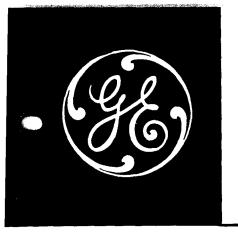
INSTRUCTIONS



TYPE A BUSHINGS

GENERAL

Type A bushings designed for use on transformers have porcelain as the major insulation and are rated 1.2 KV and above. Most low current (600 ampere) bushings have a detachable cable type of conductor (Fig. 1) which allows removal of the bushing without disturbing connections inside the transformer. Medium and high current bushings (Figs. 2 and 5) have fixed conductors and are used for currents up to 9000 amperes.

All bushings with fixed conductors are center clamped to develop maximum strength in the porce-

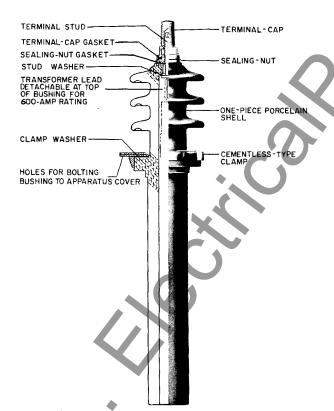


Fig. 1. Low-current Type A bushing (600 amperes)

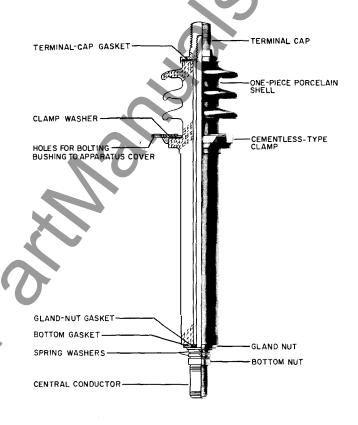


Fig. 2. Medium-current Type A bushing (1200 and 2000 amperes)

lain. A Belleville washer or other spring member is used at the bottom to maintain a pressure-tight seal at the outer end, or at both ends, depending on the application. Those used for sidewall mounting or on the cover of conservator type transformers are open at the bottom to permit entrance of oil. All other fixed-conductor bushings are sealed at both ends after being factory-filled with 10-C* insulating oil. The purpose of the oil is to keep the corona starting voltage higher than the transformer test voltage. Loss

*TRADEMARK OF THE GENERAL ELECTRIC COMPANY

These instruction do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.



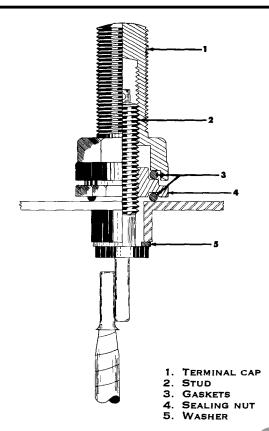


Fig. 3. Shipping cover assembly for detachable-cable bushings

of oil is not serious however, since the corona starting voltage is well above operating voltage, and the bushings will operate satisfactorily for years without it.

RECEIVING

Make an inspection of the bushings immediately upon receipt. If there is evidence of damage or rough handling, file a claim with the transportation company promptly and notify the nearest Apparatus Sales Office of the General Electric Company. Exercise care in opening shipping containers to avoid damaging petticoats or other features of the bushing.

STORING

Store the bushing in a clean, dry place, preferably in an upright position. Particular care should be taken to keep dust and dirt out of the inside of detachable conductor and self-filling bushings.

INSTALLATION

If a bushing is removed from the transformer for shipment, a temporary cover is used to seal the opening and secure the winding lead. The detachablecable and fixed-conductor bushings use slightly different shipping cover arrangements as explained in the following paragraphs.

When installing the bushing on the transformer, work in one direction around the bolt circle, tightening each mounting bolt in succession, a fraction of a turn at a time. This gradual tightening will prevent unequal clamping strains and subsequent damage to the bushing porcelain or support. A satisfactory seal can be obtained by tightening ½" bolts with a torque of 20 foot-pounds and ¾" bolts with 30 foot-pounds.

DETACHABLE-CABLE BUSHINGS

The flexible cable lead for low-current bushings is included as an integral part of the transformer and has the bushing terminal stud brazed to it. When the bushing is shipped separately, the parts on top of the porcelain are removed and used to hold the terminal stud in place on the temporary shipping cover as shown in Fig. 3.

To install the bushing, remove terminal cap (1) and tie a wire or cord in the hole provided. Remove the shipping cover, disassemble the remaining parts except for washer (5), and pass the loose end of the cord through the bushing porcelain. Draw the stud and cable up through the bushing as it is lowered into position in the transformer. Bolt the bushing to the cover or sidewall of the transformer using the clamping sectors and gasket shown in Fig. 4. Reassemble gaskets (3), sealing nut (4) and terminal cap (1) on stud (2), using a thin film of oil on the gaskets to facilitate tightening the nut and cap.

FIXED-CONDUCTOR BUSHINGS

When a fixed-conductor bushing is removed for shipment, its winding lead and terminal block are attached to a support on a temporary shipping cover. These connections must be removed internally before the temporary cover can be taken off.



Fig. 4. Bushing clamping sectors and gasket for low- and medium-current bushings

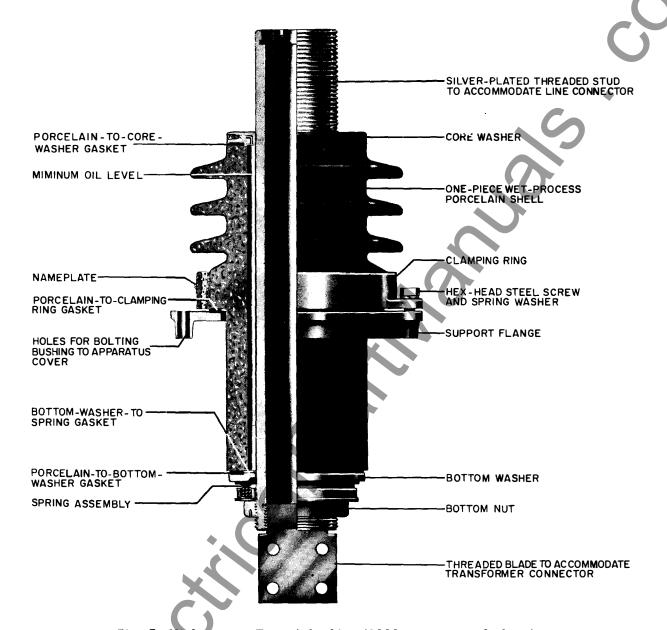


Fig. 5. High-current Type A bushing (3000 amperes and above)

Bushings having fixed conductors should be bolted to the transformer before connections are made to the winding leads. Medium-current bushings are mounted with clamping sectors and high-current bushings have a cement-attached clamping ring, as shown in Fig. 5. When installing high-current bushings, tighten only the mounting bolts. Bolts between the clamping ring and support flange have been adequately tightened and have spring washers to maintain a constant and even pressure. Further tightening is unnecessary and may result in a broken porcelain shoulder. When making internal connections to a winding lead, make sure the joint is properly aligned to avoid undue strain on the bushing.

EXTERNAL CONNECTIONS

External connections to the bushing should be tight enough so they will not loosen in service and flexible enough to prevent mechanical stresses from damaging the porcelain. Long spans of unsupported conductor, especially if outdoors, should be avoided.

MAINTENANCE

Type A bushings require little, if any, maintenance since the major insulation is porcelain. They should be cleaned occasionally when operating in a dusty or dirty atmosphere and inspected periodically for chips or cracks which could contribute to an oil leak, breathing of the transformer, or bushing failure.

MEDIUM TRANSFORMER DEPARTMENT

GENERAL ELECTRIC

ROME, GEORGIA