BELL SYSTEM PRACTICES
Teletypewriter and Manual Telegraph Station and P.B.X. Installation and Maintenance

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AT&T Co Standard

INSTALLATION OF RADIO FREQUENCY INDUCTION SUPPRESSION FILTERS FOR EQUIPMENT CONTAINING MISCELLANEOUS RELAYS OR MECHANICALLY OR MANUALLY OPERATED CONTACTS

1. GENERAL

1.01 This section covers the installation of the 88A, 88C and 88D filter units to suppress radio frequency induction from the contacts of miscellaneous neutral or polar telegraph relays, manual telegraph keys or mechanically operated contacts.

1.02 This section is reissued to include the new 88D filter and delete the now obsolescent 88B filter and to include greater detail in the application of the 88A filter to manual and semi-automatic telegraph keys.

1.03 The 88D filter is recommended to supersede the 88A and 88B filters for use on polar relays in view of the materially extended relay contact life afforded by the new filter.

1.04 Modification information is given for changing existing 88A and 88B filters to correspond to the new 88D filter.

2. PROCEDURE

2.01 The mounting of the 88 type filters may be arranged to suit the particular equipment layout to which these filters are to apply. This mounting should be such that the leads connecting into the filter from the disturbing contacts are as short as practicable, preferably not more than 2" long. The 88A filter is illustrated in Fig. 1. The filter bracket is "L" shaped with 6-32 standard threaded mounting holes on the vertical portion which mounts against the relay panel. The mounting holes are spaced 1-3/4". The bracket is 2-11/16" wide by 2-1/2" deep and the mounting screws for the coils extend

approximately 1" above the underside of the bracket. The 88C filter is similar to the 88A in every respect except that it is equipped with two W. E. Co. 118A 400-ohm vitreous resistors in place of the retard coils provided in the 88A filter. These resistors are mounted and connected in place of the retard coils and extend above the underside of the bracket approximately 1-1/2". The 88D filter is likewise similar to the 88A except that the 225A retard coils are replaced with 269A retard coils which are shunted with KS-8058 400-ohm 1/2-watt carbon resistors. Normally the terminals of the 269A coils extend 1-3/4" above the underside of the bracket but they may be bent over if desired to decrease the vertical dimension of the filter unit to about 1-3/8". The 88 type filters should mount on the terminal side of the relay panel.

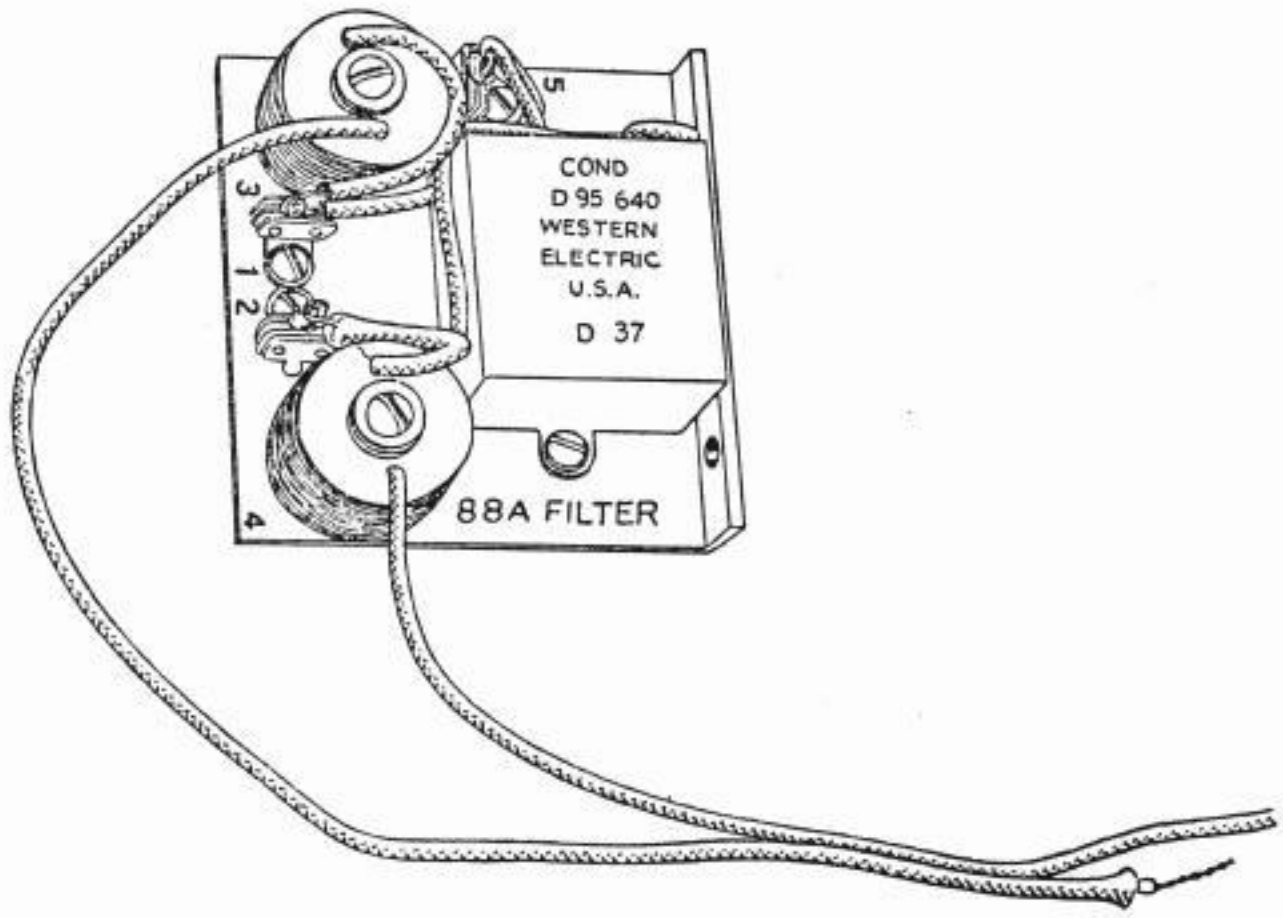

Fig. 1

2.02 The connection of the 88 type filter units is shown in Fig. 2 for various contact arrangements. The type of filter and connection used may be dictated by the circuit conditions in which the filter is to function. Any of the 88 type filters may be used in any of the applications illustrated. In view of the lower price of the 88C filter it would be chosen in preference to the 88D in any application unless the 400-ohm

series resistance cannot be compensated by reduction of circuit resistance at some other point. The 88A filter would be selected only for infrequently operated relay contacts or for contacts having substantial area and operating pressures. The

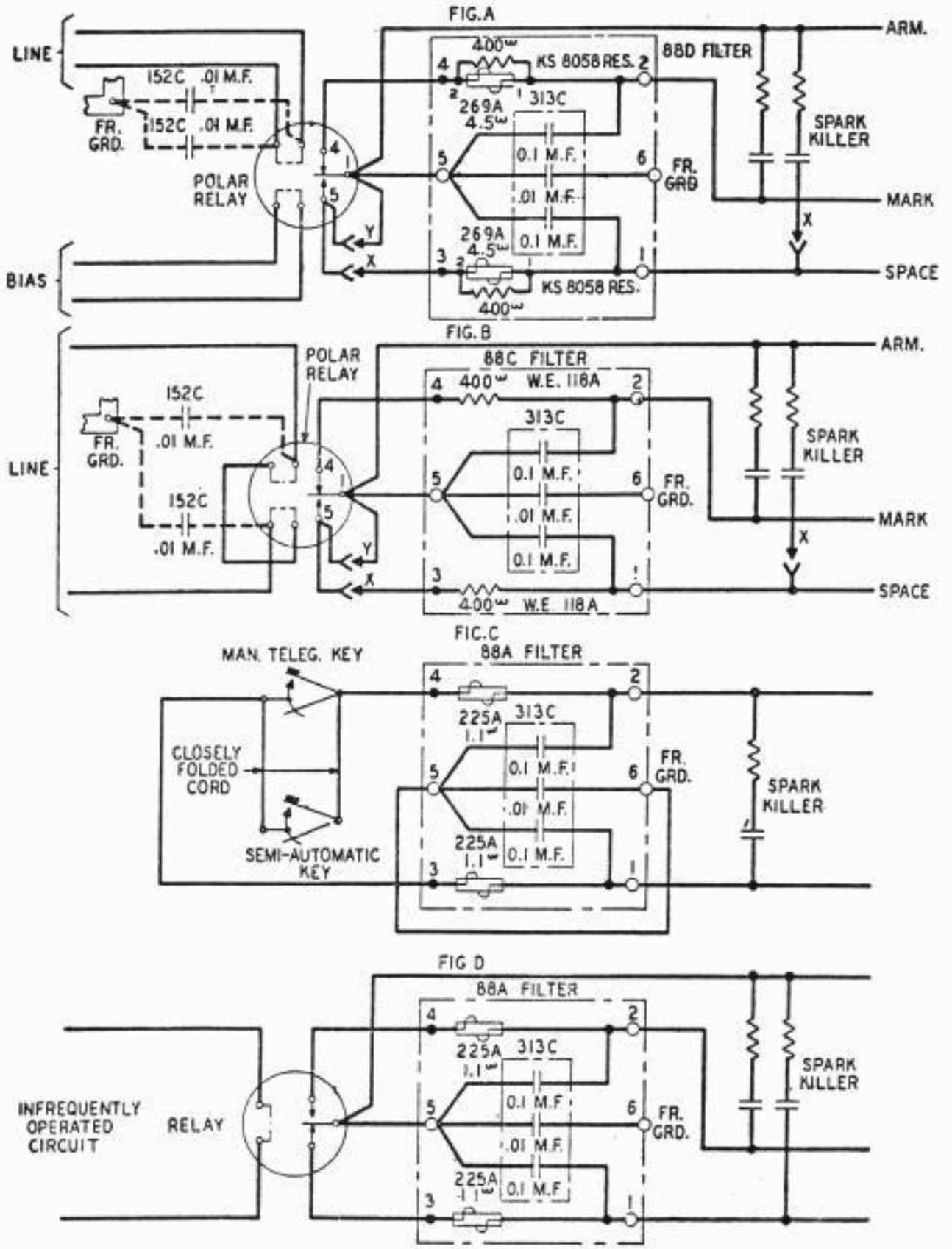

Fig. 2

88D filter would be the choice for all contacts of low area and operating pressures required to open and close more often than three or four thousand times a day where the 4.5 ohm series resistance offers advantages over the 400 ohms of the 88C filter. It should be noted that in cases where a relay armature transfers between an idle contact and another which is used to perform a circuit function, the idle contact should be connected to the armature as shown in the Y wiring of Fig. 2.

2.03 The by-pass condensers indicated as optional for the relay windings may not be required unless the operating circuit is energized through a rectifier operating on the commercial supply feeding the radio receiver or unless this circuit extends to remotely located equipment. When they are required they should be connected as indicated using "D" wiring with leads as short as practicable.

2.04 The 88A filter is recommended for the suppression of induction from manual and semi-automatic telegraph keys and in such application, the connections shown in Fig. 2C are recommended. The red leads, terminals 3 and 4 of the filter, should connect as directly as possible to the terminals of the manual key and preferably be not longer than 4".

2.05 In many cases it may be practicable to mount the filter under the table directly below the key, though in others it may be necessary to have the filter on top of the table. In these latter cases the filter may be mounted in a small metal container to protect it from dust and provide satisfactory appearance.

2.06 A satisfactory cover for the filter may be provided by using a piece-part container which must be drilled on the job at the closed end to provide for the 6-32 mounting screws to secure the filter. The red leads of the filter coils should emerge about 1" apart through suitable holes to be drilled in one end of a fibre or bakelite panel fitted into the piece-part cover, and the line leads through holes drilled in the other end to provide maximum separation between the input and output circuits of the filter. The piece-parts required may be ordered from the Western Electric Company and the small fibre or bakelite panel and screws may be readily obtained locally. The parts required are as follows:

1—Container per LP-469859

1—Cover per LP-469187
Provide with finish No. 404 black crinkle enamel (baked)

1—Panel 1/4" x 1-1/2" x 3"

4—1/4" 6-32 RHBM Screws

2.07 When semi-automatic keys are used which are not connected directly into the line circuit but are provided with a cord and plug to connect into a manual key, the cord should be shortened to about 8" or less either by cutting it or, if this is undesirable, folding it back and forth on itself and taping it into a tight bundle of equivalent length.

2.08 Where the induction exposure is particularly severe, such as in cases where a sensitive radio receiver is required to operate on low signal levels with the telegraph key on the same table, it may be desirable to provide a ground for the filter frame. The ground lead should connect to terminal 6 of the filter and should be No. 14 B&S gauge or equivalent. It should connect as directly as possible to the nearest grounded frame, conduit or waterpipe other than that serving as a ground for the radio receiver. This ground can probably be most conveniently connected by using shielded conductors to the key position and bonding the filter frame (terminal 6) to the lead sheath or copper braid which is in turn grounded to a point as near the key position as is practicable.

2.09 Existing 88A or 88B filters may be converted to 88D filters by substituting a 269A retard coil and its shunt KS-8058 400-ohm resistor for the series elements (225A coils in the 88A, 118C 100-ohm resistor in the 88B) of the older filters. When the conversion modification is made the designation "88A" or "88B" on the filter mounting plate should be obliterated.

2.10 To make the conversion modification, proceed as follows:

(1) Disconnect the existing filter from the circuit and remove it from the panel.

(2) Unsolder the white wires of the 225A coil or the leads from the lower terminal of the 118C resistor from the terminals marked 1 and 2 on the rear of the filter mounting plate.

(3) Dismount the 225A coils or 118C resistors by removing their mounting screws.
Note: These screws are given a "set" on the underside of the mounting plate and in stubborn cases may have to be drilled out of the mounting plate.

(4) Holding the KS-8058 resistor in place against the coil terminals and the top of the coil on the side opposite the terminal designations, bend the resistor leads around each terminal and solder them in place using no more heat than is required to make a good connection. Cut off the excess resistor leads.

(5) Remove the screws which mount the terminals 1 and 2 and mount the 269A coils by means of their extended cores under these terminals using the same mounting screws.

(6) Connect the coil terminals marked 1 on the top of the coils to the filter terminals marked 1 and 2 on the mounting plate.

(7) The conversion is now completed. The input terminals are the terminals marked 2 on top of the 269A coils which correspond to the terminals 3 and 4 of the unmodified filters. The terminals 1 and 2 are the output terminals as before the conversion.