REPLACING PAGE ADDENDUM
Filing Instructions:

1. REMOVE FROM THE SECTION THE PAGES NUMBERED THE SAME AS THOSE ATTACHED TO THIS PINK SHEET.
2. INSERT THE ATTACHED PAGES INTO THE SECTION IN THEIR PLACE.
3. PLACE THIS PINK SHEET AHEAD OF PAGE 1 OF THE SECTION.

ADDENDUM 028-705-701
Issue 1-D, January, 1965
AT&TCo Standard

AUTOTRANSFORMERS
CONTINUOUSLY TAPPED TYPE
MANUALLY OPERATED
KS-5657, KS-15594, KS-15646, KS-15814, KS-15831, KS-15843, AND KS-15955
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.001 This addendum supplements Section 028-705-701, Issue 4-D. The attached pages must be inserted in the section in accordance with the filing instructions above.

1.002 This addendum is issued to include the brush pressure requirement for the KS-5657 L14 autotransformer, and to change the reference from KS-5667 to KS-5657 in the requirement covering the clearance between brush holder lugs and radiator.

2. REQUIREMENTS

The following changes apply to Part 2 of this section:

(a) 2.07 — revised

(b) 2.10 — revised

Attached:

Page 3 dated January 1965, revised.
Page 4 dated January 1965, reissued.
Page 5 dated January 1965, revised.
Page 6 dated January 1965, reissued.

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REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the KS-5657, KS-15594, KS-15646, KS-15814, KS-15831, KS-15843, and KS-15955 manually operated, continuously tapped type autotransformers.

1.02 This section is reissued to cover the KS-15955 autotransformer. Detailed reasons for reissue will be found at the end of the section. Since this reissue covers a general revision, the arrows ordinarily used to indicate changes have been omitted.

1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

***1.04** *Asterisk:* Requirements are marked with an asterisk (*) when checking for them would necessitate the dismantling or dismounting of apparatus or would affect the adjustment involved or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons or its performance indicates that such a check is advisable.

1.05 Since increase in the brush contact surface due to wear does not adversely affect the operating characteristics of the autotransformers covered in this section, no requirement limiting the area of the brush contact surface is specified.

1.06 Before doing any work on an autotransformer, arrangements should be made for maintaining service and disconnecting the autotransformer from supply and load.

1.07 In some cases it is necessary to remove the autotransformer cover, if provided, or to remove the autotransformer from its mounting in order to check requirements and make adjustments.

1.08 ***Caution: Never permit a brush to break contact with the commutator surface while in operation under load, since a severe spark will be produced and damage will result.***

1.09 ***Caution: It is essential that the autotransformer meet all requirements in this section in order to avoid fire hazards.***

2. REQUIREMENTS

2.01 ***Freedom of Rotation of Brush Assembly:*** The brush assembly shall rotate without bind throughout its entire range of travel.

Gauge by feel.

2.02 ***Freedom of Movement of Brush Holder (KS-5657, KS-15594, KS-15646, KS-15831, and KS-15955 Autotransformers):*** The brush holder shall move in its slot in the radiator without bind.

Gauge by feel.

To check the requirement, move the brush holder slowly in its slot, using the KS-6320 orange stick to engage the brush holder if necessary.

2.03 ***Condition of Brush Contact and Commutator Surfaces:*** The brush contact and commutator surfaces shall be clean and smooth.

Gauge by eye.

To check the condition of the brush contact surface, raise the brush from the commutator surface using the KS-6320 orange stick to engage the brush holder if necessary. The use of

the No. 510C test lamp equipped with the No. 562B offset tip will facilitate checking the brush contact surface.

Note: Visible sparking between the brush and commutator surfaces with the autotransformer in service may indicate failure to meet the requirement. However, slight sparking is not objectionable provided the brush and commutator surfaces meet the requirement.

*2.04 ***Clearance Between Contact Button Spring Support and Contact Button Spring (KS-5657 Autotransformers Equipped With Contact Button Spring):*** Fig 1(A) — The clearance between the contact button spring support and the contact button spring, adjacent to the projecting portion of each contact button, shall be

Min 0.015 inch
Max 0.080 inch

Use the No. 131A thickness gauge nest.

To check the requirement, insert the gauge between the contact button spring support and the contact button spring so that the end of the gauge rests against the projection of the button. Take care to avoid inserting the gauge between the spring support and the projection of the button. Then, check the requirement at the other contact button. When checking the maximum requirement, use the 0.020- and the 0.060-inch gauge blades held together in the jaws of the No. 485A smooth-jaw pliers.

*2.05 ***Clearance Between Shaft Washer and Contact Button Spring (KS-15646 Autotransformer):*** Fig. 2(A) — The clearance between the shaft washer and the contact button spring, adjacent to the projecting portion of each contact button, shall be

Min 0.029 inch
Max 0.094 inch

Use the No. 131A thickness gauge nest.

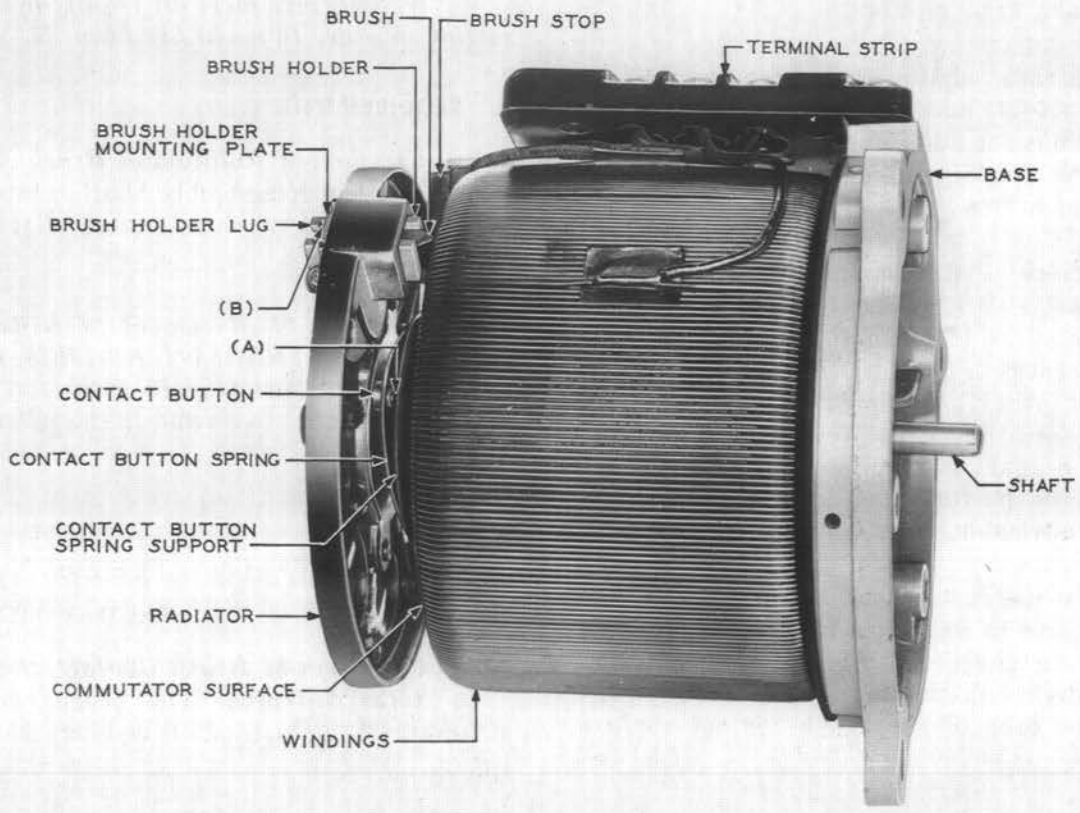

Fig. 1 – KS-5657 Autotransformer Having Contact Button Spring and Internal Spring Brush Assembly

To check the requirement, use the No. 485A smooth-jaw pliers to insert the gauge between the contact button spring and the adjacent shaft washer so that end of the gauge rests against the projection of the button. Take care to avoid inserting the gauge between the projection of the button and shaft washer. When checking the maximum requirement, use the 0.044- and the 0.050-inch gauge blades held together in the jaws of the pliers.

2.06 ***Clearance Between Brush Holder Lugs and Brush Holder Mounting Plate (KS-5657 and KS-15594 Autotransformers — Brush Assemblies With Internal Spring) (After Turnover Only):*** Fig. 1(B) — The clearance between the brush holder lugs and the brush holder mounting plate shall be

Min 0.018 inch

Use the No. 131A thickness gauge nest.

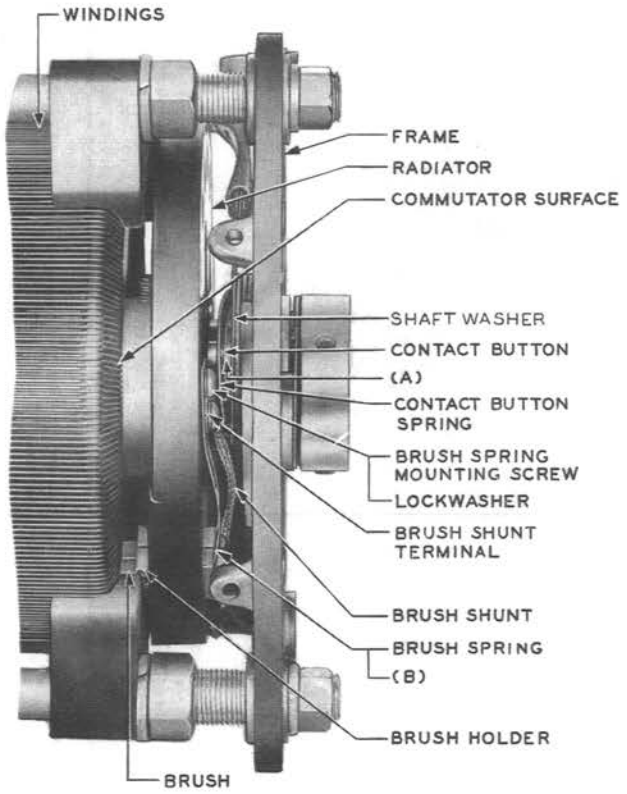

Fig. 2 – KS-15646 Autotransformer — Cover Removed

To check the requirement, insert a corner of the gauge between one of the lugs on the brush holder and the brush holder mounting plate.

2.07 ***Clearance Between Brush Holder Lugs and Radiator (After Turnover Only):*** The clearance between the brush holder lugs and radiator shall be as follows.

(1) ***KS-5657 and KS-15594 Autotransformers — Brush Assemblies With External Spring, Fig. 3(A):***

Min 1/16 inch

Gauge by eye.

(2) ***KS-15955 Autotransformer, Fig. 5(A):***

Min 0.040 inch
Max 0.100 inch

Use the No. 131A thickness gauge nest.

2.08 ***Clearance Between Radiator and Brush Springs (KS-15646 Autotransformer) (After Turnover Only):*** Fig. 2(B) — The clearance between the radiator and the brush springs, where the springs enter the brush holder slots, shall be

Min 0.018 inch

Use the No. 131A thickness gauge nest.

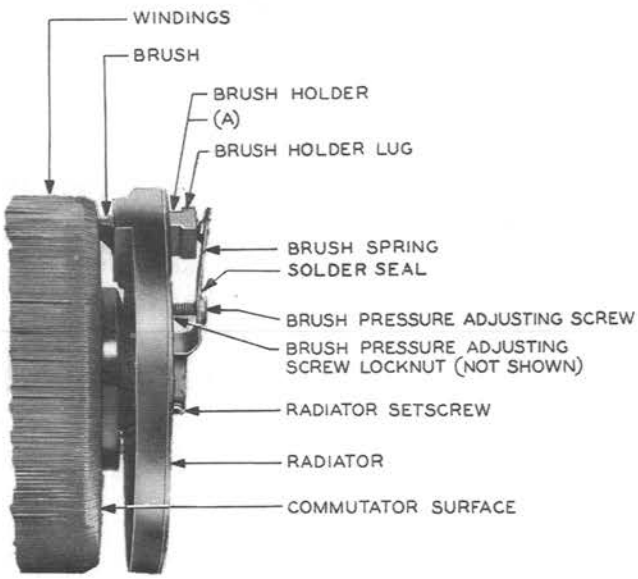

Fig. 3 – KS-5657 Autotransformer Having External Spring Brush Assembly

This requirement shall be checked at 6-month intervals. However, this interval may be changed depending upon the amount of wear due to the frequency of changing the autotransformer setting.

2.09 ***Clearance Between Commutator Surface and Brush Holder (After Turnover Only):*** The clearance between the commutator surface and the brush holder shall be

AUTOTRANSFORMER	CLEARANCE (INCHES) MIN
KS-15814, Fig. 4(A)	0.047
KS-15831	0.071
KS-15843, Fig. 4(A)	0.047
KS-15955	0.071

Use the No. 131A thickness gauge nest.

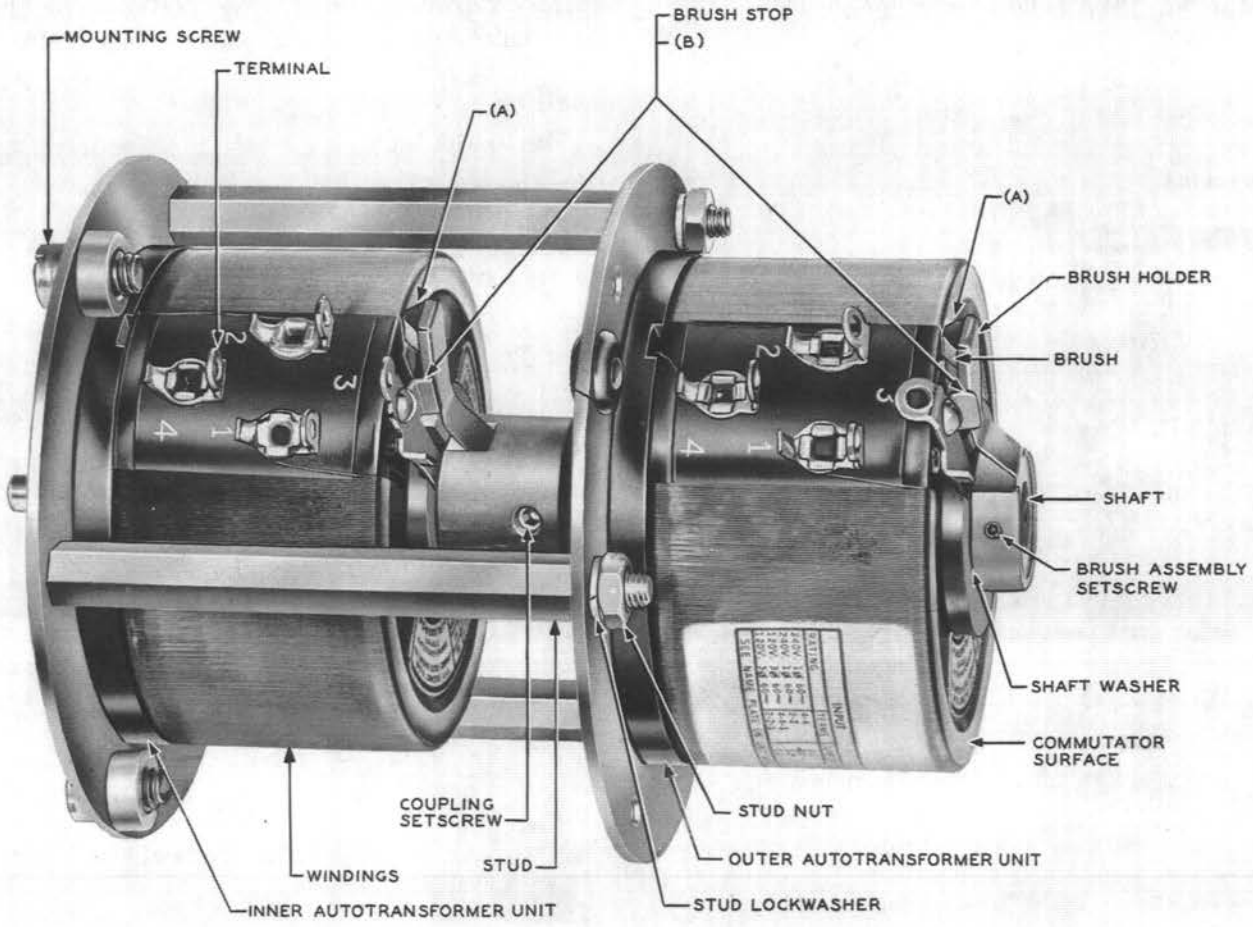

Fig. 4 – KS-15814 (Double Unit) and KS-15843 (Single Unit) Autotransformers (KS-15814 Autotransformer illustrated)

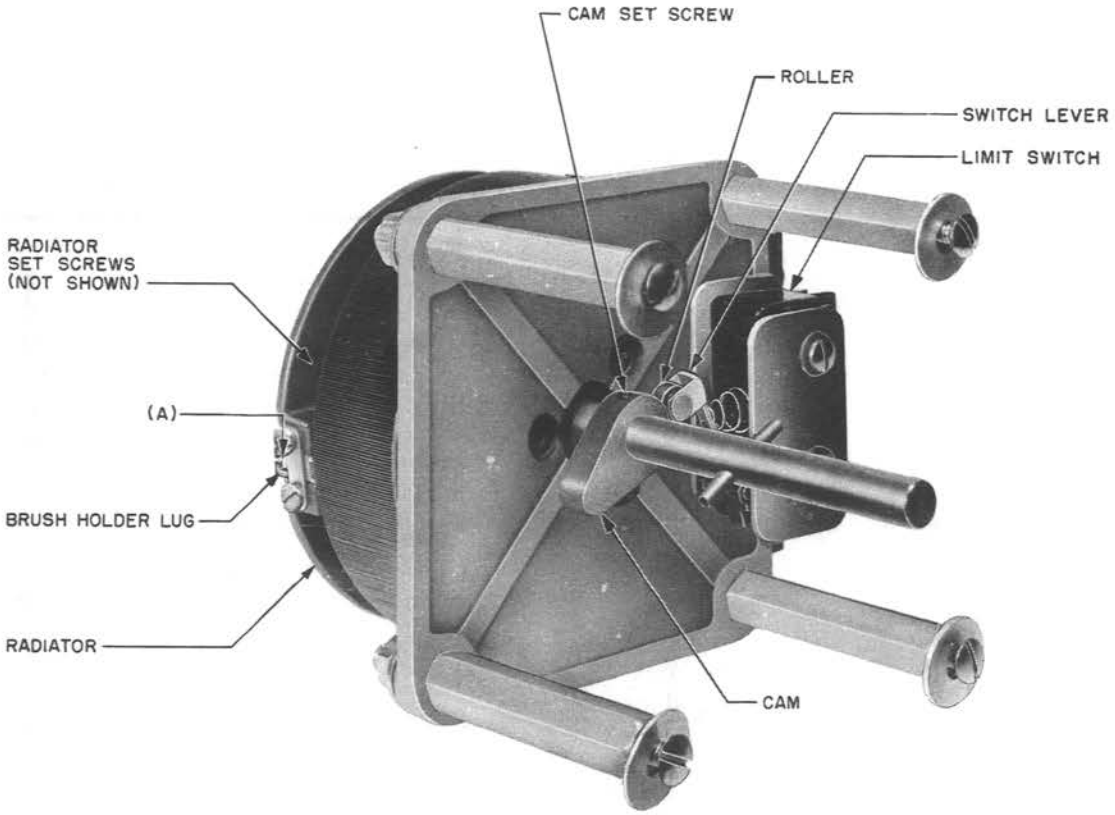

Fig. 5 – KS-15955 Autotransformers

2.10 ***Brush Pressure (After Turnover Only)***

(a) The pressure of each brush unit against the commutator surface shall be

AUTOTRANSFORMER	BRUSH PRESSURE (GRAMS) MIN	MAX	
KS-5657 (except L14)	390	510	←
KS-5657 L14	225	310	←
KS-15594	170	285	
KS-15831	480	595	
KS-15955	510	—	

Use the No. 79B gauge and check the requirement as covered in (b) or (c).

AUTOTRANSFORMER	BRUSH PRESSURE (GRAMS) MIN	MAX
KS-15646	310	425

Use the No. 79B gauge and check the requirement as covered in (d).

AUTOTRANSFORMER	BRUSH PRESSURE (GRAMS) MIN	MAX
KS-15814	170	285
KS-15843	170	285

Use the No. 62B gauge and check the requirement as covered in (e).

(b) ***KS-5657, KS-15594, KS-15831, and KS-15955 Autotransformers Having Internal Spring Brush Assembly:*** Apply the pull finger of the No. 79B gauge to one of the lugs or to the inner end of the brush holder. Observe the brush pressure just as the holder begins to move.

(c) ***KS-5657 and KS-15594 Autotransformers Having External Spring Brush Assembly:*** Place a small loop of cord around the brush spring adjacent to its point of contact with the brush holder and engage the other end of the loop with the pull finger of the No. 79B gauge. Observe the brush pressure just as the spring leaves the holder.

(d) ***KS-15646 Autotransformer:*** Loop a cord around both brush spring legs of the brush unit being checked. With the cord as close to the sides of the brush unit as possible, insert the pull finger of the No. 79B gauge in the loop. Observe the brush pressure just as the brush leaves the commutator surface. Then, check the pressure of the other brush unit similarly.

(e) ***KS-15814 and KS-15843 Autotransformers:*** Apply the tip of the No. 62B gauge to the outer end of the brush holder. Observe the brush pressure just as the holder begins to move.

2.11 ***Alignment of Brush Holders (KS-15814 Autotransformer):*** Fig. 4B — With one brush holder resting against one of its stops, the other brush holder shall be within

1/16 inch

of its corresponding stop.

Gauge by eye.

The thickness of the brush stop is approximately 1/32 inch.

2.12 ***Locking of Shaft by Shaft Locknut (KS-15831 and KS-15843 Autotransformers):*** The shaft locknut, when tightened, shall hold the shaft securely in the position at which it is set.

Gauge by feel.

2.13** ***Position of Limit Switch Cam (KS-15955 Autotransformer) (After Turnover Only): The limit switch cam shall be positioned so that the switch contacts close when the output voltage of the transformer is

Max 0.5 volt
Min 0 volt

Use the KS-14510, List 1 volt-ohm-milliammeter.

To check the requirements, rotate the shaft of the autotransformer to its extreme counterclockwise position. Using the 5000-ohm scale of the KS-14510, List 1 volt-ohm-millammeter, apply the leads to the normally open contact terminals of the limit switch to check for continuity through the switch. Then remove the meter and, using the 3-volt scale, connect the meter across terminals 1 and 3 of the autotransformer. Slowly rotate the shaft of the autotransformer clockwise until the output voltage is just above 0.5 volt. Disconnect the meter and, again using the 5000-ohm scale, apply the leads to the limit switch terminals to check that the switch contacts are open.

2.14 ***Temperature of Windings:*** With the autotransformer connected to supply and load, the temperature of the windings shall be

Max 95 C (203 F)

Use the R-1032 thermometer.

To check the requirement, apply the bulb of the thermometer to various spots on the surface of the windings in order to find the hottest spot. Take care not to touch the windings, radiator, or any other hot surface with the fingers. Cover the side of the bulb not in contact with the windings with a small asbestos pad or suitable equivalent. Check the temperature at intervals in order to determine the highest temperature reached.

3. ADJUSTING PROCEDURES

3.001 ***List of Tools, Gauges, 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
485A	Smooth-jaw Pliers
510C	Test Lamp [equipped with No. 562B offset tip and W2CB (24V) or W2BL (48V) cord]
KS-6320	Orange Stick
R-1102	Spudger
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
—	File (cutting surface as required)
—	3-Inch C Screwdriver (or the replaced 3-inch cabinet screwdriver)
—	4-Inch E Screwdriver (or the replaced 4-inch regular screwdriver)

CODE OR SPEC NO.	DESCRIPTION
GAUGES	
62B	0-700 Gram Gauge
79B	0-1000 Gram Push-Pull Tension Gauge
131A	Thickness Gauge Nest
KS-14510	Volt-Ohm-Milliammeter
R-1032	Thermometer
—	Ammeter, AC, Weston Model 528 (range as required)
MATERIALS	
KS-7860	Petroleum Spirits
KS-14666	Cloth
—	Cord
—	Asbestos Pad
—	8/0 Sandpaper
—	Stick, Thin, Flat

3.002 Care should be exercised when using petroleum spirits in power rooms where there are dc machines, since commutation may be adversely affected by softening of commutator film by the fumes. To avoid the need for burnishing the commutators of dc machines after doing any cleaning called for in this section, provide adequate ventilation. Use the absolute minimum amount of petroleum spirits required for the cleaning operation and keep the container closed when not in use.

3.01 ***Freedom of Rotation of Brush Assembly*** (Reqt 2.01)

(1) If this requirement is not met, check whether anything is jammed in the autotransformer. If this is the case, remove the object. If not, check requirement 2.03. If these procedures do not correct the condition, replace the autotransformer.

3.02 ***Freedom of Movement of Brush Holder (KS-5657, KS-15594, KS-15646, KS-15831, and KS-15955 Autotransformers)*** (Reqt 2.02)

(1) If the requirement is not met, remove the brush assembly as covered in (2) and clean the sides of the brush holder and radiator slot as covered in (3). Remount the brush assembly as covered in (4).

(2) To remove the brush assembly, proceed as follows.

(a) ***KS-5657, KS-15594, KS-15831, and KS-15955 Autotransformers Having Internal Spring Brush Assembly:*** Remove the brush assembly screw, or screws, and the associated washers and remove the brush assembly.

(b) ***KS-5657 and KS-15594 Autotransformers Having External Spring Brush Assembly***: Loosen the locknut on the brush pressure adjusting screw, unsolder the seal between the head of the screw and the brush spring, and remove the brush assembly.

(c) ***KS-15646 Autotransformer:*** Remove the brush spring mounting screws and lockwashers which secure the brush shunt terminals to the brush springs. Slightly loosen the other brush spring mounting screws and swing the springs outward to disengage them from the brush holders. Then, remove both brush units.

(3) To clean the sides of the brush holder and radiator slot, use a clean KS-14666 cloth. If necessary, use a KS-14666 cloth moistened in KS-7860 petroleum spirits and then, wipe the parts with a dry cloth. Cleaning the sides of the radiator slot may be facilitated by wrapping the cloth around the end of a KS-6320 orange stick.

(4) After cleaning, remount the brush assembly in the reverse order of removal. Check requirement 2.10. In the case of the KS-15646 autotransformer, also make sure that both 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.

3.03 ***Condition of Brush Contact and Commutator Surfaces*** (Reqt 2.03)

Commutator Surface

(1) Clean the commutator surface using a KS-14666 cloth. If necessary, moisten the cloth slightly with KS-7860 petroleum spirits and then wipe the surface with a dry cloth. Cleaning the commutator surface in some cases may be facilitated by wrapping the cloth around a KS-6320 orange stick.

(2) If the commutator surface is rough, proceed as covered in (3) for rhodium- and gold-plated surfaces and as covered in (4) and (5) for unplated surfaces. A rhodium-plated surface may be identified by its silver color.

(3) If the condition of a rhodium- or gold-plated commutator surface causes poor commutation, replace the autotransformer. Slight roughness is not objectionable provided commutation is satisfactory. Never attempt to smooth the surface of a rhodium- or gold-plated commutator.

(4) If the unplated commutator surface is slightly rough, smooth it as follows. Place a KS-14666 cloth around the surface to prevent particles from falling into adjacent portions of the windings. Wrap a piece of 8/0 sandpaper around the flat end of the R-1102 spudger or a suitable flat stick. Using the sandpaper, smooth the commutator surface taking care to maintain the surface as flat as possible.

(5) If the unplated commutator surface causes poor commutation, is badly roughened, and cannot be smoothed as covered above, replace the autotransformer.

Brush Contact Surface

(6) To clean the brush contact surface, raise the brush, using the KS-6320 orange stick to engage the brush holder if necessary. Insert a clean KS-14666 cloth between the brush and commutator surface. Release the brush. Move the brush back and forth over the cloth several times. If necessary, moisten the cloth with KS-7860 petroleum spirits and then rub the brush over a dry cloth.

(7) To smooth the brush contact surface, raise the brush, using the KS-6320 orange stick to engage the brush holder if necessary. Insert a strip of 8/0 sandpaper between the brush and commutator surface with the abrasive side of the sandpaper toward the brush. Release the brush. Move the brush back and forth over the sandpaper a few times. 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 surface several times. Again remove carbon particles.

3.04 ***Clearance Between Contact Button Spring Support and Contact Button Spring (KS-5657 Autotransformers Equipped With Contact Button Spring)*** (Reqt 2.04)

(1) If the requirement is not met, loosen the radiator setscrews. Reposition the radiator in or out on the shaft as required and securely tighten the setscrews. Recheck the requirements and check requirements 2.06 and 2.10.

3.05 ***Clearance Between Shaft Washer and Contact Button Spring (KS-15646 Autotransformer)*** (Reqt 2.05)

(1) If the requirement is not met, replace the autotransformer.

3.06 ***Clearance Between Brush Holder Lugs and Brush Holder Mounting Plate (KS-5657 and KS-15594 Autotransformers — Brush Assembly With Internal Spring)*** (Reqt 2.06)

(1) ***KS-5657 Autotransformers with Contact Button Spring:*** If the requirement is not met, loosen the radiator setscrews. Reposition the radiator inward on the shaft as required and securely tighten the setscrews. Recheck the requirement and check requirements 2.04 and 2.10. If all the requirements involved cannot be met, replace the brush assembly.

(2) ***KS-5657 Autotransformers without Contact Button Spring and KS-15594 Autotransformers:*** If the requirement is not met, replace the brush assembly.

3.07 ***Clearance Between Brush Holder Lugs and Radiator*** (Reqt 2.07)

(1) ***KS-5657 and KS-15594 Autotransformers — Brush Assemblies With External Spring:*** If the requirement is not met, replace the brush assembly.

(2) ***KS-15955 Autotransformer:*** If the requirement is not met, loosen the radiator setscrews. Reposition the radiator in or out on the shaft as required and securely tighten the setscrews. Recheck the requirement and

check requirement 2.10. If the requirements involved cannot be met, replace the brush assembly.

3.08 ***Clearance Between Radiator and Brush Springs (KS-15646 Autotransformer)*** (Reqt 2.08)

(1) If the requirement is not met, replace the brush assembly.

3.09 ***Clearance Between Commutator Surface and Brush Holder*** (Reqt 2.09)

(1) If the requirement is not met, replace the brush assembly.

3.10 ***Brush Pressure*** (Reqt 2.10)

(1) ***KS-5657 and KS-15594 Autotransformers Having Internal Spring Brush Assembly***

(a) ***KS-5657 Autotransformer with Contact Button Spring:*** To adjust the brush pressure, reposition the radiator in or out on the shaft to increase or decrease the tension of the brush assembly spring. To reposition the radiator, loosen the radiator setscrews. Then, reposition the radiator as required and securely tighten the setscrews. Recheck the requirement and requirements 2.04 and 2.06. If the requirements involved cannot be met, replace the brush assembly.

(b) ***KS-5657 Autotransformer Without Contact Button Spring and KS-15594 Autotransformer:*** If the requirement is not met, replace the brush assembly.

(2) ***KS-5657 and KS-15594 Autotransformers Having External Spring Brush Assembly:*** To adjust the brush pressure, loosen the locknut on the brush pressure adjusting screw and unsolder the seal between the brush spring and the head of the adjusting screw. Reposition the adjusting screw in or out as required in order to increase or decrease the pressure. Tighten the locknut, and solder the seal between the brush spring and the head of the adjusting screw. Then, recheck the requirement.

(3) ***KS-15831 Autotransformer:*** If the requirement is not met, replace the brush assembly.

(4) ***KS-15646 Autotransformer:*** To adjust the brush pressure, remove the brush spring mounting screws and lockwashers which secure the brush shunt terminals to the brush springs. Slightly loosen the other brush spring mounting screws and swing the springs outward to disengage them from the brush holders. Increase or decrease the tension in the spring legs associated with the brush unit by bending the legs with the No. 485A smooth-jaw pliers as required. Adjust both legs, since it is desirable to have the total tension distributed between the two legs. Take care, while bending, to maintain the gradual curve in the spring legs. Remount the brush springs in the reverse order of removal. Make sure that both 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. Check the requirement again.

(5) ***KS-15814 and KS-15843 Autotransformers***

(a) ***KS-15843 Autotransformer and Outer Unit of KS-15814 Autotransformer:*** To decrease the brush pressure, apply the No. 485A smooth-jaw pliers to the brush holder between the two bends, and bend the brush holder as required. To increase the brush pressure, loosen the brush assembly setscrews and remove the brush assembly from the shaft without removing the shaft washer. Apply the No. 485A smooth-jaw pliers to the brush holder between the two bends, and bend the brush holder as required. Making sure that the concave surface of the shaft washer is outward, remount the brush assembly on the shaft and securely tighten the setscrews. Recheck the requirement.

(b) ***Inner Unit of KS-15814 Autotransformer:*** To adjust the brush pressure, 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. Then, proceed as covered in (a) to adjust the brush pressure. After remounting the brush assembly and rechecking the requirement, remount the outer unit as follows. 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.

(6) ***KS-15955 Autotransformer:*** To increase the brush pressure, loosen the radiator setscrews and reposition the radiator inward on the shaft. Securely tighten the setscrews. Recheck the requirement and requirement 2.07. If the requirements involved cannot be met, replace the brush assembly.

3.11 ***Alignment of Brush Holders (KS-15814 Autotransformer)*** (Reqt 2.11)

(1) If the requirement is not met, loosen the coupling setscrews. Hold both brush holders against their corresponding stops and tighten the coupling setscrews.

3.12 ***Locking of Shaft by Shaft Locknut (KS-15831 and KS-15843 Autotransformers)*** (Reqt 2.12)

(1) If the requirement is not met, remove the shaft locknut. Clean the threads of the nut and the threads on which the nut is mounted with a clean KS-14666 cloth moistened with KS-7860 petroleum spirits. Then, dry the parts with a clean, dry cloth. Cleaning the threads of the nut may be facilitated by wrapping the cloth around the end of a KS-6320 orange stick.

3.13 ***Position of Limit Switch Cam (KS-15955 Autotransformer)*** (Reqt 2.13)

(1) Loosen the setscrews that secure the cam to the shaft. Rotate the shaft to its extreme counterclockwise position.

(2) Manually move the switch lever to the position where its contacts just close as indicated by a click. Hold the lever in this position and position the cam so that its approaching edge just touches the roller on the switch lever. Securely tighten the cam setscrews and recheck the requirement.

3.14 ***Temperature of Windings*** (Reqt 2.14)

(1) If the requirement is not met, check requirements 2.03 and 2.10. If these requirements are met, check that all leads to the autotransformer are connected to the proper terminals and that the input voltage and output current stamped on the nameplate are not exceeded. If the requirement still is not met, replace the autotransformer.

REASONS FOR REISSUE

1. To add requirements and adjusting procedures for the KS-15955 autotransformer.
2. To add Fig. 5.
3. To revise the list of tools, gauges, and materials (3.001).
4. To omit the Kimble Co No. 43732 thermometer and to substitute the R-1032 thermometer, wherever specified in the section.
5. To omit Weston Model 528, AC voltmeter and to substitute the KS-14510 volt-ohm-milliammeter wherever specified in the section.
6. To revise the adjusting procedure on condition of brush contact and commutator surfaces to include gold-plated commutator surface (3.03).