

WINDING AND SPRING DESIGNATIONS

APPARATUS CONNECTING POINTS REFERRED TO IN CIRCUIT REQUIREMENT TABLES

STANDARD SINCE 1931

1. GENERAL

1.001 This addendum supplements Section A804.007.2, Issue 4.

1.002 The addendum is reissued to include the 286-, 287-, and 288-type relays and to add Figs. 74 to 78, inclusive. It also covers revisions in the information on winding terminal numbering for A-, E-, and similar-type relays and revision of Figs. 2 and 11.

2. RELAYS

The following changes apply to Part 2 of the section:

- (a) 2.05 - revised ←
- (b) Figs. 2 and 11 - revised ←
- (c) Figs. 28, 32, 38, and 47 - revised
- (d) 2.70 to 2.72 and Figs. 70, 71, 72, and 73 - added
- (e) 2.73 to 2.75 and Figs. 74, 75, 76, 77, and 78 - added ←

2.05 The first letter (L, R, C, or Y) locates the winding terminal with respect to the core as shown in Fig. 1. Where no more than two winding terminals are located in the top or bottom spring assembly, the designations L and R are used, L indicating a terminal to the left and R a terminal to the right of the core as viewed from the front of the relay. Where there are more than two winding terminals in one of these spring assemblies, the designations C and Y are also used. The C terminal, like the L terminal, is located to the left of the core as viewed from the front. The Y terminal, like the R terminal, is located to the right of the core. The portions of the terminals to which connections from the rear front may be made are located between the rear spoolhead and the rear of the relay. The test connecting points on the C and Y terminals are located further to the rear than the corresponding portions of the L and R terminals.

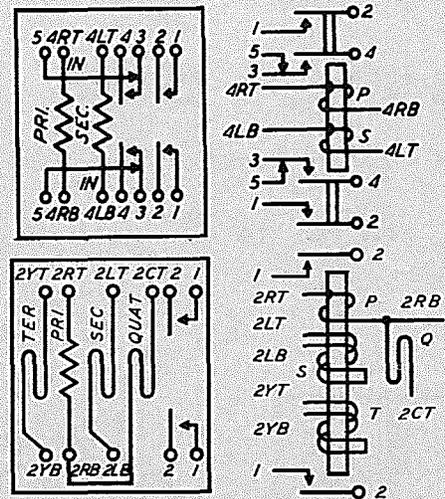


Fig. 2 - Winding and Spring Terminal Arrangement as Viewed From the Rear (Terminal Side) - A-, E-, F-, H-, M-, R-, T-, AB-, EA-, and 236-type Relays

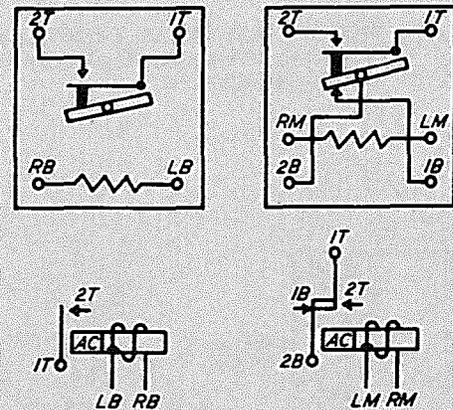
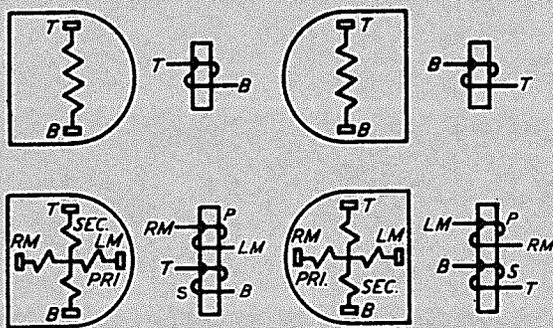


Fig. 11 - Winding and Spring Terminal Arrangement as Viewed From the Rear (Terminal Side) - 87-type Relay



222, 224, 248  
AND 252 TYPES

221, 223, 247  
AND 251 TYPES

Fig. 28 - Winding Terminal Arrangement as Viewed From the Rear (Terminal Side) - 221-, 222-, 223-, 224-, 247-, 248-, 251-, and 252-type and Similar AECO Relays

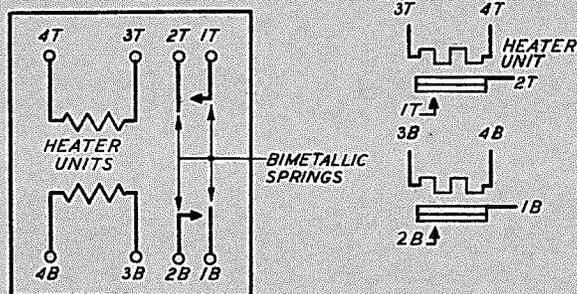


Fig. 32 - Winding and Spring Terminal Arrangement as Viewed From the Rear (Terminal Side) - 235-type Relays

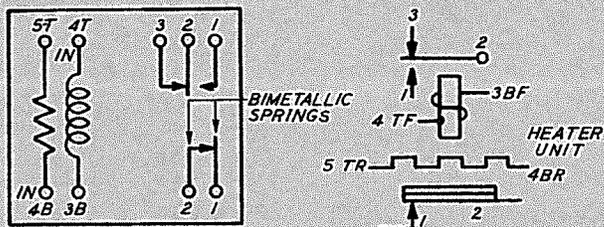


Fig. 38 - Winding and Spring Terminal Arrangement as Viewed From the Rear (Terminal Side) - 271-type Relay

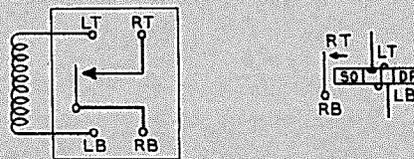


Fig. 47 - Winding and Spring Terminal Arrangement as Viewed From the Rear (Terminal Side) - KS-7800 to KS-7850 and KS-8280 Adams-Westlake Relays

AF-, AG-, and AJ-type Relays

2.70 Contact Springs (Front View)

(a) 12-position Relays: As viewed from the front of the relay, there are 12 contact positions arranged vertically. Each position has a single fixed spring and may or may not have movable make and/or break springs associated with it. The make springs are located to the left of the fixed springs and the break springs to the right. The fixed springs are numbered consecutively from 1 to 12, beginning at the bottom. The movable twin contact springs are numbered the same as their associated fixed springs with the appropriate suffix M (make) or B (break). A full complement of springs with their designations are shown in Fig. 70.

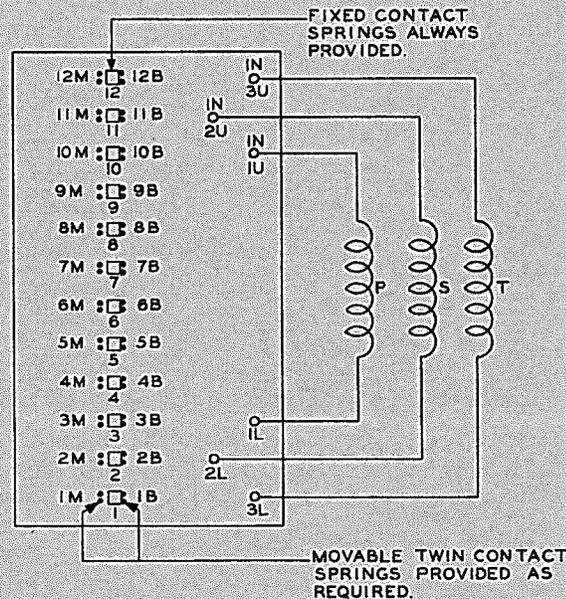


Fig. 70 - Winding and Contact Spring Arrangement as Viewed From the Front (Contact Side) 12-position AF-, AG-, and AJ-type Relays

(b) 24-position Relay: As viewed from the front of the relay, there are 24 contact positions arranged in two vertical rows of 12 each. Each position has a single fixed contact spring and a pair of associated movable make twin contact springs. The movable make springs are located to the left of their associated fixed springs. The springs in the left vertical row of fixed springs are numbered consecutively from 1 to 12, beginning at the bottom, and those in the right vertical row are numbered from 13 to 24, beginning at the bottom. The movable make twin contact springs are numbered the same as their associated fixed springs with the suffix M. The designations are shown in Fig. 71.

2.71 Contact Spring Terminals (Rear View)

(a) General: As viewed from the rear, the terminals are arranged in vertical rows. The terminal rows for fixed springs always have six terminals in a row since all relays are equipped with a full complement of fixed springs. The terminal rows for the make or break springs may have less than six terminals. However, the terminals provided in these rows are numbered the same as if the relay were equipped with a full complement of make or break springs. Identification of the make or break spring terminals may be facilitated by reference to fixed spring terminals, since all terminals in the same horizontal row have the same number.

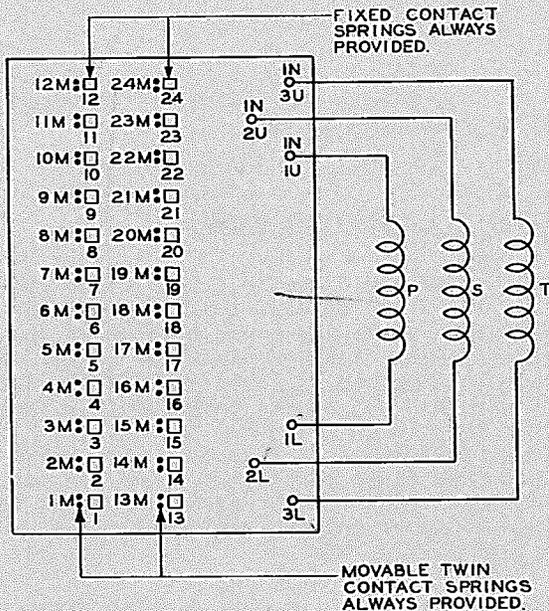


Fig. 71 - Winding and Contact Spring Arrangement as Viewed From the Front (Contact Side) 24-position AJ-type Relays

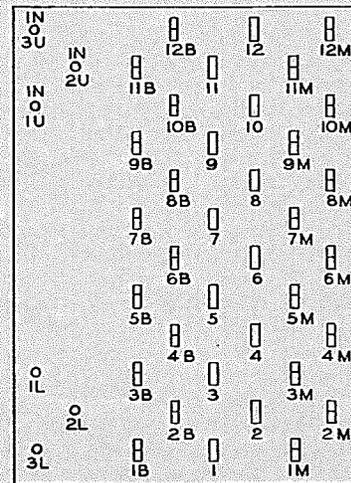


Fig. 72 - Winding and Terminal Arrangement as Viewed From the Rear (Terminal Side) 12-position AF-, AG-, and AJ-type Relays

(b) 12-position Relay: As viewed from the rear, the terminals are arranged in vertical rows. When the relay has a full complement of springs, there are six vertical rows of six terminals each as shown in Fig. 72. Starting from the right, the first pair of rows are for the make contacts, the second pair for the fixed contacts, and the third pair for the break contacts. The left row of terminals in each pair is odd-numbered from 1 to 11 beginning at the bottom, and the right row in the pair is even-numbered from 2 to 12. Make and break terminals have the suffix M and B, respectively.

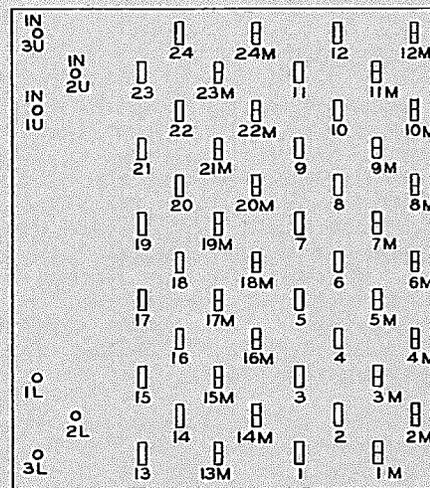


Fig. 73 - Winding and Terminal Arrangement as Viewed From the Rear (Terminal Side) 24-position AJ-type Relays

(c) 24-position Relay: As viewed from the rear, the terminals are arranged in eight vertical rows of six each as shown in Fig. 73. Starting from the right, the first pair of terminal rows is for 12 movable make contacts and the second pair for their associated fixed contacts. The third pair of rows is for an additional 12 movable make contacts and the fourth pair for their associated fixed contacts. In the two pairs of terminal rows at the right, the terminals in the left row of each pair are odd-numbered from 1 to 11, beginning at the bottom, while the terminals in the right row of these pairs are even-numbered from 2 to 12. In the two pairs of terminal rows at the left, the terminals in the left row of each pair are odd-numbered from 13 to 23, beginning at the bottom, while the terminals in the right row of these pairs are even-numbered from 14 to 24. All make terminals have the suffix M.

2.72 Winding Terminals: Winding terminals are provided as required and extend from the front of the relay, where test connections may be made, to the rear where the external wiring is connected. As viewed from the front, the winding terminals are arranged in two groups to the right of the core as shown in Fig. 70. Referring to the figure, the terminals in the upper group, designated 1U, 2U, and 3U, are connected to the inner ends of the primary, secondary, and tertiary windings, respectively. The terminals in the lower group, designated 1L, 2L, and 3L, are connected to the outer ends of the same windings. As viewed from the rear, the winding terminals are located to the left of the contact spring terminals and have the same designations as when viewed from the front.

↳ 286-, 287-, and 288-type Relays

2.73 Contact Springs (Front View)

(a) 286-type Relay

(1) As viewed from the front of the relay, there are 30 make contact positions arranged in two vertical rows of 15 positions each. Each vertical row is divided into five groups of three positions each. Each position has a single fixed contact spring and associated movable twin contact springs. The movable twin contact springs are at the right of their associated fixed contact springs. The contact arrangement and the numbering of the contact springs are shown in Fig. 74.

(2) Referring to the figure, all contact positions are designated by 2-digit numbers. The five groups of three contact positions in both vertical rows are numbered from 0 to 4 starting at the bottom. These numbers appear as the second digit in the designations of each of the three contact positions in the respective groups. L

In the right vertical row, the three contact positions in each of the five groups are numbered 0, 1, and 2 starting at the lowest position in the group. This number appears as the first digit in the designation of the individual positions in the respective groups in the right vertical row. In the left vertical row, the three contact positions in each of the five groups are numbered 3, 4, and 5 starting at the lowest position in the group. This number appears as the first digit in the designation of the individual positions in the respective groups in the left vertical row.

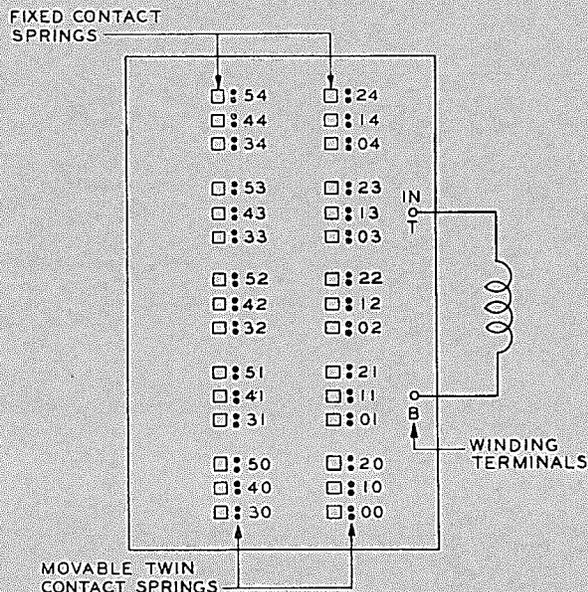


Fig. 74 - Winding and Contact Spring Arrangement as Viewed From the Front (Contact Side) 286-type Relay

(b) 287- and 288-type Relays

(1) As viewed from the front of the relay, there are 60 make contact positions arranged in two vertical rows of 30 positions each. Each vertical row is divided into ten groups of three positions. Each position has a single fixed contact spring and movable twin contact springs. The movable twin contact springs are at the right of their associated fixed contact springs. The contact arrangement and the numbering of the contact springs are shown in Fig. 75.

(2) Referring to the figure, all contact positions are designated by 2-digit numbers. The ten groups of three contact positions in both vertical rows are numbered from 0 to 9. These numbers appear

as the second digit in the designations of each of the three contact positions in the respective groups. In the right vertical row, the three contact positions in each of the ten groups are numbered 0, 1, and 2 starting at the lowest position in the group. These numbers appear as the first digit in the designations of the individual positions in the respective groups in the right vertical row. In the left vertical row, the three contact positions in each of the ten groups are numbered 3, 4, and 5 starting at the lowest position in the group. These numbers appear as the first digit in the designations of the individual positions in the respective groups in the left vertical row.

2.74 Contact Spring Terminals (Rear View)

(a) 286-type Relay

(1) The terminals of the movable contact springs are designed for individual wiring. As shown in Fig. 76, they are arranged in two vertical rows of fifteen terminals each. Each vertical row is divided into five groups of three terminals each, alternate terminals being offset to facilitate wiring.

(2) The terminals of the fixed contact springs are designed for horizontal strapping and are arranged in five horizontal rows of six terminals each. The rear ends of all fixed contact springs are offset so that their terminals are located to the right of the terminals of the movable contact springs. The six fixed spring terminals in each horizontal row are associated with the six movable spring terminals in the adjacent two groups to the left.

(3) Referring to Fig. 76, all terminals are designated by 2-digit numbers. The five groups of movable spring terminals in each vertical row are numbered from 0 to 4 starting at the bottom. Similarly, the five horizontal rows of fixed spring terminals are numbered from 0 to 4 starting at the bottom. These numbers appear as the second digit in the designations of the individual terminals.

(4) In the left vertical row of movable spring terminals, the three terminals in each of the five groups are numbered 0, 1, and 2 starting at the lowest terminal in the group. Associated with these terminals are the first three fixed spring terminals in the adjacent horizontal row which are also numbered 0, 1, and 2 starting at the left end of the row. These numbers appear as the first digit in the designations of the individual terminals.

(5) In the right vertical row of movable spring terminals, the three terminals in each of the five groups are numbered 3, 4, and 5 starting at the lowest terminal in the group. Associated with these terminals are the second three fixed spring terminals in the adjacent horizontal row which are also numbered 3, 4, and 5 from left to right starting after terminal 2 in the horizontal row. These numbers appear as the first digit in the designations of the individual terminals.

(b) 287-type Relay

(1) The terminals of the movable contact springs are designed for individual wiring. As shown in Fig. 77, they are arranged in two vertical rows of thirty terminals each. Each vertical row is divided into ten groups of three terminals each, alternate terminals being offset to facilitate wiring.

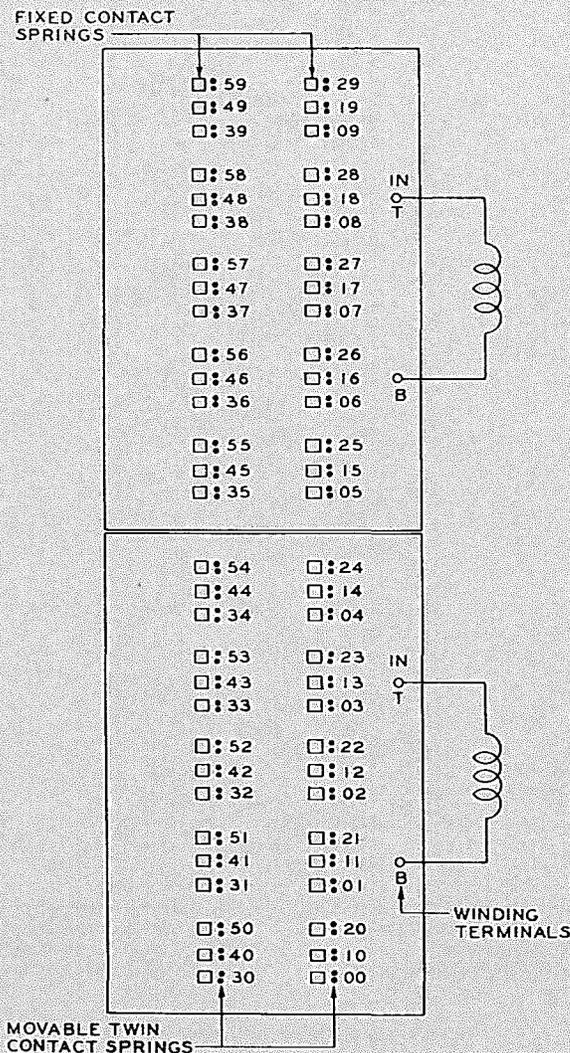
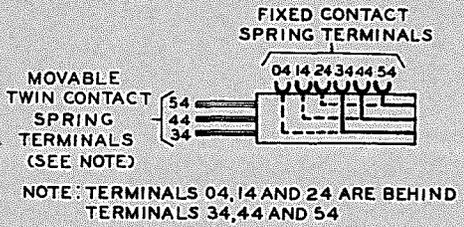
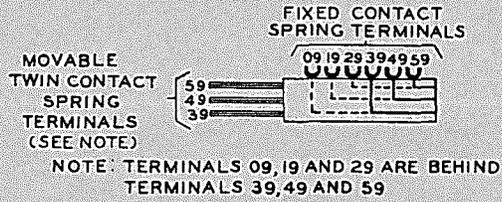


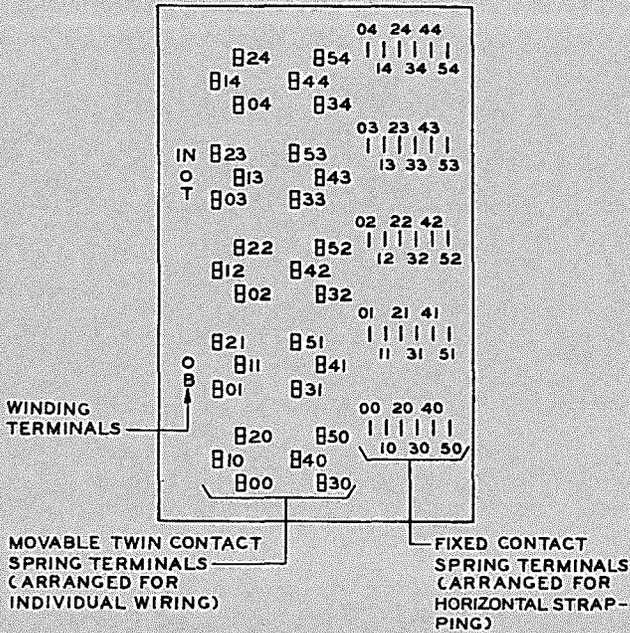
Fig. 75 - Winding and Contact Spring Arrangement as Viewed From the Front (Contact Side) - 287- and 288-type Relays



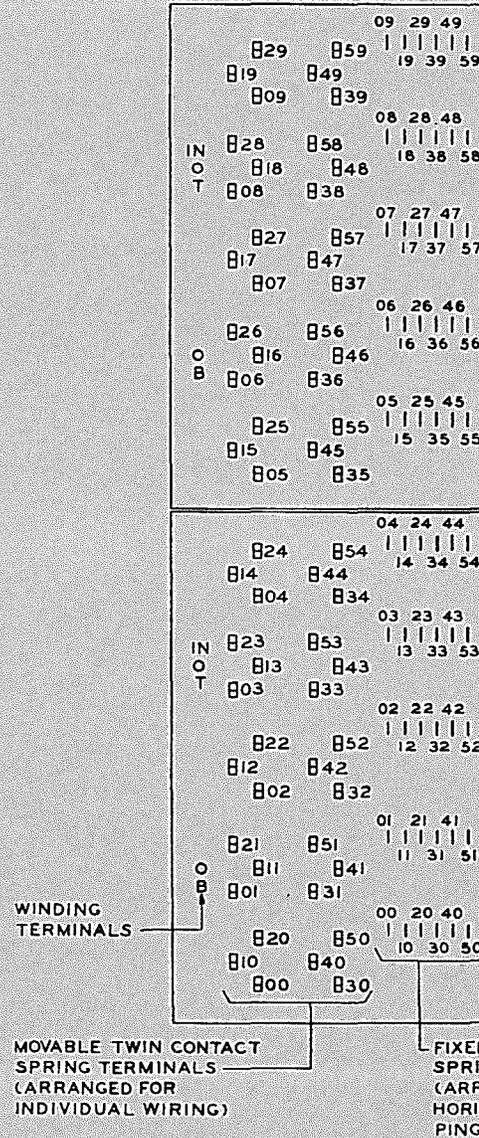
SIDE VIEW OF TERMINAL ARRANGEMENT



SIDE VIEW OF TERMINAL ARRANGEMENT



REAR VIEW OF TERMINAL ARRANGEMENT



REAR VIEW OF TERMINAL ARRANGEMENT

Fig. 76 - Winding and Terminal Arrangement as Viewed From the Rear (Terminal Side) - 286-type Relay

Fig. 77 - Winding and Terminal Arrangement as Viewed From the Rear (Terminal Side) - 287-type Relay

(2) The terminals of the fixed contact springs are designed for horizontal strapping and are arranged in ten horizontal rows of six terminals each. The rear ends of all fixed contact springs are offset so that their terminals are located to the right of the terminals of the movable contact springs. The six fixed spring terminals in each horizontal row are associated with the six movable spring terminals in the adjacent two groups to the left.

(3) Referring to Fig. 77, all terminals are designated by 2-digit numbers. The ten groups of movable spring terminals in each vertical row are numbered from 0 to 9 starting at the bottom. Similarly the ten horizontal rows of fixed spring terminals are numbered from 0 to 9 starting at the bottom. These numbers appear as the second digit in the designations of the individual terminals.

(4) In the left vertical row of movable spring terminals, the three terminals in each of the ten groups are numbered 0, 1, and 2 starting at the lowest terminal in the group. Associated with these terminals are the first three fixed spring terminals in the adjacent horizontal row which are also numbered 0, 1, and 2 starting at the left end of the row. These numbers appear as the first digit in the designations of the individual terminals.

(5) In the right vertical row of movable spring terminals, the three terminals in each of the ten groups are numbered 3, 4, and 5 starting at the lowest terminal in the group. Associated with these terminals are the second three fixed spring terminals in the adjacent horizontal row which are also numbered 3, 4, and 5 from left to right starting after terminal 2. These numbers appear as the first digit in the designations of the individual terminals.

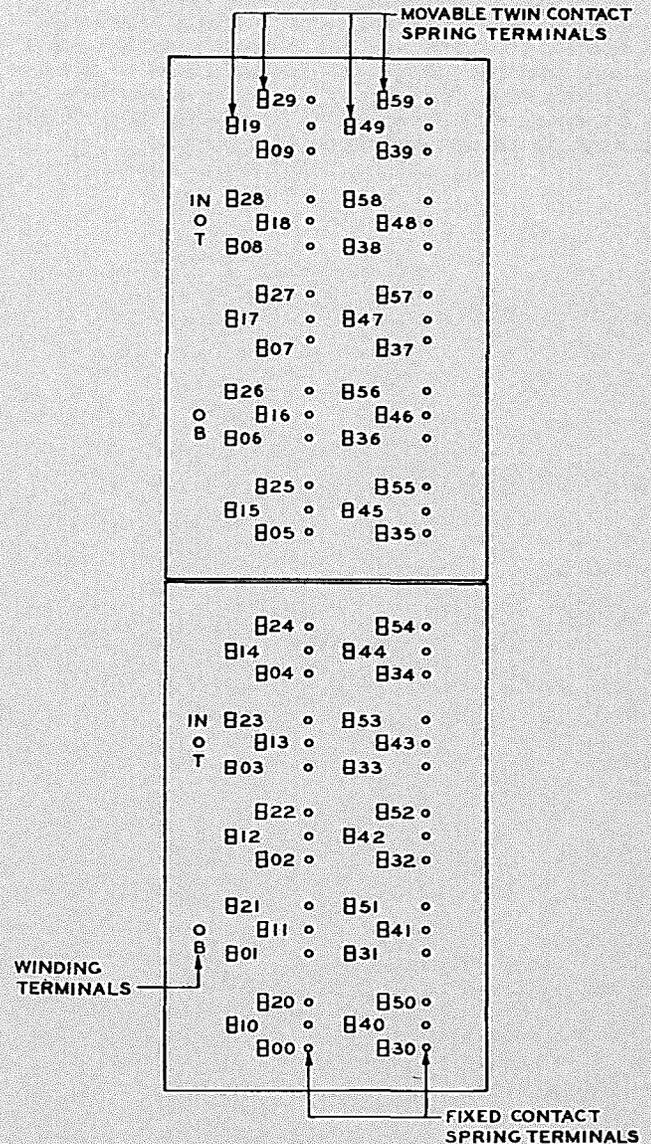
(c) 288-type Relay

(1) The contact spring terminals are arranged in vertical rows as shown in Fig. 78 and are designed for individual wiring only. As shown in this figure, the 30 fixed spring terminals in each of the two vertical rows are located directly to the right of their associated movable spring terminals. The vertical rows of both movable and fixed spring terminals are divided into ten groups of three terminals each. Alternate movable spring terminals are offset to facilitate wiring.

(2) Referring to Fig. 78, all terminals are designated by 2-digit numbers. The ten groups of movable and fixed terminals in the respective rows are numbered 0 to 9 starting at the bottom. These numbers appear as the second digit in the designations of the individual terminals.

(3) In the left vertical rows of movable and fixed terminals, the three terminals in each of the ten groups are numbered 0, 1, and 2 starting at the lowest terminal in the group. These numbers appear as the first digit in the designations of the individual terminals.

(4) In the right vertical rows of movable and fixed terminals, the three terminals in each of the ten groups are numbered 3, 4, and 5 starting at the lowest terminal in the group. These numbers appear as the first digit in the designations of the individual terminals.



NOTE: ALL TERMINALS ARE ARRANGED FOR INDIVIDUAL WIRING

Fig. 78 - Winding and Terminal Arrangement as Viewed From the Rear (Terminal Side) - 288-type Relay

2.75 Winding Terminals: One pair of winding terminals is provided for the 286-type relay and two pairs for the 287- and 288-type relays as shown in Figs. 76, 77, and 78, respectively. These terminals extend from the rear of the relay where external wiring is connected. Test lugs which are an integral

Part of the terminals are accessible from the front of the relay. As viewed from the front, the test lugs and winding terminals are at the right side of the relay. The upper terminal of each pair is designated T and the lower terminal of the pair is designated B. As viewed from the rear, the winding terminals are at the left of the contact spring terminals and have the same designations as when viewed from the front. In each case, the T terminal is connected to the inner end of the winding as indicated on the figure.

### 3. SWITCHES

The following change applies to Part 3 of the section.

(a) 3.16 - added

3.16 Sleeve Cutoff Jacks: Facing the front of the switch, the number 1 spring of the sleeve cutoff jack of 197- and 198-type switches is at the left, and the number 2 spring is at the right.