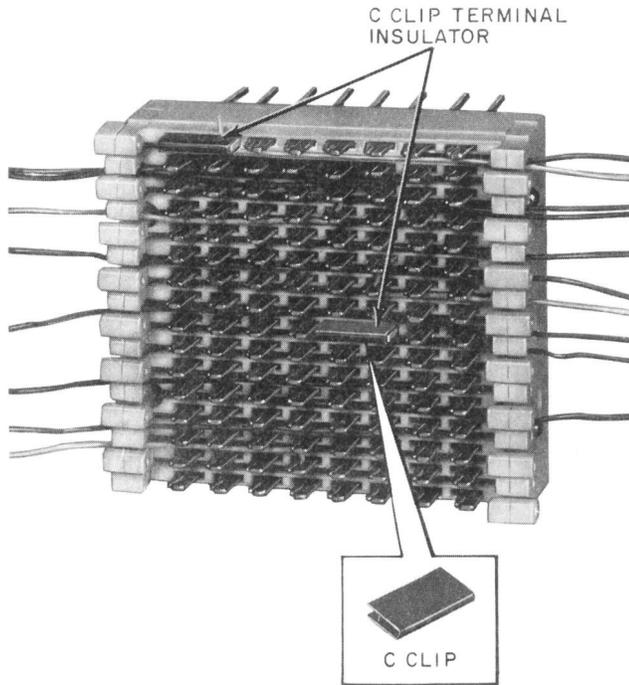


Fig. 16—Protection of Terminal Punchings—Special Service Lines—C-Clip-Terminal Insulator as Used on 66G or 78A1 Connecting Block

The shields designed for the particular terminal strips are listed in Table A.

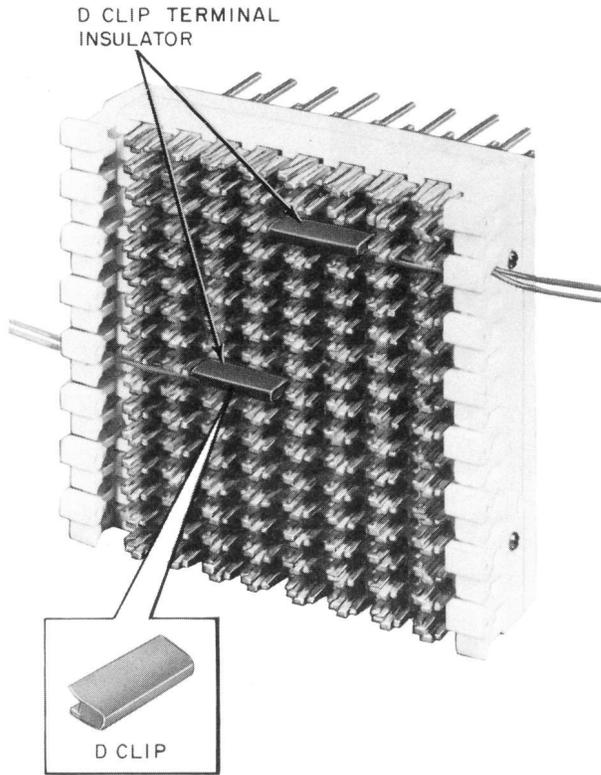
**Terminal Strip Guards**

5.10 The KS-20132 L1 through L22 guards are shown in Fig. 19. The KS-20108 L1 and L2 guards are shown in Fig. 20 and 21 and are furnished as protective devices for fastening to the bottom (cable side) of terminal strips on distributing frames of miscellaneous switching systems. The guard covers the edges of the molded barrier clamping strips and protects the solderless wrap terminals on the cable side from damage while running or removing cross-connections. It also eliminates the possibility of injury to personnel during heavy maintenance activities.

5.11 The KS-20107 L1 and L2 (Fig. 20 and 21) guards are furnished as protective devices for fastening to the top (cross-connect side) of terminal strips on distributing frames of miscellaneous switching systems. The guard covers the edges of the molded barrier clamping strips and protects the solderless wrap terminals on the cross-connect side. The guards designed for the particular terminal strips are listed in Table B. Individual terminal protection is provided by the KS-16604 L1 or L2 terminal punching insulator.

**KS-19918 L1 Guard**

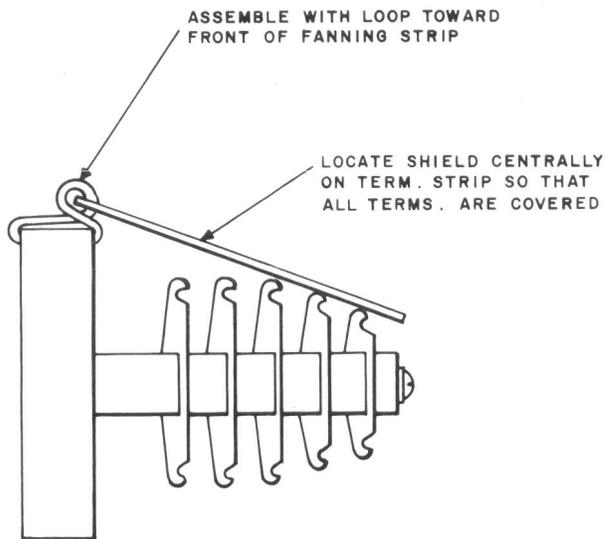
5.12 The KS-19918 L1 guard is furnished as a protective device for fastening to the ends of horizontally mounted solderless wrap type terminal strips, as shown in Fig. 22 on central office distributing frames of miscellaneous switching systems. This guard is particularly useful on terminal strips that are in end positions or on those



**Fig. 17—Protection of Terminal Punchings—Special Service Lines—D-Clip-Terminal Insulator as Used on 66H or 78B1 Connecting Block**

**TABLE A**  
**TERMINAL STRIP SHIELDS**

SHIELD CODE NO.	FITS TERMINAL STRIPS
37A	38 and 39
37B	40 and 121
37C	41, 178A, and 178D
37D	48, 50, 178B, 178C, and 178E
37E	51
37F	37, 91, and 93
37G	35, 36, and 92
37H	183A and 183B
37J	150A, 150B, and 150H
37K	183E
37L	183J, 183K, 183P, 183AA, 183AB, 183AF, and 183AG
37M	178AA
37N	150AD
37P	183G and 183W



**Fig. 18—37-Type Shield on Terminal Strip**

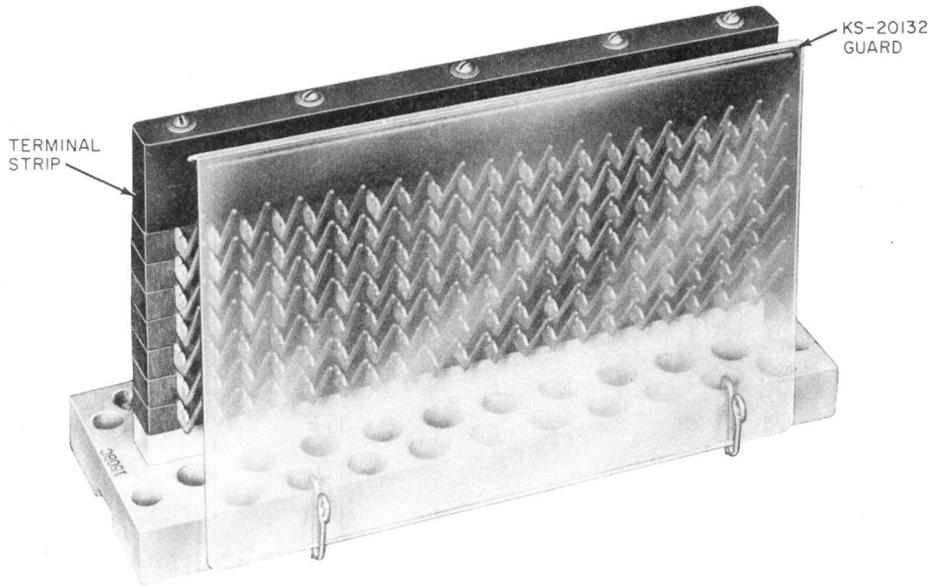


Fig. 19—KS-20132 L1 Through L22 Guards

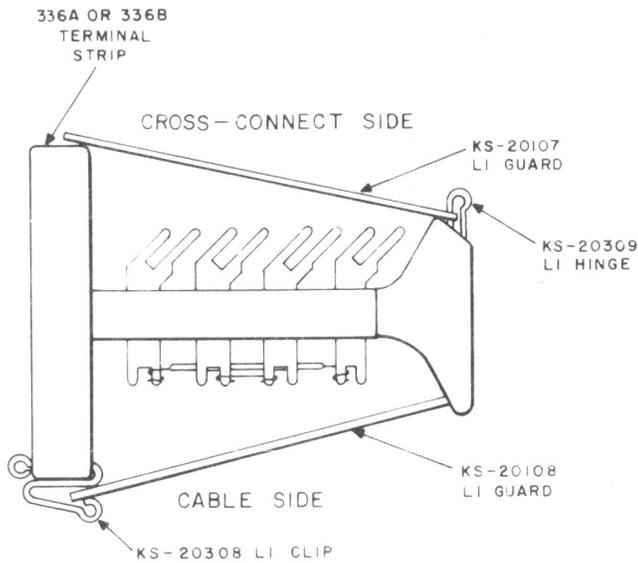
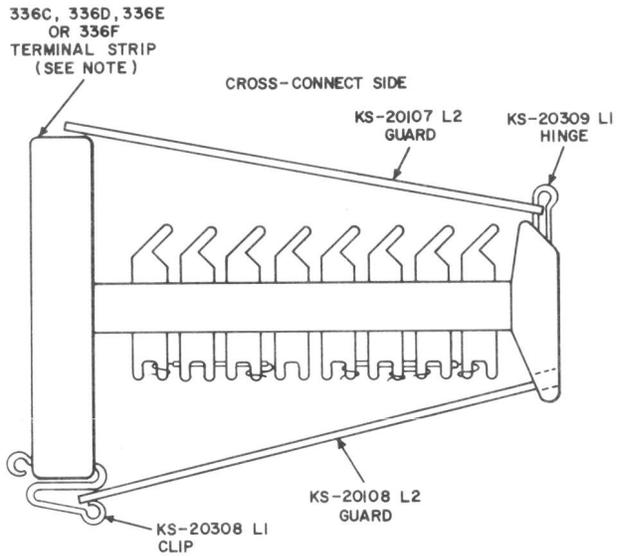


Fig. 20—336A or 336B Terminal Strips

that project beyond adjacent terminal strips. The guard covers the protruding corners and edges of the molded barrier clamping strips and protects the solderless wrap terminals on the cable side from damage while running or removing cross-connections.



NOTE:  
THE 336E AND 336F PROVIDES SPACE FOR AN ADDITIONAL WIRE WRAP ON CROSS-CONNECT (SINGLE TIME) END OF TERMINAL

Fig. 21—336C, 336D, 336E, or 336F Terminal Strips

TABLE B  
TERMINAL STRIP GUARDS

KS-20132 LIST NO.	USED ON TERMINAL STRIPS
1	150AD
2	150AE, 150AF, and 150AG
3	150AJ, 150AK, and 150AL
4	150AN, 150AP, 150AR, 150AS, 150AT, 150AU, 150AW, 150AY, and 150BB
5	150BC, 150BD, and 150BE
6	150BG, 150BH, and 150BJ
7	150BL and 150BM
8	183R
9	183S and 183AC
10	183T and 198G
11	183U and 198F
12	183W
13	183Y, 183AD, 198J, and 198L
14	183AA and 183AF
15	183AB and 198H
16	183AE
17	183AG and 198K
18	268A
19	268B
20	268C
21	268D
22	268E
KS-20107	
1	336A and 336B Cross-connection side
2	336C, 336D, 336E, and 336F Cross-connection side
KS-20108	
1	336A and 336B Cable side
2	336C, 336D, 336E, and 336F Cable side

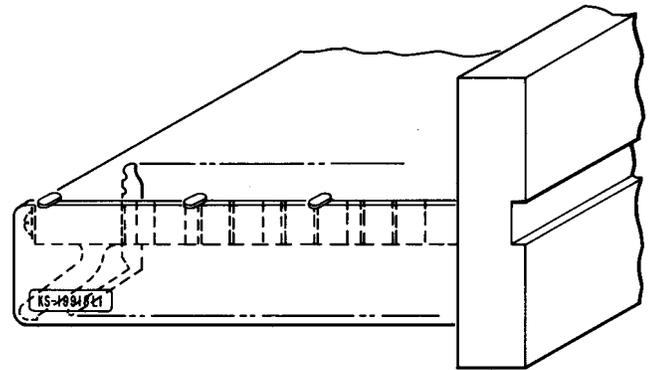


Fig. 22—Method of Mounting KS-19918, L1 Guard on Terminal Strips

**Note:** This guard shall not be used on the 150-type terminal strips where the 405A plug might be used since it would prevent proper operation of the plug.

#### Mounting KS-19918 L1 Guard

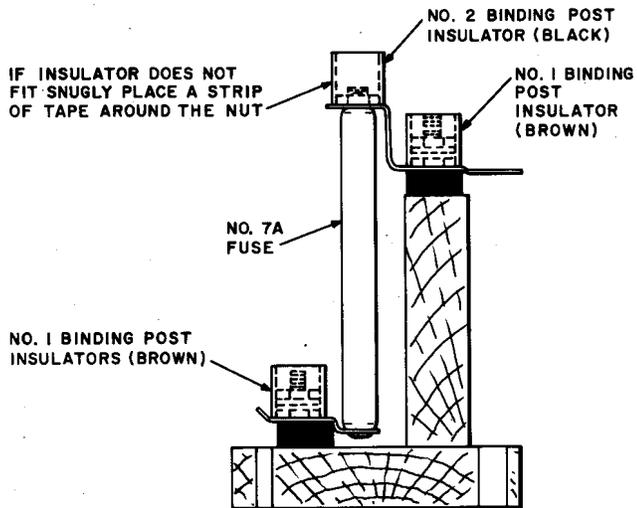
**5.13** The guard consists of a molded polyvinyl-chloride strip with retaining tabs to serve as guides while cementing to the end of the terminal strip. The guard is furnished in one length and the straight end may be cut with tin snips to fit any existing size of distributing frame terminal strip. The cement, Metalset A4 Epoxy Resin Metallic, is a 2-component type. The cement is used by squeezing equal lengths of each tube along side of one another on a piece of paper. The cement is mixed together thoroughly until streaks disappear. ***This mixture must be used within 15 minutes.*** The mixture is applied to the end of the terminal strip. Sufficient quantity should be applied to fill all crevices and to provide a flat mounting surface. The guard should be pressed into the cement until the tabs overhang the end of the strip sufficiently to support the guard and to cure in this position without clamping. After the cement has hardened about 8 hours, the tab portion of the guard not resting on the terminal strip should be cut off with tin snips. When using the cement, physical contact should be avoided and reasonable ventilation maintained.

#### 1- and 2-Type Insulators

**5.14** On main distributing frames equipped with the 7-type fuse protector (Fig. 23), the

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special circuits may be identified at the fuse by the 1- and 2-type binding post insulators. The 1-type insulator is used over the binding posts equipped with hexagonal nuts measuring  $\frac{3}{8}$  inch across the flats and also the 7T fuse. The 2-type insulator is used over binding posts having nuts measuring  $\frac{7}{16}$  inch across the flats and also the 7A fuse. If BD-type cable terminals are used, the 3-type insulator is used over the screw-type binding posts.



**Fig. 23—1- and 2-Type Insulators on 7-Type Fuse Protectors**