100A REGULATOR
EQUIPPED WITH KS-5511 MOTOR - TYPE 892B
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the 100A Regulator, equipped with a KS-5511 motor - type 892B, used in the "K" Carrier Telephone System. 100A Regulators equipped with other types of KS-5511 motors are covered in another Section.

1.02 It is reissued principally to cover the use of the KS-5551 test set. Detailed reasons for reissue will be found at the end of the section.

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 to check 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.

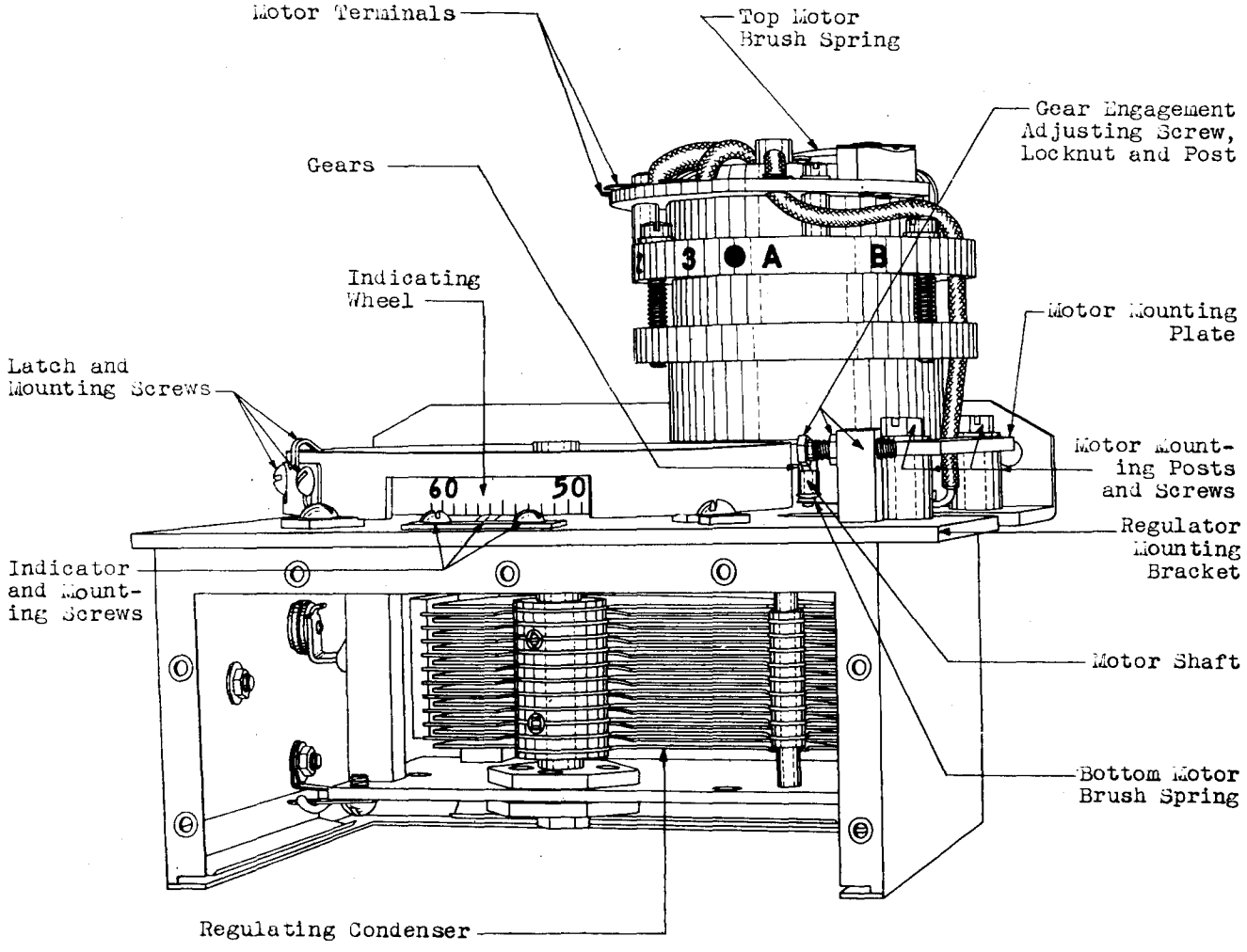

Fig. 1 - 100A Regulator

1.05 Checking and Readjusting for Requirements: All requirements shall be checked for and readjustments made with the amplifier, of which the 100A regulator is a part, removed from service. The plate and filament battery fuses shall also be removed to prevent damage to the equipment due to short circuits.

1.06 Removing Power from Motor: Remove power from the motor by removing the individual motor strap leads (designated S1, S2, S3 and P ±) at the top of the bay.

2. REQUIREMENTS

2.01 Cleaning: The top of the regulating condenser shall be cleaned, when necessary, in accordance with the procedures contained in this section.

*2.02 Motor Brush Spring Pressure: The pressure of each brush spring on the motor shaft shall be:
Minimum - 10 grams
Use the 68B gauge. Apply the gauge to the spring near the contact.

*2.03 Motor Movement: With the motor removed from its mounting and held so that the shaft is vertical and with the gear end down, the shaft shall turn freely. Gauge by feel.

2.04 Position of Latch: The latch, when not used for locking the indicating wheel in position, shall be moved up as far as possible so as to permit free movement of the indicating wheel. Gauge by eye.

2.05 Condenser Torque: Fig. 2 - With the gears disengaged, the force required at the periphery of the indicating wheel to rotate the condenser shall be as follows. The maximum reading obtained shall be noted since it is required in connection with checking requirement 2.07.

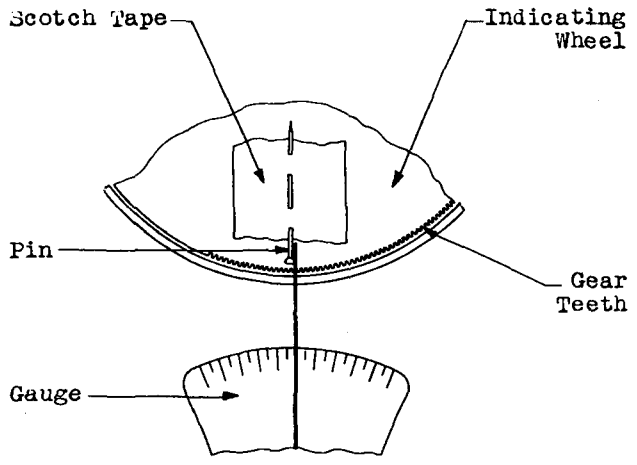

Fig. 2

Maximum 30 grams

Use the 70D or 70H gauge. To check insert a common straight pin twice thru a piece of scotch tape about 1" square. Then stick tape to top of wheel at position 15 so that the head of the pin is within approximately 1/16" of the rim of the wheel but not protruding beyond the rim. The pin should be approximately radial with the center of the wheel. Place tang of gauge against pin, immediately back of head, and hold it so that it rests on top of wheel by its own weight. The reed of the gauge should be in line with the pin.

Hold gauge lightly, and measure force required to turn wheel in a slow continuous sweep over the range from 2 to 30 and from 30 back to 2. Note maximum reading of gauge. If in making this check a point is reached where the wheel jumps several divisions, move wheel back within 1 division of point where the jump occurred and continue the measurement to the end of the range. Then relocate pin at position 45 the same as at position 15 and measure from position 30 to 60 and from 60 to 30 the same as above for the lower range of the wheel. After test is completed set wheel in step with master controller and carefully mesh gears. Note that wheel is still in step with master controller within 0.2 division after the gears are meshed.

2.06 Indicating Wheel Setting: The indicating wheel and master controller indicator shall be in step within ± 0.2 division of the indicating wheel, as indicated by the numbers on the wheel and indicator of master controller. Gauge by eye.

2.07 Gear Bind and Back Lash

(a) The gears shall not bind and back lash shall be minimum 0 degrees, maximum 10 degrees (where the condenser turning force is 15 grams or less) or between 0 and 15 degrees (where the condenser turning force is between 15 and 30 grams) as indicated on the 0-360 dial of the KS-5551 test set.

(b) To use the test set, remove the plug from the test set. Then remove the S1, S2 and S3 straps at the top of the bay for the particular regulator in question. Connect S1, S2 and S3 leads of test set cord to the lower set of S1, S2 and S3 terminals from which straps were removed. Check with a volt-ohmmeter that 48 to 62 volts AC is present on a set of spare P± and G terminals and then connect P± and G leads of test set cord to these terminals. Mount 510A test lamp rigidly so it illuminates the index and dial of regulator under test. Paste scotch tape over the lower half of the lens of the test lamp so as to leave a vertical slit of not over 1/32" width. This slit shall be approximately radial

with the center of the lens. Locate lens about 3 inches from dial so that the index line appears between and parallel to the two edges of the slit. The numerals on the dial may be observed through the upper half of the lens while the lines on the index and the dial should be observed through the slit. Set 0-60 dial of test set in step with regulator under test within 0.2 division. Then insert plug in test set. Check for presence of 48 to 62 volts AC on terminals A and B of the motor under test with a volt-ohmmeter.

(c) Turn knob of test set until 0-60 dial of test set is at 2. Turn knob slowly so that the regulator dial moves over the range from 2 to 60 and from 60 to 2 and check for bind of the gears of the regulator under test. Bind will be evidenced by the variation in pressure required to turn the knob and uneven rotation of the dial.

(d) Then starting again at 2, turn the knob slowly until the center of the line for dial position 3 of the regulator under test lines up with the center of the index line. If the dial goes beyond 3, restart again at 2. Note reading on the 0-360 dial of the test set. Continue to turn knob in same direction until regulator is approximately at position 4. Then turn knob back until regulator is again at position 3 the same as above. Do not overshoot. Note reading on 0-360 dial. This reading shall be less than the first reading by between 0 and 10 degrees (where the condenser turning force is 15 grams or less) or between 0 and 15 degrees (where the condenser turning force is between 15 and 30 grams). In cases where this reading (second reading) is in the range immediately below 360 or 0 and the first reading is immediately above 0, add 360 to the reading above 0. If the back lash is less than 2 degrees check by placing a finger lightly on the dial and noting that there is about 0.1 division play of the dial without rotating the motor.

(e) Repeat (d) for each succeeding 4 dial divisions after 3, ending at 59.

3. ADJUSTING PROCEDURES

3.001 List of Tools, Gauges, Materials and Test Sets

Code No.	Description
Tools	
206	30° Offset Screwdriver
207	90° Offset Screwdriver
363	Spring Adjuster
474A (2 Req'd)	3/16" and 1/4" Hex. Closed Double End Offset Wrench
510A	Test lamp
541A	1/4"-12 Point Double End Box Wrench
-	KS-6015 Duckbill Pliers
-	3-1/2" Cabinet Screwdriver
-	4" Regular Screwdriver
Gauges	
68B	70-0-70 Gram Gauge
70D or	50-0-50 Gram Gauge
70H	0-30 Gram Gauge
Materials	
-	D-98063 or KS-2423 Cloth
Test Sets	
-	KS-5551 Test Set and Associated W5B Cord
-	KS-8295 Volt-ohmmeter

3.002 General

(1) Removing Motor: Remove the plate and filament battery fuses for the amplifier of which the motor is a part. Remove the motor straps (designated S1, S2, S3 and P4) at the top of the bay and the amplifier can cover if not previously removed during test. Remove P4 lead of test set from P4 terminal, if connected. Remove the leads at the motor. Remove the 311A tube after it has cooled. Remove the cable hook attached to the right cover guide with the 3-1/2" cabinet screwdriver and move the cable out of the way. Remove the three motor mounting screws with the 541A wrench. Lift off the motor.

(2) Remounting Motor: To remount the motor, place it in position so that its mounting plate holes line up with the holes in the mounting posts. Check that the plate is seated on the pivot post (left rear post). Insert the three mounting screws and tighten them just sufficiently to permit moving the plate later so as to engage the gears. Reconnect the motor leads. Reconnect the P4 strap at the top of the bay and then connect the test set leads to P4, G, S1, S2 and S3 terminals at top of bay. Place the indicating wheel in step with the test set and mesh the gears. Then while

holding the motor mounting plate so that it touches the gear engagement adjusting screw, tighten all three motor mounting screws securely. Reconnect cable hook and replace the 311A tube. Recheck 2.07. Insert fuses.

(3) Removing and Remounting Regulating Condenser: Remove motor as covered above under (1). Then loosen the three screws for the cover for the T, TV and GC condensers with the 206 and 207 offset screwdrivers. Slide back the cover so that the cut out portions are in a position which will permit raising the cover. Disconnect the leads from the regulating condenser. Remove the mounting screws for the regulating condenser using the 4" regular screwdriver and remove the condenser.

(4) To remount the condenser proceed as covered in (3) going through the operations in the reverse order. Tighten all screws securely.

3.01 Cleaning (Rq.2.01)

(1) Do not wipe off the regulating condenser while the motor is mounted since dust will be disturbed and may get into the motor bearings and cause trouble later. If the motor is removed and dust is present on the top of the condenser, wipe it off with a D-98063 or KS-2423 cloth that has been oiled lightly with several drops of light oil such as KS-6232. To oil cloth apply several drops and then rub oily and dry parts together so as to spread oil. Do not get dust in condenser bearings. Wipe off condenser afterwards with a dry cloth.

3.02 Motor Brush Spring Pressure (Rq.2.02)

(1) If the pressure is too low, remove the motor as covered in 3.002(1).

(2) Increase the pressure of the top spring by adjusting it with the 363 spring adjuster. Apply the adjuster near the base of the spring. If this does not increase the pressure sufficiently, remove the terminal block screws and adjust the spring with the duckbill pliers. Remount spring and recheck. The spring should rest flat on the shaft contact.

(3) To increase the pressure of the bottom spring remove the two screws that fasten the spring block to the bottom part of the motor. Use the 3-1/2" cabinet screwdriver. Then adjust the spring with duckbill pliers. Remount spring and recheck. The spring should rest flat on the shaft contact.

(4) Remount motor as covered in 3.002(2

3.03 Motor Movement (Rq.2.03)

(1) If the motor does not turn freely at all points, replace it with one that is satisfactory.

3.04 Position of Latch (Rq.2.04)

(1) To position the latch, loosen its two mounting screws with the 3-1/2" cabinet screwdriver and raise the latch to the full extent of its travel. Tighten the screws securely.

3.05 Condenser Torque (Rq.2.05)

(1) If the torque is excessive, replace the condenser, removing it as covered in 3.002(3). Transmission tests are required on the amplifier in accordance with other sections of Bell System Practices after the condenser is replaced to insure proper setting of the T condenser of the amplifier.

(2) Check the replaced condenser for maximum 10 grams torque. Then after remounting the motor, recheck requirements 2.06 and 2.07.

3.06 Indicating Wheel Setting (Rq.2.06)

(1) If the setting is out by not more than 0.3 division, attempt to correct by shifting the indicator after loosening the two indicator mounting screws with the 3-1/2" cabinet screwdriver. If this does not correct the trouble, due to insufficient movement of the indicator, correct as covered in (2).

(2) If the setting is out more than 0.3 division, slightly loosen the three motor mounting screws with the 541A wrench and shift the motor assembly to the right so as to disengage the gears. With power on the motor, move the indicating wheel to the position corresponding to the position of the master regulator indicator. In order to obtain the correct setting, it is advisable, but not necessary, to set the wheel only when the master regulator is at a point for which there is a corresponding division line marked on the wheel. Then while holding the wheel, move the motor assembly so that the gears engage and the motor mounting plate touches the adjusting screw. Then tighten the three motor mounting screws securely. Since the engagement of the two gears may slightly change the indicator setting, recheck with the master regulator indicator. If the two are not in agreement, slightly loosen the two indicator mounting screws with the 3-1/2" cabinet screwdriver and shift the indicator as required. Then tighten the screws securely.

(3) Recheck requirement 2.07 if the gears have been disengaged.

3.07 Gear Bind and Back Lash (Rq.2.07)

(1) The engagement of the gears is controlled by the position of the gear engagement adjusting screw. This screw is carefully positioned in the shop in the assembly of the motor to the condenser to provide no gear bind and the minimum amount of back lash. Therefore, unless the locknut has become loosened or for some reason it is necessary to assemble another motor to the condenser there should be no necessity of adjusting the screw. If, however, there is evidence of gear bind, too much back lash or a motor is replaced proceed as in (2) or (3).

(2) If the gears bind on the existing assembly, just barely loosen the three motor mounting screws with the 541A wrench. Loosen the adjusting screw locknut with one 474A wrench and slightly turn the adjusting screw towards the motor mounting plate with another 474A wrench. Tighten the locknut while holding the screw in the adjusted position. Tighten the motor mounting screws.

(3) In the case of replacing a motor, mount the motor and connect the KS-5551 test set to the motor as covered in 2.07(b). Mesh the gears so that the plate touches the gear engagement adjusting screw. While holding the plate, place a finger lightly on the top of the regulator dial and check by feel or eye that the dial moves back and forth freely over an amplitude of about 0.1 division, without moving the motor. If there is some play tighten the three motor mounting screws securely. If bind exists, correct as covered above under (2). If there appears to be too much back lash, follow the procedure under (2) except back off the adjusting screw slightly, and then check for bind.

(4) Make a complete check of 2.07.

REASONS FOR REISSUE

1. To revise 1.05 and 1.06.
2. To add a cleaning requirement (2.01).
3. To omit the requirement covering lubrication and record of lubrication.
4. To reword the motor movement requirement (2.03).
5. To reword the latch requirement (2.04).
6. To omit the torque test with the gears engaged and to add in place a torque test for the condenser alone (2.05).
7. To add limits for the indicating wheel setting (2.06).
8. To change the gear bind and back lash requirement to use the KS-5551 test set (2.07).
9. To add the 206 and 207 offset screwdrivers, 510A test lamp, 541A wrench, KS-6015 duckbill pliers, and 4" regular screwdriver under "Tools." To add the 70D or 70H gauge under "Gauges." To add the KS-5551 test motor and KS-8295 volt-ohmmeter under "Test Sets." To omit the KS-7471 Grease, Toothpicks, Kerosene and Tricresyl Phosphate oil.
10. To revise the procedures for removing and remounting motors and to add procedures for removing and remounting the regulating condenser (3.002).
11. To add cleaning procedures for condenser (3.01).
12. To add a procedure for condenser torque (3.05).
13. To revise the procedure for indicating wheel setting (3.06).
14. To omit lubricating procedure for motor.

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