

MOUNTING AND ALIGNING APPARATUS

"RES" (RESISTORS)

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1. GENERAL

1.1 Scope of Section

1.11 This section covers the requirements and methods for mounting and aligning apparatus classified alphabetically under "RES".

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

1.2 General Information Pertaining to Arrangement of Tools, Precautions, Verification, Specifications, Drawings and Figures, and Associated Information

1.21 Refer to Section 52 for information pertaining to the above subjects.

2. INSTALLING EQUIPMENT

2.1 Tools

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

2.12 Additional Tools

48	Wrench, Soc., Hex., 7/32"-
	1/4" with Screwdriver
R-2443	Screwdriver, Cabinet, 3"

3. RESISTORS

3.1 18 and 19 Type - Mount single stud and double stud 18 and 19 type resistors as shown in Figure 1, 2 and 3.

NOTE: When using the new molded 18 and 19 type resistors, in place of the metal frame type, it is permissible to omit the 102A insulators and ED-90283-70 Resistance Shields.

3.11 Single Stud 18 and 19 Type

3.111 Single Stud 18 and 19 type resistors have a molded insulated base which is in contact with the mounting plate, thus eliminating the need for insulator bushings previously required in the mounting plate holes. The double stud resistors are interchangeable with the single stud so that either type resistor may be furnished for mounting on plates with or without bushings.

3.112 If the mounting plate has insulator bushings, they should be removed from the holes in the position where the resistor is to be mounted. A simple way to accomplish this is to place the terminals and stud into the mounting holes. By tightening the nut on the stud, the plastic beads at the base of the terminals dislodge the insulators and they can be readily picked off the terminals by hand or with a pair of pliers.

3.113 If a single stud resistor is to be mounted vertically, it should be positioned on the mounting plate with the code and resistance markings at the left as viewed from the apparatus side of the mounting plate. If the resistor is to be mounted horizontally, the markings should be at the top.

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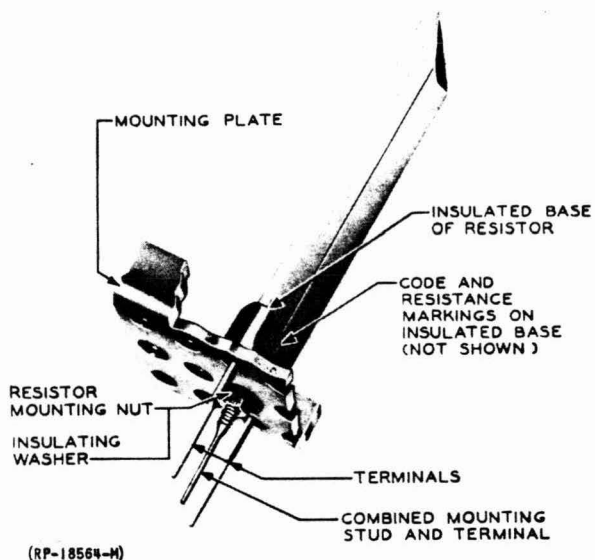


FIG. 1 MOUNTING OF 18 AND 19 TYPE SINGLE STUD RESISTORS (PAR. 3.1)
(BSP 032-140-811 FIG. 1)

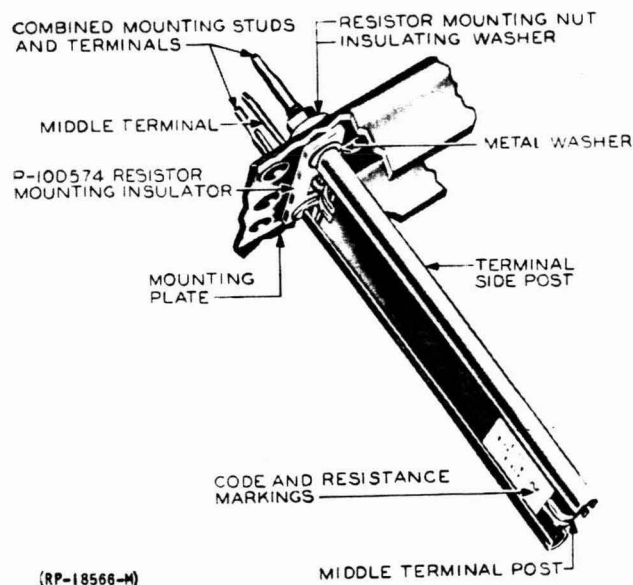


FIG. 3 MOUNTING OF 18 AND 19 TYPE DOUBLE STUD RESISTORS ON MOUNTING PLATE NOT EQUIPPED WITH INSULATOR BUSHINGS (PARS. 3.1, 3.121)
(BSP 032-140-811 FIG. 3)

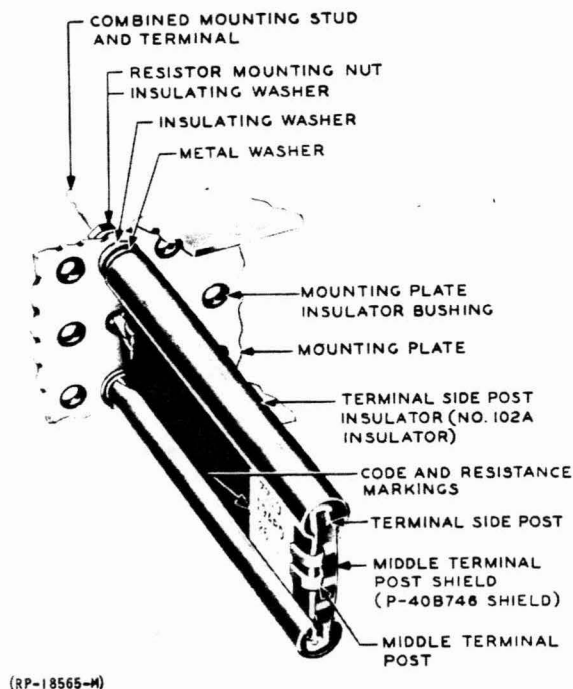


FIG. 2 MOUNTING OF 18 AND 19 TYPE DOUBLE STUD RESISTORS ON MOUNTING PLATE EQUIPPED WITH INSULATING BUSHINGS (PAR. 3.1)
(BSP 032-140-811 FIG. 2)

3.114 Where single stud resistors are required to be mounted on existing mounting plates having only two holes, drill the center hole in accordance with the methods outlined in the section of this handbook covering "Drilling Mounting Plates".

3.115 When mounting these resistors securely tighten the nut by hand, using the wrench portion of the No. 48 Combination Wrench and Screwdriver. If not already available on the installation in Tool Kits 53, 171, and 505, arrangements should be made to obtain a 48 tool.

3.12 Double Stud 18 and 19 Type

3.121 If double stud 18 and 19 type resistors are supplied for a mounting plate not equipped with insulator bushings, it is necessary to use the P-10D574 resistor mounting insulator as shown in Figure 3.

3.122 When mounting these resistors, securely tighten the nut using the wrench portion of the No. 48 Combination Wrench and Screwdriver as outlined in Paragraph 3.115.

(a) When a resistor is to be mounted on mounting plate less than $7/32$ " thick, use $1/16$ " thick fiber washers, P-216278, and discard the $1/32$ " thick fiber washers, P-45A380, if they were furnished. If mounting plate is $7/32$ " thick or more, use $1/32$ " thick fiber washers, P-45A380, and discard the $1/16$ " fiber washers. Requisition four P-45A380, $1/32$ " thick fiber washers for each resistor to be mounted on plates $7/32$ " or more thick, if the $1/32$ " washers were not furnished.

3.123 When 19 type resistors are mounted on mounting plates and there is a difference in the resistance of the halves, the half having the lower resistance shall be mounted on top when mounted vertically and on the right when mounted horizontally, looking at the resistor side of the mounting plate.

3.124 Align so that no part of the resistor extends above or below the plane of the mounting plate edges as gauged by eye.

3.2 Mount 38 type resistors which are mounted at right angles to mounting plate or panel so that the code marking reads away from plate or frame.

3.3 Mount 40 type resistors so that the top winding terminals, as indicated on the circuit, are at the top of the mounted resistor. In general, this will be accomplished by mounting the resistor with the heads of the terminal assembly screws on right side of resistor as viewed from the apparatus side of the plate.

3.4 When mounting 44-type vitreous enamel resistors the "L" head of the mounting stud should come in contact with the shoulder on the end of the resistor as shown in Figure 4. This prevents

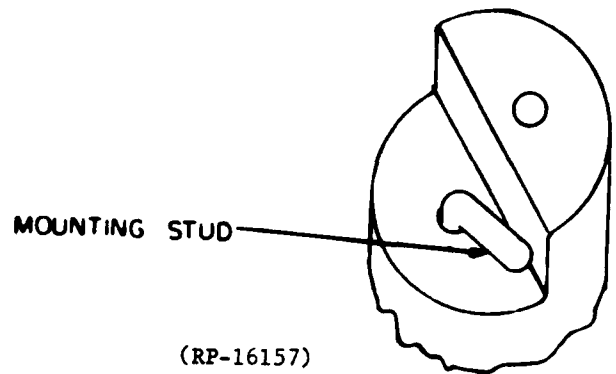


FIG. 4 MOUNTING OF 44-TYPE RESISTORS
(PAR. 3.4)
(BSP 800-610-154 FIG. 20)

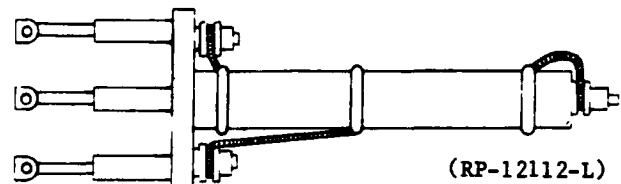


FIG. 5 METHOD FOR MOUNTING 60 TYPE RESISTORS
SIDE VIEW (PAR. 3.6)

turning of the bolt and decreases the probability of damage to the resistors when the mounting nut is tightened.

3.5 Mount 59 type resistors with resistor stud below or to the right of the terminal stud, when facing apparatus side, unless otherwise shown on equipment drawing.

3.6 Mount 60 type resistor as shown in Figure 5.

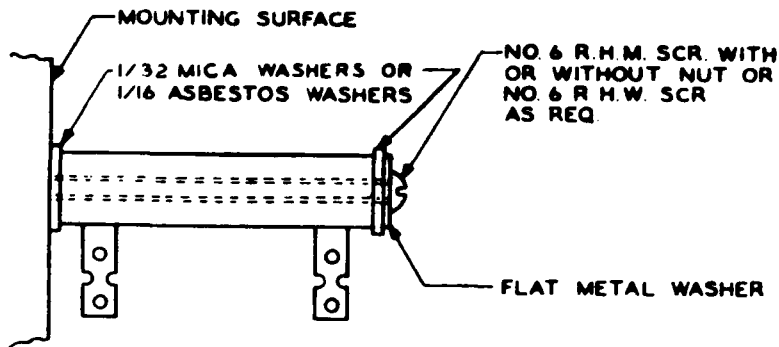
3.61 Locate the common lead (lead connecting to middle of resistor) at bottom of resistor unless otherwise indicated on the equipment drawing.

3.7 Tubular-type vitreous-enamel resistors, such as the 82, 85, 100, 119, KS-8512 and similar types should be mounted as shown in Figure 6. Some considerations in connection with the mounting of these resistors are:

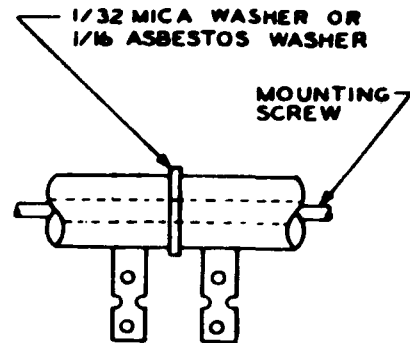
3.71 Use round head machine screws or wood screws, depending on type of surface on which the resistors are mounted.

- 3.72 Use a mica or an asbestos washer at the panel end of the resistor to cushion resistor against breakage and protect mounting surface from damage due to heat from the resistor.
- 3.73 Use a mica or an asbestos washer at outer end of resistor, (unless centering washers are used) to protect enamel from cracking when mounting screw is tightened.
- 3.74 Use a mica or an asbestos washer between resistors where two or more resistors are mounted by a common mounting screw.
- 3.75 Use centering washers at both ends of resistor when the hole in the resistor is appreciably larger in diameter than the mounting screw.

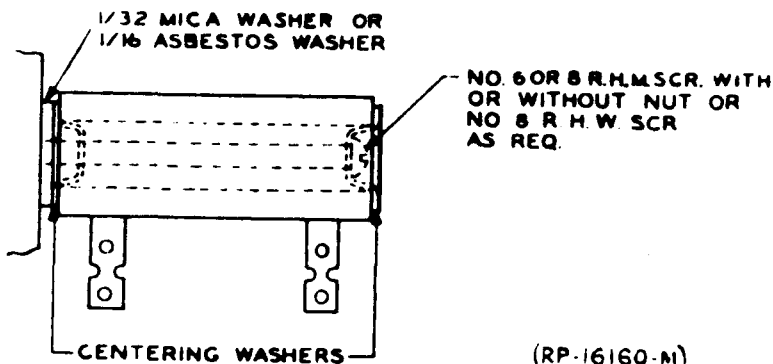
- 3.76 Where there are two or more windings of unequal resistance value, or more than one resistance per mounting, the arrangement of the resistances, or windings, (inner or outer location on the mounting screw) should be specified on the equipment drawing.
- 3.77 Resistors should be turned so that the terminals are in the most convenient location for wiring.
- 3.8 For information on the P-33A685 Resistor Mounting for KS-13491 and 145 type resistors refer to ED-92682-01.
- 3.9 The 18 type resistor manufactured by Northern Electric is basically similar to the Western Electric type but is mounted with an 8-32 nut instead



MOUNTING 100 OR KS-8512 TYPE RESISTORS

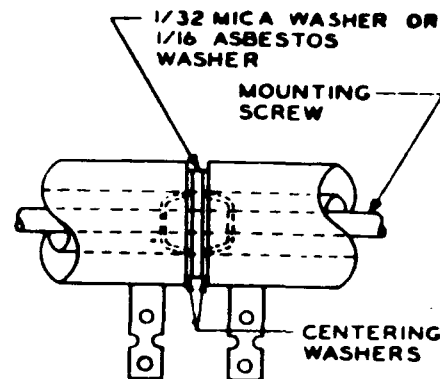


JUNCTION OF TWO 100 OR KS-8512 TYPE RESISTORS ON COMMON MOUNTING SCREW



MOUNTING 82, 85 OR 119 TYPE RESISTORS

(RP-16160-M)



JUNCTION OF TWO 82, 85 OR 119 TYPE RESISTORS ON COMMON MOUNTING SCREW

FIG. 6 MOUNTING OF TUBULAR-TYPE VITREOUS-ENAMEL RESISTORS
(PAR. 3.7) (BSP 800-610-154 FIG. 21)

of a 6-32 nut. Although there is a difference in thread specifications, the outside dimensions of the nut are identical, permitting the use of the same resistor wrench for installing operations.

- 3.91 The resistor shaft or stud is hollow and can be distorted or broken if excessive force is used. When tightening the mounting nut, a maximum torque not exceeding 10 in. lbs. shall be applied to the nut.

- 3.911 It should be noted that the only deviation in resistor design between Northern Electric and Western Electric, pertains to the mounting stud, washer and nut. Color difference of the metal used is a convenient method of identification of the two type resistors. Northern Electric employs brass stud and nut while Western Electric used cupro-nickel stud and nickel plated nut.

→ Indicates new or changed information.

[Vertical lines at side of paragraphs indicate requirements.

Engineering Planning Manager
(Installation)

Reason for Reissue:
Update BSP issue.