PROTECTOR BLOCKS
RECTANGULAR TYPE

1. GENERAL

1.01 This practice covers the use and maintenance of the protector blocks most commonly used.

1.02 Protector blocks usually consist of a pair of carbon blocks, which, when installed in a protector mounting, provide a small air gap between a line conductor and ground. A low impedance path is provided to ground when abnormally high voltages are applied to the line, which may be caused as a result of lightning or contact between telephone conductors and power lines.

2. TYPES OF PROTECTOR BLOCKS

2.01 The *rectangular type* protector block is shown in Figure 1.

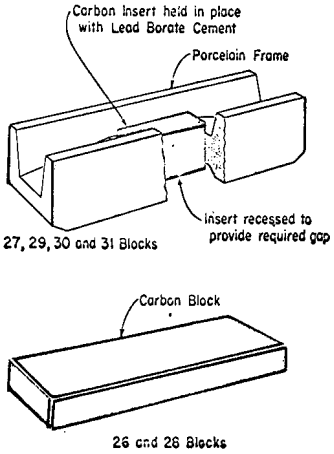

FIGURE 1

2.02 The rectangular protector block may be used in the 83A, 84A, and 87A mounting assemblies and in the 104A and 108A mountings.

2.03 The design of the protector is such that one of the blocks is made of carbon and the other of porcelain with a small carbon insert. When placed in a protector mounting, the carbon block is in contact with the ground electrode; and the carbon insert of the porcelain block is in contact with the line terminal through a protector spring which holds the assembly in place.

2.04 Protector block characteristics are shown in Table 1.

TABLE 1

Code Designation	Gap	60-Cycle R.M.S. Breakdown Voltage	Color Code on Porcelain	Common Use
26*–27	.003 in.	350	White	C.O. and Station Prot.
28*–29	.003 in.	350	White	C.O. Protection
26*–30	.006 in.	700	Blue	Cable Protection
26*–31A	.010 in.	1000	Yellow	Special Applications

2.05 In certain localities where equipment such as phantom repeating coils associated with open wire lines are located outdoors on poles, excessive maintenance is sometimes experienced with 0.006" blocks. In such cases 0.010" blocks are recommended. Where such protection is used it is recommended that a separate set of the 0.010" protector blocks be used on each side of the phantom repeating coil between each open wire conductor and a common ground consisting of two or three ground rods in parallel.

Benefits from the use of 0.010" blocks ahead of the 0.006" blocks may also be obtained where excessive maintenance has been experienced with the 0.006" blocks due to lightning. The use of double protection is not generally recommended but may be found helpful in special cases for circuits in which the avoidance of even occasional service interruptions from standard cable pole protection is desired. Where used, it is desirable to locate the 0.010" blocks about two to four spans ahead of the cable pole with the ground plate connected to about three ground rods in parallel at the base of the pole.

3. PRECAUTIONS

3.01 If there is any indication or reason to believe that a power contact has occurred, make a check from the ground to be certain that safe working conditions exist before performing any work at a protected terminal or protector mounting location.

4. PLACING PROTECTOR BLOCKS

4.01 Rectangular porcelain and carbon blocks will be placed by holding the assembly firmly by hand and pressing into place in the protector mounting so that the protector spring rests squarely against the carbon insert of the porcelain block. Avoid sliding motion between the blocks as any loosened carbon particles are a potential service hazard.

5. INSPECTION AND MAINTENANCE

5.01 Both the porcelain and carbon blocks shall be handled with care and should be kept in the original shipping cartons or in an approved holder such as the 3A type.

5.02 In the event the porcelain and carbon blocks are removed from the protector mounting to clear trouble or for any other reason, they shall be inspected and cleaned as covered in 5.03 to 5.05.

5.03 Porcelain and carbon blocks will be inspected for indications of chips and cracks. Both sides of the carbon block may be used. If one side shows pitting and the other side is satisfactory.

Reject porcelain blocks if subject to any of the following defects:

a. Porcelain blocks which have a chip or crack in the porcelain that extends to the carbon insert.

b. Porcelain blocks that have both walls of the spring groove chipped at the same end.

c. Porcelain blocks that show evidence that the carbon insert has moved.

5.04 Clean porcelain and carbon blocks which pass inspection, outlined in 5.03.

5.05 After cleaning the porcelain and carbon blocks, they shall be inspected for further evidence of defects as follows:

a. Do not reuse any blocks in which the carbon sparking areas are glazed, scratched or cracked, or show signs of soft or unduly roughened spots on those areas.

b. Do not reuse any blocks which cannot be cleaned free of dirt or other foreign matter.

6. OPERATED PROTECTOR BLOCKS

6.01 Ordinarily, lightning discharges will cause an arc across the air gap between the carbon insert and the ground block, but will not heat them sufficiently to melt the cement used for holding the insert in place.

6.02 Protector blocks operated by lightning to the extent of very heavy pitting or blackening indicates that the plant has been exposed to frequent or severe lightning discharges. Such information may be useful in the investigation of cable troubles resulting from lightning.

6.03 A cross with electricity will cause a discharge or repeated discharges of such duration that the heating of the carbon insert will melt the cement holding it and allow the mounting spring to push it into direct contact with the solid carbon block, thus permanently grounding the line.

6.04 Power may be of low voltage and generally is applied for a much longer period of time than lightning. The effect being to make deep pits with whitish deposits or to ground the blocks permanently. Blocks thus damaged by power are usually unfit for further service.

6.05 Protector blocks operated by power are indicative of an irregular plant condition. It is important, therefore, in order to take the necessary action to preclude further trouble, to make a careful inspection for direct or swinging contacts or inadequate separations between telephone and electric plant. Any cases where protector blocks are operated by power for which the cause has not been determined should be reported to the supervisor for further investigation.

6.06 Moisture may also cause deterioration of carbon protector blocks. At damp locations, moisture may accumulate between the protector blocks and establish a high resistance path for current. Electrolytic action will cause the carbon to soften and crumble and small particles of carbon will eventually bridge the gap between the two blocks, placing a permanent ground on the line. A cavity results, rendering the carbon blocks unfit for further service. The associated porcelain block with the carbon insert is not affected and remains serviceable.