

**AUTOTRANSFORMERS
CONTINUOUSLY TAPPED TYPE
MANUALLY OPERATED**

**KS-5657, KS-15594, KS-15646, KS-15814, KS-15831, KS-15843,
AND KS-15955**

REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of KS-5657, KS-15594, KS-15646, KS-15814, KS-15831, KS-15843, and KS-15955 manually operated, continuously tapped type autotransformers. It also covers approved procedures for replacing these parts.

1.02 This section is reissued to add parts replacement information for the KS-15955 autotransformer. Detailed reasons for reissue are listed at the end of this section.

1.03 Part 2 of this section covers the parts which may be replaced in the field in the maintenance of this apparatus. No attempt should be made to replace parts not designated. Part 2 also contains explanatory figures showing the different parts. This information is called Replacement Parts.

1.04 Part 3 of this section covers the approved procedures for the replacement of parts

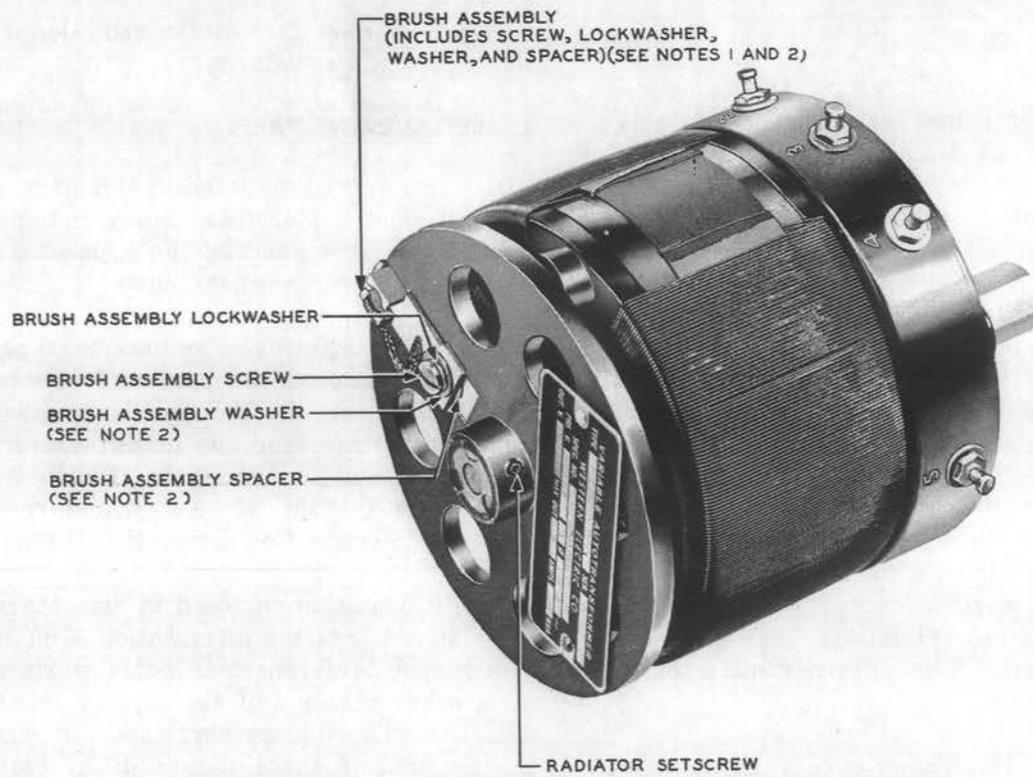
covered in Part 2. This information is called Replacement Procedures.

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replacement parts in their proper relation to other parts of the apparatus and the names of the replacement parts.

2.02 When ordering a replacement part, give the name of the part and the following nameplate data: the KS and list number of the autotransformer, and the manufacturer's name and serial number. Example: Brush Assembly for KS-5657, List 13 Autotransformer; The Superior Electric Co; Serial No. 1643.

2.03 Information enclosed by parentheses () is not ordering information. This information may be references to notes, parts referred to in other portions of the section and not considered replaceable, or part names in general use in the field if these names differ from those assigned by the manufacturer.

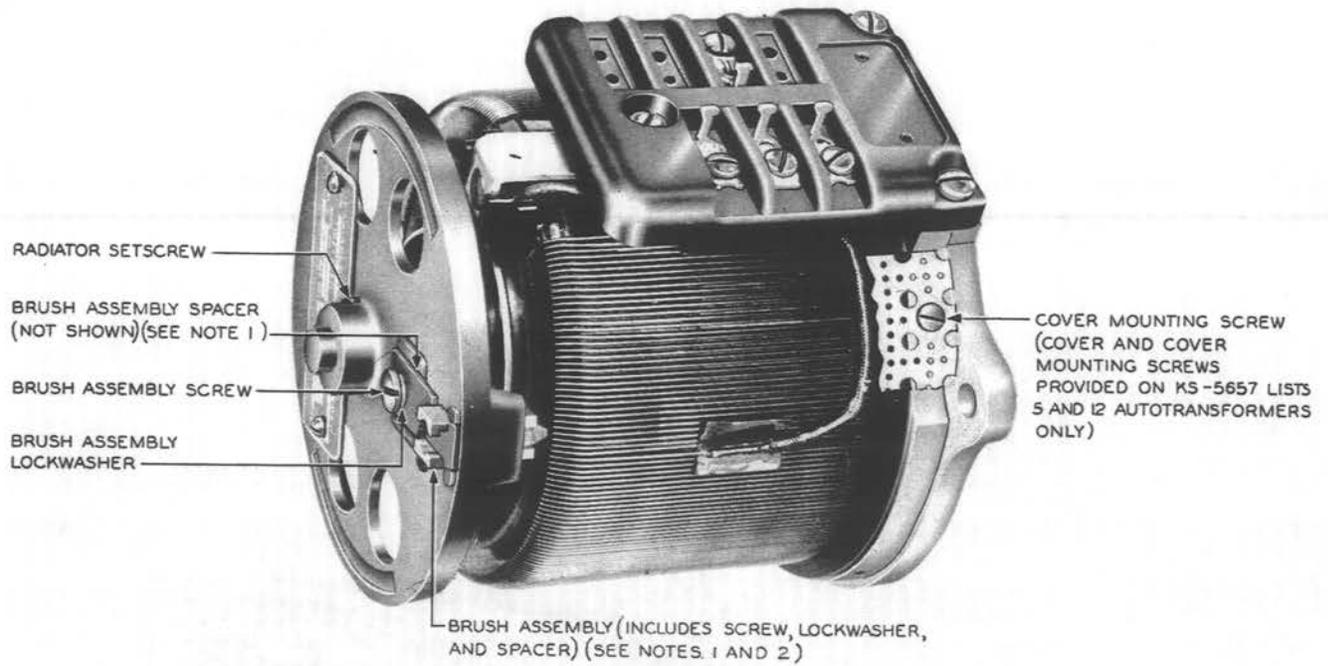


MOUNTING NUT, LOCKWASHER, AND SHAFT LOCKNUT (NOT SHOWN) (FOR MOUNTING
KS-15831 AUTOTRANSFORMER)

NOTE 1: KS-15594 AUTOTRANSFORMER BRUSH ASSEMBLY HAVING EXTERNAL SPRING
SHOULD BE REPLACED WITH INTERNAL SPRING BRUSH ASSEMBLY SHOWN.

NOTE 2: KS-15831 AUTOTRANSFORMER BRUSH ASSEMBLY DOES NOT INCLUDE WASHER
AND SPACER.

**Fig. 1 – KS-15594 and KS-15831 Autotransformers Equipped With Brush Assembly Having Internal Spring
(KS-15594 Autotransformer Illustrated)**



NOTE 1: SPACER IS USED ONLY IF BRUSH MOUNTING SURFACE ON RADIATOR HAS RECESS.
 NOTE 2: BRUSH ASSEMBLY HAVING EXTERNAL SPRING SHOULD BE REPLACED WITH INTERNAL SPRING BRUSH ASSEMBLY SHOWN.

Fig. 2 – KS-5657 Autotransformer Equipped With Brush Assembly Having Internal Spring

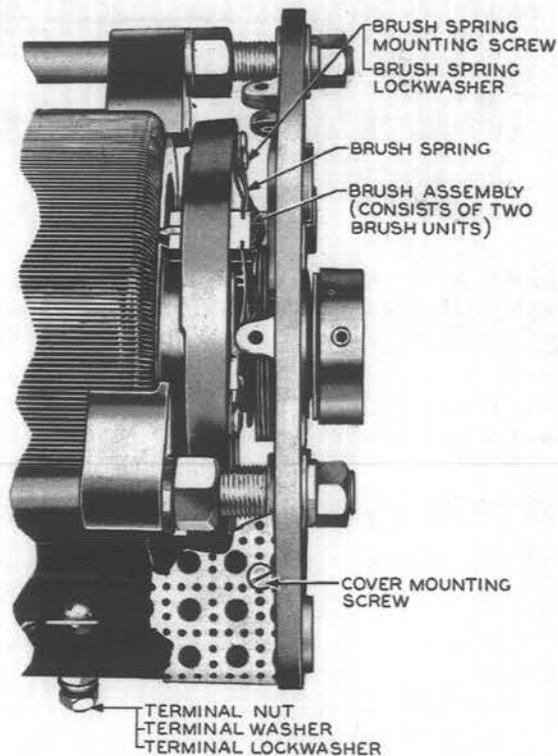
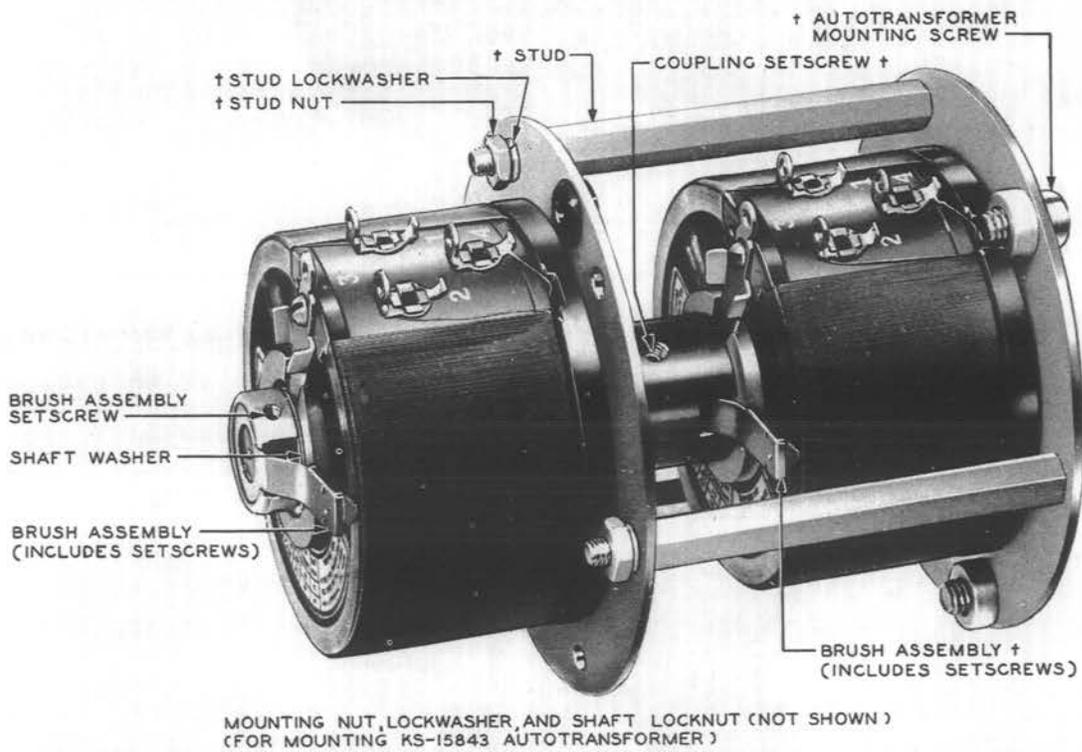


Fig. 3 – KS-15646 Autotransformer



† NOT USED ON KS-15843 AUTOTRANSFORMER

**Fig. 4 – KS-15814 (Double Unit) and KS-15843 (Single Unit) Autotransformers
(KS-15814 Autotransformer Illustrated)**

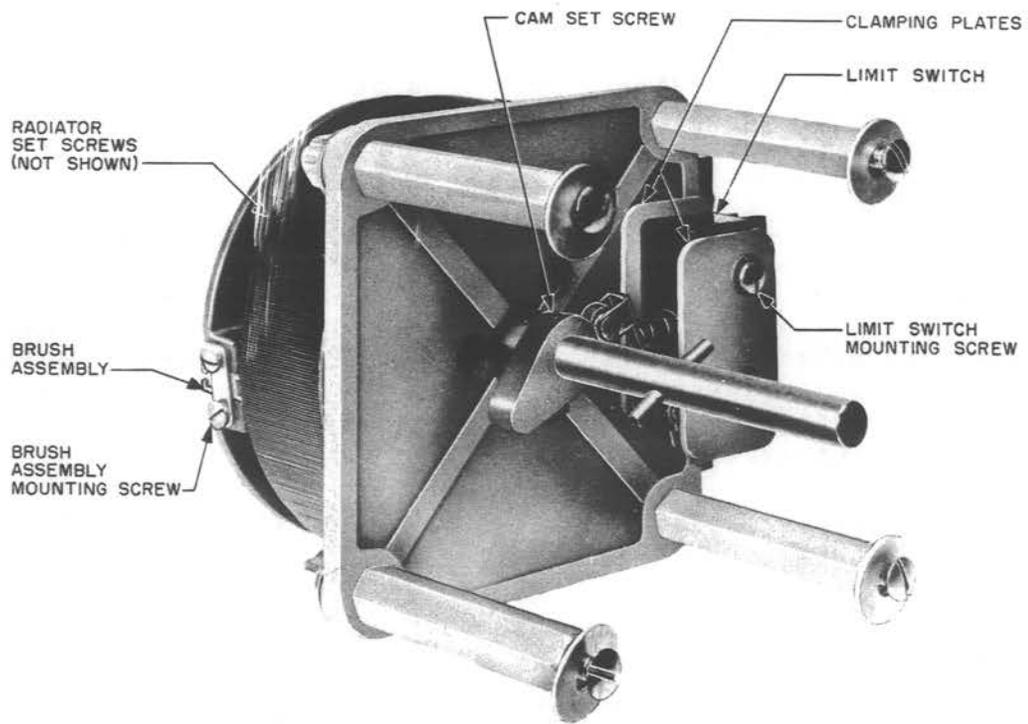


Fig. 5 - KS-15955 Autotransformer

SECTION 028-705-801

3. REPLACEMENT PROCEDURES

3.01 List of Tools and Materials (Equivalents may be substituted)

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
245	3/8- and 7/16-Inch Open Double-End Flat Wrench
417A	1/4- and 3/8-Inch Open Double-End Flat Wrench
KS-6320	Orange Stick
KS-6854	Screwdriver
R-2670	3/32-Inch Allen Socket Screw Wrench
R-2958	5/64-Inch Allen Socket Screw Wrench
R-2959	1/16-Inch Allen Socket Screw Wrench
—	10-Inch Hand Bellows
Γ—	3-Inch C Screwdriver or the Replaced 3-Inch Cabinet Screwdriver
—	4-Inch E Screwdriver or the Replaced 4-Inch Regular Screwdriver

MATERIALS

KS-14666	Cloth
—	8/0 Sandpaper

3.02 Before making any replacements, remove the autotransformer from service. If necessary to gain access to the parts to be replaced, remove the autotransformer cover, if provided, or remove the autotransformer from its mounting.

3.03 After making any replacement of parts on an autotransformer, the part or parts replaced and other parts whose adjustments may have been directly disturbed by the replacing operations shall meet the requirements covered in Section 028-705-701.

3.04 No replacement procedures are specified for screws or other parts where the procedure consists of a simple operation.

Brush Assemblies

Γ 3.05 KS-5657, KS-15594, KS-15831, and KS-15955 Autotransformers (Fig. 1, 2, and 5)

(1) Removing Brush Assembly

(a) **Assembly Having Internal Spring:** Remove the brush assembly screw or screws and associated washers and remove the brush assembly from the radiator. Take care to avoid dropping washers or spacers.

(b) **Assembly Having External Spring:** Loosen the locknut on the brush pressure adjusting screw and unsolder the seal between the head of the screw and the brush spring. Remove the adjusting screw, brush spring, and brush holder from the radiator.

(2) Mounting Brush Assembly

(a) **KS-5657 and KS-15594 Autotransformers:** Place the lockwasher and flat washer, if provided, on the brush assembly mounting screw with the lockwasher adjacent to the head of the screw. Insert the screw through the brush holder mounting plate. For the KS-15594 autotransformer, place the spacer (thin washer) on the screw. For the KS-5657 autotransformer, place the spacer furnished with the new brush assembly on the screw only if there is a recess around the hole in the radiator for the screw; otherwise, a spacer is not required. Mount the assembly on the radiator and securely tighten the screw. Fit the brush contact surface to the commutator as covered in (3).

(b) **KS-15831 Autotransformer:** Insert the new brush assembly into the radiator slot so that the side on which the brush is flush with the holder is outermost. Place a lockwasher on each brush assembly screw and securely tighten the screws. Fit the brush contact surface to the commutator as covered in (3).

(c) **KS-15955 Autotransformer:** Insert the new brush assembly into the radiator slot so that the projecting portion of the

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brush assembly mounting bracket is innermost and adjacent to the radiator surface facing the commutator. Place a lockwasher on each brush assembly screw and securely tighten the screws. Fit the brush contact surface to the commutator as covered in (3).

(3) **Fitting Brush Contact Surface To Commutator:** Using a KS-6320 orange stick, if necessary, raise the brush from the commutator and insert the strip of 8/0 sandpaper between the brush and commutator with the abrasive side of the sandpaper toward the brush. Release the brush. Move the brush a few times back and forth over the sandpaper. Raise the brush from the sandpaper and remove the sandpaper. Remove carbon particles which may have been deposited on the commutator and associated parts using the 10-inch hand bellows or a clean KS-14666 cloth. Then, work in the brush by moving it over the commutator several times. Again remove carbon particles.

3.06 KS-15646 Autotransformer: Fig. 3

(1) The brush assembly for this autotransformer consists of two brush units. When replacing a brush assembly, replace both units.

(2) **Removing Brush Assembly:** Remove the brush spring mounting screw and lockwasher which secures the brush shunt terminal on one of the brush springs. Slightly loosen the other brush spring mounting screw and swing the spring outward to disengage it from the brush units. Disengage the other brush spring from the brush units in a similar manner. Then, withdraw both brush units from the slot in the radiator.

(3) **Mounting Brush Assembly:** Insert the two new brush units into the radiator slot as follows. Place the brush units together so that the sides on which the brush is flush with the holder are against each other. Insert the two brush units into the radiator slot so that the brushes extend radially across the commutator surface. Swing one of the brush springs into engagement with the slots in both brush units. Place the lockwasher on the mounting screw and insert the screw through the hole in

the brush shunt terminal. Position the brush shunt terminal and screw on the spring and securely tighten both mounting screws. Similarly, engage the other brush spring in the slots of both brush units, mount the brush shunt terminal, and securely tighten the mounting screws with the lockwashers in place. Make sure that the brush shunts lie as close to the radiator as possible so that they do not touch the frame when the radiator is rotated between the brush stops. Fit the brush contact surface to the commutator as covered in 3.05(3), raising both brushes from the commutator when inserting the sandpaper.

3.07 KS-15814 and KS-15843 Autotransformers: Fig. 4

(1) **KS-15843 Autotransformer and Outer Unit of KS-15814 Autotransformer:** To replace the brush assembly, loosen the brush assembly setscrews and remove the assembly from the shaft without removing the shaft washer. Making sure that the concave surface of the shaft washer is outward, mount the new brush assembly on the shaft and securely tighten the setscrews. Fit the brush contact surface to the commutator as covered in 3.05(3).

(2) Inner Unit of KS-15814 Autotransformer

(a) **Removing Brush Assembly:** To remove the brush assembly, first remove the outer unit, as follows. Unsolder and disconnect the lead from terminal 1 of the outer unit. Remove the stud nuts and lockwashers and remove the outer unit. Loosen the brush assembly setscrews and remove the brush assembly from the shaft without removing the shaft washer.

(b) **Mounting Brush Assembly:** Making sure that the concave surface of the shaft washer is outward, mount the new brush assembly on the shaft and securely tighten the setscrews. Then, remount the outer unit so that the terminals of both units are in alignment and the coupling extends over the brush assembly of the inner unit with the slot in the coupling engaging the brush holder. Place the lockwashers and

nuts on the studs and securely tighten the nuts. Reconnect and solder the lead to terminal 1 of the outer unit. Fit the brush contact surface to the commutator as covered in 3.05(3).

Brush Springs

3.08 *KS-15646 Autotransformer: Fig. 3*

(1) **Removing Brush Spring:** Remove both brush spring mounting screws and associated lockwashers and remove the brush spring.

(2) **Mounting Brush Spring:** Place a lockwasher on one of the brush spring mounting screws and insert the screw through the hole adjacent to the end of the brush spring. Position the spring and screw on the radiator and partially tighten the screw. Engage the free ends of the spring in the slots of both brush units. Place a lockwasher on the other mounting screw and insert the screw through the hole in the brush shunt terminal. Position the brush shunt terminal and screw on the spring and securely tighten both mounting screws. Make sure that the brush shunt lies as close to the radiator as possible so that it does not touch the frame when the radiator is rotated between the brush stops.

Shaft Washers

3.09 *KS-15814 and KS-15843 Autotransformers: Fig. 4*

(1) **KS-15843 Autotransformer and Outer Unit of KS-15814 Autotransformer:** Loosen the brush assembly setscrews and remove the brush assembly from the shaft. Remove the shaft washer. Mount the new shaft washer with the concave surface outward. Remount the brush assembly on the shaft and securely tighten the setscrews.

(2) *Inner Unit of KS-15814 Autotransformer*

(a) **Removing Shaft Washer:** To remove the shaft washer, remove the outer unit from the studs and remove the brush assembly from the inner unit as covered in 3.09(2) (a). Then, remove the shaft washer.

(b) **Mounting Shaft Washer:** Mount the new shaft washer with the concave surface outward. Remount the brush assembly and the outer unit as covered in 3.07(2) (b).

Limit Switch

3.10 *KS-15955 Autotransformer: Fig. 5*

(1) **Removing Limit Switch:** Remove the two limit switch mounting screws and associated lockwashers and then remove the switch and clamping plates.

(2) **Mounting Limit Switch:** Position the new switch with the clamping plates on the autotransformer. Replace the mounting screws and lockwashers and securely tighten the screws.

REASONS FOR REISSUE

1. To add Fig. 5.
2. To omit the 3-inch cabinet screwdriver and 4-inch regular screwdriver and to replace them with the 3-inch C-screwdriver, and 4-inch E-screwdriver, respectively. (3.01)
3. To revise brush assembly replacement procedures to include the KS-15955 autotransformer. (3.05)
4. To add replacement procedure for the limit switch of the KS-15955 autotransformer. (3.10)