

WINDING AND SPRING DESIGNATIONS

APPARATUS CONNECTING POINTS REFERRED TO IN CIRCUIT REQUIREMENT TABLES

STANDARD SINCE 1931

1. GENERAL

1.01 This section describes the method used since 1931 of designating the winding and spring terminals of relays and other apparatus specified as connecting points in circuit requirement tables. It also describes the conventions employed to represent the apparatus on circuit drawings.

1.02 This section is reissued to add information for 235, 267, 268, 271, 275, 276, 280, EA, UA, UB, KS-7800 to KS-7850, KS-7900, KS-7901, KS-8171, KS-8280, KS-8331, KS-8346, KS-13542 and KS-13543 relays; 173 type interrupters; 12 and 14 type message registers; 176-179, inclusive and 181-184, inclusive type networks; 202, 211, 212, 308, 314, 315, 318, 324, 325 and 328 type switches, and 3 type timers. It is also reissued to revise the information for B, C, G, J and 266 type relays and 301, 303, 305 and 307 type crossbar switches. This section is reissued to include changes resulting from the separation of Section A804.007 into subdivisions. Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 The winding and contact spring designations described in this section provide means for locating the springs and terminals on apparatus without the use of wiring diagrams. These designations are used on circuit drawings and in circuit requirement tables to show the point to which connections are to be made for making tests.

1.04 The figures show the winding and spring designations on the conventions employed to represent the apparatus on circuit drawings. The conventions may be shown on the circuit drawings either vertically or horizontally. Where relays having two spring combinations are shown vertically, the top combination is shown at the top and the bottom combination is shown at the bottom. Where such relays are shown horizontally, the top combination is marked "Top".

1.05 Contact springs on relays and other apparatus are designated the same whether the apparatus is viewed from the front (contact side) or rear (terminal side). On many types of relays connections

can be made to the front portion of contact springs. While the contact spring designations which are used in the circuit requirement table do not differentiate between front and rear connections, it is the general practice to connect from the front. Contact springs on which front connections are impracticable, are ordinarily not specified as points to which test connections should be made. See Section A502.036 for information on methods of making test connections to apparatus.

1.06 In circuit requirement tables, the contact springs are designated with a terminal number followed by the letter T (top) or B (bottom), where there is an upper and a lower spring combination, to indicate that the terminal is located in the top or bottom row. However, T and B are not required on circuit drawings, since in these cases the springs are shown in their proper relative position, or the top springs are marked "Top" as described in 1.04.

1.07 Winding terminals are designated differently depending upon whether the apparatus is viewed from the front or the rear.

1.08 On many types of relays and other apparatus connection can be made to winding terminals from the front. The winding terminal designations shown in the TEST CLIP DATA columns of circuit requirement tables indicate whether the connections should be made from the front or rear of the apparatus. When connections are to be made from the front, the designations of the winding terminals as viewed from the front are used. Similarly, when rear connections are required, the designations of the terminals as viewed from the rear are used. See Section A502.036 for information on methods of making test connections to apparatus.

1.09 The inner ends of windings are shown in connection with the terminal arrangements in part 2 of this section by IN or in some cases by solid semicircles. On the circuit conventions, the inner ends of windings are indicated by solid semicircles.

1.10 Armature terminals which are not in alignment with other terminals are designated A.

2. RELAYSA, E, F, H, M, R, T, AB, EA and 236 Types

2.01 Contact Springs: As viewed from the front (contact side) of the relay, contact springs are numbered consecutively from left to right. As viewed from the rear (terminal side) of the relay the contact springs are numbered consecutively from right to left.

2.02 Balancing Springs: Balancing springs (springs not equipped with contacts or soldering terminals) are not numbered. Their presence in the pileup is ignored in the numbering of the associated contact springs. Thus, where a balancing spring appears as the first spring at the left, as viewed from the front of the relay, the contact spring immediately to the right is numbered 1. Similarly, where a balancing spring is located between contact springs, the associated contact springs are numbered in the regular order without regard to the balancing spring.

2.03 Winding Terminals: The designations of the winding terminals differ as viewed from the front and the rear of the relay. As viewed from the front of the relay, the winding terminals are designated by two letters as described in 2.04 to 2.06, inclusive. Where these two letter designations are shown on the circuit requirement table, connection to the terminal is to be made from the front of the relay. As viewed from the rear of the relay, the winding terminals are designated by a numeral and two letters as described in 2.07 to 2.11, inclusive. Where these designations, consisting of a numeral and two letters, are shown on the circuit requirement table, connection to the terminal is to be made from the rear of the relay.

Winding Terminal Numbering - Viewed From The Front of The Relay

2.04 The winding terminals are designated by two letters. The first letter indicates the position of the terminal with respect to the core of the relay. The second letter indicates whether the terminal is in the top or bottom spring assembly. The designations have the following significance.

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, is located to the left of the core as viewed from the front. The Y terminal, like the R, is located to the right of the core. The portions of the terminals to which connections from the front may be made are located between the rear spoolhead and the rear of the relay. The connecting portions of the C and Y terminals are located nearer the rear spoolhead than the corresponding portions of the L and R terminals.

2.06 The second letter (T or B) designates a terminal in the top or bottom row, respectively.

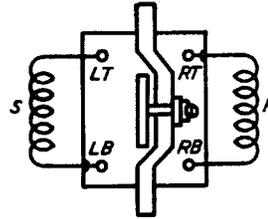


FIG. 1 - WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)-A, E, F, H, M, R, T, AB, EA AND 236 TYPE RELAYS

Winding Terminal Numbering - Viewed From The Rear of The Relay

2.07 The winding terminals are designated by a numeral and two letters. The numeral, which locates the winding terminal with respect to the contact spring terminals, may either precede or follow the letters. The letters, used in describing the winding terminals as viewed from the front, are also used to designate the same terminals as viewed from the rear. The designations are described below.

2.08 A numeral preceding two letters shows the location of the winding terminal with respect to the contact spring terminal. The numeral is the same as that of the contact spring terminal immediately to the right.

2.09 Where a numeral (always 1) follows the letters, the winding terminal is located at the extreme right in the row, or the terminal is located in a row of winding terminals only. Each terminal located in a row of winding terminals only has (1) following the letters.

2.10 The first letter (L, R, C or Y) shows the location of the winding terminal with respect to the relay core. The terminals are arranged in two horizontal rows as shown in Fig. 2. Where no more than two winding terminals are in one row, the designations L and R are used, L designating a terminal to the right and R

a terminal to the left of the core as viewed from the rear of the relay. Where there are more than two winding terminals in a row the designations C and Y are also used. The C terminal is located to the right of the L terminal and the Y terminal to the left of the R. Contact springs are often located between winding terminals, so that the winding terminals C and L or Y and R may not be adjacent to one another.

2.11 The second letter (T or B) designates a terminal in the top or bottom row, respectively.

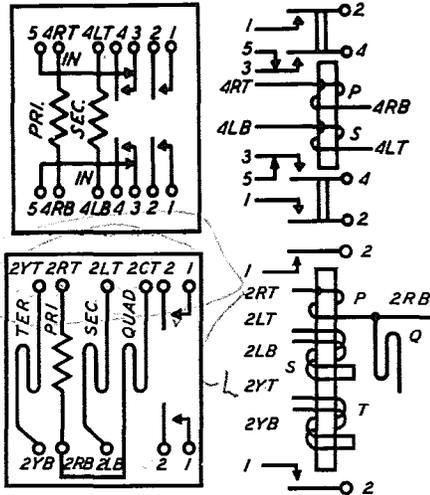


FIG. 2 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - A, E, F, H, M, R, T, AB, EA AND 236 TYPE RELAYS

B, C, G and J Type Relays

2.12 As viewed from the front of the relay, contact springs are numbered from left to right.

2.13 Armatures are not designated from the front. As viewed from the rear of the relay, contact spring and winding terminals are located in three rows as shown in Fig. 3. The contact spring terminals are located in the top row and are numbered consecutively from right to left. The winding terminals are located in the middle row and are designated from right to left. The letter M following the number indicates the middle row of terminals.

2.14 Spring combinations may contain two armature springs, one of which is not electrically connected to the relay frame. Such a spring is located in the top row and takes the proper consecutive numerical designation in this row. The armature terminal electrically connected to the relay frame is located below the winding terminals and is designated A.

Exception: On the B607 and B1158 relays the armature terminal is

located in the row of winding terminals. As viewed from the rear of the relay, the terminals in this row are designated 1M, A, 2M, 3M and 4M from right to left.

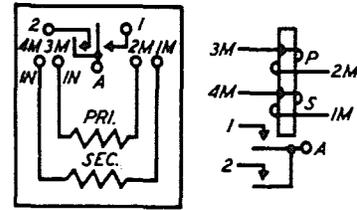


FIG. 3 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - B, C, G AND J TYPE RELAYS

L, N and S Type Relays

2.15 As viewed from the front of the relay, the left hand contact is numbered 1, the armature is numbered 2 and the right hand contact is numbered 3.

Exception: Contacts that do not have wiring terminals are not numbered; e.g. where the front contact does not have a wiring terminal, the armature is numbered 1 and the back contact is numbered 2.

2.16 As viewed from the rear of the relay the winding and contact spring terminals are numbered consecutively from right to left as described in 2.07 to 2.11, inclusive (See Fig. 4).

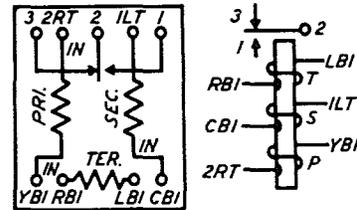


FIG. 4 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - L, N AND S TYPE RELAYS

U, Y and UA Type Relays

2.17 As viewed from the front of the relay the contact springs are located to the left and the winding terminals to the right of the relay core.

2.18 Contact springs are numbered consecutively from left to right facing the front of the relay and from right to left facing the rear.

2.19 Balancing or Buffer Springs (springs not equipped with soldering

terminals or contacts) are not numbered. Thus, where a balancing or buffer spring appears as the first spring at the left, as viewed from the front of the relay, the contact spring immediately to the right is numbered 1. Similarly, where a balancing or buffer spring is located in the middle of a pileup, the associated contact springs are numbered in the regular order without regard to the balancing or buffer spring. However, for adjustment purposes these springs are designated X and X', respectively, in the A400 Series BSP's.

**2.20 Winding Terminals:** The designations of the winding terminals differ as viewed from the front and rear of the relay. As viewed from the front of the relay the winding terminals are designated by one or two letters as described in 2.21 and 2.22. Where these two letter designations are shown on the circuit requirement table, connection to the terminal is to be made from the front of the relay. As viewed from the rear of the relay the winding terminals are designated by one or two letters and a numeral as described in 2.23 to 2.26, inclusive. Where these designations, consisting of a numeral and two letters are shown on the circuit requirement table, connection to the terminal is to be made from the rear of the relay.

**Winding Terminal Numbering - Viewed From The Front of The Relay**

**2.21 The first letter (on single wound relays the only letter) is T or B.** This indicates winding terminals in the top or bottom row of terminals, respectively.

**2.22 The second letter is used on multi-winding relays where the terminal is located in a row containing two or more winding terminals.** The second letter is F for front, C for center or R for rear as shown in Fig. 5. These letters represent the position with respect to the front of the relay of that portion of the winding terminal located in front of the rear spoolhead. The F terminal is located nearest the armature and toward the front of the relay.

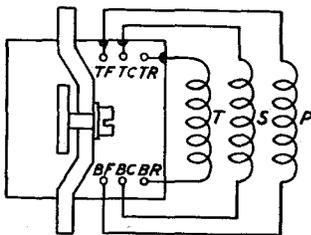


FIG. 5 - WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE) - U, Y, UA AND UB TYPE RELAYS

**Winding Terminal Numbering - Viewed From The Rear of The Relay.**

**2.23 Where a numeral precedes a letter, the terminals are numbered consecutively from right to left as viewed from the rear of the relay.**

**2.24 Where the numeral is followed by T or B it represents winding terminals in the top or bottom row, respectively.**

**2.25 When a winding is directly connected to a contact spring terminal, the terminal is given only the contact spring terminal designation.**

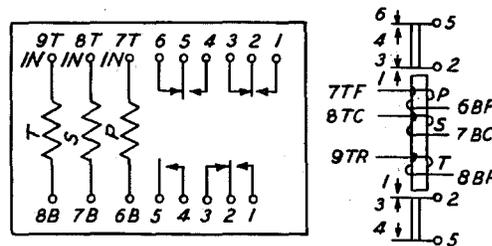


FIG. 6 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) U, Y, UA AND UB TYPE RELAYS

**2.26 Shielding Springs:** Where an electrostatic shielding spring is used, it does not in most cases extend beyond the mounting plate as viewed from the front of the relay. Only a wiring terminal appears from the terminal side. This wiring terminal is given the number of the wiring terminal immediately to its right as viewed from the rear followed by the letter X as shown in Fig. 7, except when the spring is the first spring in the pileup. In this case, the spring is numbered X1.

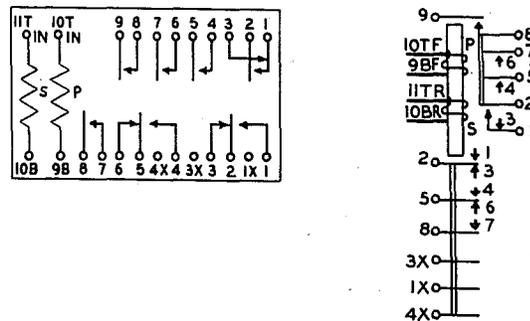


FIG. 7 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - U, Y, UA AND UB TYPE RELAYS HAVING SHIELDING SPRINGS

**UB Relays**

**2.27 The contact springs are numbered consecutively from left to right facing the front of the relay, except that the two springs which make up the armature (moving) spring of a break-make combination are**

numbered as one spring. These springs appear at the terminal end of the relay as one spring. In other respects, the winding and spring numbering of these relays is the same as for U, Y, and UA type relays described in 2.17-2.26, inclusive.

21 Type Telegraph Relays

2.28 Facing the front or contact side of the relay the terminals are numbered as shown in Fig. 8.

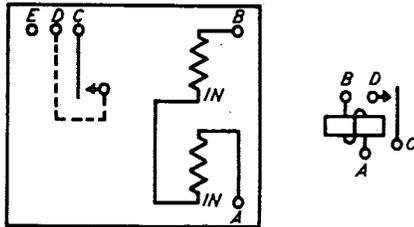


FIG. 8-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)-21 TYPE TELEG. RELAY

44 Type Relays

2.29 The armature (frame terminal) is designated A and the front contact is designated 1. The winding terminals are designated as shown in Fig. 9.

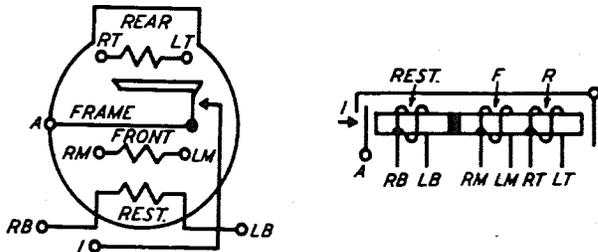


FIG. 9-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-44 TYPE RELAY

85 Type Relays

2.30 The front contact spring is indicated by 1 and the armature by 2. On those relays having two contact springs, the front contact spring is indicated by 1 and the spring that rests on the armature stud is indicated by 2. The relative location of the winding and contact terminals and typical designations are shown on Fig. 10.

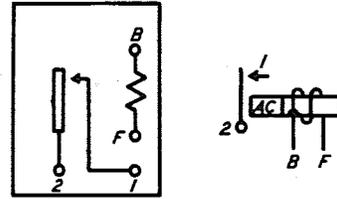


FIG. 10-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)-85 TYPE RELAY

87 Type Relays

2.31 The contact terminals are numbered consecutively from right to left facing the terminal side of the relay with the suffix T (top) or B (bottom). On those relays having only a front contact, the spring operated by the armature stud is indicated by 1T and the front contact spring is indicated by 2T. On those relays having a front and back contact, the spring operated by the armature stud is indicated by 1T, the front contact spring by 2T, the back contact by 1B and the armature by 2B. The relative positions and designations of the winding terminals are shown on Fig. 11.

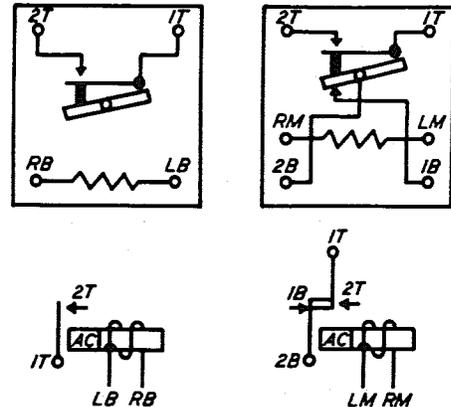


FIG. 11-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-87 TYPE RELAY

89, 101, 105, 108, 118, 172, 189, 190, 208, 214 and 253 Type Relays

2.32 The winding and contact terminal numbering is the same as covered in 2.33. These relays are, however, always mounted as shown in Figs. 12, 13, 14, and 15 below.

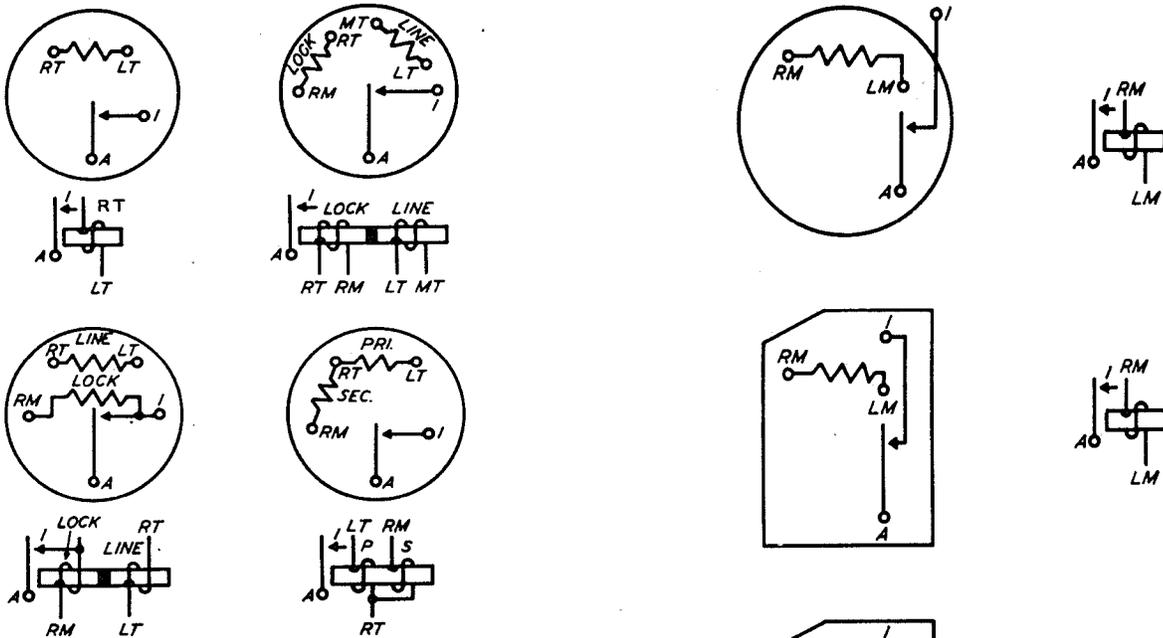


FIG.12-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-89,101,105, 108,118 AND 172 TYPE RELAYS

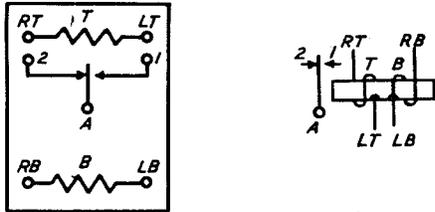


FIG.13-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-190 TYPE RELAY

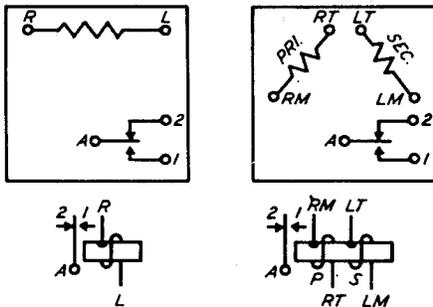


FIG.14-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-208, 214 AND 253 TYPE RELAYS

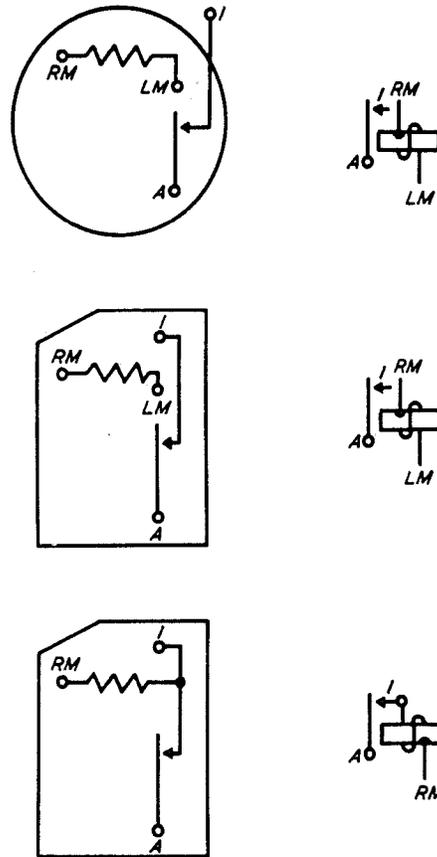


FIG.15-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-189 TYPE RELAY

114, 124, 126, 174, and 198 Type Relays

2.33 The front contact is indicated by 1, the armature by A and the back contact by 2 except on relays having only a back contact in which case the back contact is indicated by 1 and the armature by A. Fig. 16 shows the relative location of the winding terminals of these relays, as viewed from the rear, when mounted with the retractile spring at the right. The test clip data specified on the circuit requirement table is based on this position of mounting. If the relay is mounted with the retractile spring in any other position, the test clip data should be translated to care for this position of mounting.

121, 122, 125, 149, 162, 178 and 179 Type Relays

2.34 The contact terminals are numbered diagonally downward from right to left facing the rear of the relay. On the 125 and 179 type relays the middle contact terminals have a suffix M. The relative location of the winding terminals as viewed from the terminal side and typical designations are shown in Fig. 17.

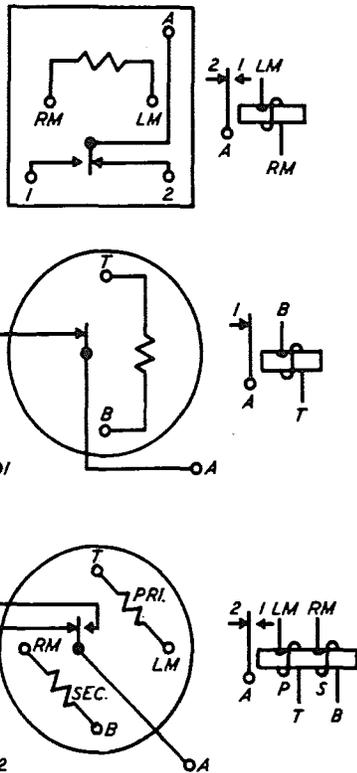


FIG. 16- WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)- 114 124, 126, 174 AND 198 TYPE RELAYS

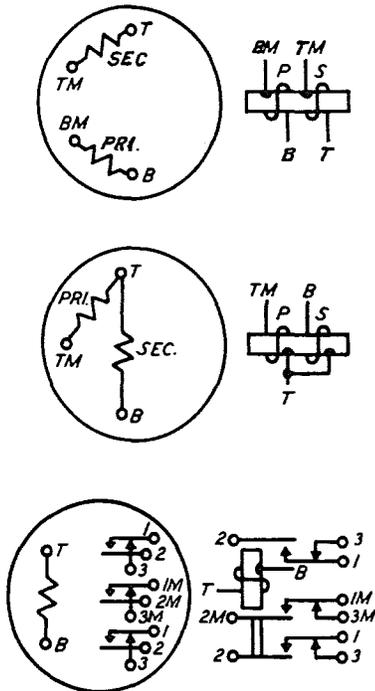


FIG. 17- WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 121, 122, 125, 149, 162, 178 AND 179 TYPE RELAYS

150 Type Relays

2.35 The contact and winding terminals are numbered consecutively from right to left facing the front end of the relay as shown in Fig. 18.

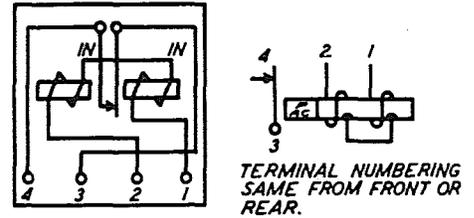


FIG. 18- WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)- 150 TYPE RELAY

177 and 203 Type Relays

2.36 As viewed from the front of the relay the front contacts are numbered 1 and 4, the travel springs (the springs picked up by the hard rubber bridge) 2 and 5 and the back contacts 3 and 6. The winding terminal designations as viewed from the terminal side are shown on Fig. 19. The designations + and - shown in Fig. 19 indicate which polarity of the battery should be connected to this point.

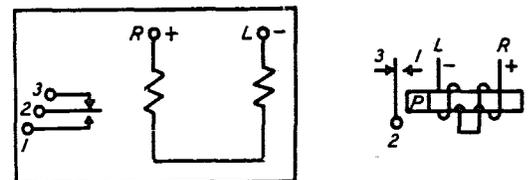


FIG. 19 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)- 177 AND 203 TYPE RELAYS

186 Type Relays

2.37 The spring operated by the armature stud is numbered 1 and the front contact is numbered 2 as shown in Fig. 20. The top winding terminal is designated 1T and the bottom winding terminal is designated B.

196 Type Relays

2.38 The contact terminals are numbered consecutively from right to left facing the terminal side of the relay. The

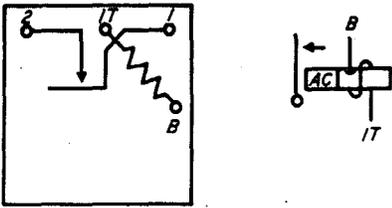


FIG. 20-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-186 TYPE RELAY

front contact is numbered 1, the armature 2 and the back contact 3 except on relays having only a back contact in which case the armature is numbered 1 and the back contact 2. The relative location of the winding and contact terminals as viewed from the terminal side, and typical designations are illustrated in Fig. 21. Facing the contact side of the relay the L and R winding terminals are at the left and right sides of the spoolhead, respectively.

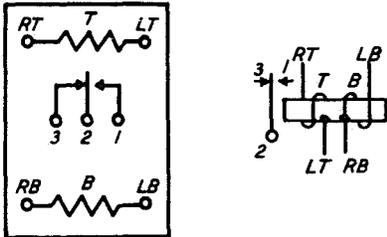


FIG. 21 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-196 TYPE RELAY

206, 227, 231, 239 and 280 Type Relays

2.39 The contact and winding terminals are numbered consecutively from right to left facing the terminal side of the relay as shown in Fig. 22.

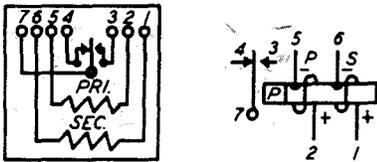


FIG. 22-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-206, 227, 231, 239 AND 280 TYPE RELAYS

207, 213 and 268 Type Relays

2.40 The armature (frame terminal) is designated A and the front contact or make contact screw is designated 1. The winding terminals are designated as shown in Fig. 23.

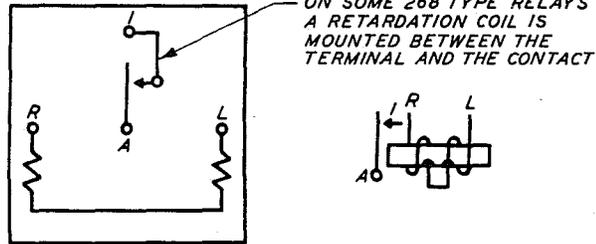


FIG. 23-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-207, 213, AND 268 TYPE RELAYS

209, 215, 218, 228 and 255 Type Relays

2.41 Facing the terminal side of the relay terminals are numbered as shown in Figs. 24, 25, 26 and 27. On the 209 type relay, numbers 1, 6 and 11, shown on Fig. 24 are stamped in the terminal block. The other terminals are numbered consecutively from top to bottom in each row. Terminal numbers of the 215, 218, 228 and 255 type relays are similarly stamped in the terminal block. Connections between terminals and contact springs and coil windings with which they are associated are shown on the relay conventions on the circuit drawing.

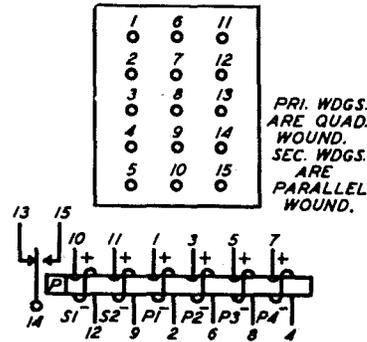


FIG. 24-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-209 TYPE RELAYS

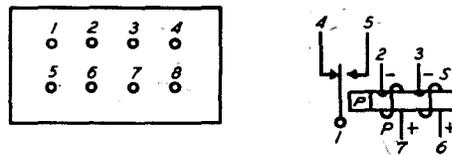


FIG. 25-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-215 AND 255 TYPE RELAYS

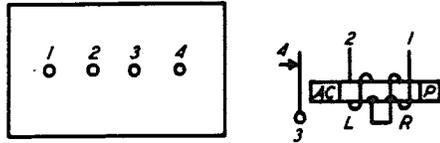


FIG. 26-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-218 TYPE RELAYS

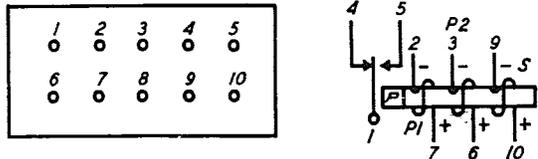


FIG. 27-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-228 TYPE RELAYS

221, 222, 223, 224, 247, 248, 251, and 252 Types, and Similar A.E.Co. Type Relays

2.42 The springs in an assembly are consecutively numbered outward from the frame on which the assembly is mounted, that is, the springs on a right-hand relay are consecutively numbered from left to right and on a left-hand relay from right to left. The connecting point is indicated by the relay letter designation preceded by the spring number. Where the designation X follows a numeral it indicates a spring having no soldering terminal or contact, and is located, on a left hand relay, to the immediate left of the spring having the same numerical designation and, on a right hand relay, to the immediate right of the spring having the same numerical designation. If no numeral precedes the designation X, it indicates that such a spring is the first spring in the pileup. For example: The numeral 3 indicates spring No. 3 of the relay while 2B would indicate spring No. 2 in the bottom spring combination of the relay. The winding terminals are arranged as illustrated in Fig. 28.

225 Type Relays and A.E.Co. Pivot Type Relays

2.43 The winding terminals are indicated by T (top) and B (bottom) with the spring combination uppermost. On relays with more than two winding terminals, the letters T and B are followed by the letters F (front) and R (rear), the armature end of the relay being considered the front. The springs in an assembly are consecutively numbered outward from the frame on which the assembly is mounted. Fig. 29 shows the winding terminal arrangement as viewed from the rear.

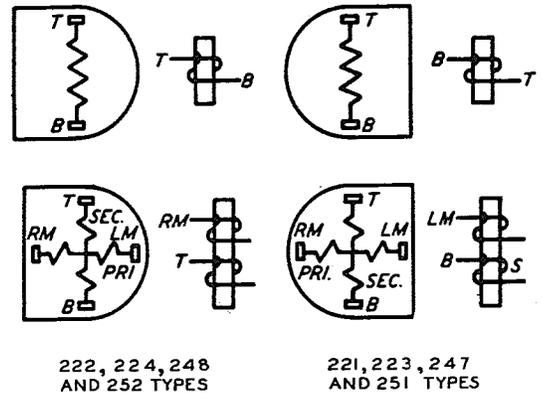


FIG. 28-WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)- 221, 222, 223, 224, 247, 248, 251 AND 252 TYPE AND SIMILAR A.E. CO. RELS.

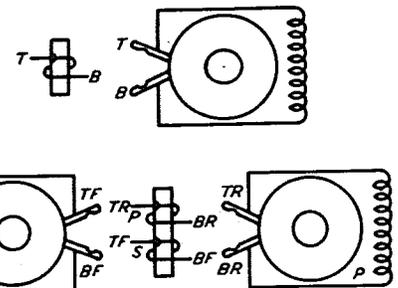


FIG. 29-WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR-225 TYPE AND SIMILAR A.E. CO. RELAYS

229, 230 and 232 Type Relays

2.44 The contact terminals are numbered consecutively from right to left facing the terminal side of the relay with the suffix T (top) and B (bottom) as shown in Figs. 30 and 31 except on relays used in equipment where the contact terminals are identified by functional designations.

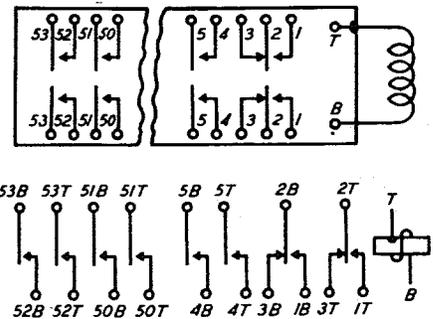


FIG. 30- WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) -229 TYPE RELAY

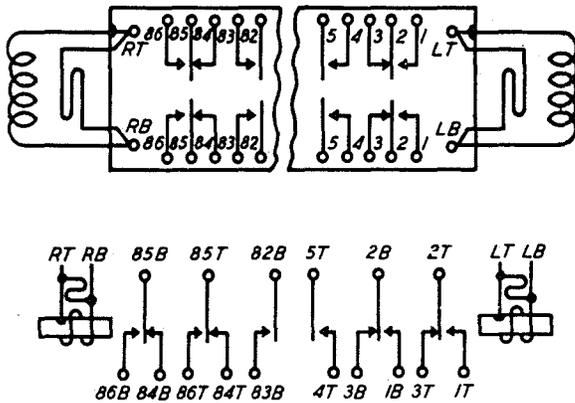


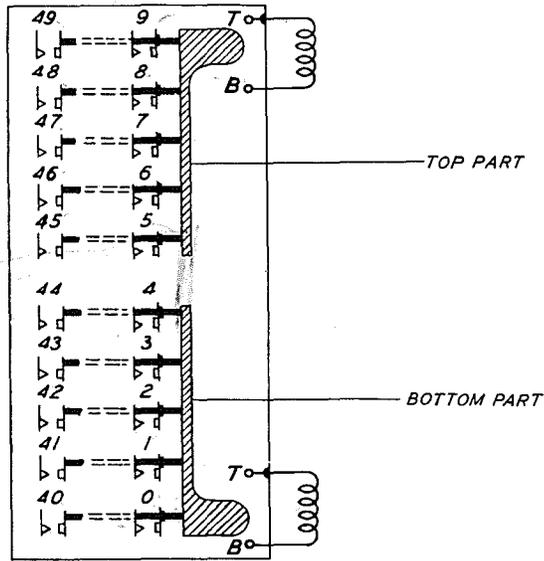
FIG. 31- WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) -230 AND 232 TYPE RELAYS

with each vertical row of springs from right to left facing the contact side of the relay. Either half of a relay may be operated separately or both halves may be operated together, the numbering of the contact springs being the same in each case. Where both halves are operated together the schematic drawing shows the two windings in multiple and shows a single armature and all the contact spring pairs. In case both halves of the relay perform identical functions but operate separately, one magnet and set of springs are shown with two sets of spring numbers. Otherwise

235 Type Relays

2.45 Facing the front of the relay the contact springs are numbered consecutively from left to right. Facing the rear the contact and heater unit terminals are numbered from right to left as shown in Fig. 32. The terminals are designated by a number followed by T or B depending upon whether the terminal is in the top or bottom row. Heater unit terminals on these relays cannot be connected to from the front. On the circuit drawing the terminals are designated by a number followed by T or B.

Note: On some circuits the No. 235A relay heater unit winding terminals were numbered 1, 1LT, 1RT and 2 starting at the right as viewed from the rear.



50 CONTACT RELAY

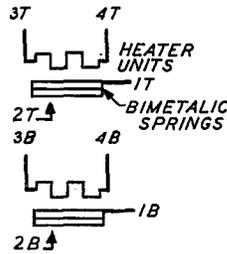
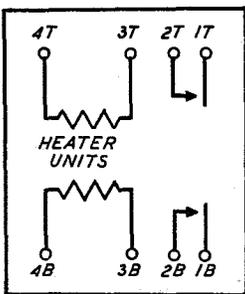


FIG. 32- HEATER UNIT AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) -235 TYPE RELAYS.

245, 254, 263 and 264 Type Relays

2.46 The contact springs are numbered consecutively in vertical rows of ten pairs of springs starting at the bottom with pair 0 in the row nearest the vertical armature as shown in Fig. 33 and continuing

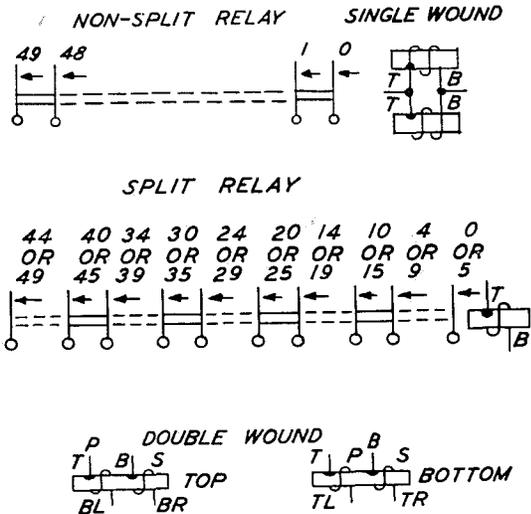


FIG. 33- WINDING AND CONTACT SPRING ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)-245, 254, 263 AND 264 TYPE RELAYS.



consecutively from 1 up starting at the left as shown in Fig. 36. However, the front and back contacts (numbered 3 and 4, respectively at the rear) connect directly to the wiring terminals, and do not appear among the terminals used to connect to the relay from the front. Viewed from the front, the terminals which extend forward from the terminal assembly have the same number as they do at the rear. They therefore number from left to right as viewed from the front, starting with 1. As viewed from the rear the contact and winding terminals are numbered consecutively from 1 up, starting at the right as shown in Fig. 37.

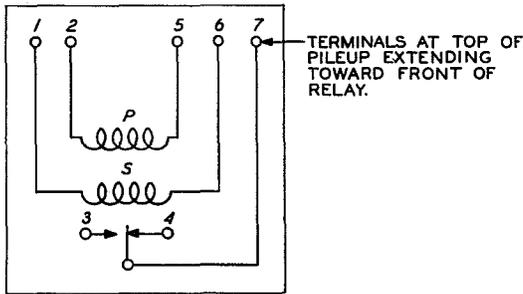


FIG. 36 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE) - 267 TYPE RELAYS

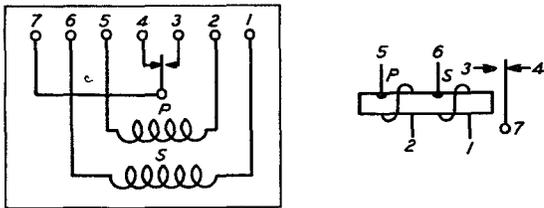


FIG. 37 WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 267 TYPE RELAYS

271 Type Relays

2.55 As viewed from the rear, the winding and contact terminals for this relay, shown in Fig. 38, are numbered the same as

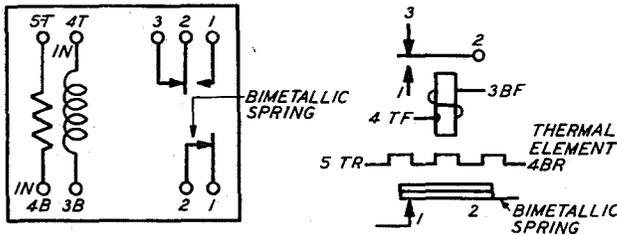


FIG.38 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 271 TYPE RELAY

those of U and similar type relays described in 2.17-2.26. As viewed from the front the winding and spring terminals are numbered the same as U type relays. The balancing spring is designated as described for U type relays in 2.19. These springs have no soldering terminal extending to the rear of the relay. The circuit convention differs from that of the U type relay to show the thermal element (heater winding) and the bimetallic contacts.

275 and 276 Type Relays

2.56 The contact and winding terminals are numbered in accordance with the BSP figures referred to on the circuit requirement table and in Section A460.055.2. As viewed from the base of the socket, the terminals are numbered numerically clockwise from 1 to 8 starting at the key as shown in Fig. 39.

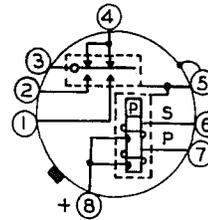


FIG. 39 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE BASE - 275 AND 276 TYPE RELAYS

260 Type and Other Voltmeter and Milliammeter Relays

2.57 The terminal designations for these relays are stamped on the relays.

KS-3067, KS-5013, KS-5381, KS-5483, KS-6319 and KS-6724 Relays

2.58 The winding and contact numbering for these relays is based on the relay mounted in a vertical position with the armature lowermost. The contact terminals of these relays are designated with one numeral and two letter designations as shown in Fig. 40. The first letter, L or R, indicates the left or right side, respectively, of the relay coil on which the terminal is mounted. The numeral (1 or 2) indicates the location of the terminal with respect to the free end of the armature spring, 1 indicating the terminal toward the free end of the armature spring, and 2 indicating the terminal toward the armature end. The second letter T (top) or B (bottom), indicates the position of the terminal with respect to the base, the letter T indicating the terminals farthest from the base, and the letter B indicating the terminals on the base. For example, the designation LLT means the contact on the left side of the relay at the free end

of the spring and farthest from the base as shown in Fig. 40. The armature and windings are designated by two letters; the first letter L or R, indicating the left or right side, respectively, of the relay coil and the second letter, A or W, indicating the armature and winding terminals, respectively.

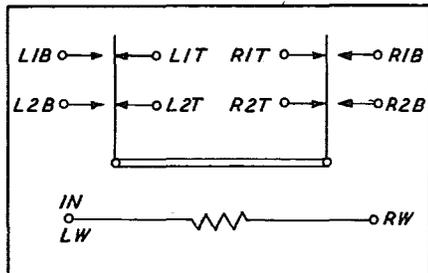


FIG.40-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED WITH THE RELAY MOUNTED IN A VERTICAL POSITION WITH THE ARMATURE LOWERMOST — KS-3067, KS-5013, KS-5381, KS-5483, KS-6319 AND KS-6724 RELAYS

KS-5350 and KS-5451 Relays

2.59 In certain cases the designations which are shown for these relays on the circuit are also stamped on the relays. Where this is not the case the following general numbering scheme applies, based on viewing the relay from the terminal side with the relay mounted vertically and the armature pivot below the center line of the coil.

2.60 The contacts in any vertical row of terminals number from the top down beginning with 1 in the right row of terminals, except that where the top terminal in this row has a letter designation, in accordance with 2.61, 2.62 and 2.63 the number 1 is applied to the terminal directly below it, if any. (See Fig. 41)

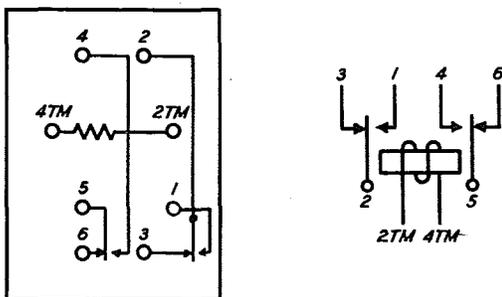


FIG. 41 - WINDING AND SPRING TERMINAL ARRANGEMENT (TERMINAL SIDE) - KS-5350 AND KS-5451 RELAYS HAVING FOUR HORIZONTAL ROWS OF TERMINALS

2.61 Where the relay has two horizontal rows of terminals the bottom row is designated by the letter B preceded by the same number as the nearest terminal above. (See Fig. 42)

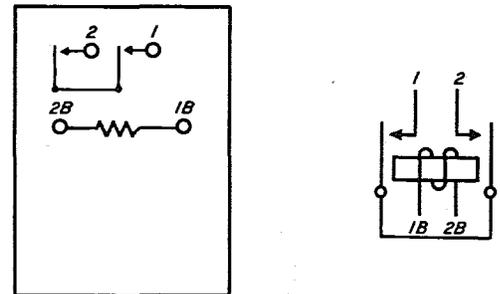


FIG. 42 - WINDING AND SPRING TERMINAL ARRANGEMENT (TERMINAL SIDE) - KS-5450 AND KS-5451 RELAYS HAVING TWO HORIZONTAL ROWS OF TERMINALS

2.62 Where the relay has either three or five horizontal rows of terminals the middle row of terminals is designated by the letter M preceded by the same number as the nearest terminal above. (See Figs. 43 and 44)

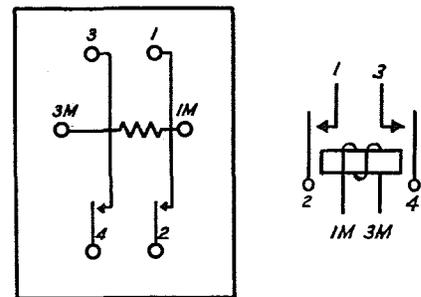


FIG. 43-WINDING AND SPRING TERMINAL ARRANGEMENT (TERMINAL SIDE) - KS-5350 AND KS-5451 RELAYS HAVING THREE HORIZONTAL ROWS OF TERMINALS

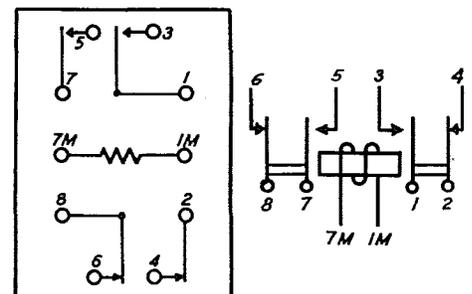


FIG. 44 - WINDING AND SPRING TERMINAL ARRANGEMENT (TERMINAL SIDE) - KS-5350 AND KS-5451 RELAYS HAVING FIVE HORIZONTAL ROWS OF TERMINALS

2.63 Where the relay has either four or six horizontal rows of terminals the upper middle row of terminals is designated by the letters TM preceded by the same number as the nearest terminal above. (See Figs. 41 and 45)

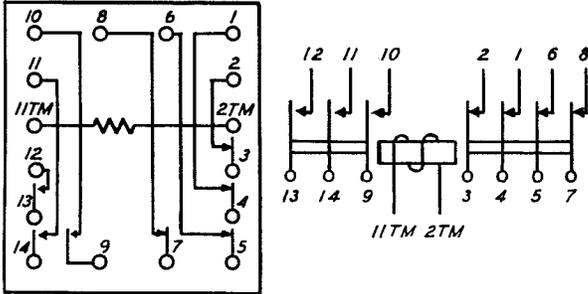


FIG. 45-WINDING AND SPRING TERMINAL ARRANGEMENT (TERMINAL SIDE)-KS-5350 AND KS-5451 RELAYS HAVING SIX HORIZONTAL ROWS OF TERMINALS

KS-6902, KS-6903 and KS-7252 Relays

2.64 The contacts of each unit of these relays are numbered from left to right starting at the top row and continuing through the bottom row of contacts as viewed from the front as shown in Fig. 46. The bus bar terminals are designated A1 and A2 numbered from left to right as viewed from the front of the relay. The winding terminals are designated as covered in 2.58.

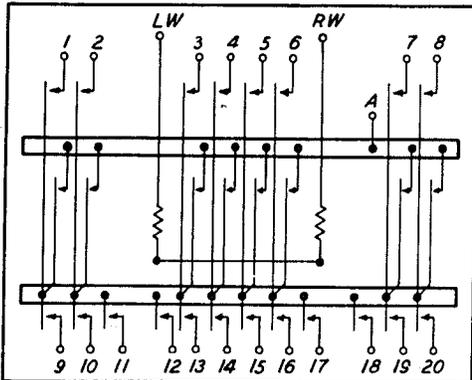


FIG. 46-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED WITH THE RELAY MOUNTED IN A VERTICAL POSITION WITH THE ARMATURE LOWERMOST - KS-6902, KS-6903 AND KS-7252 RELAYS

KS-7800 to KS-7850, Inclusive and KS-8280 Adams-Westlake Relays

2.65 The contact and wiring terminals for these relays are designated as shown in Fig. 47 as viewed from the rear or terminal side of the relays.

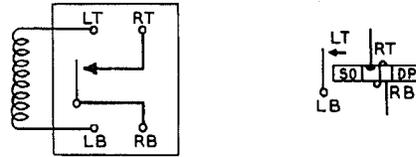


FIG. 47-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-KS-7800 TO KS-7850 AND KS-8280 ADAMS-WESTLAKE RELAYS

KS-7900, KS-7901, KS-8383 and KS-8388 Relays (Sensitrol)

2.66 The terminal numbering which appears on the circuit requirement table is marked on the relays.

KS-8171 and KS-8331 Adams-Westlake Relays

2.67 These Adams-Westlake relays have loose leads and no specific terminal numbering.

KS-13542 and KS-13543 Relays

2.68 The heater winding terminals are numbered 2 and 3, and the contact terminals are numbered 5 and 7. Terminals 1 and 4 are not connected. Looking at the bottom of the relay, the terminals are numbered consecutively clockwise starting at the key.

Dash Pot Relays

2.69 The springs are numbered as covered in 2.42. The winding terminals are designated as shown in Fig. 48 viewing the relay from the top with the springs on the right.

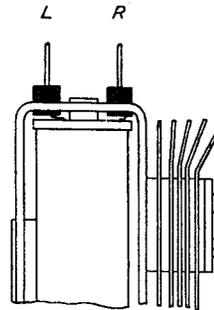


FIG. 48-WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE TOP - DASHPOT RELAYS

3. SWITCHES

197 and 198 Type Switches and Associated Parts

3.01 Contact Springs: The designations shown for the contact spring assemblies of 197 and 198 type switches are:

RON = Rotary Off Normal Springs  
 R. STP = Rotary Step Springs  
 ROT = Rotary Interrupter Springs  
 VERT = Vertical Interrupter Springs  
 VON = Vertical Off-Normal Springs  
 REL = Release Contact Springs  
 NPS = Normal Post Springs  
 L. NPS = Left Normal Post Springs  
 R. NPS = Right Normal Post Springs

Unless otherwise specified on the circuit requirement table, these contact springs number consecutively outward from the frame upon which the spring assembly is mounted, as viewed from the contact end of the spring, except as indicated in Notes 2 and 3. When springs in these assemblies are used as connecting points these springs are indicated by the designation of the spring assembly preceded by the spring number. For example: 3(VON) indicates the third spring in the vertical off-normal spring assembly; 2(11 R. STP) indicates the second spring in 11th rotary step spring assembly.

Note 1: The vertical off-normal springs were formerly designated ON and the 11th rotary step spring was formerly designated CAM SPG.

Note 2: On vertical interrupter springs of earlier switches having a vertical armature arm, the No. 1 spring is the upper spring and the No. 2 spring is the lower spring.

Note 3: Normal post springs number from the normal post outward and are designated 1R, 2R, etc. when mounted to the right of the normal post and 1L, 2L, etc., when mounted to the left of the normal post.

3.02 Switch Plugs and Jacks: The springs of switch jacks and plugs are numbered from the center outward as viewed from the rear of the switch with the even numbered springs on the left and the odd numbered springs on the right. Connection to the various springs are indicated by the abbreviations JK or PG preceded by the jack or plug spring number.

3.03 Wipers: When it is necessary to connect to one or more wipers of a switch, the wipers to which connections should be made are indicated by the symbol WPR followed by the particular designation of that wiper as shown on the associated circuit schematic drawing. The bank wipers referred to in the circuit requirement table appear on the schematic drawing in the same order in which they are located on the switch shaft. Fig. 49 shows the relative location of the wipers on a 200 point line finder and the designations given for them on the schematic drawing. On switches

having four bank wipers the wipers are designated as shown in Fig. 49 except that the added wiper at the bottom has the designation A1 and A.

Note: On some of the earlier circuits the symbol BRUSH or ER was used as a designation for the wipers in place of WPR.

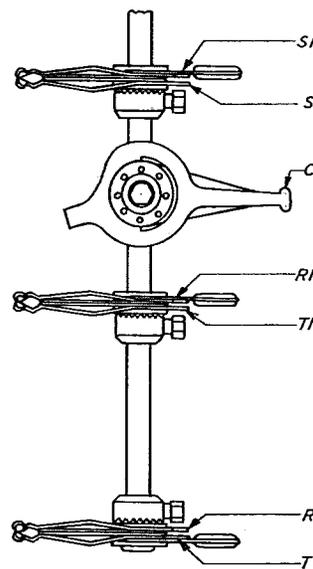


FIG. 49 - BANK WIPER TERMINAL DESIGNATIONS - 197 AND 198 TYPE SWITCHES

3.04 Test Jacks: The springs on test jacks are numbered consecutively from top to bottom. For example:

TST JK 2 and TST JK 3 should be interpreted as the second and third springs of the test jack, counting from the top down.

#### 202, 211 and 212 Type Switches

3.05 The contact terminals of these switches are numbered consecutively from one up from right to left as viewed from the terminal end of the switch as shown in Fig. 50. Where the word "top" or "upper" is associated with a spring combination on the schematic or if the suffix "T" is used in connection with a terminal number this refers to springs in the upper row of terminals. Likewise the term "lower" or "bottom" or the suffix B refers to terminals in the lower row.

Note: Prior to February 1, 1942, various numbering schemes were used for the terminals of these switches. In some cases the individual contact groups were numbered from one up, the odd groups being at the top of the switch and

the even groups being at the bottom of the switch, the groups being numbered from right to left as viewed from the rear. In other cases the various contact groups were lettered from right to left as viewed from the rear, contact group A being the bottom at the right, contact group B being the top at the right, contact group C being the second one from the right at the bottom, D the second one from the right at the top, etc. In some of these cases the individual groups were numbered from 3 to 1, respectively, from right to left as viewed from the terminal side of the switch.

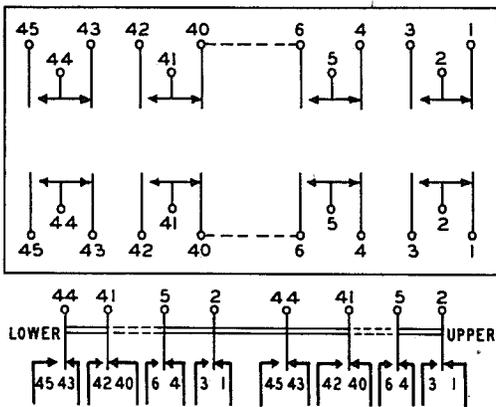


FIG. 50 - SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 202, 211 AND 212 TYPE SWITCHES

Nos. 216A and 217A Switches

3.06 The contact springs are numbered consecutively in vertical rows of 10 pairs of springs starting at the bottom with pair 0 in the row nearest the armature as shown in Fig. 51, and continuing with each vertical row of springs from right to left facing the contact side of the switch. On the schematic drawing the contact springs are not necessarily shown in numerical order.

300, 301, 302, 303, 304, 305, 306, 307, 308, 314, 315, 318, 324, 325 and 328 Type Switches (Crossbar Types)

3.07 Vertical Units: The individual vertical units are numbered as follows:

- (a) 300, 304, 314 and 324 Type Switches (Crossbar Type Switches Having Ten or Less Vertical Units): The vertical units are numbered from 0 to 9 starting at the left hand side of the switch as viewed from the contact side.

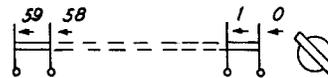
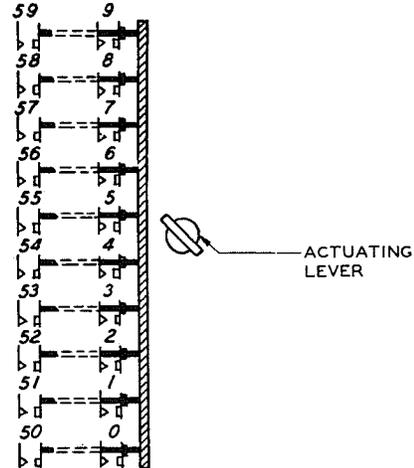


FIG. 51 - CONTACT SPRING ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE) - NOS. 216A AND 217A SWITCHES.

- (b) 301, 303, 305, 307, 308, 315, 318, 325 and 328 Type Switches (Crossbar Type

Switches Having More Than Ten and Maximum of Twenty Vertical Units): These switches are considered as being composed of two separate switch units, a left switch unit and a right switch unit. The first ten units starting at the left hand side of the switch facing the contact side are numbered from 0 to 9 and are so designated. On subscriber sender links, district links, office links and incoming link switches the number is followed by the letter L; for example, 3L, which indicates the fourth vertical unit from the left facing the contact side of the switch. The second ten vertical units starting with the 11th unit from the left are also numbered from 0 to 9 and are so designated and on the above mentioned links the number is followed by the letter R; for example, 5R, which indicates the 16th vertical unit from the left facing the contact side of the switch. On switches used in other circuits the numbering is varied.

Note: On certain switches having 20 vertical units (for example the terminating sender test connector of No. 1 crossbar) when more than 6 crosspoints must be operated at one time, the hold magnets are operated in pairs. The magnets operated in pairs are designated H0, H0A; H1, H1A; --- H8, H8A; H9, H9A starting at the left as viewed from the contact side of the switch. Pairs

0-4 correspond to the left half of the switch and pairs 5-9 correspond to the right half of the switches.

(c) 302 and 306 Type Switches (Cross-bar Type Switches Having 19 Vertical Units): The vertical units of these switches are numbered the same as 301 and similar type switches as outlined in (b) except that the 9 units on the right side of the switch (11th to 19 verticals from the left) are numbered 0 to 8. The letters L and R are not used.

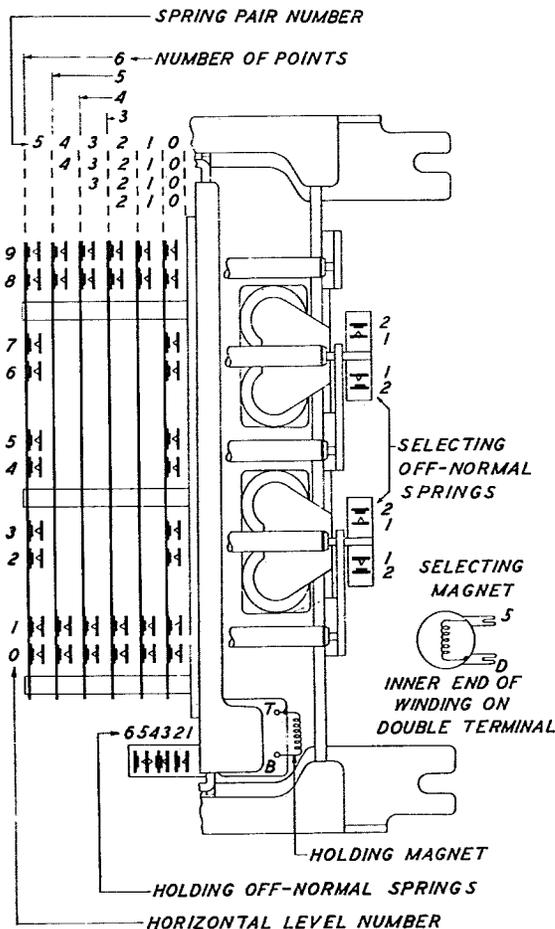


FIG. 52- PARTIAL VIEW OF WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)-300 AND SIMILAR TYPE SWITCH CROSSPOINTS, HOLDING AND SELECTING MAGNETS AND ASSOCIATED OFF-NORMAL SPRINGS

**3.08 Holding Magnet and Holding Off-Normal Springs:** The holding off-normal springs are designated by a numeral followed by a reference to the particular vertical unit with which the springs are associated; for example, 4 (HLD2), which indicates the fourth off-normal spring of

vertical unit 2. The first numeral indicates the position of the spring in the assembly, the springs being numbered from right to left starting with 1 facing the contact side of the switch. Balancing springs, (springs not equipped with soldering terminals or contacts), are not numbered. The balancing spring is the first spring in the pileup and the spring immediately to its left as viewed from the contact side of the switch is numbered 1. The holding magnets are numbered the same as the vertical units as described in 3.07. The winding terminals are designated with a letter T (top) or B (bottom) as shown in Fig. 52 followed by the reference to the particular magnet involved; for example, T(HLD4), which indicates the top winding terminal of holding magnet 4.

**Exception:** On 324, 325 and 328 type switches certain molded holding off-normal springs have two rows of terminals. These are designated 1T, 2T, 1B and 2B, those in the top row being designated T and those in the bottom row being designated B. The springs number from 1 facing the contact side of the switch. The hold magnet terminals of these switches are designated L (left) and R (right) as viewed from the front of the switch.

**Note:** A soldering terminal without a spring is included in some holding off-normal spring assemblies. This terminal, designated "C" on the circuit drawing, is ignored in the numbering of the holding off-normal springs. Viewed from the rear, the C terminal is located to the left of the No. 1 spring on assemblies held by a nut and to the right of the No. 6 spring on assemblies held by a screw.

**3.09 Selecting Magnets:** The selecting magnets are numbered from 0 to 9 in accordance with the levels which they serve, starting with 0 for the magnets serving the bottom level. The selecting magnets for levels 0, 1, 4, 5, 8 and 9 are located at the left facing the contact side of the switch and the selecting magnets for levels 2, 3, 6 and 7 are located at the right. The winding terminals are designated with two letters RB, RT, LB and LT as indicated in Fig. 53, followed by a reference to the particular selecting magnet involved; for example, LB (SEL3), which indicates the left bottom terminal of magnet 3. Magnet 3 is the first magnet from the bottom of the switch at the right side facing the contact side of the switch. The inner end is RB on the side of the switch having six magnets and is LT on the side of the switch having four magnets. The L and R mean left and right of the individual select magnets as viewed from the

contact side of the switch and do not refer to the side of the switch on which those select magnets are located.

Note 1: Prior to June 1, 1941 the select magnets had both single and double terminals. In this case the single terminal was designated S and the double terminal was designated D; the double terminal being a bifurcated soldering terminal. When the select magnet was located at the left side of the switch facing the contact side, the single winding terminal was located at the top and the bifurcated terminal was located at the bottom. When the select magnet was mounted at the right side of the switch facing the contact side the bifurcated terminal was located at the top and the single terminal was located at the bottom. The inner end of the winding was always connected to the double terminal.

Note 2: Where other numbering schemes are used for the select magnets the numbering is stenciled on the parts.



FIG. 53 - WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE FRONT (CONTACT SIDE)-300 AND SIMILAR TYPE SWITCH SELECT MAGNETS

### 3.10 Selecting Off-Normal Contact Springs:

The selecting off-normal contact springs are designated by a numeral followed by a reference to the particular selecting magnet with which the springs are associated, as for example, 2 (SEL3), which indicates the second spring of selecting unit 3. The numeral indicates the position of the contact spring in the assembly; springs being numbered up and down from the centering spring stop starting with 1 for the contact spring nearest the centering spring stop. Springs not equipped with soldering terminals or contacts are not numbered.

### 3.11 Crosspoints and Crosspoint Contacts:

The crosspoints are referred to in accordance with the particular vertical unit and horizontal level, and the location of the contact in its assembly. The individual pairs of contacts at a crosspoint are numbered from right to left beginning with 0 for the contacts nearest the holding armature, as shown in Fig. 52. For example, 3L4-5 would indicate the sixth

pair of contacts from the armature in the fourth vertical unit from the left and the fifth level from the bottom.

Note: In the 0 horizontal level of the D-159187 switch only crosspoint contacts 3, 4 and 5 are provided; while in horizontal level 1 only contacts 0, 1 and 2 are provided.

## A.E.Co. 25 Point Rotary Switches

3.12 See 4.15.

### Sequence Switches

3.13 The four springs of a sequence switch cam are known as left outer, left inner, right outer and right inner according to their position as viewed from the front (spring side). The left side of the cam is that side nearer the drive magnet and the springs on that side of the cam are the left springs. The two springs nearest the cam spindle are the inner springs. The springs, except those on the A cam, are numbered from the cam side as follows:

- 1 = Left Inner
- 2 = Left Outer
- 3 = Right Outer
- 4 = Right Inner

Note: On the A cam the right inner spring is numbered 1 and the right outer spring is numbered 2. There are no springs on the left side of this cam.

3.14 The information for connection to sequence switch springs contains the spring number and the cam's letter designation. For example, SS2-Q indicates sequence switch spring 2 (left outer) of cam Q. SS4-L indicates sequence switch spring 4 (right inner) of cam L. Where more than one sequence switch is employed in a circuit, the cam designations include the sequence switch number. For example, Q-2 indicates cam Q of number 2 sequence switch. The numbering of sequence switch springs in this case is SS2-Q-2, SS4-Q-2, etc. See Figs. 54 and 55 for the method of numbering.

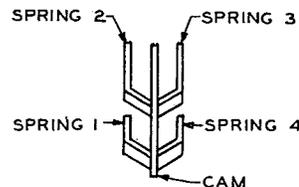


FIG. 54 - SEQUENCE SWITCH SPRING NUMBERING AS VIEWED FROM THE FRONT (SPRING SIDE) OF THE SWITCH

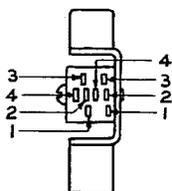


FIG. 55 - SEQUENCE SWITCH SPRING TERMINAL NUMBERING AS VIEWED FROM THE REAR (TERMINAL SIDE) OF THE SWITCH

3.15 KS-5264 Transfer Switches: With the switch mounted vertically with the pivot below the center of the coil, when viewed from the terminal side of the switch, the contacts in any row of terminals number from the top down beginning with 1 in the right row of terminals and progressing to the rows toward the left. The three winding terminals number from right to left as shown in Fig. 56.

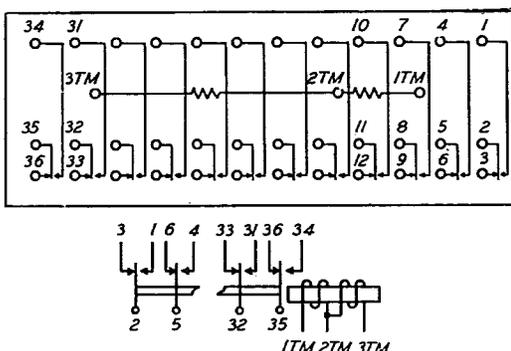


FIG. 56 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM REAR (TERMINAL SIDE) - KS-5264 TRANSFER SWITCH

4. OTHER APPARATUS

4.01 Panel Commutator Terminals: The method of designating commutator terminals is shown on the circuit drawing and in Section A449.002.

Conductors

4.02 Terminating Trunk Conductors are indicated by the abbreviation TRK, followed by the conductor designations T for Tip, R for Ring and S for Sleeve. For example:

- TRK.-T - Tip Conductor of Trunk
- TRK.-R - Ring Conductor of Trunk
- TRK.-S - Sleeve Conductor of Trunk

4.03 Through Trunk Conductors Including District, Office, Incoming and Final Selectors, Etc., are indicated by either

the abbreviation INC. or OG. followed by the conductor designations T, R and S. For example:

- INC.-T - Tip Conductor of Incoming Trunk
- OG.-R - Ring Conductor of Outgoing Trunk
- INC.-S - Sleeve Conductor of Incoming Trunk

Should the circuit be provided with a test jack where the tip, ring or sleeve is readily accessible, the notations TST, JK.T, TST, JK.R, or TST, JK. S will be used likewise if the tip, ring, or sleeve of the trunk is accessible at some convenient point, such as a sequence switch spring or relay contact spring the notation indicates that point.

4.04 Line Circuit Conductors are indicated by the abbreviation LN, followed by either T or R. For example:

- LN.-T - Tip Conductor of Line
- LN.-R - Ring Conductor of Line

4.05 Cord Conductors are indicated by the abbreviation CD, followed by either T, R, or S. For example:

- CD.-T - Tip Conductor of Cord
- CD.-R - Ring Conductor of Cord
- CD.-S - Sleeve Conductor of Cord
- A-CD.-T - Tip Conductor of Answering Cord
- C-CD.-R - Ring Conductor of Calling Cord

4.06 Jack Conductors are indicated by the abbreviation JK., followed by T, R, or S. For example:

- JK.-T - Tip Conductor of Jack
- JK.-R - Ring Conductor of Jack
- JK.-S - Sleeve Conductor of Jack
- A-JK.-T - Tip Conductor of Answering Jack
- M-JK.-R - Ring Conductor of Multiple Jack

Drops

4.07 The contact and winding terminals of drops are designated as shown in Figs. 57-59, inclusive.

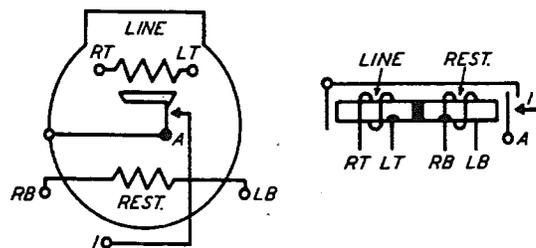


FIG. 57 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 22 TYPE DROP

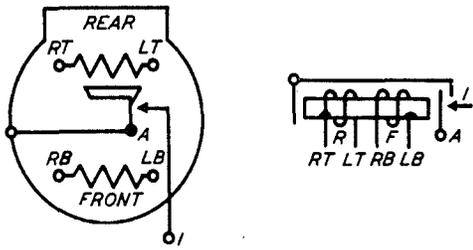


FIG. 58 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 35 TYPE DROP

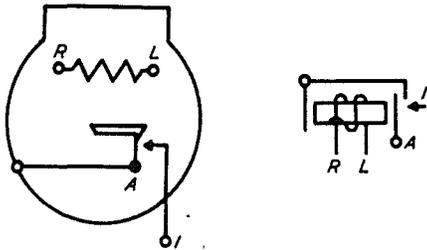


FIG. 59 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 56 TYPE DROP

Clutch and Trip Magnets

4.08 The connecting points for clutches and trip magnets are covered in the individual A400 sections covering this apparatus.

Interrupters

4.09 149, 152, 160, 161, 164, 165, 166 and 167 Type Interrupters (Reciprocating Bar Type): Contacts closed when the interrupter is normal (cam roller resting on that portion of the cam cutting nearest the center of the cam) are back contacts and the back contact spring is designated B. Contacts closed when the interrupter is operated (cam roller resting on that portion of the cam cutting farthest from the center of the cam) are front contacts and the front

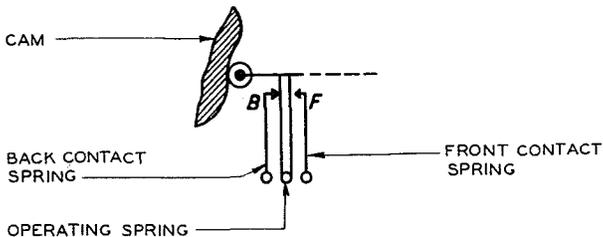


FIG. 60 - CONTACT NUMBERING ON 149, 152, 160, 161, 164, 165, 166, AND 167 (RECIPROCATING BAR) TYPE INTERRUPTERS.

contact spring is designated F. The operating spring is not designated. On switch-hook spring combinations, two front contact springs are provided and these springs are designated F1 and F2; the F2 spring being farther from the operating spring.

4.10 173 Type Interrupters: The terminal designations for the interrupter are stamped on the interrupter.

176, 177, 178, 179, 181, 182, 183 and 184 Type Networks

4.11 The terminals of these networks are lettered as indicated in Fig. 61, as viewed from the terminal end of the network. The C terminal is designated on the apparatus in cases where there are three terminals. The A terminal is located adjacent to the network code marking. The 184 type networks have no terminals and are wired directly to the apparatus.

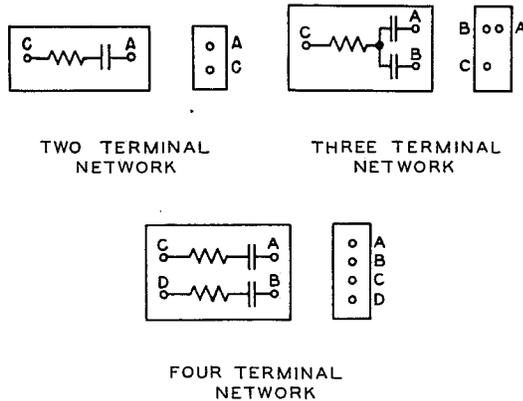


FIG. 61 - TERMINAL ARRANGEMENT OF 176, 177, 178, 179, 181, 182, AND 183 TYPE NETWORKS AS VIEWED FROM TERMINAL SIDE

Registers

4.12 5, 12 and 14 Type Message Registers: Connections to the frame of these registers are indicated by "Frame". Other terminals are designated as shown in Fig. 62.

4.13 KS-3106 and KS-3107 Pen Registers: The winding terminals of the KS-3106 single pen register are lettered I for inner and O for outer. The double pen registers per KS-3107 are numbered and lettered as shown in Fig. 63. The B binding posts are associated with the coils which control the bottom tape marking and the T binding posts are associated with the coils which control the top tape marking as shown in Fig. 63. The I represents the binding posts nearest the mechanism and the O represents the binding posts furthest from the mechanism.

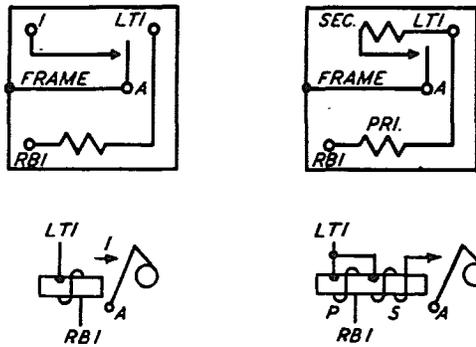


FIG. 62-WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)- 5, 12 AND 14 TYPE MESSAGE REGISTERS

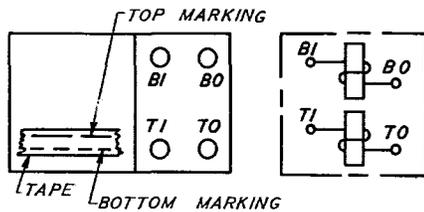


FIG. 63 - WINDING TERMINAL ARRANGEMENT OF KS-3106 (SINGLE PEN) AND KS-3107 (DOUBLE PEN) FOOTE-PIERSON PEN REGISTERS

40 Type Resistances

4.14 The winding terminals are numbered from right to left facing the terminal side of the resistance as shown in Fig. 64. The terminal numbers are followed by the suffix T (top) or B (bottom) to indicate that the terminal is in the top or bottom row of terminals.

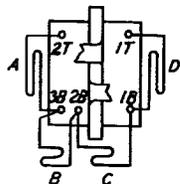


FIG. 64 - TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) 40 TYPE RESISTANCES

Selectors

4.15 200, 206, 209 and 211 Type Selectors and A.E. Company 25 Point Rotary Switches: Facing the front of the

apparatus the interrupter contact springs are numbered consecutively starting at the interrupter spring mounting bracket and numbering toward the front of the switch. The winding connecting points are covered in the individual A400 sections covering this apparatus.

4.16 204 Type Selectors: The contact terminals are numbered consecutively from the mounting bracket outward. The winding terminals are designated as shown in Fig. 65.

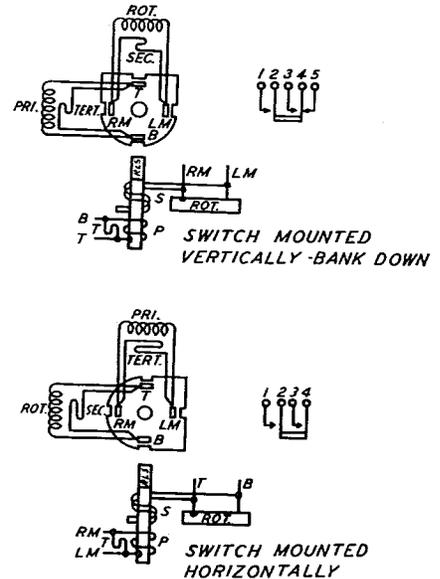


FIG. 65 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-204 TYPE SELECTORS

Signals

4.17 The contact and winding terminals of signals are shown as indicated in Figs. 66, 67 and 68.

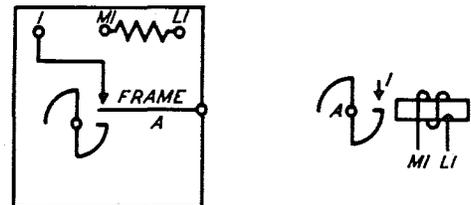


FIG. 66 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE)-34 TYPE SIGNAL

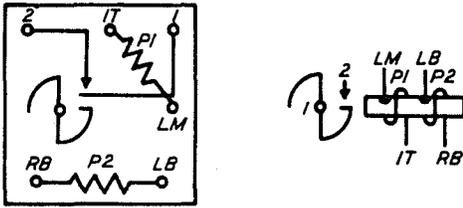


FIG. 67 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 41 TYPE SIGNAL

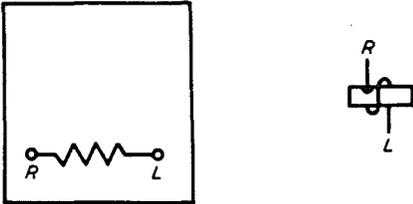


FIG. 68 - WINDING TERMINAL ARRANGEMENT AS VIEWED FROM THE REAR (TERMINAL SIDE) - 42 TYPE SIGNALS

1 and 2 Type Timers

4.18 The contact springs are numbered consecutively from left to right facing the contact side of the timer and from right to left facing the terminal side. Balancing springs (springs not equipped with contacts) are not numbered.

4.19 Winding terminals are designated with a letter and numeral. Where

the letter follows the numeral, the numeral is the same as that of the contact terminal at the immediate right, facing the terminal side, and indicates the position of the winding terminal with respect to the contact terminal. Where the numeral follows the letter, it is always 1 and indicates that the winding terminal is at the extreme right end position in the row of terminals when facing the terminal side of the timer.

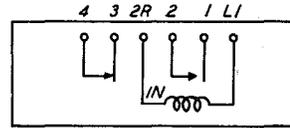


FIG. 69 - WINDING AND SPRING TERMINAL ARRANGEMENT AS VIEWED FROM REAR (TERMINAL SIDE) - 1 AND 2 TYPE TIMERS

3A Timers

4.20 Facing the front of the timer the cams are lettered in alphabetical order from left to right starting with A. The designations of the winding and contact spring terminals are stamped on the front of the terminal plate. The bottom row of terminals is numbered 1 to 5 starting at the right, the middle row are numbered from 6 to 10 starting at the right and the top row are numbered from 11 to 15. Facing the rear of the timer, the terminals are similarly numbered from left to right. The terminals of the No. 18A connecting block are numbered to correspond with the numbering of the timer terminals as viewed from the rear. The terminal numbers are stamped on the top and bottom of the connecting block. The timer and connecting block terminal numbering is shown on the circuit drawing.