AUTOTRANSFORMERS
CONTINUOUSLY TAPPED TYPE
MOTOR DRIVEN
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-5552, KS-5621, KS-5702, KS-5775, KS-15581, KS-15583, KS-15585, KS-15680, KS-15682, KS-15683, KS-15684, KS-15685, KS-15779 continuously tapped motor-driven autotransformers and the autotransformers of the KS-15508 motor-driven, tapped autotransformer-type regulators. It also covers approved procedures for replacing these parts.

1.02 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.

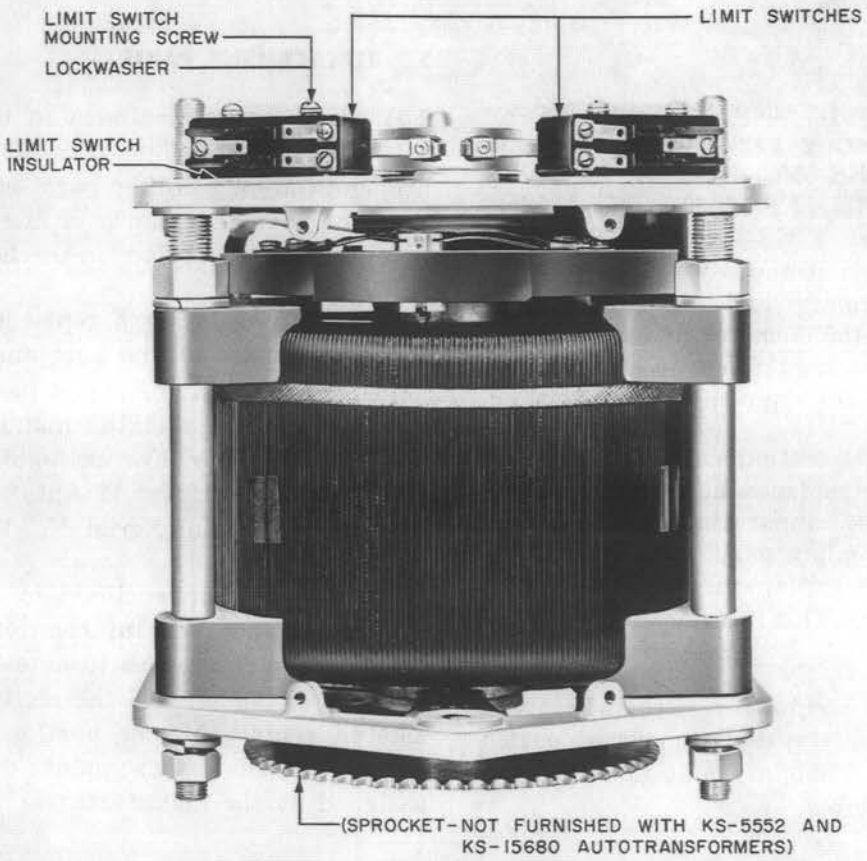
1.03 Part 3 of this section covers the approved procedures for the replacement of parts covered in Part 2. This information is called Replacement Procedures.

2. REPLACEMENT PARTS

2.01 The figures included in this part of the section show the various parts in their proper relation to other parts of the apparatus together with the names of the parts which it is practicable to replace in the field.

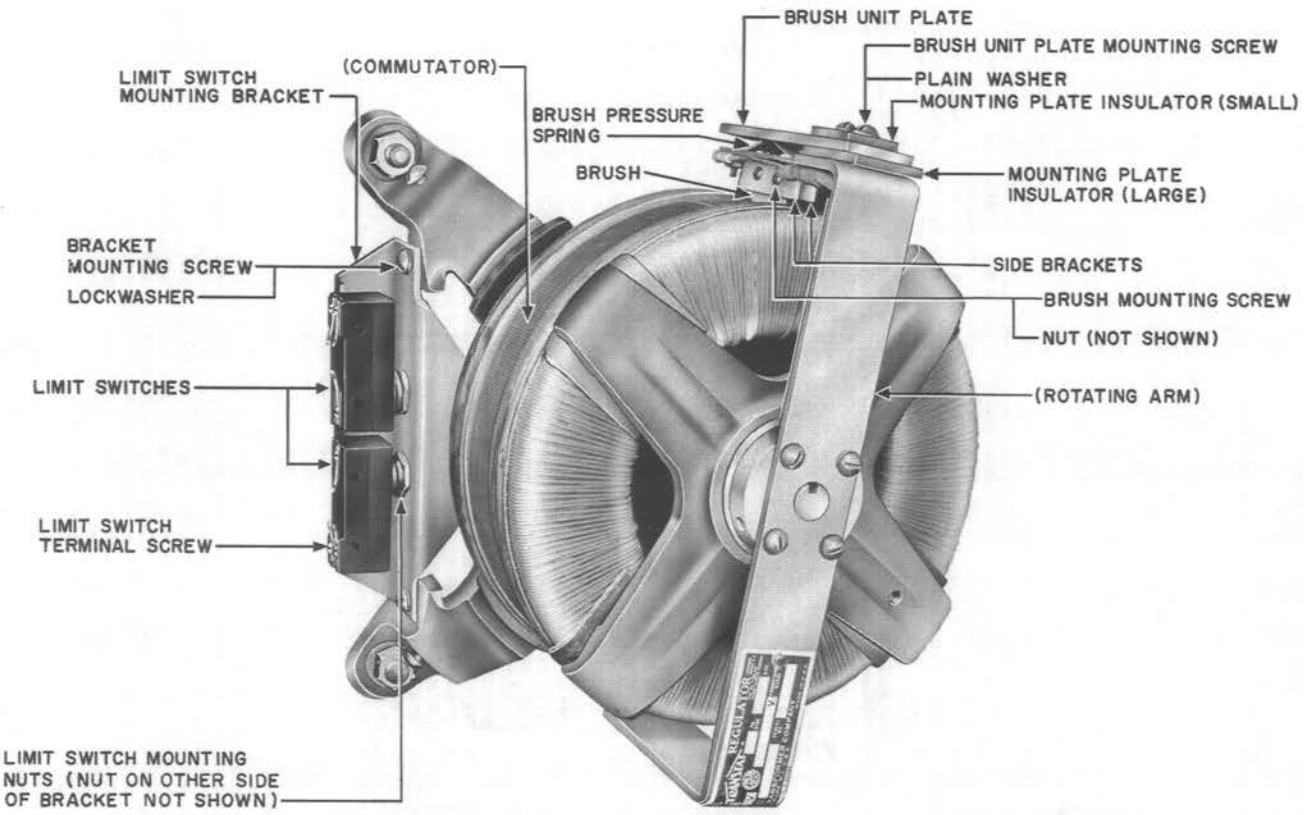
2.02 When ordering a replacement part, give the name of the part and the following nameplate data: the KS and list number of the autotransformer, and the manufacturers name and serial number. For example: Brush Assembly for KS-15680, List 11 Autotransformer; Superior Electric Co; Serial No. 1763.

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.



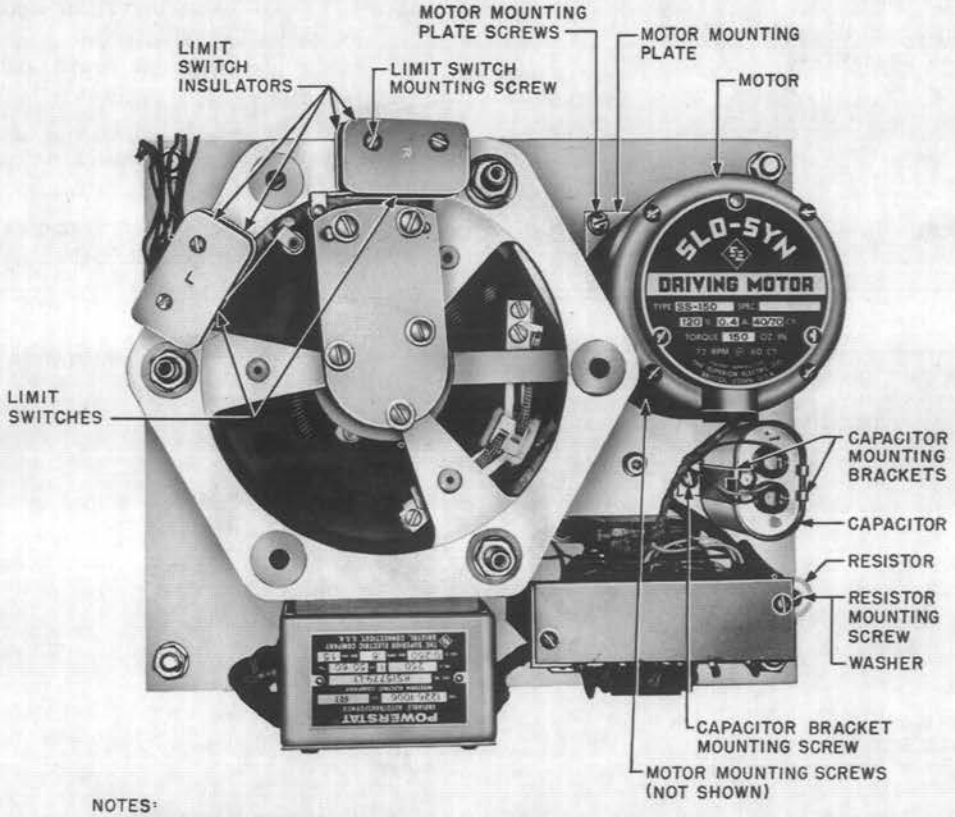
NOTES: 1. THE MOTOR AND CAPACITOR ARE NOT FURNISHED AS PART OF THE AUTOTRANSFORMER AND ARE NOT SHOWN. TO ORDER THE MOTOR (FURNISHED WITH CAPACITOR) OR CAPACITOR, GIVE THE THE KS AND LIST NUMBER OF THE MOTOR, AND THE MANUFACTURERS NAME AND SERIAL NUMBER.
2. FOR BRUSH ASSEMBLIES, SEE FIGURE 6.
3. FOR FUSE WIRE, SEE FIGURE 7.

Fig. 1 – KS-5552 (Superior Electric Co Powerstat), KS-15585, KS-15680, and KS-15685 Autotransformers (KS-15685 autotransformer shown)



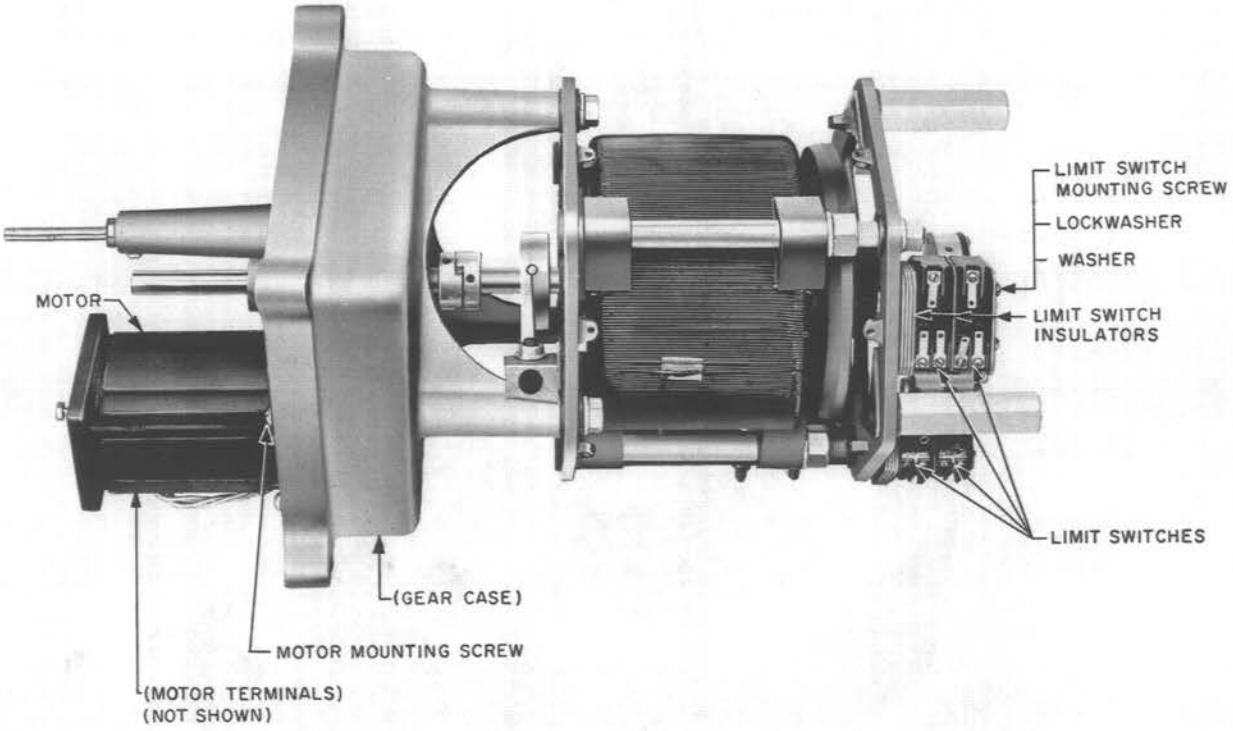
NOTE: THE MOTOR AND CAPACITOR ARE NOT FURNISHED AS PART OF THE AUTOTRANSFORMER AND ARE NOT SHOWN. TO ORDER THE MOTOR (FURNISHED WITH CAPACITOR) OR CAPACITOR, GIVE THE KS AND LIST NUMBER OF THE MOTOR, AND THE MANUFACTURERS NAME AND SERIAL NUMBER.

Fig. 2 – KS-5552 Autotransformer (American Transformer Co Transtat)



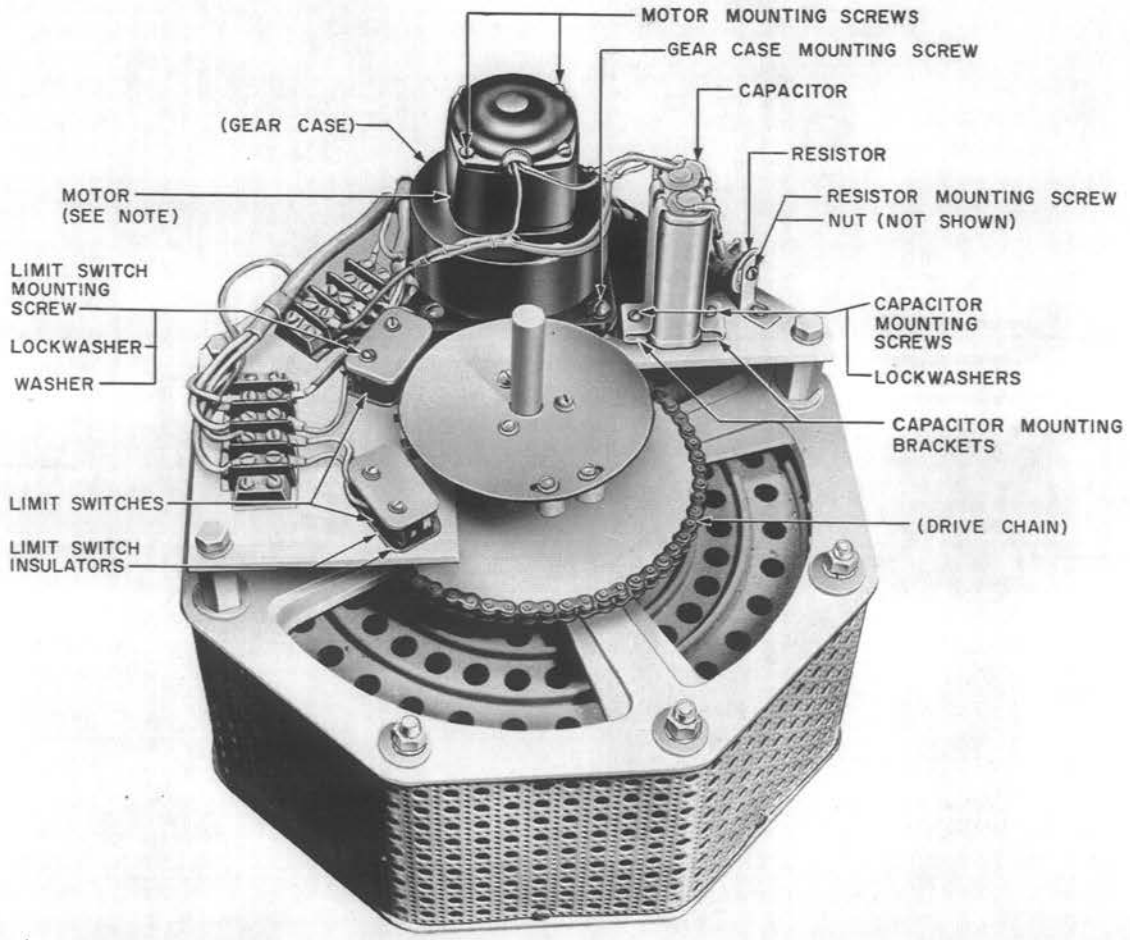
NOTES:
1. FOR BRUSH ASSEMBLIES, SEE FIG. 6
2. WHEN ORDERING THE MOTOR, ALSO ORDER THE CAPACITOR.

Fig. 3 – KS-5621, KS-5702, KS-15779 Autotransformers and Autotransformers of KS-15508 Regulators (KS-15779 autotransformer shown)



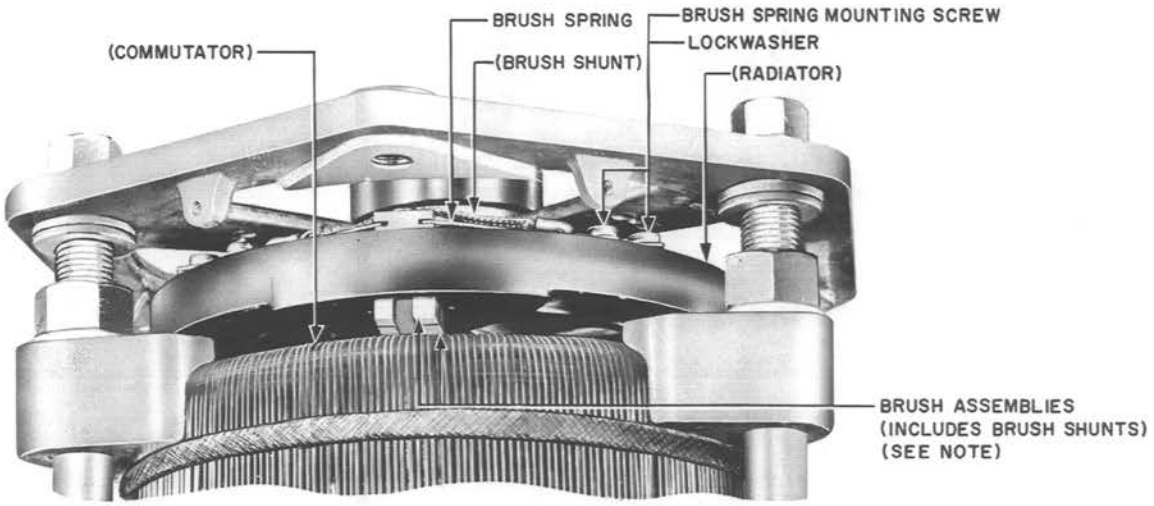
NOTE:
FOR BRUSH ASSEMBLIES, SEE FIGURE 6

Fig. 4 – KS-5775, KS-15581, KS-15682, and KS-15683 Autotransformers (KS-15682 autotransformer shown)



NOTES:
1. WHEN ORDERING THE MOTOR, ALSO ORDER THE CAPACITOR.
2. FOR BRUSH ASSEMBLIES, SEE FIGURE 6.

Fig. 5 – KS-15583 and KS-15684 Autotransformers



NOTE: P-TYPE BRUSHES USED IN THE KS-15680, KS-15682, KS-15683, KS-15684, KS-15685 AUTOTRANSFORMERS, AND THE AUTOTRANSFORMERS OF KS-15508 REGULATORS ARE INTERCHANGEABLE WITH OLD TYPE BRUSHES, BUT THE OLD TYPES CANNOT BE USED IN UNITS HAVING PLATED COMMUTATORS.

Fig. 6 – Brush Assemblies — All Autotransformers Except KS-5552 Autotransformer (American Transformer Co Transtat) [KS-5552 autotransformer (Superior Electric Co Powerstat) shown]

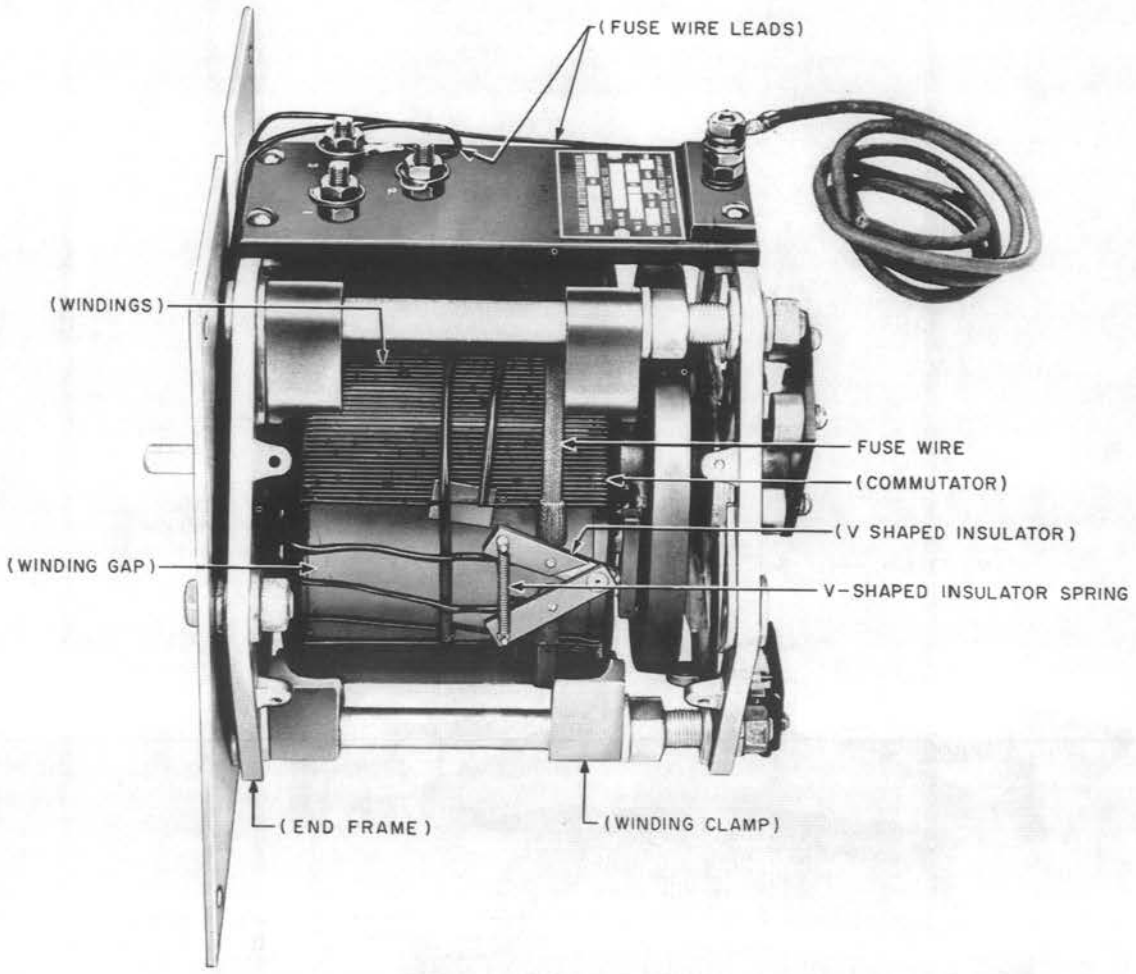


Fig. 7 – Fuse Wire — KS-5552, KS-15585, KS-15680, and KS-15685 Autotransformers (KS-15680 autotransformer shown)

3. REPLACEMENT PROCEDURES

3.01 *List of Tools and Materials*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
417A	1/4- and 3/8-Inch Hex. Open Double-End Wrench
563A	Offset Screwdriver
KS-6320	Orange Stick
KS-6854	Screwdriver
R-1542	3/4-Inch Adjustable Wrench
R-2670	3/32-Inch Allen Socket Screw Wrench
R-2959	1/16-Inch Allen Socket Screw Wrench
—	Long-Nose Pliers
—	4-Inch B Screwdriver
—	4-Inch E Screwdriver
—	5-Inch E Screwdriver
—	10-Inch Hand Bellows
MATERIALS	
KS-14666	Cloth
—	8/0 Pouncing Paper

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, the part or parts replaced and other parts whose adjustments may have been disturbed by the replacing operations shall meet the requirements covered in Section 028-706-701.

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

Motor

3.05 Although the motor for the KS-5552, KS-15585, KS-15680, and KS-15685 autotransformers is not furnished as part of the autotransformer, procedures for replacing the motor of these autotransformers are covered in 3.07 and 3.11.

3.06 When replacing a motor, also replace the capacitor associated with the motor as covered in 3.12.

3.07 ***KS-5552 and KS-15680 Autotransformers***

(1) Tag the motor leads for reference when connecting the leads of the new motor. Using the 4-inch E screwdriver, disconnect the motor leads from the terminal block.

(2) If the motor is mounted on a removable bracket, remove the bracket mounting screws using the 4-inch E screwdriver and remove the bracket with the motor.

(3) Using the 4-inch E screwdriver, loosen the two motor mounting screws while holding the nuts at the rear of the bracket with the R-1542 adjustable wrench. Then, support the motor, remove the mounting screws, and remove the motor from the bracket. Take care not to lose the lockwasher under each nut.

(4) Using the proper size Allen wrench, loosen the two setscrews and remove the coupling from the autotransformer shaft. The new motor is equipped with a complete coupling which should be used.

(5) Mount the new coupling on the autotransformer shaft but do not tighten the setscrews. Then, mount the motor on the bracket and, if the bracket was removed, remount the bracket, securely tightening the screws.

(6) Engage the two halves of the coupling so that there is a clearance of approximately 1/64 inch between the end of the projections on one half and the bottom of the grooves on the other half. Securely tighten the setscrews.

(7) Connect the motor leads to the proper terminals on the terminal block, securely tightening the screws.

3.08 ***KS-5621, KS-5702, KS-15779 Autotransformers and Autotransformers of KS-15508 Regulators — Fig. 3***

(1) Tag the motor leads for reference when connecting the leads of the new motor. Using the 4-inch E screwdriver, disconnect the motor leads from the terminal block.

(2) Observe the position of the motor in order to similarly position the new motor. Using the 4-inch E screwdriver, loosen the motor mounting plate screws. Then, support the motor, remove the mounting plate screws, and remove the motor with the mounting plate. Remove the motor mounting screws on the rear of the plate and remove the plate from the motor.

(3) Mount the plate on the new motor, securely tightening the screws. Mount the motor and plate with the motor gear meshing with the gear on the autotransformer and partially tighten the screws. Making sure that the motor gear meshes freely with the gear on the autotransformer, securely tighten the screws.

(4) Connect the motor leads to their proper terminals on the terminal block, securely tightening the screws.

3.09 ***KS-5775, KS-15581, KS-15682, and KS-15683 Autotransformers — Fig. 4***

(1) Tag and disconnect the leads from the terminals on the motor using the 4-inch E screwdriver.

(2) Note the position of the motor for reference when mounting the new motor. Then, using the 4-inch B screwdriver, remove the motor mounting screws and remove the motor.

(3) Note the position of the gear with relation to the end of the motor shaft. Using the proper size Allen wrench, loosen the setscrew and remove the gear from the shaft. Then, place the gear in the same position on the shaft of the new motor with the setscrew in line with the flat on the shaft. Securely tighten the setscrew.

(4) Making sure that the gear on the motor shaft meshes freely with the gear in the gear case, mount the motor and securely tighten the screws.

(5) Connect the leads to the proper terminals on the motor, securely tightening the screws.

3.10 ***KS-15583 and KS-15684 Autotransformers — Fig. 5***

(1) Tag the motor leads for reference when connecting the leads of the new motor. Using the 4-inch E screwdriver, disconnect the leads from the terminal block.

(2) Two of the four screws on the end of the motor are mounting screws as shown in Fig. 5. Observe the position of the motor in order to similarly position the new motor. Using the 4-inch E screwdriver, remove the mounting screws and remove the motor.

(3) Mount the new motor making sure that its gear meshes freely with the gear in the gear box and securely tighten the mounting screws.

(4) Connect the motor leads to the proper terminals on the terminal block, securely tightening the screws.

3.11 ***KS-15585 and KS-15685 Autotransformers***

(1) Tag the leads for reference when connecting the leads of the new motor. Using the 4-inch E screwdriver, disconnect the motor leads from the terminal block.

(2) Using a pencil, mark the autotransformer sprocket and drive chain to obtain the same relation between the two when mounting the new motor. Also mark the vertical position of the motor mounting bracket for remounting it in the same position. Using the 4-inch E screwdriver, loosen the bracket mounting screws and lower the bracket and motor downward as far as the mounting screw slots in the bracket will allow. Then, remove the drive chain.

(3) Two of the four screws on the end of the motor are mounting screws. One is immediately counterclockwise of the nameplate and the second diagonally across from the first. Observe the position of the motor in order to similarly position the new motor. Support the motor and, using the 4-inch E screwdriver, remove the motor mounting screws and remove the motor.

(4) Mount the new motor on the mounting bracket and securely tighten the screws. Position the chain on the sprockets so that the lines marked on the chain and autotransformer sprocket in (2) will be in line when the motor mounting bracket is positioned as covered in (2). Position the bracket and securely tighten the mounting screws. Make sure that the chain properly engages both sprockets.

(5) Connect the motor leads to their proper terminals on the terminal block, securely tightening the screws.

Capacitor and Resistor

3.12 ***KS-5552, KS-5621, KS-5702, KS-15583, KS-15585, KS-15680, KS-15684, KS-15685, KS-15779 Autotransformers and Autotransformers of KS-15508 Regulators***

(1) A capacitor is used with the motor of these autotransformers and, in some cases, a resistor is also provided. To replace the capacitor or resistor, proceed as covered in (2).

(2) Unsolder and disconnect the leads at the capacitor or resistor terminals. Remove the mounting screw or screws and nuts, if provided, using the 4-inch E screwdriver and the R-1542 adjustable wrench. Remove the capacitor or resistor, taking care not to lose the washers, if provided. Mount the new capacitor or resistor in reverse order of removal and securely tighten the mounting screws. Solder the leads to the terminals.

Brushes

3.13 ***General:*** Except for the Transtat, KS-5552 Autotransformer supplied by American Transformer Co, all the autotransformers are provided with two brush assemblies. Replace

both assemblies as covered in 3.14 through 3.17 whenever one requires replacement.

3.14 *Making Brushes Accessible*

(1) If the autotransformer is provided with a perforated screen or guard plate, remove the screen or plate mounting screws, using the 4-inch E screwdriver, and remove the screen or plate.

(2) It will be necessary to rotate the radiator to gain access to the brush assemblies through one of the openings in the autotransformer frame and also to fit the new brushes to the commutator. To rotate the radiator, proceed as follows.

(a) ***KS-5552 and KS-15680 Autotransformers:*** Using the proper size Allen wrench, loosen the setscrews in the half of the coupling on the autotransformer shaft and disengage the coupling. Turn the radiator as required.

(b) ***KS-5621, KS-5702 Autotransformers and Autotransformers of KS-15508 Regulators:*** Tag and disconnect the motor leads from the terminal block using the 4-inch E screwdriver. Remove the motor mounting plate screws and washers, if washers are provided, and remove the plate with the motor. Turn the radiator as required.

(c) ***KS-5775, KS-15581, KS-15682, and KS-15683 Autotransformers:*** Push in and turn the manual adjusting shaft knob to rotate the radiator.

(d) ***KS-15583 and KS-15684 Autotransformers:*** Using a pencil, mark the autotransformer sprocket and drive chain to obtain the same relation between the two when remounting the chain. Using the 5-inch E screwdriver, remove the screws and lockwashers that secure the gear case and motor to the autotransformer. Disengage the drive chain from the autotransformer sprocket by tilting the gear case and motor. Turn the radiator as required.

(e) ***KS-15585 and KS-15685 Autotransformers:*** Using a pencil, mark the autotransformer sprocket and drive chain to obtain the same relation between the two when remounting the chain. Also mark the vertical position of the motor mounting bracket for remounting it in the same position. Using the 4-inch E screwdriver, loosen the bracket mounting screws and lower the bracket and motor as far as the screw slots in the bracket will allow. Then remove the drive chain. Turn the autotransformer sprocket to rotate the radiator.

(f) ***KS-15779 Autotransformer:*** Turn the gear on the motor shaft to rotate the radiator.

3.15 *Removing and Mounting Brushes*

(1) ***All Autotransformers Except Transtat — Fig. 6***

(a) Disengage both brush springs from the brush assemblies as follows. Using the 4-inch E screwdriver or the 563A offset screwdriver, remove the brush spring mounting screw and lockwasher which secures the brush shunt terminal. Loosen the other brush spring mounting screw and swing the spring outward to disengage it from brush assemblies. Then, withdraw both brush assemblies from the slot in the radiator.

(b) Place the new brush assemblies together so that the sides on which the brush is flush with the holder are against each other. Insert the brush assemblies into the radiator slot so that the brushes extend radially across the commutator surface. Swing one of the brush springs into engagement with the groove in both brush assemblies. Insert the screw with the lockwasher through the hole in the brush shunt terminal and mount the shunt terminal and brush spring. Securely tighten both brush spring screws. Similarly mount the other shunt terminal and brush spring. Make sure that the brush shunts lie as close to the radiator as possible so they will not touch the frame when the radiator is rotated.

(2) ***Transtat KS-5552 Autotransformer Supplied by American Transformer Co — Fig. 2***

(a) Using the 4-inch E screwdriver, remove the two screws and flat washers that secure the brush unit mounting plate and insulators to the rotating arm of the autotransformer and remove the insulators while holding the plate. Remove the plate,

withdrawing the plate pins from between the side brackets holding the brush, taking care not to lose the brush pressure spring positioned on the pins. Allow the brush and side brackets to hang temporarily on the lead.

(b) Using the 417A wrench to hold each nut, remove the brush mounting screws with the KS-6854 screwdriver. Remove the brush and the side bracket not having the lead.

(c) Insert the brush mounting screws through the holes in the side bracket connected to the lead. Place the new brush and the other side bracket on the screws and securely tighten the nuts on the screws.

(d) Insert the plate mounting screws with the washers through the holes in the small insulator and then through the slots in the plate from the side opposite the plate pins. Position the large spacer on the screws against the plate. Place the brush-pressure spring on the plate pins so that the bend at the center of the spring is against the plate. Insert the pins betwen the side brackets so that the brush is between the pins. Then, making sure that the brush is pressed properly against the commutator by the pressure spring, mount the unit on the autotransformer arm and securely tighten the screws.

3.16 ***Fitting Brush Contact Surface to Commutator***

(1) Using the KS-6320 orange stick, if necessary, raise the brush or brushes from the commutator and insert a strip of 8/0 pouncing paper between the brush and commutator with the abrasive side of the paper towards the brush. Release the brush or brushes and, by rotating the radiator, move them back and forth over the paper several times to fit the brush contact surface to the commutator. Then, raise the brushes and remove the paper.

(2) Using the 10-inch hand bellows or a clean KS-14666 cloth, remove any carbon particles which may have been deposited on the commutator and associated parts. Then, work in the brush by moving it back and forth over the commutator several times. Again remove carbon particles.

3.17 ***Remounting Parts***

(1) ***KS-5552 and KS-15680 Autotransformer:*** Engage the two halves of the coupling so that there is a clearance of approximately 1/64 inch between the end of the projections on one half and the bottom of the grooves on the other half. Securely tighten the setscrews.

(2) ***KS-5621, KS-5702 Autotransformers and Autotransformers of KS-15508 Regulators:*** Making sure that the gear on the motor shaft meshes freely with the gear on the autotransformer shaft, mount the plate with the motor and securely tighten the screws. Connect the motor leads to the proper terminals on the terminal block, securely tightening the screws.

(3) ***KS-15583 and KS-15684 Autotransformers:*** Position the chain on the autotransformer sprocket so that the lines marked on the chain and sprocket in 3.14(2)(d) are in line. Tilt the gear case and motor and position the chain on the gear case sprocket. Then, mount the gear case and motor, securely tightening the screws. Make sure that the chain properly engages both sprockets.

(4) ***KS-15585 and KS-15685 Autotransformers:*** Position the chain on the sprockets so that the lines marked on the chain and autotransformer sprocket in 3.14(2)(e) will be in line when the motor mounting bracket is positioned as covered in 3.14(2)(e). Position the bracket and securely tighten the mounting screws. Make sure that the chain properly engages both sprockets.

Limit Switches

3.18 ***All Autotransformers Except Transtat KS-5552 Autotransformer Supplied by American Transformer Co***

(1) If the autotransformer is provided with a guard plate, remove the plate mounting screws and remove the plate to gain access to the limit switch.

(2) Tag and disconnect the leads from the limit switch to be replaced using the 4-inch E screwdriver. Where insulators are mounted with the switch, particularly in cases where two switches are stacked together, observe the thickness and position of the insulators for remounting them in their original positions. Using the 4-inch E screwdriver,

remove the two limit switch mounting screws and washers and remove the limit switch and insulators. Where two switches are stacked together, allow the switch not being replaced to hang temporarily on the leads.

(3) Place the lockwasher and flat washer, if provided, on each switch mounting screw. Position the new switch and insulators, if insulators were used, on the screws so that they will be in their proper order when mounted. If two switches were stacked together, also place the switch not being replaced in its proper position on the screws. Then, mount the switch or switches, securely tightening the screws. Connect the leads to the proper terminals on the new switch and securely tighten the screws.

3.19 ***Transtat KS-5552 Autotransformer Supplied by American Transformer Co***

(1) The limit switches on most of these autotransformers are secured to the mounting bracket by two nuts. To replace one of these switches, proceed as covered in (2) and (3).

(2) Tag and disconnect the leads from the limit switch to be replaced using the 4-inch E screwdriver. Remove the screws that secure the limit switch mounting bracket and move the bracket away from the autotransformer, taking care not to damage the leads connected to the other switch. While holding the bracket, remove the switch mounting nut on the plunger side of the bracket using the R-1542 adjustable wrench and remove the switch.

(3) With one of the mounting nuts positioned on the plunger arm of the new limit switch, insert the arm through the hole in the bracket. Then, mount the switch securely by tightening the other mounting nut. Mount the bracket with the switches on the autotransformer, securely tightening the screws. Connect the leads to the proper terminals and securely tighten the screws.

Fuse Wire

3.20 To replace the fuse wire, proceed as follows.

(1) Note the terminals to which the fuse wire leads are connected. Using the R-1542 adjustable wrench, disconnect the leads from the terminals.

(2) While holding the V-shaped insulator, remove the spring from the pins on the insulator with the long-nose pliers. Spread the insulator, disengage the fuse wire from the insulator pins, and remove the insulator. Then, carefully remove the fuse wire.

(3) Referring to Fig. 7, thread the end of the fuse wire having the longer lead over the autotransformer windings so that the two ends of the fuse wire are positioned at the winding gap. Take care to avoid sharp bending of the fuse wire.

(4) With the opening of the V-shaped insulator toward the left as shown in Fig. 7, insert the pins on the insulator in the holes of the fuse-wire terminal lugs. Then, hold the insulator and position the fuse wire against the winding clamps on the commutator end of the autotransformer as shown in the figure. With the fuse wire in this position, engage the ends of the V-shaped insulator spring on the pins of the insulator. Make sure that the fuse wire rests firmly against the autotransformer windings.

(5) Neatly dress the leads, connect them to the proper terminals, and securely tighten the nuts.

V-Shaped Insulator Spring

3.21 To replace the V-shaped insulator spring, remove the spring from the insulator with the long-nose pliers, while holding the insulator. Then, engage the end of the new spring on the pins.