

REPLACING BLOWN FUSES

1. GENERAL

1.01 This Section covers general precautions to be observed in replacing fuses and replaces A302.405, Issue A. It is reissued primarily to change the method of replacing fuses having a condenser load and describes special procedures for replacement of blown cartridge fuses under circumstances which permit the temporary development of abnormal loads, as described below.

1.02 Special procedures may be required for replacement of battery distributing fuses serving line finders, and possibly for replacement of fuses serving some other types of equipment in which a temporarily abnormal load may develop immediately after insertion of a new fuse. When such a fuse is blown by an accidental short circuit or ground occurring during a busy hour, calls may "pile up" on the equipment while it is out of service to such an extent that after the fault has been cleared and the circuit re-energized the initial current drain will exceed the capacity of a replacing fuse of normal value. In some such cases it may be feasible to open temporarily the leads to portions of the equipment served and to reconnect them one by one, thus avoiding overloading of the distributing fuse. In the majority of instances, however, such a procedure would delay unnecessarily the complete restoration of service, and the method described in Part 3 should be employed.

1.03 Spare fuses of all required capacities, fuse pullers, and screwdrivers for use in making fuse replacements should be available in readily accessible locations. Double fuses as described in 3.02 should be available for temporary replacement of battery distributing fuses serving line finders in all large step-by-step offices and may be provided for other circuits and in other types of offices when circumstances warrant.

2. GENERAL PRECAUTIONS

2.01 Locate and clear fault which caused fuse operation before inserting new fuse.

2.02 Be sure that capacity of new fuse is correct. Check against markings on panel or fuse block.

2.03 Use fuse puller when replacing cartridge fuses. This protects against possibility of injury should new fuse be blown while being installed.

2.04 In replacing alarm type fuses, see that alarm tongue is not bent or otherwise defective, that bead holder is in correct position, and that screws are firmly seated.

2.05 When the circuit in which the fuse is used includes a switch or other device for opening the circuit, see that circuit is opened before replacing fuse. Re-energize circuit after new fuse has been inserted.

2.06 When the circuit includes two fuses in tandem and is provided with a bridging switch for short circuiting either one of the two fuses, a blown fuse is removed from service and a good fuse is connected by operating the bridging switch to short-circuit the blown fuse. After such an operation a new fuse should immediately be installed in place of the blown fuse.

2.07 In a circuit containing a cartridge fuse in parallel with an alarm type fuse, the alarm type fuse will normally operate only after blowing of the cartridge fuse. Be sure to replace the alarm type fuse after the cartridge fuse has been replaced. (Operation of the alarm type fuse without blowing of the cartridge fuse may be caused by employment of fuses of incorrect capacity, or by high contact resistance in the portion of the circuit associated with the cartridge fuse. If such a condition is encountered and cannot be corrected by attention to the possibilities just mentioned, it should be reported to the general plant supervisor for investigation.)

3. SPECIAL PROCEDURE FOR REPLACEMENT OF BLOWN CARTRIDGE FUSES UNDER CIRCUMSTANCES PERMITTING TEMPORARY DEVELOPMENT OF ABNORMAL LOADS

3.01 Fuses having no condenser load - The procedure described below is for use when a cartridge fuse has been blown by an accidental short circuit or ground under circumstances such as described in 1.02, which permit the temporary development of an abnormal load immediately upon insertion of the new fuse. The procedure is not applicable under circumstances resulting in overloads of any appreciable duration due to cable failures or other trouble conditions, and the double fuses specified for use in connection with this procedure are in no event to be employed as a means of carrying such overloads.

3.02 This procedure requires the use of a double fuse consisting of two fuses, side by side, soldered together at each end.

In soldering, care should be taken to insure that the fuses are not rendered defective by excessive heating and that surplus solder is not left where it might prevent ready insertion of the fuse into the fuse mounting. Each of the two fuses used in making the double fuse should be of the same capacity as the fuse which is to be replaced. In addition to the double fuse, two separate fuses of the same capacity as the fuse to be replaced will be needed.

3.03 When a fuse has blown under circumstances requiring application of this replacement procedure, and the fault has been cleared, insert the double fuse into the circuit in place of the blown fuse. Then, as soon as observation of the equipment served by the fuse indicates that the initial abnormal load has subsided (which should be, at most, within 1/2 to 2 minutes after closure of the circuit), place one of the separate spare fuses in contact with the outside of the fuse clips, holding it firmly with fuse pullers. While maintaining continuity of the circuit in this way, remove the double fuse and insert the second separate fuse in its place. Finally, withdraw the first separate fuse from contact with the fuse clips.

Note: If a bridging switch is provided, there will, of course, be no need to hold a fuse against the outside of the fuse clips. Substitution of the permanent fuse for the double

fuse can in that case be accomplished through use of the switch.

Fuses Having Condenser Load

3.04(1) The charging current of a condenser when added to the load and leakage currents may be sufficient to blow the associated fuse unless precautions are taken when fuse is installed. Blowing is more likely to occur with a large condenser and a small fuse. For example, KS-8056 condenser and 2-ampere fuse in station equipment.

(2) A lamp or a 10 to 100-ohm resistor held for a few minutes in series with the condenser and source of power will allow the condenser to charge and avoid the chance of the fuse blowing. A permanent fuse should be installed before removal of the lamp or resistor while the condenser is still charged.

(3) Some condensers are provided with a permanent charging fuse, and resistor, as well as the customary circuit fuse. In this case replacement of fuses must be in the proper sequence, i.e. charging fuse placed in circuit first, then the regular circuit fuse placed second.

(4) Fuses serving important services having high capacity condensers in the supply circuits such as program, multi-channel carrier, etc., may be designated at the discretion of the supervisor, by stenciling a yellow "C" above the fuse.