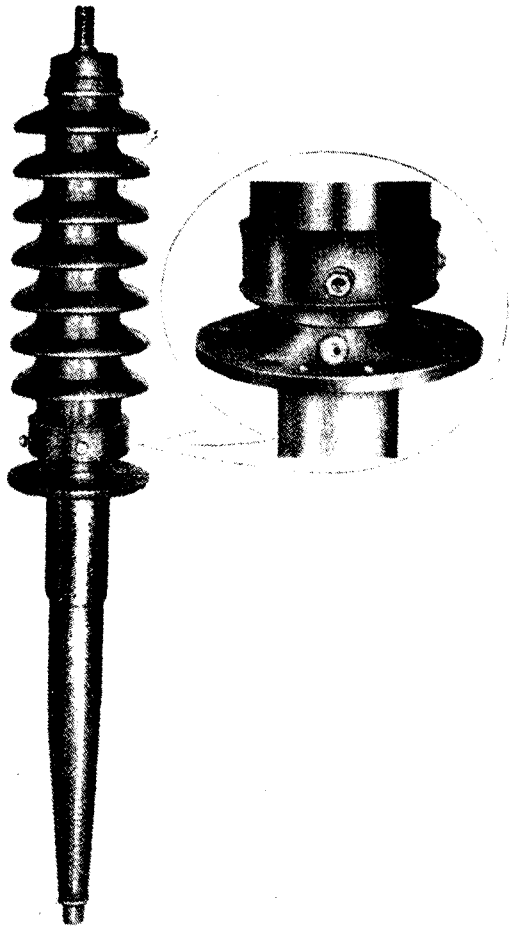
RECEIVING • INSTALLATION • MAINTENANCE

INSTRUCTIONS

ASA STANDARD OUTDOOR CONDENSER BUSHINGS

Type "S"



ASA TYPE "S" CONDENSER BUSHINGS, designed for circuit breaker applications, consist principally of a conductor, insulating condenser, mounting flange, power factor test terminal, bushing plastic, and solder seal porcelain weather-casing assembly.

The weather casing is solder-sealed to the stud and flange, and tested for tightness. Unless injured mechanically there should be no reason for breaking these seals.

RECEIVING AND STORING

Bushings not installed in the apparatus are shipped vertically in a packing crate. Use care in unpacking and handling to protect the bushings from damage.

Important: Lift by the lead or the flange, but never by the porcelain.

Do not remove the coated wrapping from the lower end of the condenser until immediately before assembling in the breaker.

Bushings that are not placed in service immediately should be stored vertically, with the cap end up, in a clean dry place.

INSTALLATION

Remove the coated wrapping from the lower end of the condenser by pulling downward on the rip cord. Do not use knives or scrapers. Remove any protecting material left on the condenser or flange with a clean cloth saturated with benzine or warm transformer oil.

Bushings which are accidentally shipped or stored in a horizontal position should be placed upright in a warm location for 24 to 48 hours if possible, before being energized.

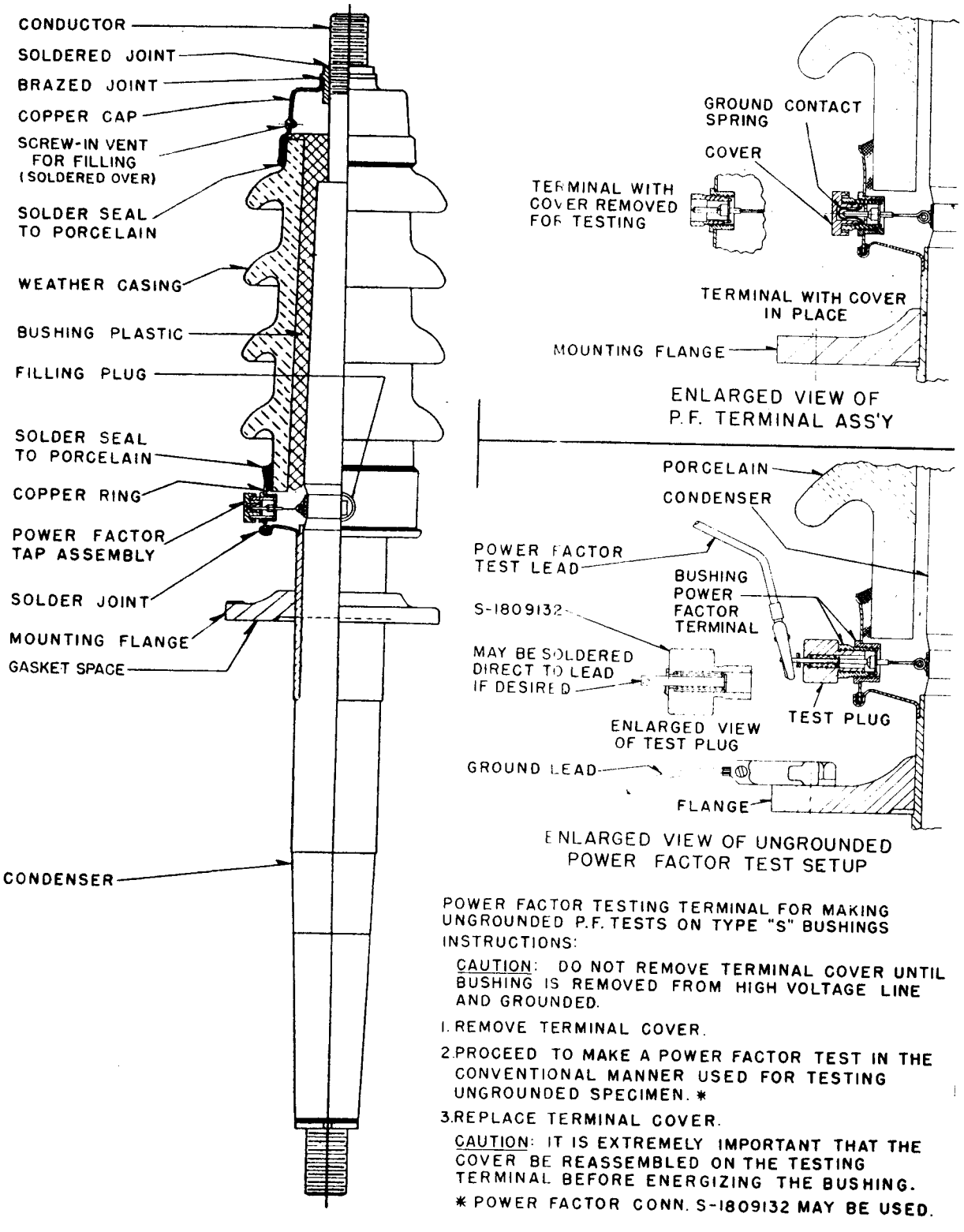
Do not use cement on the gasket between the main flange and the mounting boss on the circuit breaker.

POWER FACTOR MEASUREMENT

Check the power factor and capacitance of bushings that have been in storage before using.

An insulated power factor tap is brought out at the flange on the new ASA standard bushings for making ungrounded power factor tests, when desired (see Figure 2). By the ungrounded power factor method*, power factor tests can be obtained on the bushing alone and exclude outer parts connected to the bushing (see Figure 1).

**Note: The bushings may also be given a power factor test by the standard grounded method if so desired.*



POWER FACTOR TESTING TERMINAL FOR MAKING UNGROUNDED P.F. TESTS ON TYPE "S" BUSHINGS

INSTRUCTIONS:

CAUTION: DO NOT REMOVE TERMINAL COVER UNTIL BUSHING IS REMOVED FROM HIGH VOLTAGE LINE AND GROUNDED.

1. REMOVE TERMINAL COVER.
2. PROCEED TO MAKE A POWER FACTOR TEST IN THE CONVENTIONAL MANNER USED FOR TESTING UNGROUNDED SPECIMEN. *
3. REPLACE TERMINAL COVER.

CAUTION: IT IS EXTREMELY IMPORTANT THAT THE COVER BE REASSEMBLED ON THE TESTING TERMINAL BEFORE ENERGIZING THE BUSHING.

* POWER FACTOR CONN. S-1809132 MAY BE USED.

FIG. 1. Cross Section of Outdoor Condenser Bushing, ASA Standard Type "S"

Caution: Do not remove terminal cover until bushing is removed from high voltage line and grounded (See Figure 1).

To measure the power factor of the bushing, remove the cap and spring from the testing terminal. The outermost layer of the condenser is then insulated from the grounded flange by means of the insulator in the terminal assembly. The terminal should be connected to the ground shield of the test set and the flange to ground. A testing fixture (Style #1809132) provides a convenient means for making the lead accessible for test clips. It guards against accidental grounding during the test procedure and prevents dangerous mechanical strains on any parts of the terminal. This fixture (identified by Style Number) may be ordered from the East Pittsburgh plant. Test potential can be applied to the bushing lead and only the losses in the bushing insulation will be recorded by the meter.

Caution: It is extremely important that the cover be reassembled on the testing terminal before energizing the bushing.

Important: Connections to the outside end of the bushing should be made so as to avoid stresses on the bushing from expansion or contraction of the lead with temperature changes.

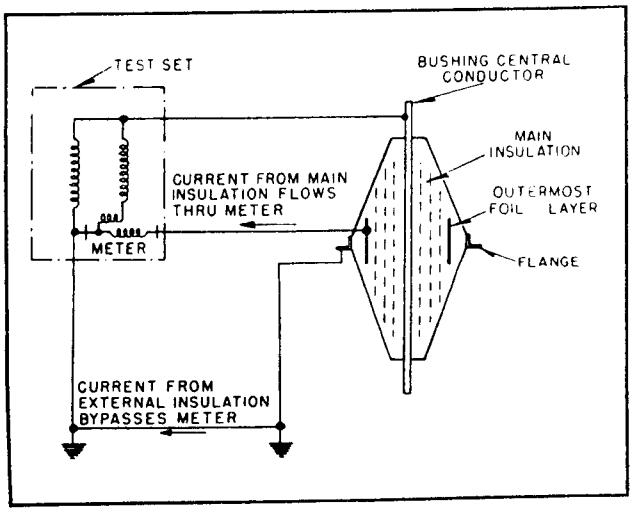


FIG. 2. Connections for Power Factor Testing, Using the "Ungrounded Specimen" Method

MAINTENANCE

To maintain the insulating strength of these bushings at the original value, the insulating surfaces must be kept clean and free from accumulations of dirt or other foreign material. The bushings should be given periodic visual inspection for physical damage, bad connections, etc.

If power factor testing schedules have been established, the power factor and capacitance should be measured prior to being put into service and thereafter at intervals according to the established schedule.

Important: The correct values of the bushing power factor may be greatly distorted if the porcelain surface is dirty or if the "De-ion" grids have a high power factor.

High power factor in the "De-ion" grids is not detrimental to the operation in any way except that they give erroneous results on bushing power factor tests.

If power factors are higher than expected, the surfaces should be cleaned and the "De-ion" grids either shielded or removed for the test. To shield the grid, cover all sides with a screen of metal connected to the metal contacts. The size of openings in the shield should not be over 2½ inches square. With the bushing cleaned and grids shielded or removed, the power factor should not exceed the allowed value. (See Bushing Manual).

It should rarely be necessary to repair or rebuild solder seal type bushings. Repairs in the field should be limited to repairs of minor injuries such as damage to threads or finish and replacing power factor insulator assembly.

If the test terminal itself becomes damaged, or the insulator inside the terminal is broken, it is possible to replace the terminal assembly without removing any other part of the bushing.

To replace a testing terminal in the field it is necessary to remove the bushing from the breaker and lay it on its side with the defective terminal uppermost. This will permit removal of the terminal without loss of insulating oil or compound.

To remove the defective terminal the cap and spring assembly must be taken off first. Then sufficient heat to melt the solder on the end of the cable lead should be maintained while the test terminal is turned out of the flange. If the solder is allowed to harden the cable will twist off and necessitate shop repairs.

To assemble a new terminal in the flange, apply cement #6499-2 to the threads and fish the lead from the condenser through the tube in the terminal while the terminal body is screwed into place. Solder the end of the cable into the outer end of

the tube using rosin core solder. Avoid excess solder on the outside of the tube. Clean rosin flux from the insulator by flushing with benzine. Pressure test can be applied by placing the entire bushing in a 90° C oven for four hours and inspecting for leaks.

Finally assemble the cap and spring assembly to ground the terminal to the flange.

RENEWAL PARTS

To order a new terminal specify power factor testing terminal, and give bushing drawing number, stock order and serial number. A complete terminal will be supplied for the particular bushing.

Damaged threads may be repaired by running a die over the injured part. The thread size used on standard bushings is 1½-12.

Injuries to the condenser surface finish (if they are not too deep) may be repaired by sanding lightly to remove damaged material. Refinish with six coats of Westinghouse #7623-1 varnish. Each coat of varnish should be baked at 90°C for 4 hours, or allowed to air-dry for 24 hours before the next coat is applied. (If baking is used, the bushing should be set upright and the breather screw in the cap removed.)

REPLACING THE WEATHER CASING

Where the required facilities such as ovens and soldering equipment are available, a broken weather casing may be readily replaced. The weather casing, consisting of the porcelain with the spun or drawn copper cap on the upper end and a copper ring on the lower end, is a factory assembled unit in which the parts are joined together by soldering.

Note: No attempt should be made to unsolder, or re-solder these joints except by a specially trained operator. While soldering the fittings to the stud, or to the bottom diaphragm, the porcelain-to-metal soldered joint should be protected from excessive heat by wrapping with strips of wet felt about 2 inches wide and ⅜ inch thick.

Use an oxygen-acetylene torch with a tip adjusted to produce a small blue flame. Move the flame continuously around the solder joint (or rotate the bushing) to avoid overheating in spots. Use non-corrosive flux, "rosin-alcohol", Westinghouse M#751-1 or the equivalent.

Removal of Weather Casing

1. Unsolder and remove the screw in the side of the cap to open the breather hole. Unsolder copper disc cover from the filling opening in the copper ring at flange and remove counter sunk pipe plug. Place the bushing in a 90°-100°C oven for bushing plastic to soften and run out.

2. With the bushing inverted apply the torch flame to the soldered joint between the copper ring and the flange diaphragm, until all the solder runs out. Tap the outer edge of the flange diaphragm gently to move it slightly away from the copper ring.

3. Apply the torch flame to the soldered joint between the conductor and the cap nut until all solder runs out.

4. Remove the weather casing by rotating it counter-clockwise.

5. Remove the remaining bushing plastic from the condenser and porcelain with warm transformer oil. Thoroughly clean the parts to be soldered with benzine or gasoline.

Installation of Weather Casing

1. If necessary, run a die over the threads of the condenser lead. For threads per inch information refer to general maintenance section.

2. Re-tin the groove in the flange diaphragm and the threads of the condenser lead. (All parts and materials must be clean. Dirty parts, or dirty tools will result in leaky joints.)

3. With the bushing upright, place the weather casing over the condenser and turn it clockwise until the copper ring touches the bottom of the groove in the flange diaphragm. Tap lightly all around on the bottom of the diaphragm groove to press the diaphragm firmly against the copper ring.

4. Apply the torch flame to the cap nut and conductor, and add enough solder to close the opening between the two parts. Flux the surface with Westinghouse Flux M#751 and continue the soldering to make a smooth joint between the cap nut and conductor with a slope to shed water.

5. Heat the corresponding surfaces of the copper ring, and flange diaphragm. Flux with Westinghouse Flux M#751 and feed solder gradually into the groove to form a smooth surface with a slope to shed water.

6. Place the self-tapping screw in the breathing hole of the cap and solder over lightly.

7. Test solder joints by applying 15 lbs. per square inch of dry air or nitrogen gas pressure through the filling hole in the copper ring. Paint thick soap lather over the solder joints to detect any leaks. If leaks are found, resolder and retest.

8. Remove the screw from the breather hole. Screw a pipe into the filling hole in the copper ring, with a valve inserted not over six inches away. Extend the pipe upward parallel to the bushing conductor to a height greater than the bushing. Provide a funnel at the end of the pipe for pouring the bushing plastic.

9. Set the bushing in an upright position in a 90°C oven for at least one hour. Pour bushing plastic M# 7399-1 heated to 125°C into the funnel until the plastic starts to run out of the breather hole in the side of the cap. This gives the correct height of plastic in the bushing and gas expansion space in the cap. Close valve and move the bushing to room temperature for two hours. Remove the pipe and insert the counter-sunk pipe plug in the filling hole.

10. Clean the plastic from the filling plug and the breather hole. Place the copper disc in the filling hole and seal by solder all around edge. Place self-tapping screw into cap hole and solder over to seal.

Important: All plastic must be removed from the surfaces to be joined. Even small amounts of plastic will form gas during the hardening of the solder, and produce leaky joints.

11. Clean the bushing and paint the metal parts. Give 60 cycle insulation and dielectric loss tests.

Instructions for field testing and maintenance are given in the Westinghouse Manual for Outdoor Bushings—Technical Data # 33-360.

Comparable instructions for Outdoor Transformer Bushings Type "S" are given in I.L. 46-719-7.

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