100A REGULATOR
EQUIPPED WITH KS-5511 MOTOR
TYPE 892D OR RECONDITIONED TYPE 892C
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the 100A regulator equipped with a KS-5511 motor, type 892D or reconditioned type 892C, used in the K1 carrier telephone system. Reconditioned type 892C motors are indicated by the letter R stamped on the nameplate. The 100A regulators equipped with other types of KS-5511 motors are covered in other sections.

1.02 This section is reissued to add instructions for reconditioning or replacing motor bearings.

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 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 *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. All requirements are based on power being connected to the motor unless otherwise specified. (See Fig. 1.)

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.

Caution: Except under the following conditions, either the flat gain master controller or a KS-5551 test set shall always be used to rotate the motor of the 100A regulator, in order to avoid damage to the motor bearings. The indicating wheel of the regulator may be turned manually only in emergencies requiring the resetting of a large number of regulators in a short time in order to restore normal service conditions. Such an emergency may be due to a large number of regulators getting out of step with the master controller because of power interruptions, or to failure of a complete repeater office requiring readjustment of all repeater gains at adjacent stations. Power should be removed from the 100A regulator motors and the master controller transmitter motor before making emergency manual adjustments. The indicating wheel of the regulator should be moved slowly, and if any case is found where the wheel does not turn freely without appreciable force being applied, the KS-5551 test set shall be employed to complete the adjustment of that particular regulator.

Power should be removed by removing the PW REG line fuse. Under this condition the emergency alternator will run for 15 seconds at intervals of about 10 minutes. No manual adjustment of the regulator should be made while the alternator is running, and any change in the setting of the master controller which takes place while the alternator is running must be taken into account in resuming the manual adjustments when the alternator stops.

1.07 Motor noise shall not be considered a criterion in rejecting equipment and the equipment shall be accepted if it meets the requirements in Part 2 of this section.

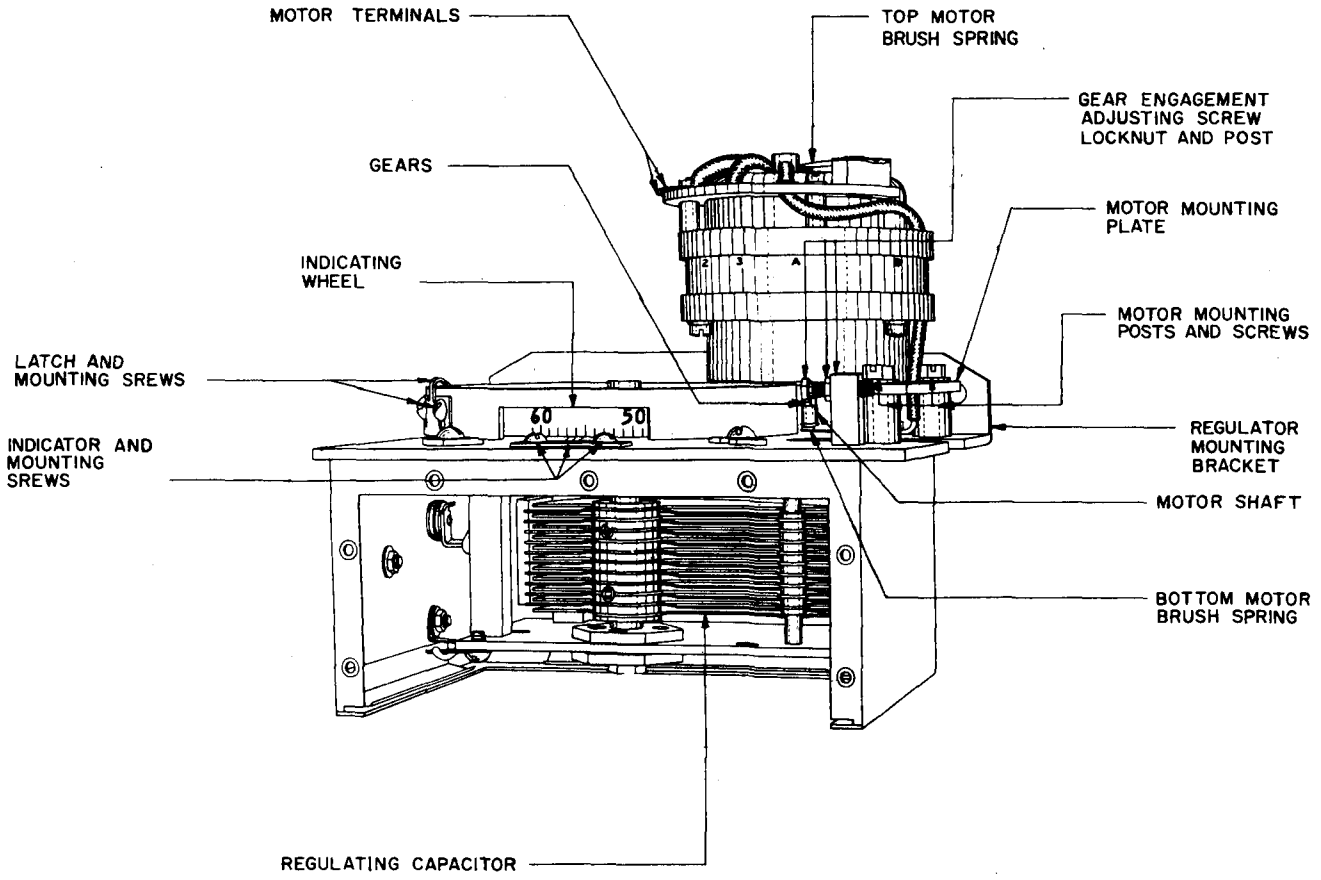


Fig. 1 – 100A Regulator — Capacitor Cover Removed

2. REQUIREMENTS

2.01 ***Cleaning:*** The regulator shall be cleaned, when necessary, in accordance with the procedures contained in this section.

2.02 ***Lubrication:*** The bearings on every motor shall be checked periodically at intervals of less than 10 years.

2.03** ***Top Motor Brush Spring Pressure: The pressure of the top brush spring on the motor shaft shall be

Min 10 grams

Use the 68B gauge applied to the spring near the contact.

2.04** ***Bottom Motor Brush Spring Pressure: The pressure of the bottom brush spring on the motor shaft shall be

Min 10 grams

Use the 68B gauge applied to the spring near the contact.

2.05** ***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.

2.06 ***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.

2.07 ***Tracking, Gear Bind, and Backlash***

(a) ***Tracking:*** The regulator shall follow the KS-5551 test set (or the flat gain master controller) over the range from 60 to 2. Check that the readings are alike within 0.3 division at positions 60, 51, 39, 31, 19, 11, and 2.

(b) ***Gear Bind and Backlash:*** The gears shall not bind and the backlash as indicated in degrees on the 0-360 dial of the KS-5551 test set shall be as specified below.

Max 10 degrees (at time of turnover)

Max 15 degrees (after turnover only)

For Maintenance Test and for Initial Test on New Equipment (additions to existing installations)

(c) ***Connecting the KS-5551 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 the S1, S2, and S3 leads of the test set cord to the lower set of S1, S2, and S3 terminals from which straps were removed. Check with a volt-ohm-milliameter that 45 to 70 volts ac is present on a set of spare P± and G terminals and then connect the P± and G leads of the test set cord to these terminals. Check for presence of 45 to 70 volts ac on terminals A and B of the motor under test with a volt-ohm-milliammeter. Mount 510B test lamp rigidly so it illuminates the index and indicating wheel of regulator under test (see Fig. 2). 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 inch width. This slit shall be approximately radial with the center of the lens. Locate lens about 3 inches from indicating wheel so that the index line appears between and parallel to the two edges of the slit. The numerals on the wheel may be observed through the upper half of the lens, while the lines on the index and the wheel should be observed through the slit. Set the 0 to 60 dial of the test set at the same reading as the indicating wheel of the regulator. The latch on the regulator shall be in its raised position to permit free movement of the indicating wheel. Then insert the plug in the test set.

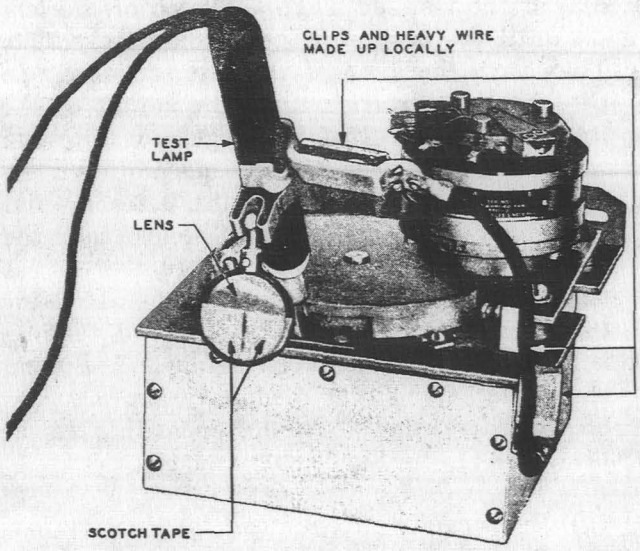


Fig. 2 – Voltage Test

(d) ***Test for Gear Bind:*** Turn the knob of the test set until the 0 to 60 dial of the test set is at 60. Then turn the knob slowly so that the regulator indicating wheel moves over the range 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 by uneven rotation of the wheel.

(e) ***Test for Tracking:*** While proceeding from 60 to 2, check that the regulator indicating wheel reads the same as the test set dial within 0.3 division when the test set dial is at 60, 51, 39, 31, 19, 11, and 2.

(f) ***Test for Backlash:*** Starting below 2, turn the knob of the test set slowly until the center of the line for position 2 of the regulator under test lines up with the center of the

index line. (If the dial goes beyond 2, start over again.) Note the reading on the 0 to 360 dial of the test set. Turn the knob of the test set until the regulator is approximately at 3. Then turn the knob of the test set slowly in the opposite direction until the center of the line for position 2 of the regulator lines up with the center of the index line. Do not overshoot. Note the reading on the 0 to 360 dial of test set. This reading shall be less than the first reading by a maximum of 10 degrees (at time of turnover) or a maximum of 15 after turnover. In cases where the 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. Repeat this test at positions 11, 19, 31, 39, 51, and 60.

(g) ***Reconnecting Regulator to Master Controller:*** Set the indicating wheel of the regulator at the same reading as the dial of the flat gain master controller by means of the KS-5551 test set. Disconnect the test set and then the P± strap for the regulator under test. Then reconnect, in the following order the S1, S2, S3, and P± straps. This sequence of connecting the straps is necessary to prevent the regulator from jumping when it is being reconnected to the master controller.

Note: It may happen that the dial reading of the master controller is in the process of a fairly rapid change just at the time of reconnecting the regulator to the master controller. In this case it may be necessary to stop the master controller for a short time to perform (g). The master controller is stopped by blocking relay AL operated. The master controller shall not be stopped unless necessary and the time during which it is stopped shall be kept to a minimum.

For Initial Test on New Equipment (new installations only)

(h) On new installations where the KS-5551 test set is available, check for gear bind, backlash, and tracking as described in (c) to (g) inclusive.

(i) On new installations where the KS-5551 test set is not available, the master flat gain controller shall be used and a tracking test only shall be made as follows.

(j) The MOT PRI fuse shall be installed but the TRS MOT PRI, REC PRI, and REC SEC fuses shall not be installed. The synchronous motor shall be stopped so that the clutch of the master controller is disengaged. This may be accomplished as covered in the section on the master flat gain controller or as follows.

(k) Manually operate the AL relay and note whether or not the clutch is disengaged when the motor has stopped. If the clutch is not disengaged, release and reoperate the relay, continuing this procedure until the motor stops with the clutch disengaged. The AL relay shall then be blocked in the operated position.

(l) Set the master flat gain controller at the same reading as that at which the 100A regulator indicating wheels are locked when shipped. The latches on the 100A regulators shall then be raised to permit free movement of the indicating wheels. Remove the PW REG line fuse, install the REC SEC, TRS MOT PRI, and REC PRI fuses, and then replace the PW REG line fuse.

(m) Turn the clutch disc of the master controller slowly (not more than 3 revolutions per minute of the clutch disc) until its dial reading is 60. In turning the clutch disc, exercise care not to touch the clutch disc face that the clutch corks engage, as any slight trace of oil on it will cause the clutch corks to slip when the controller is placed in operation. Apply the turning force to the outer edge or rim of the clutch disc, being careful that the fingers are free from oil or grease, as otherwise the action of the clutch disc brake may be decreased. With the master controller dial turned to 60, all 100A regulator indicating wheels shall read 60 ±0.3. Then slowly rotate the master controller in the other direction and check that at 51, 39, 31, 19, 11, and 2, all 100A regulator indicating wheels read the same as the master controller dial within ±0.3 division.

Note: Requirement 2.08 shall be considered as having been met if requirement 2.07 is met. If 2.07 is not met, then 2.08 shall be checked before adjusting per 3.07.

2.08 *Capacitor Torque*

(a) Fig. 3 — With the gears disengaged, the force required at the periphery of the indicating wheel to rotate the capacitor shall be as follows:

Max 10 grams (at time of turnover)

Max 30 grams (after turnover only)

Use the 70D or 70H gauge.

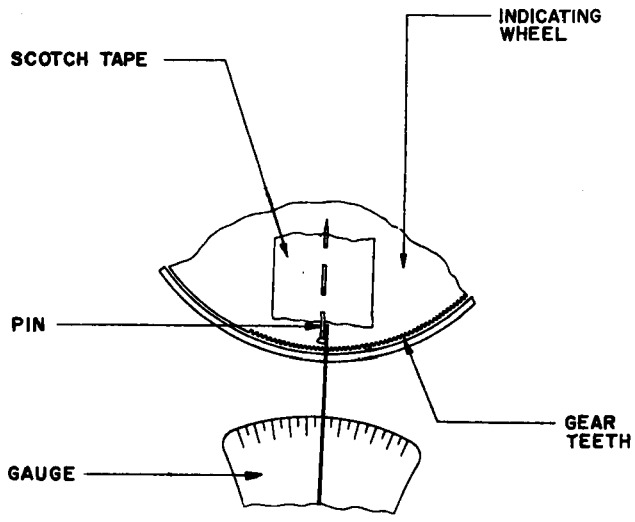


Fig. 3 – Torque Test

(b) To check proceed as follows: Insert a common straight pin twice through a piece of scotch tape about 1 inch square. Then stick tape to top of wheel at position 15 so that the head of the pin is within approximately 1/16 inch 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 one division of point where the jump occurred and continue the measurement to the end of the range. After the check from 2 to 30 and from 30 to 2, 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.

(c) ***Remeshing Gears:*** After this test is completed, set indicating wheel to read the same as the master controller dial and carefully mesh gears as follows: Insert the 0.018 inch blade of the 74D gauge between the gear engagement adjusting screw and the motor mounting plate. With the gauge held flat against the end of the screw, move the mount-plate in until the plate is tight against the gauge. While holding the gauge and plate in position, tighten the front motor plate clamping screw securely. Remove gauge and tighten securely the right rear clamping screw and then the left rear screw. After the gears are meshed, note that the indicating wheel still reads the same as the master controller dial within 0.3 division. Recheck 2.07.

2.09 ***Indicating Wheel Setting:*** The indicating wheel and master controller indicator shall be in step within ±0.3 division of the indicating wheel, as indicated by the numbers on the wheel and indicator.

Gauge by eye.

3. ADJUSTING PROCEDURES

3.001 ***List of Tools, Gauges, Materials, and Test Sets***

(a) List of tools, gauges, materials, and test sets for adjustments

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
206	30 degree Offset Screwdriver
207	90 degree Offset Screwdriver
474A (2 reqd)	3/16- by 1/4-inch Hex Closed Double-end Offset Wrench

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
510C	Test Lamp (must be equipped with 561A Straight tip, W2CB (24V) or W2BL (48V) Cord
541A	1/4-inch 12 Point Double-end Box Wrench
KS-6015	Duckbill Pliers
—	3-inch Cabinet Screwdriver
—	4-inch Regular Screwdriver
GAUGES	
68B	70-0-70 Gram Gauge
70D or 70H	50-0-50 Gram Gauge 0-30 Gram Gauge
74D	Thickness Gauge Nest
KS-14510	Volt-ohm-milliammeter
MATERIALS	
KS-2423	Cloth
—	Nontransparent Scotch Tape
TEST SETS	
KS-5551	Test Set and Associated W5B Cord equipped with a 330A, 330B, 330C, 330D, and 330E Plug

(b) List of tools and materials for reconditioning KS-5511 type 892D motor

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
KS-6320	Orange Stick
KS-14162	Brush
R-8950	Rubber Syringe
—	Bearing Pullers (made up locally)
	Punch Pins (prepare locally from piano wire)
—	Ball Bearing, Fafnir 33K5, New Departure SSR3
—	Ball Bearing, Fafnir 33KDD3 New Departure SSRS77R2
—	4-ounce Hammer (or equivalent)
—	X-Acto Hand Drill and Pin Vise ID (X-Acto, Inc., Long Island City, N. Y. or obtain locally)
—	3-inch Cabinet Screwdriver
—	3-inch "H" Cabinet Screwdriver
MATERIALS	
KS-7860	Petroleum Spirits
—	Cotton (obtain locally)
—	Swab Sticks (obtain locally)
—	Metal Container, Shallow (for use of petroleum spirits)
—	Pine Board 2 by 8 by 14 inches, drilled
—	Oil (Pioneer No. 10)

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 P±) at the top of the bay and the amplifier can cover if not previously removed during test. Remove P± lead of test set from P± terminal, if connected. Remove the leads at the motor. Remove the 311A or 311B tube after it has cooled. Remove the cable ring attached to the right cover guide with the 3-inch cabinet screwdriver and move the cable out of the way.

Remove the three motor mounting screws with the 541A wrench. Lift off the motor. Remove the screws that fasten the motor to the plate with the 3-inch cabinet screwdriver.

(2) ***Remounting Motor:*** Mount the motor on the mounting plate, tightening the screws securely. Place plate 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 in engaging the gears. Reconnect the motor leads. Reconnect the P± strap at the top of the bay. Adjust for gear bind and backlash as covered in 3.07. Reconnect cable ring and replace the 311A or 311B tube. Insert fuses.

(3) ***Removing and Remounting Regulating Capacitor:*** Remove motor as covered above under (1). Do not remove motor from mounting plate. Then loosen the three screws for the cover for the T, TV, and GC capacitor with the 206 and 207 offset screwdrivers. Slide back the cover so that the cutout portions are in a position which will permit raising the cover. Disconnect the three leads from the regulating capacitor. Remove the mounting screws for the regulating capacitor, using the 4-inch regular screwdriver and remove the capacitor.

(4) To remount the replacing capacitor, proceed as covered in (3) going through the operations in the reverse order. Remount motor as covered in (2).

3.003 ***Procedure for Reconditioning KS-5511 type 892 Motor***

(1) Motor is removed from amplifier in standard manner. Remove mounting plate from motor, using "H" cabinet screwdriver. Remove bottom contact using 3-inch screwdriver. Remove three screws holding bottom end plate of motor and lift end plate off, being careful to pull straight in order to keep from damaging bearings or breaking off insulated tips on end of shaft. It may be necessary to use a knife to start end plate from motor frame. Where end plate is difficult to remove, it may be necessary to place a screwdriver on each side and force the plate off by prying. After removal of the end plate the motor should be placed so as not to damage wiring. Extreme caution should be used to prevent breaking tips off armature.

(2) Some bearings bind in the end plates due to dried grease. These can be removed as follows: Insert the punch in the X-Acto hand drill and pin vise as far as possible before tightening chuck. Where top bearing is frozen in its recess, the motor is placed over the 2-inch hole in the board to prevent winding damage, with the contact wire laying in the slot to prevent damage to that wire (see Fig. 4). The bearing may then be driven out by gently tapping on the punch pin inserted alternately through each of the two holes located in the end plate over the outer race (see Fig. 5.) The pin bears on the outer race. Care should be used in this operation to prevent the punch pin from bending and being driven through the ball retainer of the bearing. This can best be prevented by keeping the punch at an angle toward the outer portion of the race and using only light taps, frequently alternating from one hole to the other. ***Do not attempt to pull the armature out of the bearing by tapping the end of the armature.*** A small amount of petroleum spirits placed in the holes may assist in

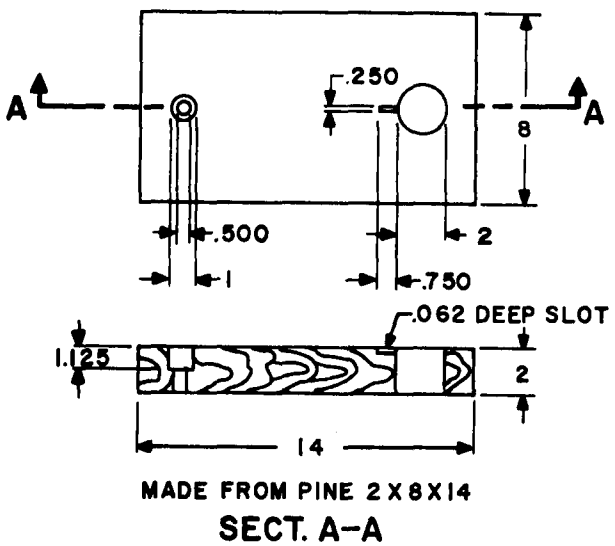


Fig. 4 – Work Board

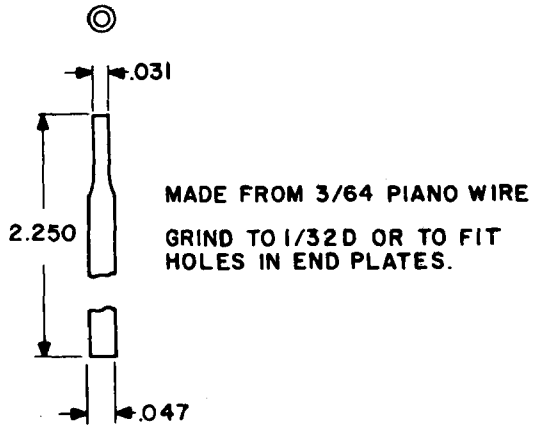


Fig. 5 – Punch Pins

removing the bearing. The bottom bearing may be removed in the same manner as the top bearing.

(3) The bearings which are apparently good should be washed with petroleum spirits. Those bearings which have remained on the armature may be washed without removing from the shaft. Care must be exercised so as not to get petroleum spirits on the windings. The armature should be held over a shallow pan of petroleum spirits in a horizontal position while thoroughly washing the bearing, and the "armature protecting grease shield." The R-8950 syringe, should be used to blow the petroleum spirits from the bearing. Again the bearing should be inspected for excessive wear by turning the bearing with the fingers and feeling for rough spots as well as excessive play. Excessive play may be judged by comparison with a new bearing. A gritty feeling of the dry bearing should not be mistaken for a rough surface.

(4) If the bearing is in good condition, lubricate with a small amount of Pioneer No. 10 oil on the end of an orange stick. Excess oil should be removed by use of a KS-2423 cloth.

(5) Where the bearing is judged defective, it may be replaced as follows (see Fig. 6): Place the armature in the hole provided in the board in order to hold the armature steady. Using the two bearing puller tools (see Fig. 7), place

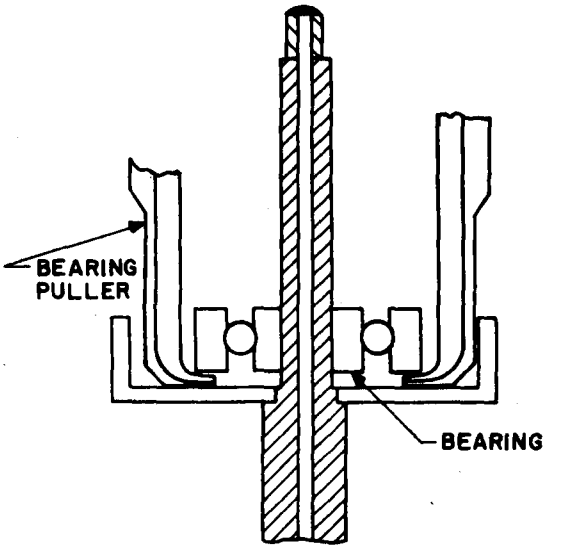


Fig. 6 – Cross Section Showing Use of Bearing Puller to Remove Bearing

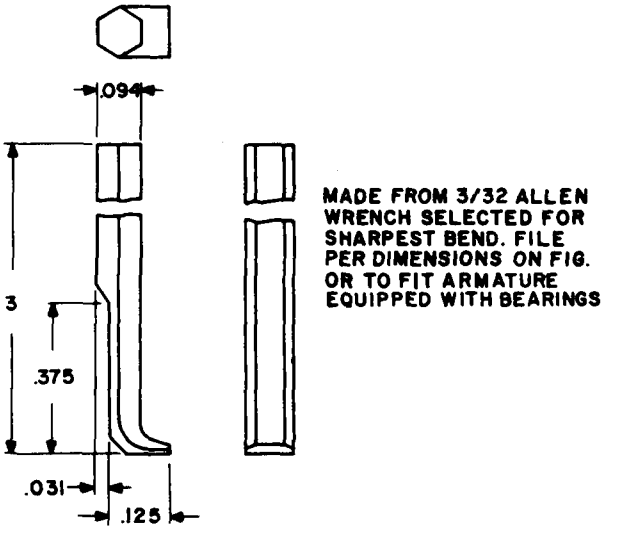


Fig. 7 – Bearing Pullers

one on each side of the bearing, sliding the sharp end under the bearing as far as possible, and then exerting a side pull on the two bearing pullers, using the feet of the puller against the grease shield as a lever fulcrum. Care should be exercised to pull evenly, and when the bearing has moved up to the insulating tip, be careful not to let a tilt of the bearing cause a breakage of the insulating tip. While the bearing is off the shaft, the armature grease shield should be wiped out, using a KS-2423 cloth on the end of an orange stick moistened in petroleum spirits. The new bearing may then be oiled with Pioneer No. 10 oil, excess oil wiped off, and placed on the shaft, being careful not to break the insulating tip. The bearing should be pressed into place as far as possible with the fingers. If it will not go completely into position, the bearing may be driven into position by tapping on the inner race with a piece of pipe or tubing the inside diameter of which is slightly larger than the shaft.

(6) Before reassembling the motor, the end plate bearing recess should be washed out with petroleum spirits by using a cotton swab dipped in petroleum spirits. Care should be exercised not to get petroleum spirits on the windings.

(7) Reassemble the motor and before placing the bottom contact in position, check to see that the motor turns freely and that some end play is present. The motor may now be reinstalled in the amplifier.

(8) A Fafnir bearing 33KDD3 or a New Departure SSRS77R2 replaces the top bearing and is a prelubricated bearing with a shield.

(9) A Fafnir Bearing 33K5 or a New Departure SSR3 replaces the bottom bearing. Bearings cost about $2.00 each.

(10) All bearings were lubricated with Pioneer No. 10 oil. This oil conforms to MIL-L-6085A specification. It is a low volatility oil and provides oxidation and corrosion resistance. It is manufactured by Eclipse Pioneer Division of Bendix Aviation Company.

(11) Time required to recondition each motor, that is, disassembling and reinstalling, averages 1 man hour.

3.01 ***Cleaning*** (Reqt 2.01)

(1) With the gears disengaged, wipe off the top of the regulating capacitor and outside of the motor with a clean piece of KS-2423 cloth. Remesh gears as covered in 2.08(c) and then recheck 2.07 and 2.09.

3.02 ***Lubrication*** (Reqt 2.02)

(1) At intervals of less than 10 years, bearings should be lubricated with a small amount of Pioneer No. 10 oil on the end of an orange stick.

3.03 ***Top Motor Brush Spring Pressure*** (Reqt 2.03)

3.04 ***Bottom Motor Brush Spring Pressure*** (Reqt 2.04)

(1) Remove motor as covered under 3.002 (1). Do not remove motor from plate. To adjust the bottom spring, remove the two screws holding the spring assembly to the motor. To adjust the top spring, remove the two terminal block mounting screws. Use the 3-inch cabinet screwdriver. Then apply the KS-6015 duckbill pliers near the base of the spring and adjust the spring so that it bears on the contact with a greater pressure. Adjust spring so that it bears flat against the contact. If the spring is bowed appreciably or kinked, correct by drawing the pliers along the spring. Replace screws, tightening them securely.

(2) Remount motor as covered under 3.002 (2). Remesh gears as given in 2.08(c) and then recheck 2.07 and 2.09.

3.05 ***Motor Movement*** (Reqt 2.05)

(1) If the motor does not turn freely, remove the motor as covered in 3.002 (1) and replace it with another motor, mounting it as covered in 3.002 (2). Motors removed should be returned for repair in accordance with local instructions.

3.06 ***Position of Latch*** (Reqt 2.06)

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

3.07 ***Tracking, Gear Bind, and Backlash*** (Reqt 2.07)

(1) If, in the tracking test made with the master flat gain controller, the regulator indicating wheel is out of step with the master controller by more than 0.3 division uniformly throughout the range, this may indicate a wrong setting of the indicating wheel, in which case proceed as in 3.09. If the indicating wheel is out more than 0.3 division at random, this may be an indication of gear bind.

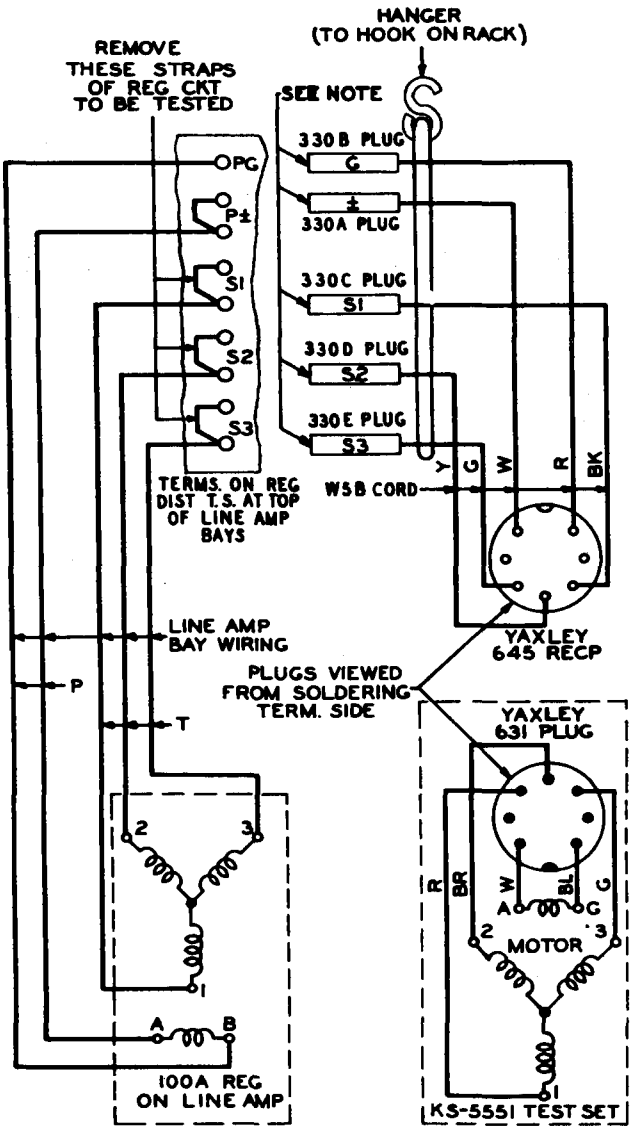
(2) If the tracking test made with the KS-5551 test set is not met, or if the gears bind or if there is too much backlash, disengage the gears and check the capacitor torque according to Requirement 2.08. If the torque is outside limits replace the capacitor as described in 3.08. If the capacitor torque is satisfactory proceed as follows.

(3) Loosen gear engagement adjusting screw locknut with 474A wrench and back off adjusting screw until it is barely protruding through the post.

(4) Loosen the three motor mounting plate clamping screws with the 541A wrench just enough to permit the motor and plate to be moved out freely.

(5) Connect the KS-5551 test set to the motor, check for voltage, and position lamp as covered in 2.07(c). See Fig. 8 for connection of test set to regulator.

(6) Slide the motor mounting plate to the left so as to mesh the gears. If gear teeth are prevented from meshing due to being in contact at ends, rotate motor slightly with test set until gears mesh. Mesh gears fully but do not use excessive pressure as this will damage motor shaft. The mounting plate should not touch the adjusting screw.



Note: The 330 type plugs are stamped (G), (±), (S1), (S2), and (S3) as shown. The (G) and (±) plugs should be connected to the nearest PG and P± terminals on the amplifier bay terminal strip. The (S1), (S2), and (S3) plugs should be connected to the corresponding bottom terminals of the regulator circuit to be tested.

Fig. 8 – Schematic Arrangement for Use of KS-5551 Test Set at Line Amplifier Bay

(7) Using the test set, rotate the regulator motor from 5 to 55 and back again. The purpose of this is to permit the motor to move out so as to accommodate the combined gear and motor pinion eccentricities. Do not go beyond 5 or 55. While holding the mounting plate in this position, tighten the front clamping screw first, then right rear, and finally left rear clamping screws. Use the 541A wrench and ***tighten screws securely. Do not move plate.***

(8) Now turn in the adjusting screw with the fingers until it touches the plate and then lock the screw in this position with the locknut. Use one 474A wrench to hold the screw while tightening the locknut with another 474A wrench.

(9) Then loosen the three motor mounting plate clamping screws with the 541A wrench and push plate to the right. Do not loosen screws more than just sufficiently to move plate. Insert the 0.018 inch blade of the 74D gauge between the end of the gear engagement adjusting screw and the motor mounting plate. With the gauge held flat against the end of the screw, move plate to the left until the plate is tight against the gauge. Then while holding the gauge and plate in position, securely tighten the front plate clamping screw with the 541A wrench. Remove gauge and tighten the right rear and finally the left rear screw.

(10) Recheck the tracking, gear bind, and backlash requirements.

(11) If the tracking, gear bind, or backlash requirements are not met after the above adjustment and the capacitor torque requirement is met, the trouble is probably due to the motor which should be replaced following the procedure covered in 3.002(1) and (2). Motors removed should be returned for repair in accordance with local instructions.

3.08 ***Capacitor Torque*** (Reqt 2.08)

(1) If the torque is excessive, replace the capacitor, removing it as covered in 3.002 (3). This procedure is for maintenance use only. During installation if excessive torque is encountered, the entire amplifier should be replaced. Transmission tests are required on the amplifier in accordance with other sections of Bell System Practices after the capacitor is replaced, to insure proper setting of the T capacitor of the amplifier.

(2) Check the replacing capacitor for maximum 10 grams torque. Remount motor as covered in 3.002 (2). Then perform the adjustments in 3.07 (3) to (10) inclusive and then check requirement 2.09.

3.09 ***Indicating Wheel Setting*** (Reqt 2.09)

(1) If the requirement is not met, loosen slightly the three motor mounting screws with the 541A wrench just sufficiently to shift the motor assembly to the right so as to disengage the gears.

(2) With power on the motor move the indicating wheel as necessary to meet the requirement. Then remesh the gears as covered in 2.08(c).

(3) If this does not meet the requirement, unmesh the gears again and move the indicating wheel so as to mesh different gear teeth. Then remesh the gears as covered in 2.08(c).

(4) When the requirement has been met with the gears meshed, tighten the motor mounting screws securely in the sequence given in 2.08. Recheck that the gear bind and backlash requirements are met.

REASONS FOR REISSUE

1. To add list of tools and materials for reconditioning KS-5511 type 892D motor.

2. Information regarding the lubrication of bearings 2.02 and 3.02 added.

3. Procedure for reconditioning KS-5511 type 892D motor added.

4. Fig. 4, 5, 6, and 7 added.