

CLEANING EQUIPMENT FRAMES BY MEANS OF COMPRESSED AIR NO. 4A AND 4M TOLL SWITCHING SYSTEMS

1. GENERAL

1.01 This section covers the method of pressure cleaning equipment frames in No. 4A and 4M Toll Switching Systems. It is intended for use with Section 069-703-801 which covers general information applicable to all crossbar offices.

1.02 This section is reissued to add a caution and reference concerning relays and crossbar switches and to make other changes as required. This reissue does not affect the Equipment Test List.

1.03 In compliance with specifications, as outlined by the Occupational Safety and Health Act (OSHA), compressed air for cleaning shall be reduced to less than 30 PSI and then shall be used only with chip guarding and personal protective equipment. ♦To meet this objective when using the KS-14758 or De Vilbiss DG-514-2 duster gun, it should be equipped with a KS-14758 L10 booster nozzle.♦

1.04 All cleaning by means of compressed air shall be done at no more than 30 PSI pressure using a 3/32-inch nozzle.

1.05 Do not use compressed air to clean card translators or electronic translator frames.

2. METHOD

2.01 The need for making circuits busy to avoid service reaction depends on the type of circuits on the frame and on traffic conditions. During extremely light traffic, frames may be cleaned without making the circuits busy. At any other time, it is recommended that common

equipment, such as markers or link controllers, be removed from service. Careful consideration should be given to the amount of this equipment made busy so as not to adversely affect service.

Crossbar Switch Frames, Relay Racks, etc

2.02 Relay covers shall be removed, except as indicated below, in accordance with the following.

(a) **Relays Under Common Strip Covers:** Remove the common strip covers for the complete frame, and store in a convenient location.

(b) **Polarized Relays, B- and G-Type Relays, and Wire-Spring Type Relays:** These relays shall be pressure cleaned with the cover caps in place.

(c) **Multicontact Relays (Other Than Wire-Spring Type):** The cover shall be removed from one relay at a time and replaced before proceeding to the next relay.

(d) **Relays Under Individual Covers:** Remove the individual covers for the complete frame [except as in (b)].

(e) **Selecting Off-Normal Spring Covers:** The selecting off-normal spring covers, if provided, shall be removed and treated as a relay cover.

Note: Exercise care in removing and remounting the selecting off-normal spring covers so the cover spring is not flexed enough to reduce the tension, and the contact springs are not disturbed.

2.03 To clean the covers which have been removed, blow out the inside of the covers with the

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nozzle held approximately 6 inches away from the cover. This operation shall be done at the exhauster end of the curtain enclosure before the pressure cleaning on the frame is started and while the exhauster sets are operating. Do not direct the air stream toward the frame. Wipe the outside surfaces of the covers using a KS-14668 cloth, and store outside the curtain enclosure in a clean location. Store in an orderly manner so no difficulty will be experienced in replacing each cover in the original location.

2.04 The cleaning of a frame shall start at the point farthest removed from the exhauster sets, continuing in an orderly manner toward the sets. (Set Fig. 1.)

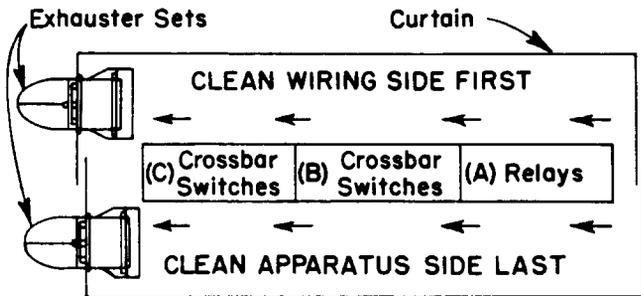


Fig. 1—Curtain Enclosed With Exhauster Sets in Place

2.05 The sides of the frame group may be divided into arbitrary horizontal and vertical sections of a width that will facilitate orderly cleaning progress. (See Fig. 2.)

2.06 Starting at the top of the frame, exercising care not to blow dust over the top of the enclosure, clean progressively each vertical section, as shown in Fig. 2. Repeat the procedure for each section.

2.07 Following the general methods described in 2.04 through 2.06, clean the wiring and forms on the frame by directing and moving the air nozzle in the manner indicated by Fig. 3, 4, and 5. Exercise care that insulation is not damaged. When cleaning the wiring side of wire-spring type relays, point the nozzle downward over the wiring at an angle approximately 30 degrees from vertical, as shown in Fig. 4, so dust and lint will not be blown through openings in the mounting plates onto the springs and contacts of the relays.

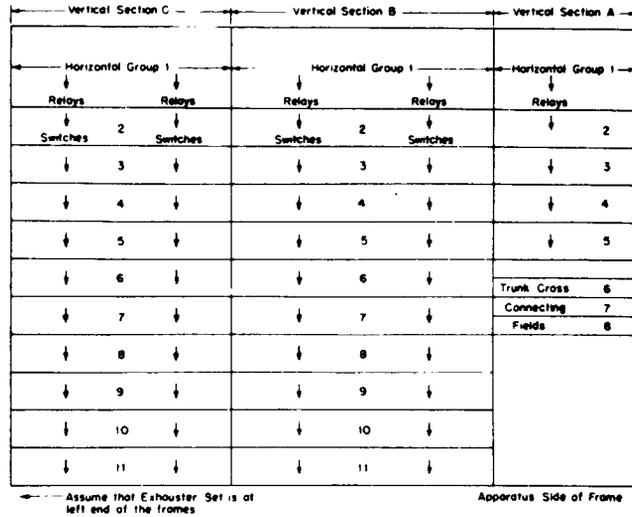
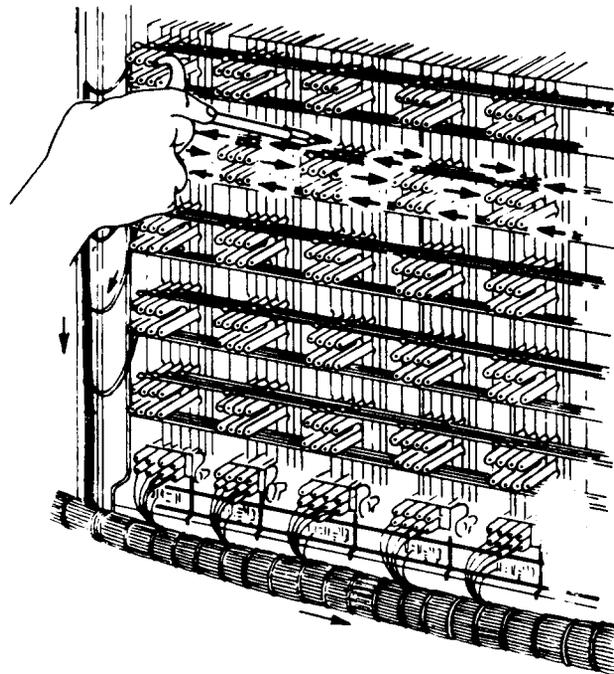


Fig. 2—Apparatus Side of District Frame Group



First operation to remove dirt from vertical forms and wiring.
 Second operation to remove dirt where wiring lugs enter spring pile up.
 Third operation to remove dirt where multiple strapping is soldered to wiring lugs.
 Repeat operations two and three for each row of solder lugs.
 Final operation to remove dirt from horizontal form and wiring at bottom of switch.

Fig. 3—Rear of Crossbar Switch

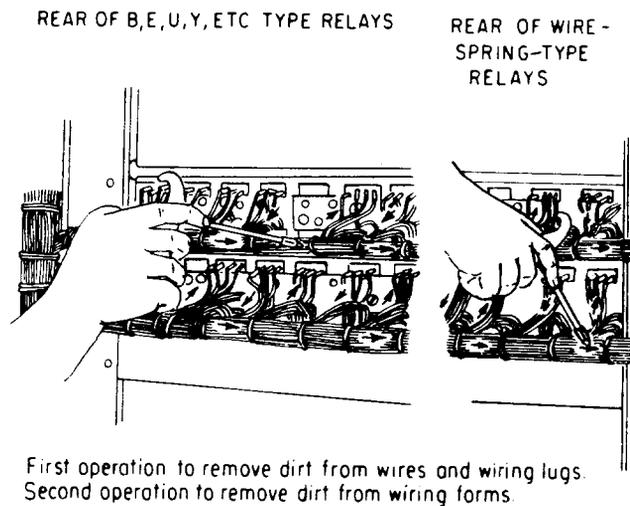


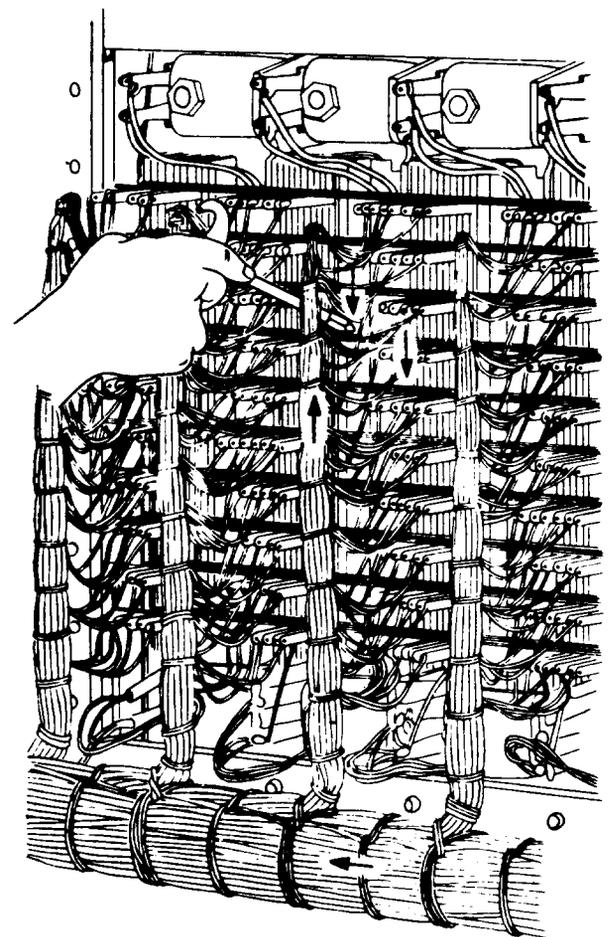
Fig. 4—Method of Directing Nozzle for Cleaning Rear of B-, E-, U-, Y-, etc., and Wire-Spring Type Relays

2.08 When cleaning the crossbar switch, clean the rear of the vertical units, as shown in Fig. 3. Clean the wiring at the bottom of the switch, as shown for B-, E-, U-, Y-, etc., type relays in Fig. 4. Clean the wiring at the side of the switch, as shown for multicontact relays in Fig. 5.

2.09 When pressure cleaning horizontal strapping on crossbar switches and multicontact relays, care shall be exercised to see that dust is removed from the location where the strapping is connected to the lugs.

2.10 After the wiring side of the frame has been cleaned, follow the same general methods outlined in 2.04 through 2.06 and clean the apparatus side of the frame.

⚠Caution: Care must be exercised when pressure cleaning relay springs and crossbar switches. Excessive air pressure directed toward the moving springs of relays and crossbar switches may cause contacts to make or break falsely or selecting fingers to blow out of position. Refer to Section 069-306-801 for additional cleaning procedures.⚠

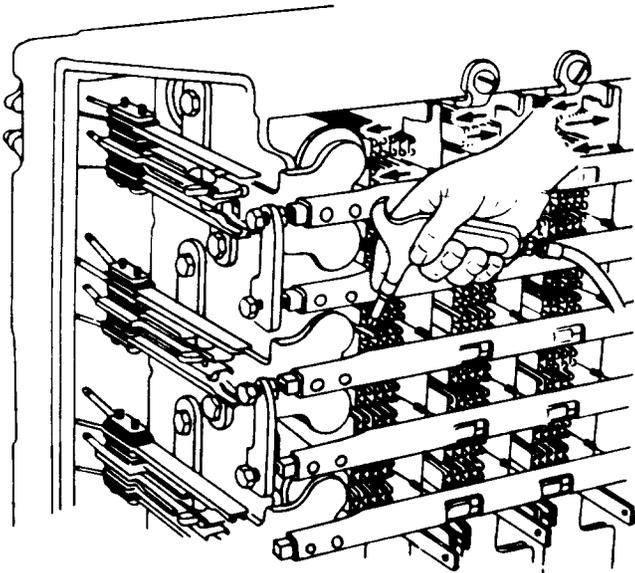


First operation downward to left or right of vertical form to remove dirt from wires and wiring lugs.
 Second operation upward to remove dirt from vertical form.
 Third operation downward to right or left (opposite side to first operation) of vertical form to remove dirt from wires and wiring lugs. Repeat operations 1, 2 and 3 for each relay or switch.
 Last operation to remove dirt from horizontal wiring form.

Fig. 5—Rear of Multicontact Relay or Multicontact Switch

2.11 When cleaning the apparatus side of the crossbar switches, point the air nozzle downward at an angle of about 45 degrees in order to clean two rows of contacts from above the selecting bar associated with the two rows of contacts, as shown in Fig. 6.

2.12 When cleaning multicontact relays other than wire-spring type multicontact relays, proceed as indicated by the arrows in Fig. 7, point the air nozzle directly at the end of the relay springs,



First operation to remove dirt where springs enter pile up and to remove dirt from select magnet coils.
 Second operation to remove dirt from upper contacts.
 Third operation to remove dirt from lower contacts.
 Fourth operation to remove dirt from select off normal springs.
 Repeat operations one, two, three and four for each two rows of contacts associated with a selecting bar.
 Final operations
 A. To remove dirt from hold off normal springs and contacts.
 B. To remove dirt from hold magnet coils.*

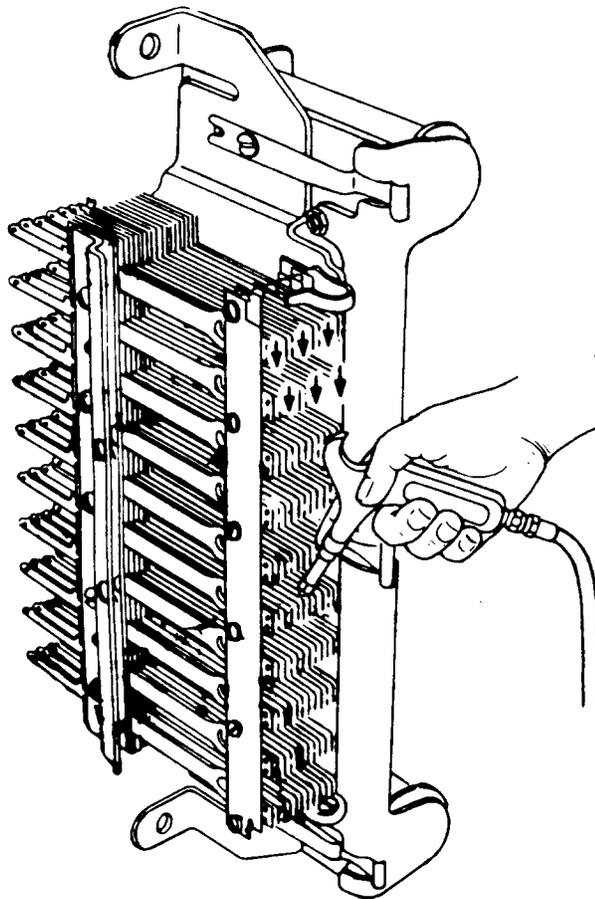
Fig. 6—Front of Crossbar Switch

and work from the top of the relay toward the bottom.

2.13 When cleaning U-type and similar-type relays, progress across the relay mounting plate in the manner indicated by Fig. 8.

2.14 When pressure cleaning relays (other than wire-spring type) from which covers or caps are not removed, hold the nozzle at least 6 inches from the front of the mounting plates where the cover is located and avoid directing the nozzle between two adjacent covers to prevent dirt from being blown under the covers. At the rear of the mounting plate, point the nozzle downward over the wiring so the dirt will not be blown into the cover through openings in the mounting plate.

2.15 When cleaning wire-spring type relays, have the nozzle tipped slightly downward about 8 inches away from the relays; then direct the nozzle over the equipment using slow horizontal strokes starting with the relays at the top of the frame farthest from the exhausters and moving downward



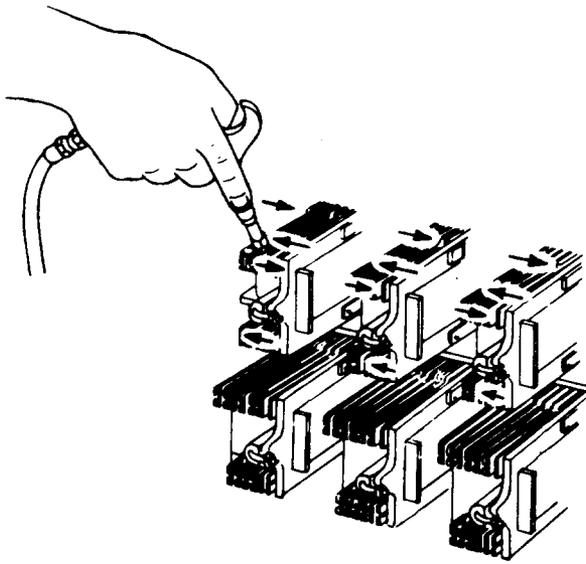
Each operation shall be downward to remove dirt from contacts and where springs enter pile up.

Fig. 7—Front of Multicontact Relay

and toward the exhausters. Exercise care not to direct the nozzle in such a manner as to dislocate or blow off the plastic covers since this might cause false contacts or displaced springs.

2.16 As a vertical section of relays has been given the final dusting operation (2.18) and before the remaining apparatus and curtains have been given the final dusting operation, replace the relay covers in their proper locations on the frame and replace select off-normal spring covers.

2.17 After all the wiring and apparatus within the enclosure have been cleared, as described above, a final dusting operation shall be performed. In performing this operation, start at the top of the frame farthest from the exhausters, as in previous cleaning, and with the air nozzle pointed



First operation to remove dirt where springs enter pile up.
 Second operation to remove dirt from relay coil.
 Third operation to remove dirt from upper contacts.
 Fourth operation to remove dirt from lower contacts.

Fig. 8—Front of Relay

slightly downward using a sweeping stroke work toward the floor removing any dust that may have settled out during cleaning. The final dusting shall be done first on the wiring side and then the apparatus side. Include the curtains and ladders in this operation.

2.18 Permit the exhauster sets to operate for at least 5 minutes after completing the operation described in 2.17 so any dust suspended in the air inside the enclosure will be removed before proceeding as in 2.19.

2.19 Move the curtains to the next frame pulling them along the sash cords from which they are suspended. In this connection it will be necessary to remove and relocate any auxiliary supports, such as insulated "S" hooks, that were used to prevent the sash cords from sagging.

2.20 Exercise care in moving the curtains along the sash cords so they will be agitated as little as possible, thereby reducing to a minimum the possibility of dislodging any dust or lint that may be on their surfaces.

2.21 Wipe off the flat surfaces of the frame just cleaned using a KS-14668 cloth. Sweep the floor area around the frame using the method described in Division 700 of the appropriate BSP for dustless sweeping in switchrooms.

2.22 Test the circuits in the approved manner, and return them to service.

2.23 Proceed as in 2.01 through 2.22 for the next group of frames.

Frames Equipped With Cross-Connecting Fields

2.24 When frames equipped with cross-connecting fields are enclosed with the curtains, as in the case of markers, clean the wiring side of the entire frame (Fig. 4 and 5); then clean the apparatus side (Fig. 7 and 8), and place the cleaned covers on the relays (2.02 and 2.03) before cleaning the cross-connecting fields, as indicated in 2.25.

2.25 The terminal strips on both sides of the frame shall then be cleaned using slow horizontal strokes starting at the top moving downward and toward the exhausters. Clean the cross-connections with vertical downward strokes always starting from the top of the frame moving downward and toward the exhausters.

2.26 When all frames enclosed in the curtains have been cleaned, proceed as covered in 2.17 through 2.22.

Circuits Enclosed in Cabinets

2.27 With the curtains in place and the apparatus set up as covered in Section 069-703-801, make circuits busy, as required, on the frame to be cleaned. (See 2.01.)

2.28 Clean the structural details and other apparatus and wiring above the equipment casings.

2.29 Open the casing doors on the front and rear sides of all cabinets on one vertical frame. No relay covers or cover caps shall be removed from relays located in cabinets. Clean the inside of the casing, and remove any dust from the inside bottom of the cabinet with the vacuum cleaner. Clean the wiring side of the apparatus in each casing, as indicated in Fig. 4 and 5. (See 2.14.)

2.30 Then clean the apparatus side of the equipment in the cabinets in the manner indicated in Fig. 6 and 8 beginning with the top mounting plate in the cabinet and working downward to the bottom mounting plate. When all apparatus in one cabinet and the inside bottom of the cabinet have been cleaned, direct the air stream over all apparatus inside the casing using long sweeping strokes as a final dusting operation. Close the front door of each cabinet before proceeding to the next cabinet below.

2.31 When the apparatus side of a frame has been cleaned, wipe the inside of the cabinet and doors (front and rear) and the base of the enclosure with a KS-14668 cloth and close the respective doors (front and rear) after the operations are completed.

2.32 Repeat the cleaning, as described in 2.27 through 2.31, on the next frame enclosed in the curtains.

2.33 When all frames enclosed in the curtains have been cleaned, wipe the outside of the cabinets and framework with a KS-14668 cloth and proceed as covered in 2.17 through 2.22.

2.34 Proceed to the next group of frames, and repeat 2.27 through 2.33.

3. SUMMARY OF WORK OPERATIONS

3.01 This summary is provided for ready reference to facilitate review of the pressure cleaning operation without referring to the entire section. All cleaning operations shall be done with compressed air, pressure regulated to less than 30 PSI, using a 3/32-inch nozzle.

METHOD	REFERENCE	METHOD	REFERENCE
A. Clean cable runs and superstructure.	Section 069-703-801 Par. 1.07 through 1.11	5. Wiring side of relay mounting plates.	Par. 2.07, Fig. 4
1. Clean ventilating ducts as required.		F. Equipment side shall be pressure cleaned using the same pattern for cleaning as outlined for the wiring side.	
B. Set up curtains and pressure cleaning equipment.	Section 069-703-801 Part 4	1. U-, Y-, E-, and similar-type relays.	Par. 2.13, Fig. 8
C. Remove relay covers and off-normal select covers (other than polarized relays, B- and G-type, wire-spring type, and multicontact relays).	Section 069-703-804 Par. 2.02	2. Crossbar switches.	Par. 2.11, Fig. 6
D. Clean relay covers.	Par. 2.03	3. Multicontact relays.	Par. 2.12, Fig. 7
E. Wiring side shall be cleaned first starting at a point farthest from the exhausters and cleaning from the top down.	Par. 2.07	4. Wire-spring type relays.	Par. 2.15
1. Wiring side of multicontact relays.	Par. 2.08, Fig. 5	5. Flat-type cross-connecting frames.	Par. 2.24 and 2.25
2. Wiring side of crossbar switch.	Par. 2.08, Fig. 3	G. Final dusting.	Par. 2.17 and 2.18
3. Wiring side of wire-spring type relays.	Par. 2.07, Fig. 4	H. Move curtain,	Par. 2.19 and 2.20
4. Wiring on circuits enclosed in cabinets.	Par. 2.27 through 2.34	1. Exercise care in moving not to dislodge dust or lint that may be on surface.	
		I. Wipe off flat surfaces of equipment just cleaned.	Par. 2.21
		J. Damp dust sweep floor area.	Section H51.104
		K. Make operating tests as required.	Section 069-703-804 Par. 2.22