

287- AND 288-TYPE RELAYS

REPLACEMENT OF 245-, 254-, 263-, AND 264-TYPE RELAYS

REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers information required when a 287-type relay is used to replace a 245 or 263 type, and a 288-type relay is used to replace a 254 or 264 type in existing equipment. This information is provided because mounting information and the electrical requirements for the 287- and 288-type relays may not be available. This section should be used in conjunction with Section 040-272-701.

1.02 This section is reissued to revise the relay mounting information and Fig. 1, to add information for splicing multiple strap wires to 287-type relays, to omit information covering length of sleeving on skimmers, and to add Fig. 3.

1.03 The 263- and 264-type relays replaced the 245 and 254 types, respectively. Therefore, references in this section to 263- and 264-type relays also apply to 245 and 254 types.

1.04 Part 2 of this section covers individual codes of 287- and 288-type relays with reference to the corresponding 263- and 264-type relays which they replace.

1.05 Part 4 of this section covers information required to mount 287- and 288-type relays in place of 263- and 264-type relays.

1.06 Part 5 of this section covers the information required for wiring and testing 287- and 288-type relays used as replacements for 263 and 264 types.

1.07 Cartons containing 287- and 288-type relays are stamped with the following information. "If this relay is used to replace a 245-, 254-, 263-, or 264-type relay, see BSP 040-273-711.

1.08 All 287- and 288-type relays have 60 make contacts. These relays are used to replace all codes of 263- and 264-type relays which include those having 30, 40, and 50 make contacts as well as 60 make contacts.

1.09 When unsoldering individual leads to 263- or 264-type relays to be replaced, tag them to facilitate their connection to the proper terminals of the 287- or 288-type relay. While the terminals of the 287- or 288-type relay are numbered the same as those of the 263 or 264 type, the arrangement of certain terminals is different as covered in Part 5.

1.10 If solder splash guards were used with the horizontal strapping of a 263-type relay to be replaced by a 287 type, these guards cannot be used at the 287-type relay because of interference with the terminals.

1.11 Where multiduct sleeving has been used on the strap wires, it may be necessary to trim the sleeving when a 287-type relay is to be installed.

2. REPLACEMENT BY CODES OF 263- AND 264-TYPE RELAYS BY 287 AND 288 TYPES

2.01 The following table lists the individual codes of 287- and 288-type relays together with the codes of the corresponding 263- and 264-type relays which they replace.

CODE	NO. OF MAKE CONTACTS	CODE	NO. OF MAKE CONTACTS
287A	60	263A	60
		263B	40
		263C	30
		263D	50
		263F	60
		263G	60
		263J	50
287B	60	263E	60
		263H	60
288A	60	264A	50
		264B	60

3. LIST OF TOOLS AND MATERIALS

CODE OR SPEC NO.	DESCRIPTION
TOOL R-1760	Frame and Armature Adjuster
MATERIAL KS-7851	Varnish-impregnated Sleeving

4. MOUNTING

4.01 Initially, 287- and 288-type relays were mounted with washers and round head screws. Later the washers were eliminated and binding head screws adopted in place of round head screws. The binding head screws are furnished with the relays.

4.02 In mounting a 287-type relay, carefully guide the terminals between the levels of horizontal strapping taking care to keep the terminals clear of the strapping.

4.03 When a 287- or 288-type relay is to be mounted in place of a 263 or 264 type, the clearance between the winding terminal test lugs of the 287- or 288-type relay and the adjacent relay at the right should be minimum 1/32 inch. The clearance between the cover of the 287- or 288-type relay and the relay at the left should be sufficient to permit removal of the cover. This clearance should also be sufficient to prevent the cover of the 287- or 288-type relay from interfering with the operation of the armature of the relay at the left. The brackets of 287- and 288-type relays have elongated mounting holes for positioning the relay with respect to adjacent relays. If the minimum clearances cannot be obtained by positioning the new relay, it will be necessary to bend the mounting lugs of one or both adjacent 263- or 264-type relays. To do this, apply the R-1760 frame and armature adjuster to the mounting lug of the adjacent relay as shown in Fig. 1. Adjust the top and bottom mounting lugs as required. Check the clearances between other relays which may have been affected and make additional adjustments as required.

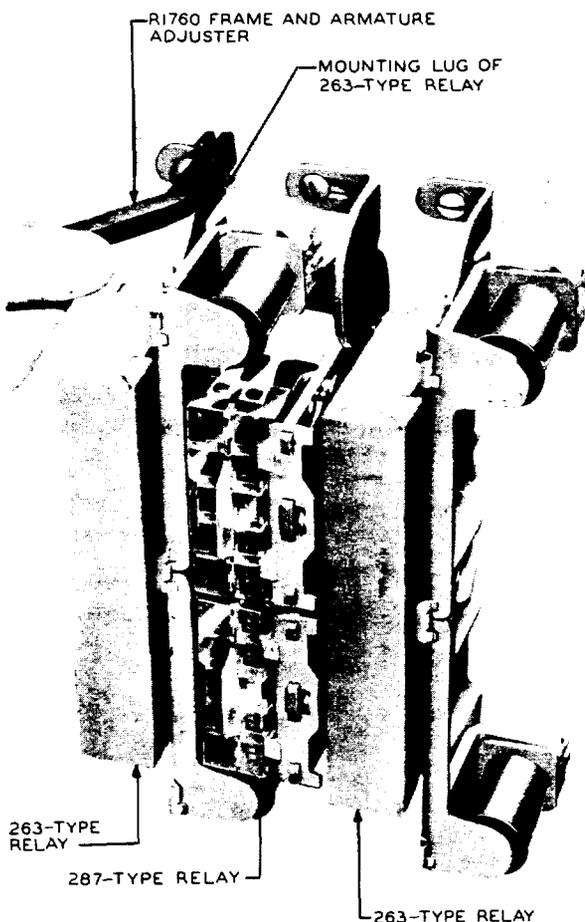


Fig. 1 - Method of Adjusting Mounting Lug

5. WIRING AND TESTING

5.01 Connections removed from a 263- or 264-type relay should be transferred to the replacing 287- or 288-type relay as described in the following paragraphs. Fig. 2 shows the terminal arrangement of 287- and 288-type relays compared to the arrangement of terminals on 263 and 264 types. Referring to Fig. 2 and the associated notes, the movable contact springs of 263-type relays are arranged for horizontal strapping while on 287-type relays fixed contact springs are arranged for horizontal strapping.

5.02 The terminals on 287-type relays which are arranged for horizontal strapping are on approximately the same centers as the corresponding terminals on 263-type relays. However, since there is a slight misalignment between strapping notches on corresponding terminals of the two relays, care should be taken to insure that the wire is seated in the notch while making the soldered connection.

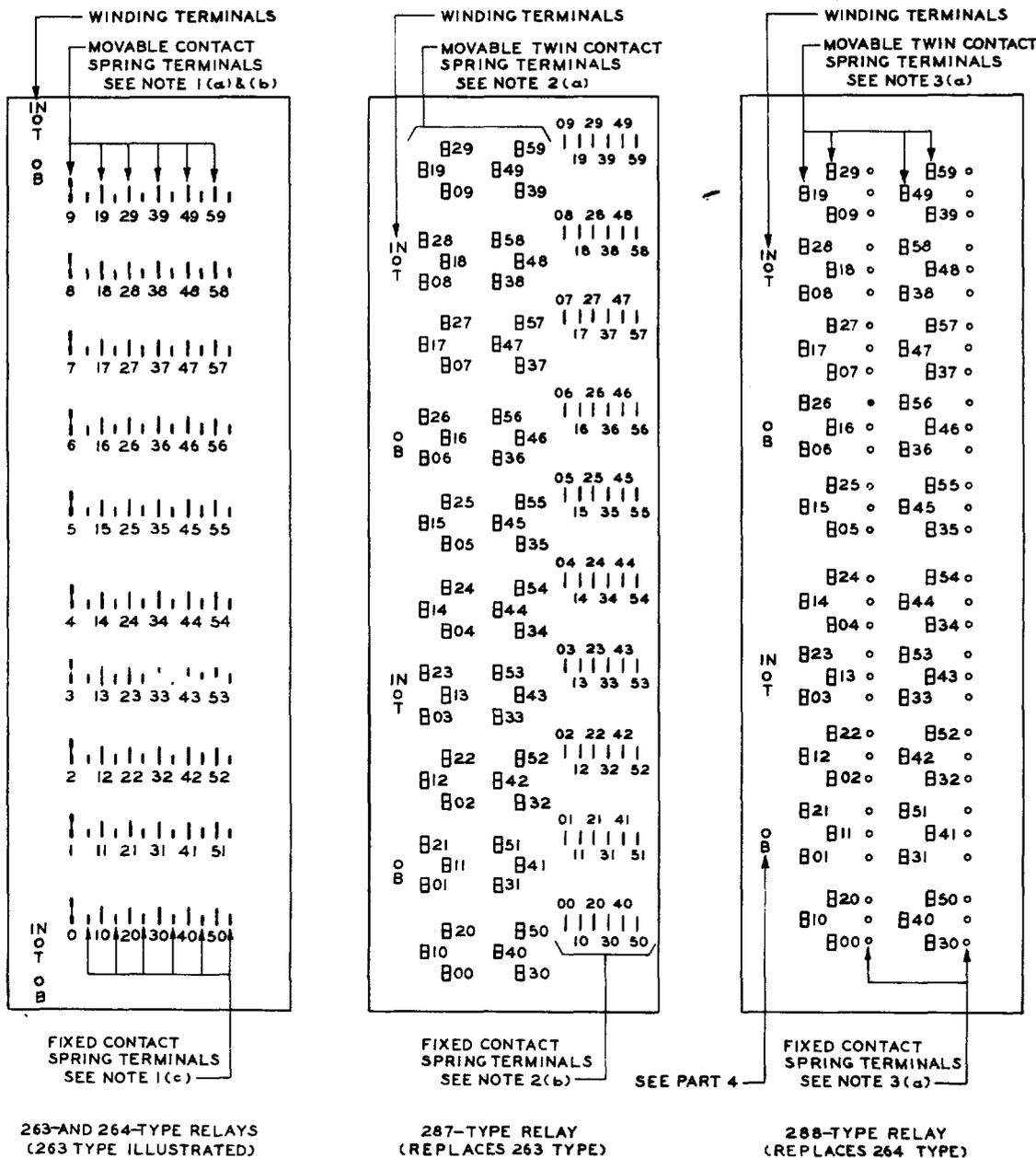


Fig. 2 - Terminal Arrangement Viewed From Wiring Side

NOTES FOR FIG. 2

Note 1 - 263- and 264-Type Relays

- (a) All movable contact spring terminals of 263-type relays arranged for horizontal strapping. 0 to 9 terminals also arranged for individual wiring.
- (b) All movable contact spring terminals of 264-type relays arranged for individual wiring only.
- (c) All fixed contact spring terminals of 263- and 264-type relays arranged for individual wiring.

Note 2 - 287-Type Relay

- (a) All movable contact spring terminals arranged for individual wiring.
- (b) All fixed contact spring terminals arranged for horizontal strapping.

Note 3 - 288-Type Relay

- (a) All terminals arranged for individual wiring.

5.03 If the multiple strap wires connecting three or more relays in a row of relays are too short for connection to terminals of a 287-type relay added at the right end of the row as viewed from the wiring side, the strap wires may be extended by splicing additional lengths of wire to the strapping, using soldered hook connections as shown in Fig. 3A and 3B. Fig. 3A shows the details of the hook connection and Fig. 3B shows the position of the splices in the multiple strap wires. If a 287-type relay is added between 263- or 287-type relays, the splicing method for bridging the cuts in the multiple strapping is not recommended since two splices would be required in each strap wire. If the two splices were made, it would be difficult to maintain straightness of the strap wires and it is therefore preferable to replace the strap wires as required.

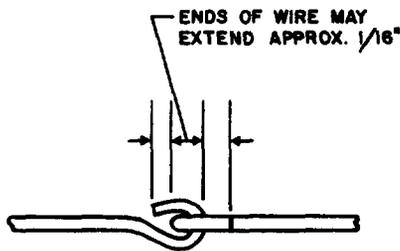


FIG. 3A-DETAILS OF HOOK CONNECTION

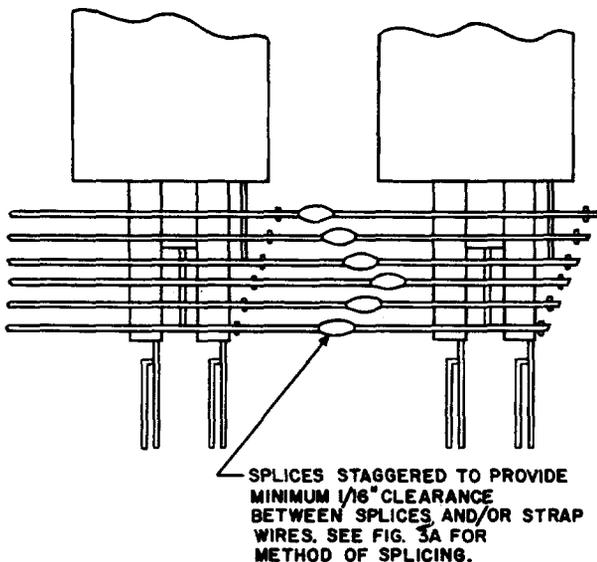


FIG. 3B-POSITION OF SPLICES

Fig. 3 - Splicing of Multiple Strap Wires to 287-Type Relay

5.04 The 0 to 9 movable contact spring terminals on 263-type relays are arranged for both individual wiring and horizontal strapping. The corresponding fixed contact spring terminals on 287-type relays are arranged for horizontal strapping only. It may be necessary to connect both individual and strap wires to these terminals or to make either one of these connections. If an individual connection only is to be made to one of these terminals, wind at least 1-1/2 turns of the wire around the terminal at the notch and solder the connection. If both a horizontal strap and an individual wire are to be connected, first position the strap wire in the notch, then wrap at least 1-1/2 turns of individual wire around the terminal and the strap wire at the notch of the terminal and solder both wires to the terminal.

5.05 Connections to the terminals intended for individual wiring on 287- and 288-type relays should be made by winding at least 1-1/2 turns of the wire around the terminal and soldering the connection. In making connections to the fixed contact spring terminals of the 288-type relay, fan the top terminal of each group of three upward and the bottom terminal of the group downward in order to provide clearance between the terminals.

5.06 As shown in Fig. 2, the location of the winding terminals on 287- or 288-type relays is different from that of corresponding terminals on 263- and 264-type relays. Where skinners to be connected to winding terminals on 287- and 288-type relays are too short, splice them using a straight splice insulated with varnish-impregnated sleeving per KS-7851.

5.07 **Current Flow Values:** The following table gives the operate current flow values to be used for 287- and 288-type relays when these relays replace 263 and 264 types. The values supersede those given in the circuit requirement table for the 263- and 264-type relays.

CODE	BSP FIG.	TEST	READJ	REMARKS
		OPR MA.	OPR MA.	
287A	60	80	75	One winding
		180	170	Two windings in parallel
287B	60	160	150	One winding
288A	60	80	75	One winding
		180	170	Two windings in parallel