Semi-postpay Paystations 470-919

SEMI-POSTPAY PAYSTATION

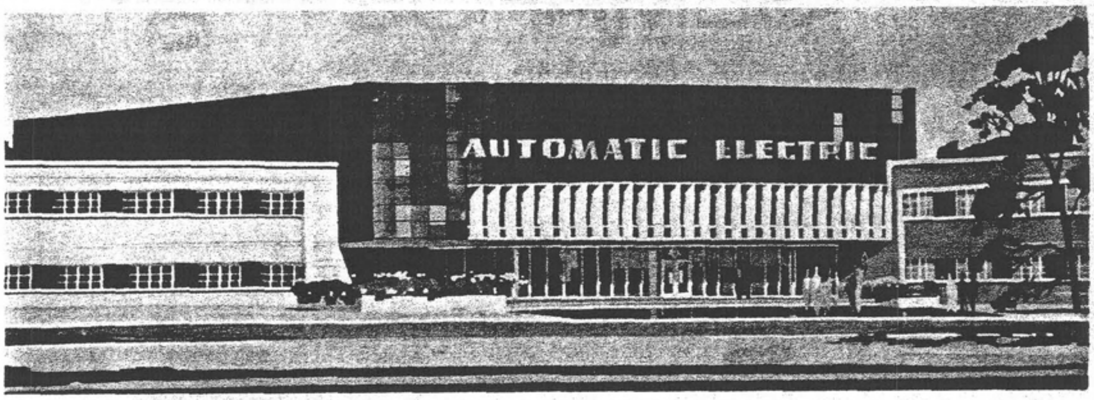
Technical bulletin 470-919

AUTOMATIC ELECTRIC

GENERAL SYSTEM

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS



Factory, development laboratories, and general office at Northlake, Illinois, U.S.A.

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Strowger Automatic Telephone Systems—Complete automatic central-office equipment for exchange areas of any size, from small towns to the largest metropolitan networks.

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Automatic Toll Boards—An adaptation of Strowger principles to toll switching, resulting in simplification of operators' equipment and greater economy of operating and toll-circuit time.

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Makers also of electrical control apparatus for industrial, engineering, and public utility companies, telephone apparatus for railroads and pipe-line companies, private telephone systems of all types, electrical and communication devices for aircraft and airways control, and special communication apparatus for military and naval departments.

SEMI-POSTPAY PAYSTATIONS

Type LPA 86, LPA 86-10, LPA 86-55, LPB 86, LPB 86-10, LPB 86-55, LPA 96, LPA 96-10, LPA 96-55, 66E and 96-E

1. GENERAL

1.1 This publication describes the semi-postpay paystations (figure 1); these paystations are designed for use in an automatic exchange equipped for reversal of transmission battery at the connector when the called party answers. The LPA 86 series paystations are equipped with manually-adjusted loop compensating networks; the LPB 86 series and the LPA 96 series are equipped with self-compensating networks. The -10 suffix following the paystation type number denotes dime only service; the -55 suffix denotes two-nickel service.

1.2 Supervision of coin collection is not required for local service. The calling party has unlimited access to the line (without depositing coins), for dialing and talking to the operator, or for completing connections to local stations. The caller hears the called party answer before he must deposit required coins. Thus, if a call is incomplete for any reason, no coins are deposited. When the called party answers, battery to the paystation reverses. The paystation coin control mechanism short-circuits the transmitter and shunts the receiver to enforce coin collection. Coins deposited trip a restoring mechanism, removing the transmission block. The parties converse. Battery does not reverse on calls to or through the toll operator's position. The paystation coin control relay remains unoperated, and coin collection is supervised by the toll operator. These coins strike a bell or a gong, producing audible signals conveyed to the supervising operator by a special resonator transmitter inside the paystation. The operator can easily identify the sounds.

When the called party replaces the handset, battery reverses back to normal, allowing the coin control to reset instantly upon release of the connection by the calling party.

For local service, semi-postpay paystations may be equipped for collection of one dime (only), one dime or two nickels, or single nickels.

Figure 1. Semi-postpay paystation.

2. INSTALLATION

2.1 Perform following steps to install paystation.

(a) Place backboard against wall vertically (make sure that backboard and paystation are perfectly upright).

(b) Mark through backboard holes B onto wall (figure 2).

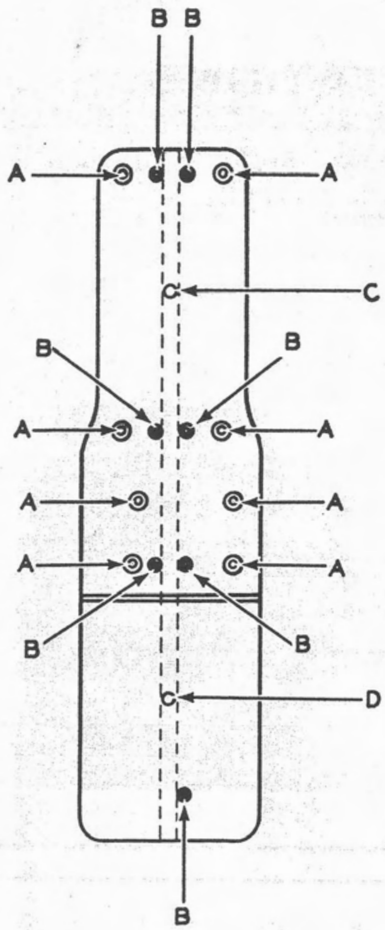


Figure 2. Backboard.

(c) Drill holes in wall where marked to take anchors, either Ackerman-Johnson or Rawl-Taper 1/4''-20.

(d) Mount anchors in wall.

(e) Push a loop of interior wire through hole in backboard marked C.

(f) Carry rest of interior wire down channel at rear of backboard.

(g) Push end of interior wire through backboard hole marked D. (If interior wire runs along the bottom of paystation booth or enclosure, reverse order of steps e, f, and g.)

(h) Mount backboard using anchor screws.

(i) Unlock upper housing of paystation and remove.

(j) Mount lower housing and backplate onto backboard with 1/4'' -20 flat-head machine screws, using holes A, which have threaded inserts to take these screws.

(k) Make sure that loop or end of interior wire comes through backplate slot by terminal strip without pinching.

(l) Remove cover from ringer box.

(m) Mount ringer box on bottom part of backboard, using wood screws.

(n) Make sure that interior wire has free access to ringer box without being pinched.

(o) Connect as shown in figure 3.

(p) Replace cover on ringer box.

(q) Replace upper housing on paystation and lock.

2.2 Tests. After installation, perform the following tests.

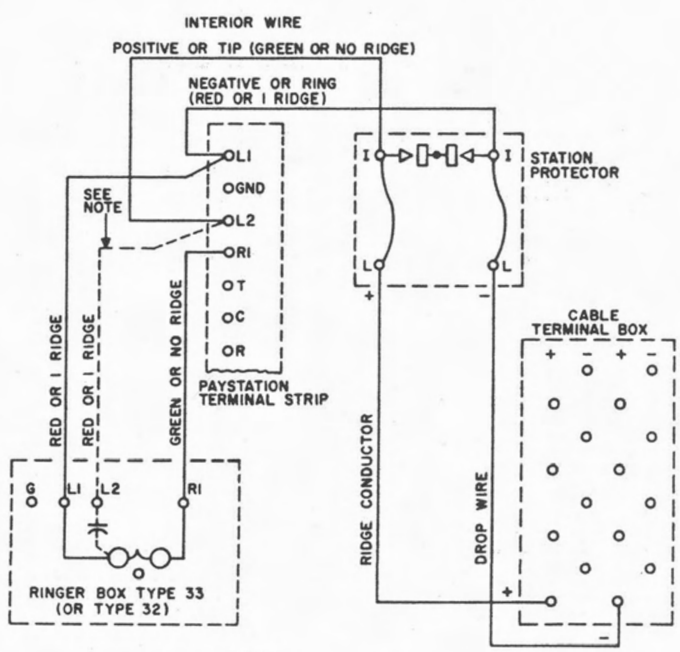
2.2.1 Using cash-compartment key.

(a) Unlock cash compartment.

(b) Dial paystation number and wait for busy tone.

(c) Hang up.

(d) Dial predetermined local test point (not operator) and when called party answers:



NOTE:
ON TYPE LPB 86, LPB 86-10, LPB 86-55, LPA 96, LPA 96-10 AND LPA 96-55 RINGER IS CONNECTED TO TERMINAL L2.

Figure 3. Connection diagram.

(1) For LPA 86-10, LPB 86-10, or LPA 96-10, deposit one nickel to check that nickels are rejected. Then deposit one dime or quarter to check that transmission block is removed.

(2) For LPA 86-55, LPB 86-55 or LPA 96-55, deposit one nickel to check that transmission is still blocked. Then deposit the second nickel to check that transmission block is removed.

(e) When conversation is finished, hang up.

(f) Dial operator for assistance with coin-signal test. Have operator identify all coins deposited. Check to make sure that all nickels deposited are collected while operator is on the line.

(g) When testing is completed, lock cash compartment door.

2.2.2 If cash compartment keys are not available, arrangements must be made to provide the tester with coins to follow the required testing procedure as outlined.

3. MECHANISM

3.1 Coin gauge. The coin gauge at the top of the upper housing has three different size openings – for nickels, dimes, and quarters. Each of these openings is directly above the corresponding channel in the coin chute.

3.2 Coin chute. The coin chute is mounted inside the upper housing directly below the coin gauge. See figure 4. The three channels are designed so that only the correct coin in the correct channel will operate the mechanism. All three channels end directly over the mouth of the coin hopper (figure 5). The lugs which hold the coin chute to the upper housing are part of a framework welded to the upper housing, which constitutes the coin return chute. Rejected coins fall down this chute to the coin return slot on the lower housing.

3.3 Coin signals. The three channels of the coin chute are arranged so that nickels, dimes, and quarters are directed either to the top or bottom of the bell, or to the cathedral gong, mounted on the opposite side of the coin chute. A nickel strikes the bell once, at the bottom of the bell; a dime strikes the bell twice, once at the top and again at the bottom of the bell; a quarter strikes the cathedral gong once. These bell and gong signals are conveyed to the central office via the special transmitter mounted on the back of the coin chute (figure 6). A permanent magnet mounted adjacent to the quarter channel on the coin

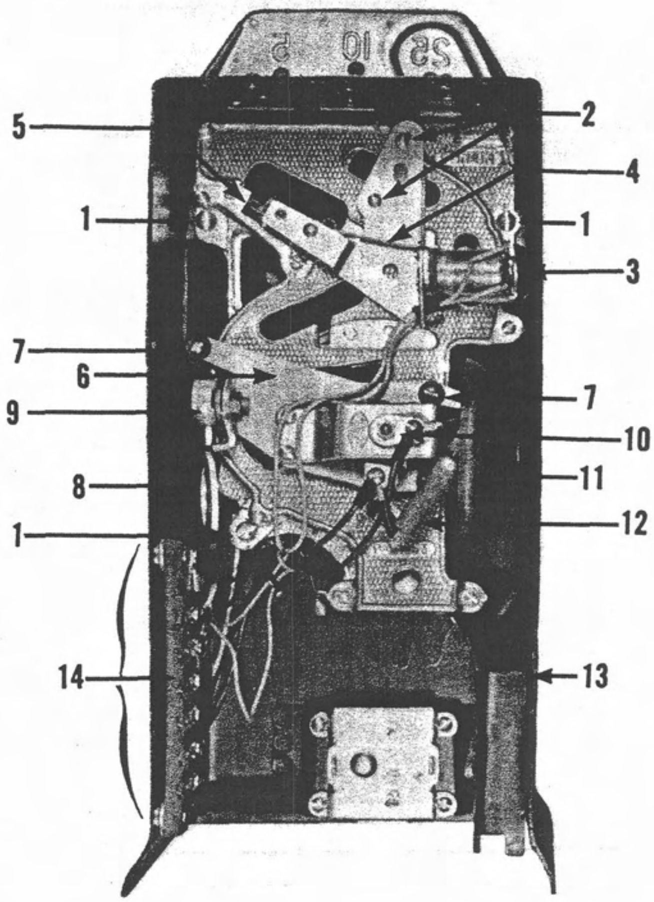


Figure 4. Upper housing.

1. *Coin chute mounting screws (3)*
2. *Nickel-rejector mounting screws*
3. *Relay magnet*
4. *Rejector actuator arm*
5. *Wire rejector loop*
6. *Mounting bracket for coin-signal gongs*
7. *Mounting screws for coin-signal bracket*
8. *Cathedral gong*
9. *Cathedral gong mounting*
10. *Coin signal transmitter assembly*
11. *Bronze bell.*
12. *47 ohm resistor*
13. *Rejected-coin return chute*
14. *Jackstrip terminal block*

chute acts as a slug rejector. A slug (possessing magnetic properties) deposited in the quarter channel will be attracted by the slug rejector, thus being prevented from striking the cathedral gong; however, the slug will be deposited in the cash-compartment coin receptacle. On toll calls, since the coin signal will not be received, the toll operator will not accept the slug for a toll charge.

3.4 Coin relay description. Figures 7, 8, and 9 show the coin relay in its normal condition. Two coils mount vertically on the base – one coil with a 2900/77-ohm winding, and one with an 83-ohm operate winding. The 77- and 83-ohm windings are connected in series. The

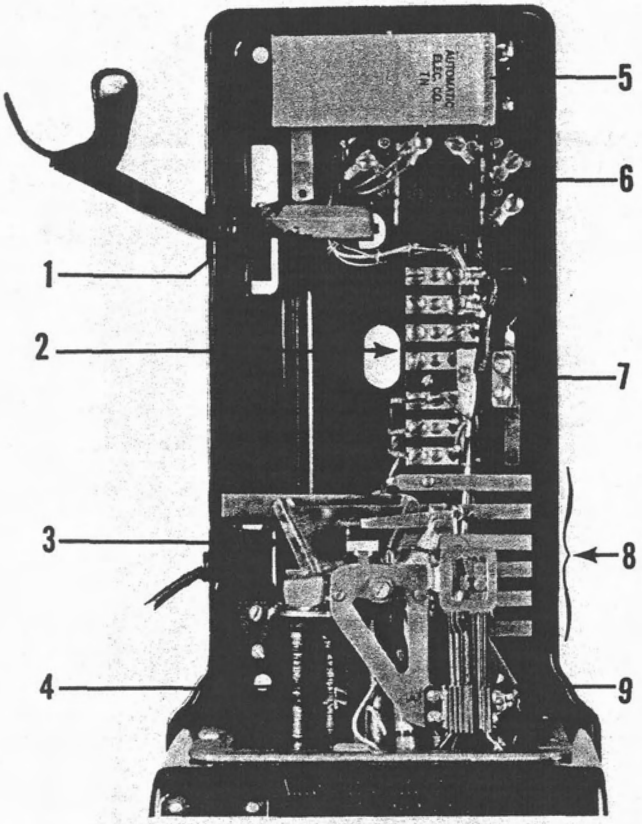


Figure 5. Lower housing (upper housing removed).

1. *Hookswitch springs*
2. *Terminal block*
3. *Coin hopper*
4. *Coin relay*
5. *0.4 and 5 microfarad capacitor*
6. *Induction coil*
7. *Auxiliary transfer spring*
8. *Transfer springs*
9. *Lineswitch*

armature pivots in the center and has a permanent magnet attached to the underside. The right hand side of the armature terminates in two pairs of roller-type buffers, which engage the lineswitch when the armature tilts to the right. One pair of roller-buffers pivots on the armature on a swinging arm. The switch lever pivots on the relay frame as shown in figure 10.

The horizontal stop arm terminates in a stud which normally clears the coin trigger stop surface by .010'', to permit tripping and restoring of the coin trigger without engaging the switch lever when the armature is tilted left.

The vertical portion of the switch lever forms a cam-like surface, forcing the pivoted roller buffer to the left or right, engaging lineswitch springs 3 or 4 selectively, depending upon the position of the coin trigger (figures 10 and 11). The coin trigger is counter-balanced on its pivot to restore by itself when tripped. The coin trigger arm extends through slots in the front and rear walls of the coin hopper (figure 7), so that it must be tripped each time a coin passes through the hopper.

3.5 Coin relay operation. The coin relay operates in four steps to prevent conversation until the proper coins are deposited:

(a) Figure 9 shows the coin relay in its "normal" condition, during dialing, waiting for called party to answer, and throughout toll calls. Note that the armature is tilted to the left, coin trigger is *normal*, and all lineswitch contacts are open. Under these conditions line polarity is normal (-48 volts dc applied to the -line). Current in the paystation circuit (figure 12) flows from L2, dial impulse springs, coin signal transmitter, regular transmitter and receiver, induction coil, 83- and 77-ohm coin relay windings 78-ohm magnet, to hookswitch "X" contacts and L1. The 78-ohm magnet is part of the "dime-only" mechanism in the -10 series and the nickel-counter in the -55 series paystations. See paragraphs 3.6 and 3.7.

(b) When the called party answers, the connector reverses line polarity on the calling line, reversing flow of current through the coin control mechanism. The coin relay armature is attracted to the right (figure 10). Armature roller-buffers engage lineswitch springs 3 and 6, closing contacts 1-2-3 and 6-7. The shunting contacts 1-2-3 shunt the receiver and short-circuit the transmitter. The caller cannot be heard, although the called party may be faintly heard. Restoring contacts 6-7 in closing, prepare for restoring of the coin relay at the end of the call, but do nothing at this time. Current now flows through L1, hookswitch "X" contacts, rectifier paralleling 78-ohm magnet, 77-

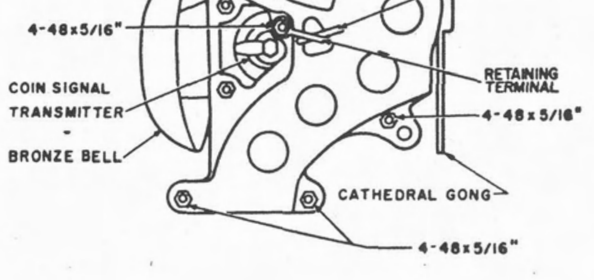


Figure 6. Coin chute.

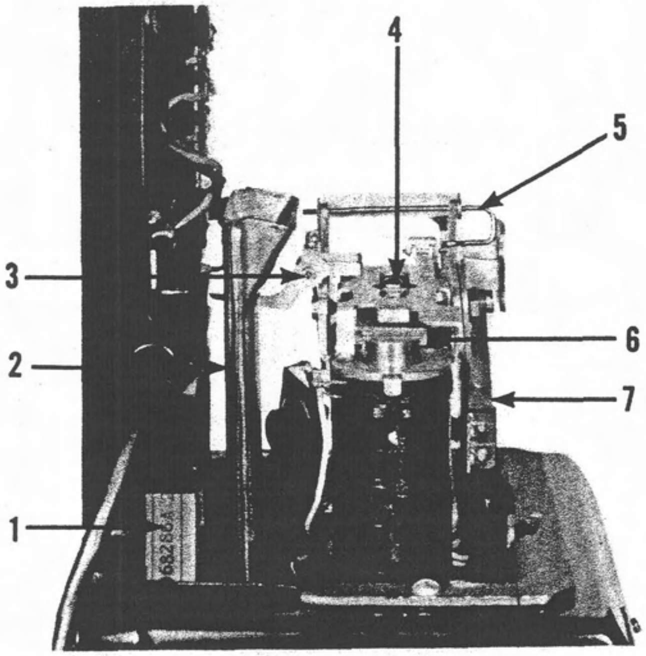


Figure 7. Coin relay installed in lower housing.

1. *2.5 microfarad capacitor*
2. *Coin hopper*
3. *Coin trigger pivot*
4. *Armature adjusting screws*
5. *Switch lever pivot*
6. *Permanent magnet*
7. *Lineswitch*

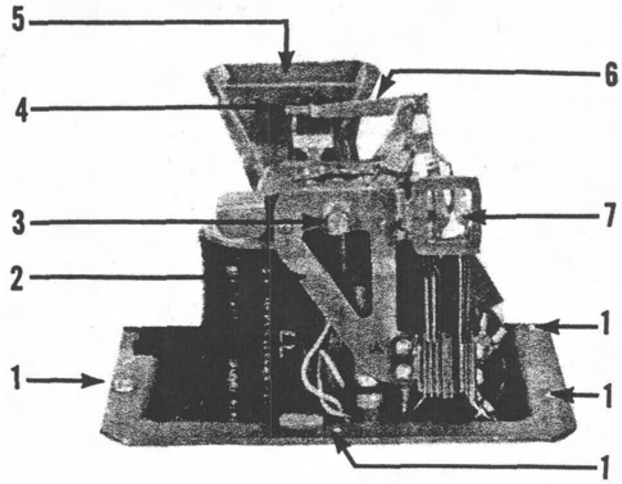


Figure 8. Coin relay (front view).

1. *Mechanism base mounting screws*
2. *Frame assembly*
3. *Armature pivot screw*
4. *Stop arm stud*
5. *Coin hopper mouth*
6. *Switch lever*
7. *Armature roller buffers (2)*

and 83-ohm winding, shunting contacts 1-2-3, dial impulse springs to L2 (figure 12). Enough current flows through the 39-ohm primary winding of the induction coil to allow the caller to hear the called party answer. The rectifier which formerly directed current to the 78-ohm magnet now shunts it, and the magnet releases. When the armature tilts right, the stop-arm stud, in striking the trigger stop surface, arrests the swing of the cam portion.

(c) Caller must deposit proper coins to converse. As coins drop through the coin hopper to the collection box, they trip the coin trigger. The stop-arm stud drops down and latches, throwing the switch lever cam portion abruptly to the right. This releases the left roller-buffer, opening contacts 1-2-3, to remove the shunt from the receiver and the short-circuit from the transmitter. The switch lever buffer engages shorting spring #4, closing contacts 4-5 (figure 11). This shorts the coin relay out of the talking circuit. Talking circuit (figure 12) is through L1, hookswitch "X" contacts, coin relay shorting contacts 4-5, induction coil, regular transmitter and receiver, coin signal transmitter, dial impulse springs to L2. The coin relay remains thus until the end of the call.

(d) If the calling party hangs up first, hookswitch "X" contacts open to remove the short from the 2900-ohm winding of the coin relay. Reversed line polarity prevents its operation until the called party also hangs up. Then the central office connector reverses line polarity (to normal) and the relay armature is attracted to the left. All lineswitch contacts open. A copper sleeve on the core of the restoring winding retards decay of the magnetic flux to aid in carrying the armature to the end of its stroke after the current is cut off. As the armature tilts to the left, the switch lever restores to normal, allowing the coin trigger to restore. The coin collector is ready for another call.

If the called party replaces his handset first, line polarity to the calling line restores to normal. Thus the 2900-ohm winding becomes properly poled to attract the armature as soon as the caller hangs up (opening hookswitch "X" contacts).

3.6 Ten cent service dime-only control. Paystations such as the LPB 86-10 have a nickel rejector to provide "dime-only" local service. The nickel rejector consists of a modified relay, mounted on the back of the coin chute as in figure 4. The long armature arm engages the pivoted-wire rejector loop with its notched end. The rejector loop mounts beside an opening in the nickel channel so that the long part of the loop lies in and across the channel when the relay is restored. In this

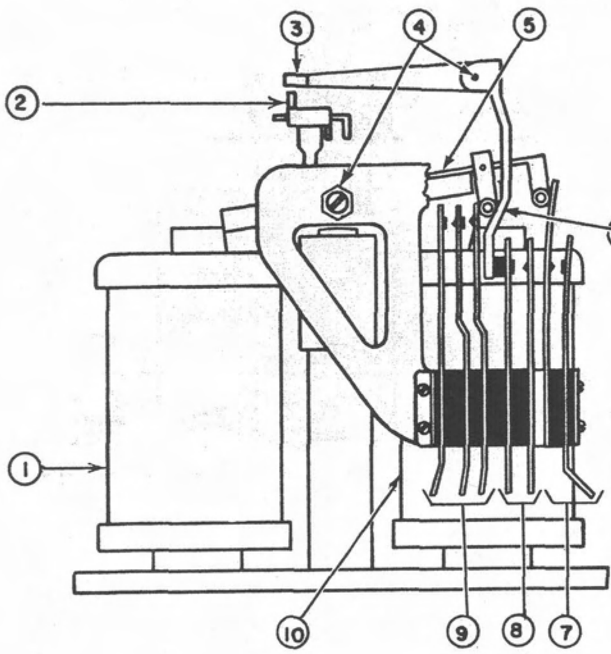


Figure 9. Coin relay – paystation idle.

1. *2900/77 ohm coil*
2. *Coin trigger*
3. *Stop arm stud*
4. *Pivot points*
5. *Armature*
6. *Switch lever*
7. *Lineswitch restoring contacts*
8. *Lineswitch shorting contacts*
9. *Lineswitch shunting contacts*
10. *83 ohm coil*

position, it trips out all nickels accidentally deposited, so that they drop down the return chute to the coin return slot in the lower housing.

The 78-ohm relay magnet is normally operated; i.e., paystation idle, caller dialing and awaiting answer, and throughout toll calls, holding the rejector loop withdrawn from the nickel channel. Once the caller reaches his party and line polarity reverses, one dime must be deposited to converse. Reversing line polarity restores the 78-ohm magnet, releasing the rejector loop into the nickel channel. It remains there until the call is finished and line polarity returns to normal. Caller deposits one dime, and converses.

3.7 Ten cent service, two-nickel control. Paystations such as the LPB 86-55 are equipped with a nickel-counter to permit deposit of one dime or two nickels for a ten cent local call. This mechanism (figure 13) consists of a 78-ohm magnet relay with a special armature, a micro-switch whose wire operating arm extends through the nickel channel of the coin chute, and a "pendulum" for latching the

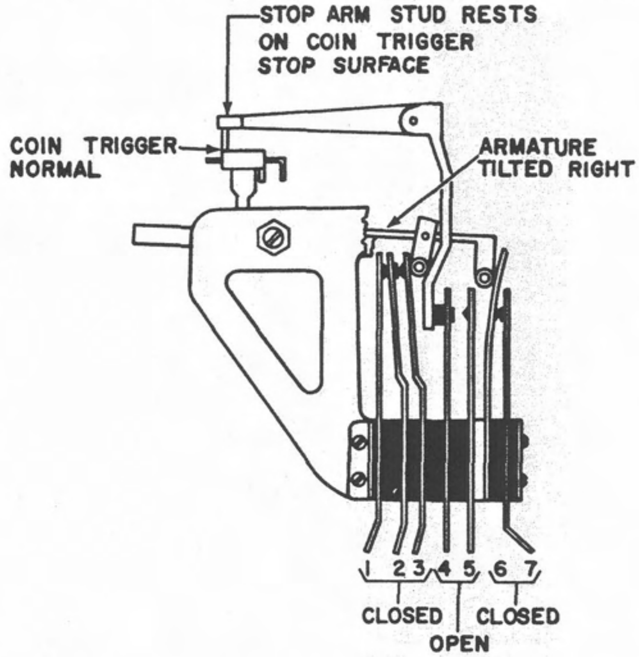


Figure 10. Coin relay – paystation after called party answers.

micro-switch contacts in their operated position. The micro-switch contacts, when closed, serve to short-circuit the transmitter and receiver of the paystation to enforce deposit of the second of two nickels. If the caller elects to deposit a dime, this mechanism does not operate.

3.8 The 78-ohm relay is normally operated – as explained in paragraph 3.6 – holding the pendulum slightly to the left of its position in figure 13 by means of its special armature. During this time the micro-switch arm tip rests against the coin chute ("A", figure 13)

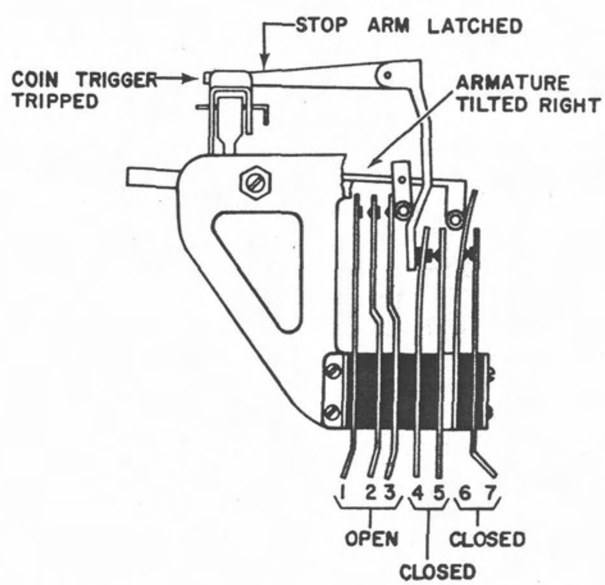


Figure 11. Coin relay – paystation during conversation, coins deposited.

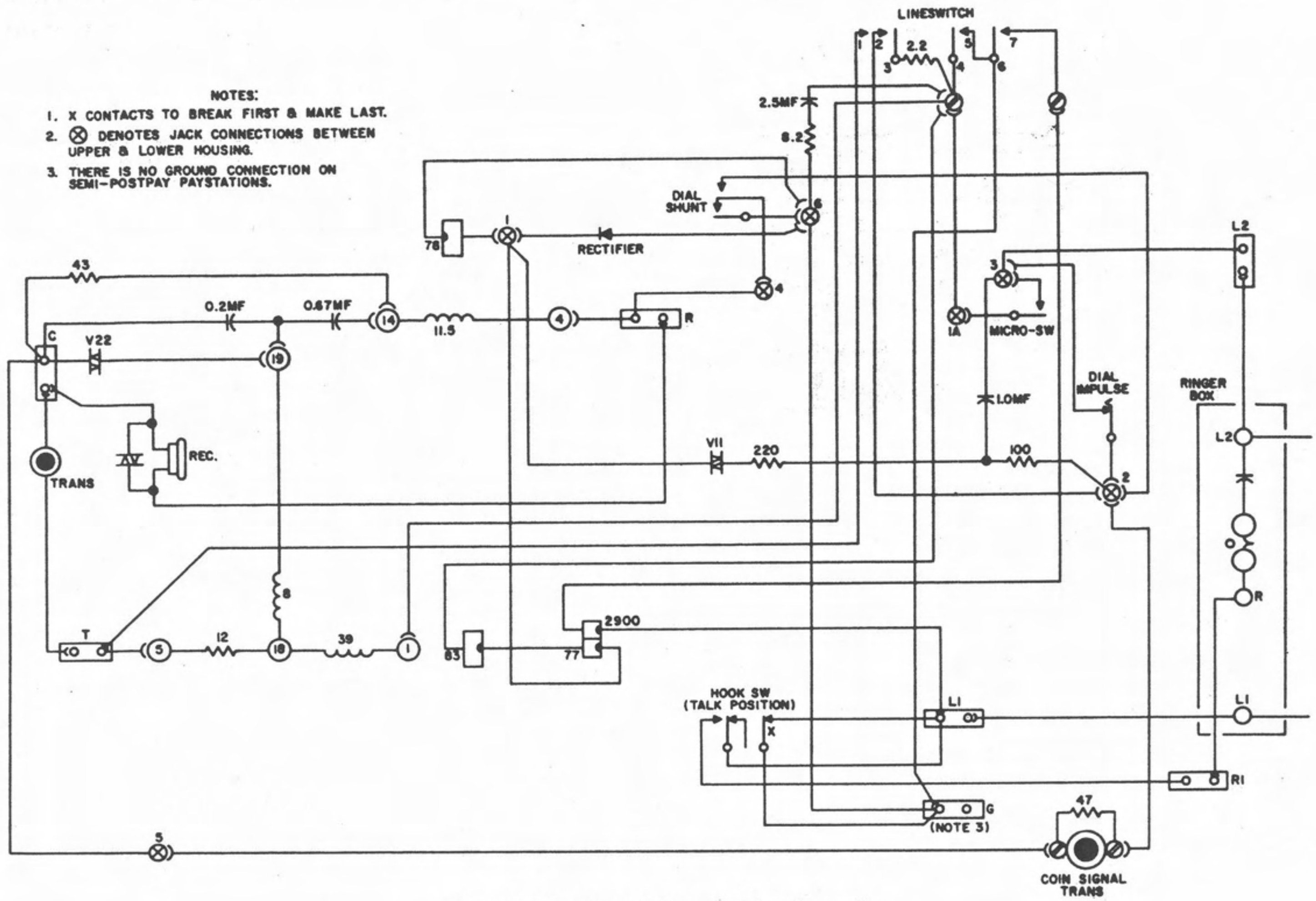


Figure 12. Type LPB 86-55 schematic.

and is capable of operating and restoring instantly without latching in the pendulum notch. In this position, the micro-switch contacts are open.

When the called party answers, battery to the paystation reverses, de-energizing the 78-ohm relay and blocking transmission as explained in section 3.5b. The relay restores, releasing the pendulum to swing to a nearly vertical position. The caller deposits the first nickel, which falls through the nickel channel, striking the micro-switch operating arm with sufficient force to carry it down the edge of the pendulum past the notch ("B", figure 13). This action closes the micro-switch contacts and short-circuits the transmitter and receiver (figure 12). As the nickel passes on down the chute, restoring force in the spring-restored micro-switch arm carries it up the pendulum edge to latch ("B" figure 13). Although the first nickel trips the coin trigger, releasing the lineswitch shunting springs (section 3.5c), the parties are still unable to converse.

The caller deposits the second nickel, which again strikes the tip of the micro-switch operating arm, forcing it downward against the bottom edge of the pendulum notch. This throws the pendulum abruptly to the left, allowing the operating arm to restore to its original position ("A", figure 13), opening the micro-switch contacts. This removes the short-circuit to the transmitter and receiver so that the parties may converse.

During toll calls, battery to the paystation is not reversed, and the 78-ohm relay holds operated continuously. Since the relay armature prevents latching of the micro-switch arm as described above, any number of nickels may be deposited under supervision of the toll operator.

4. ROUTINE MAINTENANCE

4.1 Upper housing.

4.1.1 Coin gauge. When inspecting the coin gauge, check for cleanliness, mutilation, and stuck coins or slugs. Use only wooden instruments to remove coins or slugs, such as a toothpick or orange stick; hard steel instruments can cause damage. Look for the reason why coins have stuck; e.g., dirt, sticky deposits, or coin gauge out of alignment. If out

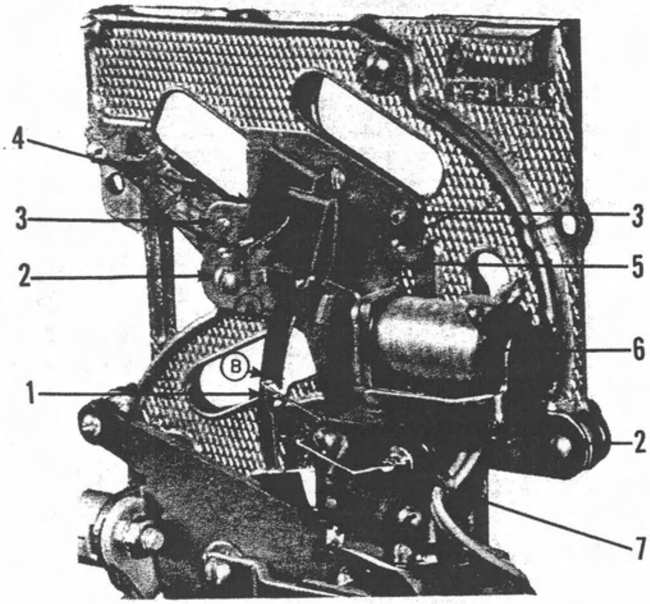


Figure 13. Microswitch assembly.

1. *Pendulum notch*
2. *Two-nickel assembly mounting screws (2)*
3. *Cover-mounting studs and screw holes*
4. *Shock lever*
5. *Pendulum pivot*
6. *Relay magnet*
7. *Micro-switch operating arm (shown latched)*

of alignment or mutilated, remove the upper housing for shop overhaul, and replace it with another.

4.1.2 Coin chute. Inspect the coin chute for cleanliness, mutilation and stuck coins or slugs. If chute is dirty or damaged in any way, replace the entire upper housing and overhaul the original upper housing. Check signals for nickel, dime, and quarter; if the operator fails to recognize the signals, replace the upper housing and overhaul. Check also micro-switch or nickel-rejector, if present.

4.1.3 Dial. Check dial for bind-free operation and correct speed. See technical bulletin 527 for maintenance of Type 52 dial.

4.2 Lower housing. Inspect handset cord and check hookswitch for ease of operation. Remove spring-clip from coin-relay pivot screw and remove the plastic dust cover.

4.2.1 Coin trigger. See that coin-trigger arm is aligned in its slots in coin hopper. It should not touch sides or top of slots. With armature tilted left, a .030'' thickness guage passed down back face of coin hopper should trip the trigger. Side play of trigger on its bearing pin should be barely perceptible.

4.2.2 Switch lever. Stop-arm stud rests approximately on a vertical line with coin-trigger pivot when armature is tilted right. With armature tilted left, stud clears coin-trigger stop surface by at least .010'', or far enough to allow trigger to trip and restore without engaging switch lever. If this clearance is not met, adjust by slightly bending switch lever just below pivot.

4.2.3 Lineswitch. Check lineswitch springs for proper contact and follow. Clean contacts if necessary, using A. E. Co. contact cleaner H-42962. (Never use paper or cloth for cleaning contacts.) When armature is tilted left, coin trigger normal, all contacts must be open at least .010''. When armature is tilted right, coin trigger normal, contacts 1-2-3 and 6-7 must be closed. When armature is tilted right, coin trigger tripped, contacts 4-5 and 6-7 should be closed. Adjust springs and tension as necessary to achieve the above. Clean the mechanism thoroughly with a soft brush, removing any stray iron filings from the armature and coils. Make certain that line voltage is between 44 (min) and 54 (max) volts dc. Report variations from these limits.

4.2.4 Coin-relay adjustment. When testing the coin relay with the upper housing removed, use Automatic Electric Company paystation test cord, No. P-60605 (figure 14). If this cord is used for testing paystations such as Type LPB 86 which have no auxiliary jack spring terminals, plug in both ends of the cord so that the unused terminal is at the top.

Where the test outline below calls for reverse battery (i.e., apply − 48 volts dc to + line), reverse the spade-tipped leads L1 and L2 at the terminal block.

(a) Tilt armature to right, coin trigger untripped. Lift handset. Apply 48 volts dc to plus (+) side of line. Armature should tilt to left with a minimum of rebound, opening all lineswitch contacts. If rebound is excessive, increase tension in shunt spring #3 and restoring spring #6.

(b) Tilt armature to left and replace handset, coin trigger normal. Apply voltage to plus (+) side of line. Armature should remain tilted to left. If armature tilts to right, move armature nearer to left pole piece by means of adjusting screws (figure 7).

(c) Lift handset. With armature tilted left, coin trigger normal, apply voltage to minus (-) side of line. Armature should tilt to right. If armature remains left, either shorting springs 4-5 are closed, or armature is too near to left pole piece. If former, bend springs to meet requirements stated in 4.2.3 above.

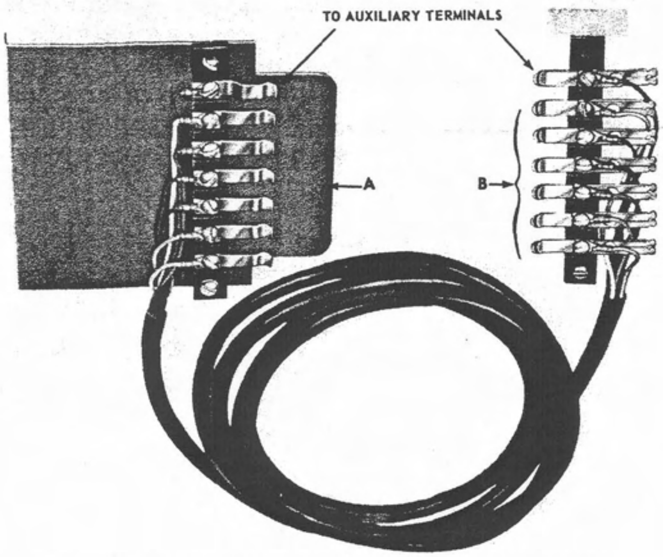


Figure 14. Paystation test cord.

If armature requires adjustment, loosen adjusting screws (figure 7), and move armature slightly to right.

(d) With handset off-hook, armature tilted to right, coin trigger tripped, apply voltage to plus (+) side of line. Hang up. Armature should tilt to left. If it does not tilt, armature is either too near right pole piece – see (b) above – or restoring-springs 6-7 are not making contact. If latter, bend spring 7 to left until this pair of contacts meets requirements stated in 4.2.3 above. These springs must make contact when armature tilts to right to energize the 2900-ohm winding previous to opening of lineswitch contacts. Residual magnetism in restoring winding restores armature.

(e) Make sure that all coin relay screws are tight, and carefully replace dust cover. Snap spring-clip over armature-pivot screw to secure dust cover.

4.2.5 After completing all inspection and adjustments, replace and lock the upper housing in place. (Upper housing. Test the mechanism as outlined in paragraph 2.2.)

Note: Final tests for coin relay must be made with upper housing in place. (Upper housing is made of magnetic material which alters shape and strength of magnetic field.) If coin relay still does not operate properly after finishing above tests and adjustments, replace coin relay.

5. SHOP OVERHAUL

5.1 Upper housing. Unlock upper housing with key provided. Pull lower part of upper housing outwards and lift. This disengages stud in inside top of upper housing from socket on backplate of lower housing.

5.1.1 Coin gauge. The coin gauge is mounted with rivets; to disassemble, remove these rivets after first removing coin chute 5.1.2 below. Install coin gauge before coin chute.

5.1.2 Coin chute disassembly.

(a) Lay upper housing front downward on bench. Remove 3 mounting screws (figure 4).

(b) Unscrew all leads to transfer springs.

(c) Lift out coin chute assembly complete, making sure not to damage cathedral gong.

(d) Pull leads through retaining brackets fixed to housing.

(e) Lay coin chute flat with sub-assemblies uppermost.

(f) Unscrew nut holding bronze bell and remove bell complete with its washer.

(g) Unscrew nut holding cathedral gong and remove gong.

(h) Unscrew mounting screws and nuts of nickel rejector (if Type LPA 86-10, LPB 86-10, or LPA 96-10). Note that long screw is the one situated directly underneath restoring magnet.

(i) Unscrew 2 screws and nuts holding signal transmitter mounting bracket. Note that long screw is the one situated just above cathedral gong mounting. Lift off bracket complete with signal transmitter assembly.

(j) Unscrew 4 screws holding signal transmitter assembly to mounting bracket. Lift off transmitter assembly.

(k) Unscrew nut holding signal transmitter. Lift out signal transmitter.

(l) Unscrew 8 remaining screws and nuts on coin chute (figure 6), so that the three parts can be separated. One of these screws secures the quarter slug magnet rejector retaining terminal in place, use care in removing terminal and magnet.

(m) Unscrew 2 relay-mounting screws and withdraw relay magnet from its mounting bracket.

*(n) Unscrew 2 screws running through micro-switch and withdraw micro-switch, taking care not to damage operating arm.

*(o) Unscrew 2 remaining screws holding cover plate of pendulum and shock lever, and remove cover plate.

*(p) Carefully remove pendulum and shock lever from their pivots.

*(q) Draw all pivots from backplate.

*(r) Clean all parts and inspect thoroughly.

(s) Make sure that transfer springs mounted on terminal block assembly are clean and properly tensioned. (These springs are the electrical connection between upper and lower housings.)

(t) Replace parts as necessary.

5.1.3 Dial removal.

(a) Remove the coin chute per section 5.1.2.

(b) Disconnect dial leads from jackstrip terminals inside upper housing.

(c) Unscrew 3 remaining flat-head screws and carefully pull dial outward, feeding dial leads out through inner mounting cup.

5.1.4 Dial installation.

(a) Feed dial leads from front of paystation through slot in inner mounting cup and push dial home.

**(b) Install 3 long flat-head screws and tighten.

(c) Connect dial leads to transfer springs per applicable wiring diagram (figures 15 through 22).

---

*Starred steps are for Type LPA 86-55, LPB 86-55, and LPA 96-55 only.

**If difficulty is encountered in locating threaded holes in dial, loosen 3 round-head screws and align holes. Tighten 3 round-head screws after aligning holes.

5.2 Upper housing tests and adjustments. Test slugs for coin gauge and coin chute must have the following dimensions. It is recommended that brass (or equivalent non-magnetic metal) be used for quarter slugs to avoid attraction by the quarter slug rejector magnet (paragraph 3.3).

5.2.1 Coin gauge. The coin gauge must accept the following maximum slugs.

	Quarter	Dime	Nickel
Diameter	0.961″	0.710″	0.846″
Thickness	0.083″	0.058″	0.083″

5.2.2 Coin chute. The coin chute must accept the following maximum, minimum, and standard slugs.

Quarter	Max	Min	Standard	Reject
Diameter	0.977″	0.938″	0.961″	0.903″
Thickness	0.090″	0.052″	0.083″	0.083″
Dime				
Diameter	0.721″	0.685″	0.710″	0.653″
Thickness	0.070″	0.043″	0.058″	0.052″
Nickel				
Diameter	0.857″	0.805″	0.846″	0.767″
Thickness	0.090″	0.050″	0.083″	0.083″

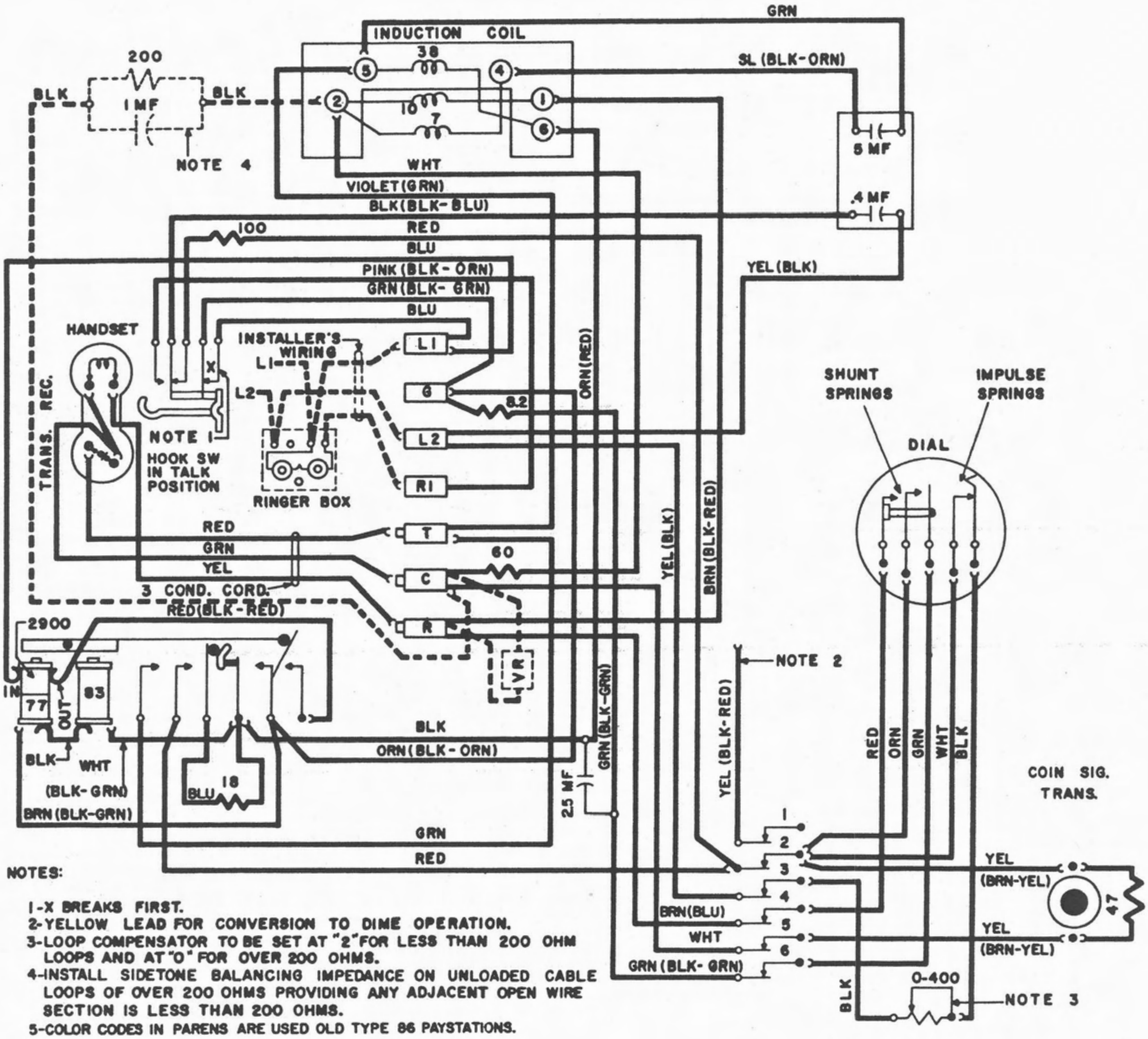
Note: The maximum slugs will not pass through the coin gauge.

Coin chute must reject the slug dimensions given in the right-hand column.

5.2.3 Dime-only mechanism adjustment. Check the operating arm for free movement on its pivot. When the relay is restored, arm should touch the opposite wall of the nickel channel with its tip; when relay is operated, the arm should lie in the recessed area in the inside wall of the chute cover, where it cannot obstruct the passage of nickels through the nickel channel.

The magnet relay should operate completely in series with 2100 ohms on 50 volts dc (23 milliamperes), but should *not* operate in series with 2300 ohms on 50 volts dc (21 milliamperes). The relay stroke should be approximately .008". The relay springs (one armature and one backstop spring) should be adjusted to provide sufficient restoring force to hold the wire operating arm firmly in the nickel channel with the relay restored.

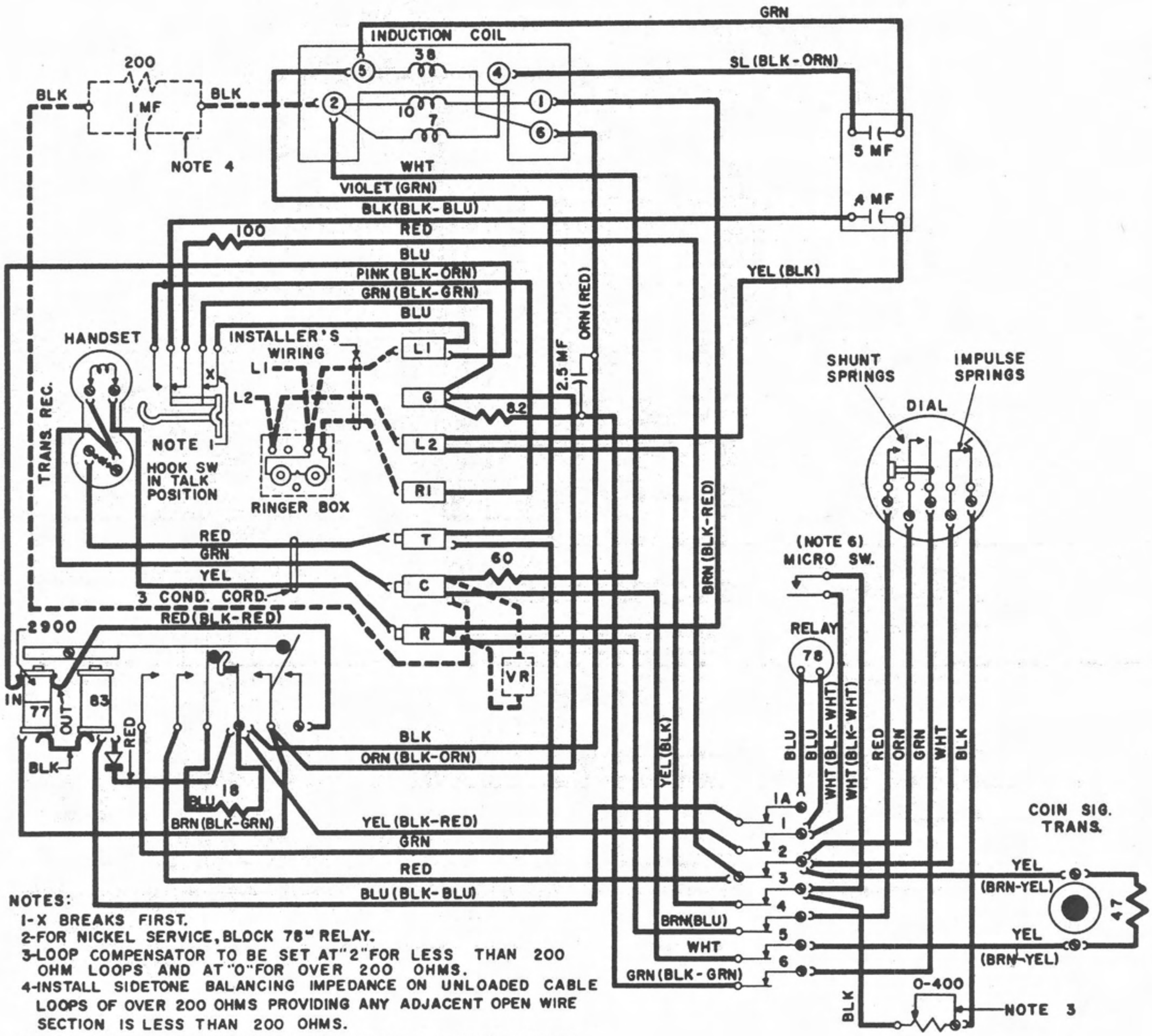
Mounting plate bends should be right angles as gauged visually.



NOTES:

1-X BREAKS FIRST.
2-YELLOW LEAD FOR CONVERSION TO DIME OPERATION.
3-LOOP COMPENSATOR TO BE SET AT "2" FOR LESS THAN 200 OHM LOOPS AND AT "0" FOR OVER 200 OHMS.
4-INSTALL SIDETONE BALANCING IMPEDANCE ON UNLOADED CABLE LOOPS OF OVER 200 OHMS PROVIDING ANY ADJACENT OPEN WIRE SECTION IS LESS THAN 200 OHMS.
5-COLOR CODES IN PARENS ARE USED OLD TYPE 86 PAYSTATIONS.

Figure 15. Type LPA 86 wiring diagram.



NOTES:

1-X BREAKS FIRST.

2-FOR NICKEL SERVICE, BLOCK 78" RELAY.

3-LOOP COMPENSATOR TO BE SET AT "2" FOR LESS THAN 200 OHM LOOPS AND AT "0" FOR OVER 200 OHMS.

4-INSTALL SIDETONE BALANCING IMPEDANCE ON UNLOADED CABLE LOOPS OF OVER 200 OHMS PROVIDING ANY ADJACENT OPEN WIRE SECTION IS LESS THAN 200 OHMS.

5-COLOR CODES IN PARENS ARE USED ON OLD TYPE 86-55 PAYSTATIONS.

6-MICROSWITCH CONTACTS AND LEADS DO NOT APPEAR ON LPA 86-10.

Figure 16. Type LPA 86-10 and LPA 86-55 wiring diagram.

At no time should the operating arm bind in its slot in the tip of the relay armature extension, or touch the bottom of the slot. Relay armature extension shall not touch the sides of the slot in the mounting plate.

5.2.4 Two-nickel mechanism adjustment. The magnet relay operating limits are as set forth in paragraph 5.2.3. Minimum stroke is .010''.

The pendulum should not bind on its pivot, and, at normal, remain nearly vertical and parallel to the mounting plate. With the cover in place and the screws tight, the pendulum must not bind when the cover is pressed firmly with the thumb at a point midway between the bearing holes.

The micro-switch operating arm should operate freely and without bind, and rest against the pendulum and coin chute (or mounting plate) at normal (''A'', figure 13). When fully operated it should touch the bottom of the nickel channel.

Micro-switch contacts should operate before the arm reaches the notch in the pendulum when operated manually. Contacts should restore (when operating arm is manually restored) between points 3/16'' above the pendulum notch and 1/16'' below its normal position. Operation of the micro-switch contacts is accompanied by an audible click.

A nickel released 1/4'' above the operating arm (at normal) should operate and latch the arm as the nickel falls through the nickel channel. Test should be repeated by dropping the nickel from the top opening of the nickel channel.

5.3 Upper Housing Mechanism Reassembly

(a) Fit three parts of coin chute together. Insert slug rejector magnet in slot at quarter channel. Position retaining terminal to secure magnet in place. Install screws and nuts per figure 6 and tighten.

(b) Install bell and gong mounting bracket using correct screws and nuts per figure 6.

(c) Mount cathedral gong. Tighten screw and nut.

(d) Mount bronze bell. Place flat brass washer between bell and bracket, with countersunk side of washer next to bell. Tighten screw.

(e) Test coin chute with slugs. See section 5.2.

(f) If Type LPA 86-10, LPB 86-10, LPA 96-10:

(1) Mount magnet to its mounting plate, making sure that the slotted end of the armature engages shorter loop of wire rejector arm. Tighten 2 screws.

(2) Mount dime-only mechanism on coin chute with 2 screws, per figure 4. Tighten screws.

(3) Thread magnet relay lead through hole in mounting bracket; insulate leads from bracket with a short piece of spaghetti tubing.

(g) If Type LPA 86-55, LPB 86-55, or LPA 96-55:

(1) Mount restoring magnet on mounting plate and tighten 2 screws.

(2) Mount micro-switch on mounting plate and tighten screw. Thread magnet leads through loop on micro-switch.

(3) Remount pivots for pendulum and shock lever.

(4) Mount pendulum and shock lever on pivots.

(5) Place cover plate on 2 pivots, being careful not to bend pivots. Do not install screws until 2 pivots and two studs are through their respective holes, and edges of cover plate are flat against surface of mounting plate.

(6) Mount two-nickel mechanism on coin chute with correct screws and nuts. Be careful not to damage micro-switch operating arm.

(h) Test coin gauge with slugs (section 5.2).

(i) Replace coin gauge if necessary and install new coin gauge with new rivets.

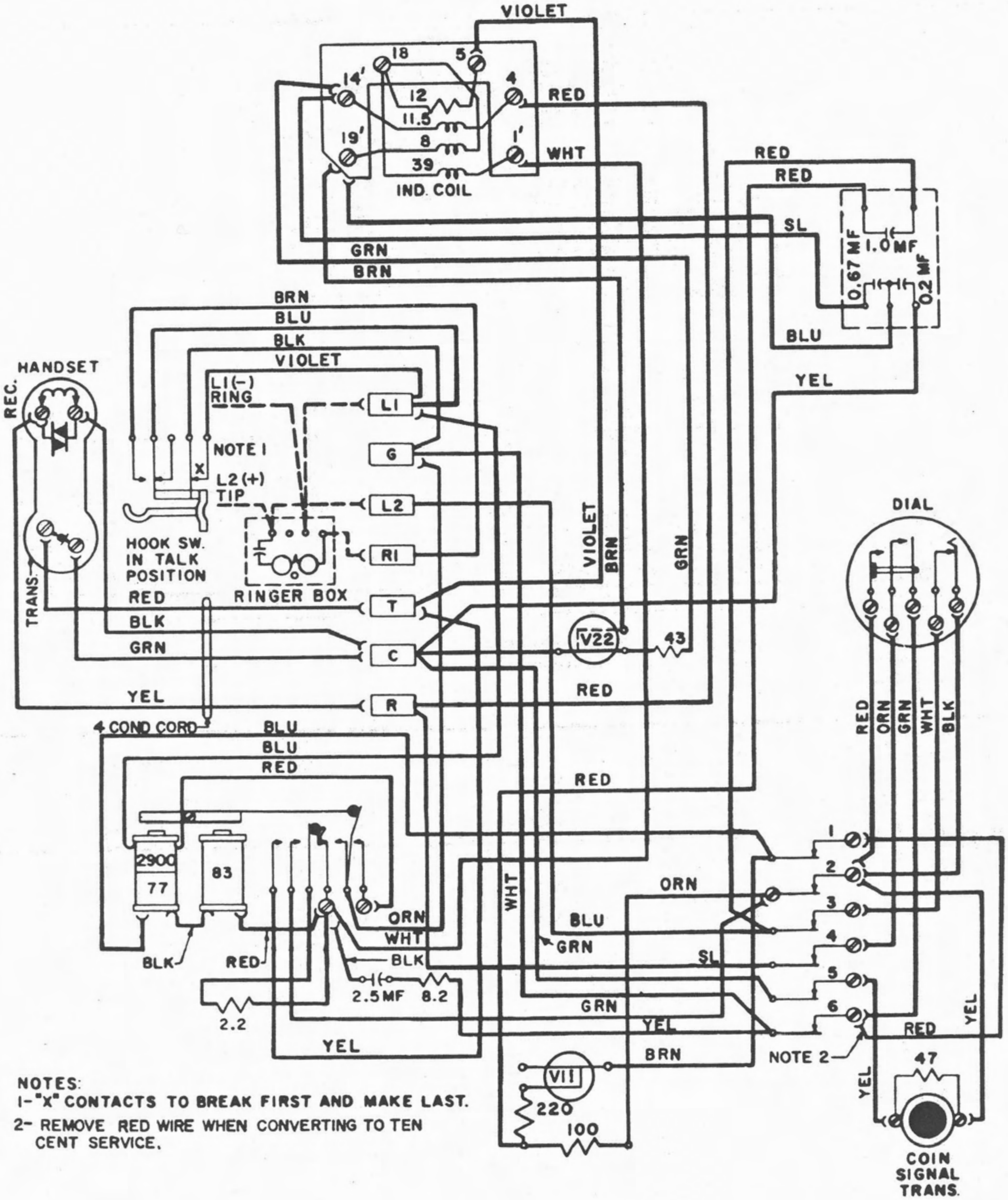
(j) Mount coin chute and tighten 3 mounting screws (figure 6).

(k) Connect leads per applicable wiring diagram (figures 15 through 22).

5.4 Lower housing.

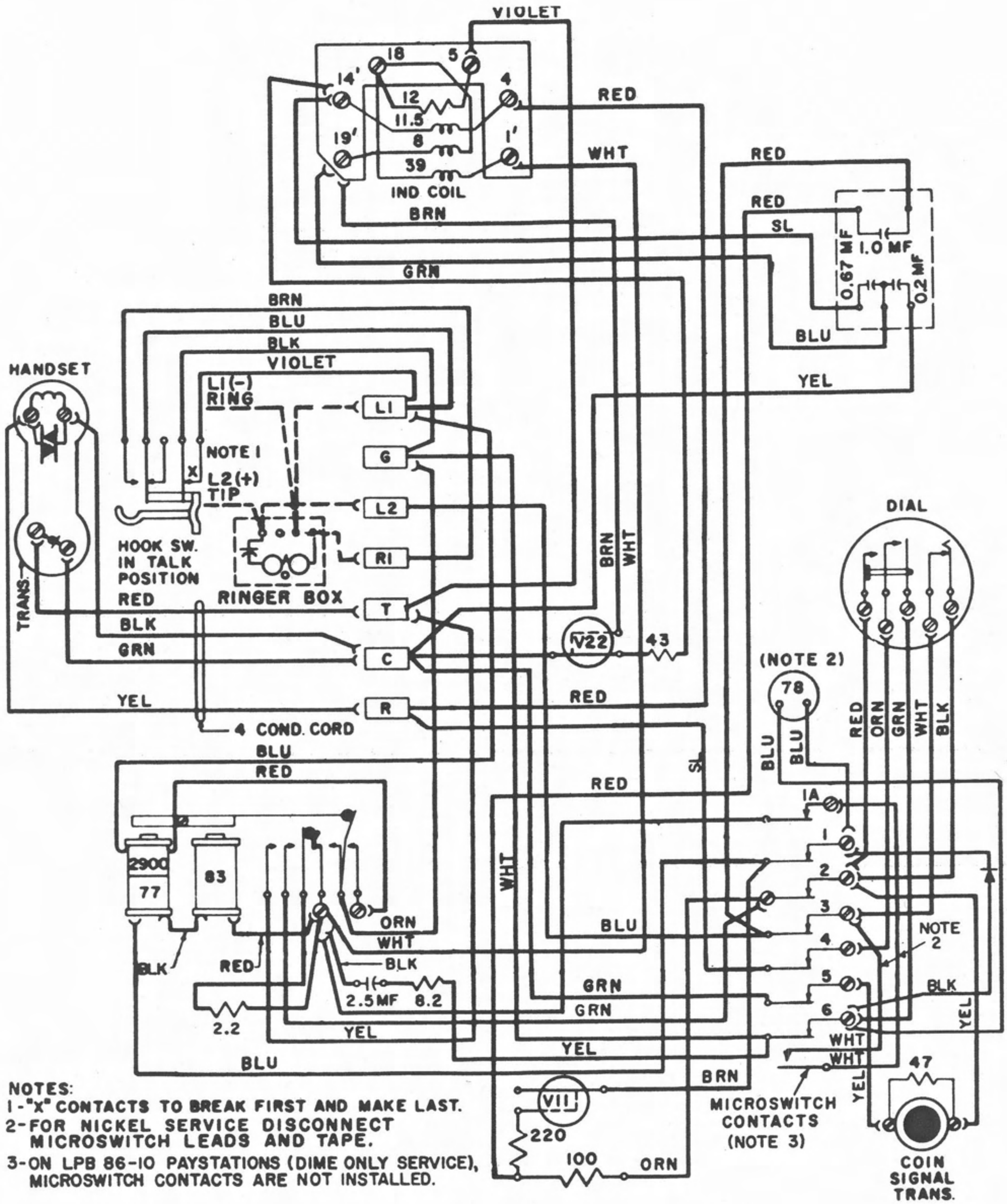
5.4.1 Mechanism unit disassembly.

(a) Unlock and remove cash compartment.



NOTES:
1- "X" CONTACTS TO BREAK FIRST AND MAKE LAST.
2- REMOVE RED WIRE WHEN CONVERTING TO TEN CENT SERVICE.

Figure 17. Type LPB 86 wiring diagram.



NOTES:
1-"X" CONTACTS TO BREAK FIRST AND MAKE LAST.
2-FOR NICKEL SERVICE DISCONNECT MICROSWITCH LEADS AND TAPE.
3-ON LPB 86-10 PAYSTATIONS (DIME ONLY SERVICE), MICROSWITCH CONTACTS ARE NOT INSTALLED.

Figure 18. Type LPB 86-10 and LPB 86-55 wiring diagram.

(b) Loosen screws on jackspring terminal 2, terminals L1, G, and T, lineswitch terminals (two screws); and operate coil base.

(c) Disconnect leads to coin relay from each of above terminals, making sure to free them from retaining bracket at lower right corner of backplate. Loosen screw on retaining bracket, if necessary, to withdraw leads.

(d) Unscrew 2 round-head screws on ends of relay heelplate.

(e) Lift coin relay out of its housing, taking care not to bend coin trigger in slots in coin hopper.

(f) To remove coin hopper, unscrew 3 round-head screws at base from inside of collection box.

5.4.2 Coin relay adjustment. The coin relay must operate within the following limits: Max. 54 volts – 100 milliamperes – with zero (0) line resistance. Min. 44 volts – 30 milliamperes – with 1000-ohm line resistance (for 3000 ohm and 90 ohm relay). Min. 44 volts – 26 milliamperes – with 1000-ohm line resistance (for "E" relay 2900-ohm/77-ohm and 83-ohm). When the coin relay is unoperated, all lineswitch contacts should be open a minimum of .010". Other specifications are given in paragraph 4.2.4.

6. CABLE AND ELECTRICAL PARTS

6.1 Breakdown test. The insulation between all adjacent insulated metal parts shall withstand 500 volts ac, 16 to 60 cycles per second for one-fourth second.

6.2 Micro-switch (two-nickel service). With buzzer connected between terminals, buzzer should operate when micro-switch is latched on pendulum and cease when released from pendulum.

7. CONTINUITY TESTS

The continuity tests are made using an ohmmeter. The paystation upper housing must be removed before performing these tests.

7.1 Lower housing.

7.1.1 Type LPA 86, LPA 86-10, and LPA 86-55. Hookswitch down. BLK on 0.4 microfarad capacitor to terminal R1 reads approximately 0 ohms.

Hookswitch up – armature to left – trigger normal.

(a) Terminal L1 to lineswitch spring 7 reads approximately 2,900 ohms.

(b) BLK on 0.4 microfarad capacitor to transfer spring 2 reads approximately 100 ohms.

(c) SL on 5 microfarad capacitor to transfer spring 4 reads approximately 17 ohms.

(d) GRN on 5 microfarad capacitor to lineswitch spring 4 reads approximately 38 ohms.

(e) Terminal L1 to terminal G reads approximately 0 ohms.

(f) Transfer spring 6 to terminal G reads approximately 8.2 ohms.

(g) Terminal C to lug 2 on induction coil reads approximately 60 ohms (when sidetone balancing impedance network is not installed).

Note: On Type LPA 86 only: terminal G to lug 6 on induction coil reads approximately 160 ohms. On Type LPA 86-10 and LPA 86-55 only: Positive side (+) of ohmmeter at auxiliary transfer spring 1A to transfer spring 1 reads approximately 10 ohms.

Hookswitch up – armature to right – trigger normal.

(a) Transfer spring 2 to lug 5 on induction coil reads approximately 0 ohms.

(b) With hookswitch down, terminal L1 to terminal G reads approximately 2,900 ohms.

Note: On Type LPA 86-10 and LPA 86-55 only: transfer spring 2 to transfer spring 1 reads approximately 18 ohms.

Hookswitch up – armature to right – trigger tripped. Terminal G to lug 6 on induction coil reads approximately 0 ohms.

7.1.2 Type LPB 86, LPB 86-10 and LPB 86-55.

Hookswitch down – terminal L1 to terminal R1 reads approximately 0 ohms.

Hookswitch up – armature to left – trigger normal.

(a) Terminal L1 to terminal G reads approximately 0 ohms.

(b) Lug 14 on induction coil to terminal R reads approximately 11.5 ohms.

(c) Terminal T to lug 19 on induction coil reads approximately 20 ohms.

(d) Transfer spring 1 to lug 18 on induction coil reads approximately 199 ohms.

(e) Terminal L1 to lineswitch spring 7 reads approximately 2,900 ohms.

Hookswitch up - armature to right - trigger normal.

(a) Transfer spring 2 to terminal T reads approximately 0 ohms.

(b) Lug 1 on induction coil to transfer spring 2 reads approximately 2.2 ohms.

(c) With hookswitch down, terminal L1 to terminal G reads approximately 2,900 ohms.

Note: On Type LPB 86-55 only; lug 1 on induction coil to auxiliary transfer spring 1A reads approximately 0 ohms.

Hookswitch up - armature to right - trigger tripped.

(a) Terminal G to lug 1 on induction coil reads approximately 0 ohms.

7.1.3 Type LPA 96, LPA 96-10, and LPA 96-55.

Hookswitch down. Terminal L1 to terminal R1 reads approximately 0 ohms.

Hookswitch up - armature to left - trigger normal.

(a) Terminal L1 to terminal G reads approximately 0 ohms.

(b) Lug 6 on induction coil to terminal R reads approximately 14 ohms.

(c) Terminal T to lug 7 on induction coil reads approximately 36 ohms.

(d) Lug 2 on induction coil to transfer spring 5 reads approximately 14 ohms.

(e) Terminal L1 to lineswitch spring 7 reads approximately 2,900 ohms.

Note: On LPA 96-55 only: lug 3 on induction coil to auxiliary transfer spring 1A reads approximately 16 ohms. Transfer spring 1 to auxiliary transfer spring 1A reads approximately 160 ohms.

Hookswitch up - armature to right - trigger normal.

(a) Transfer spring 2 to terminal T reads approximately 0 ohms.

(b) Transfer spring 2 to lug 4 on induction coil reads approximately 2.2 ohms.

(c) With hookswitch down, terminal L1 to terminal G reads approximately 2,900 ohms.

Note: On LPA 96-55 only: auxiliary transfer spring 1A to transfer spring 2 reads approximately 2.2 ohms.

Hookswitch down - armature to right - trigger tripped.

(a) Terminal G to lug 4 on induction coil reads approximately 0 ohms.

7.2 Upper housing. On LPA-86 series paystations having manually - adjusted loop compensating networks, set loop compensator at 0 ohms. Ohmmeter reads short (± 10%) when connected between the points, given in the following procedures (except where noted otherwise).

7.2.1 Type LPA 86, LPA 86-10 and LPA 86-55.

Dial normal.

(a) Transfer springs 2 and 3.

Note: On Type LPA 86-10 and LPA 86-55 only: transfer spring 1 to auxiliary transfer spring 1A reads 78 ohms.

Dial off normal.

(a) Transfer springs 6 and 4.

7.2.2 Type LPB 86, LPB 86-10 and LPB 86-55.

Dial normal.

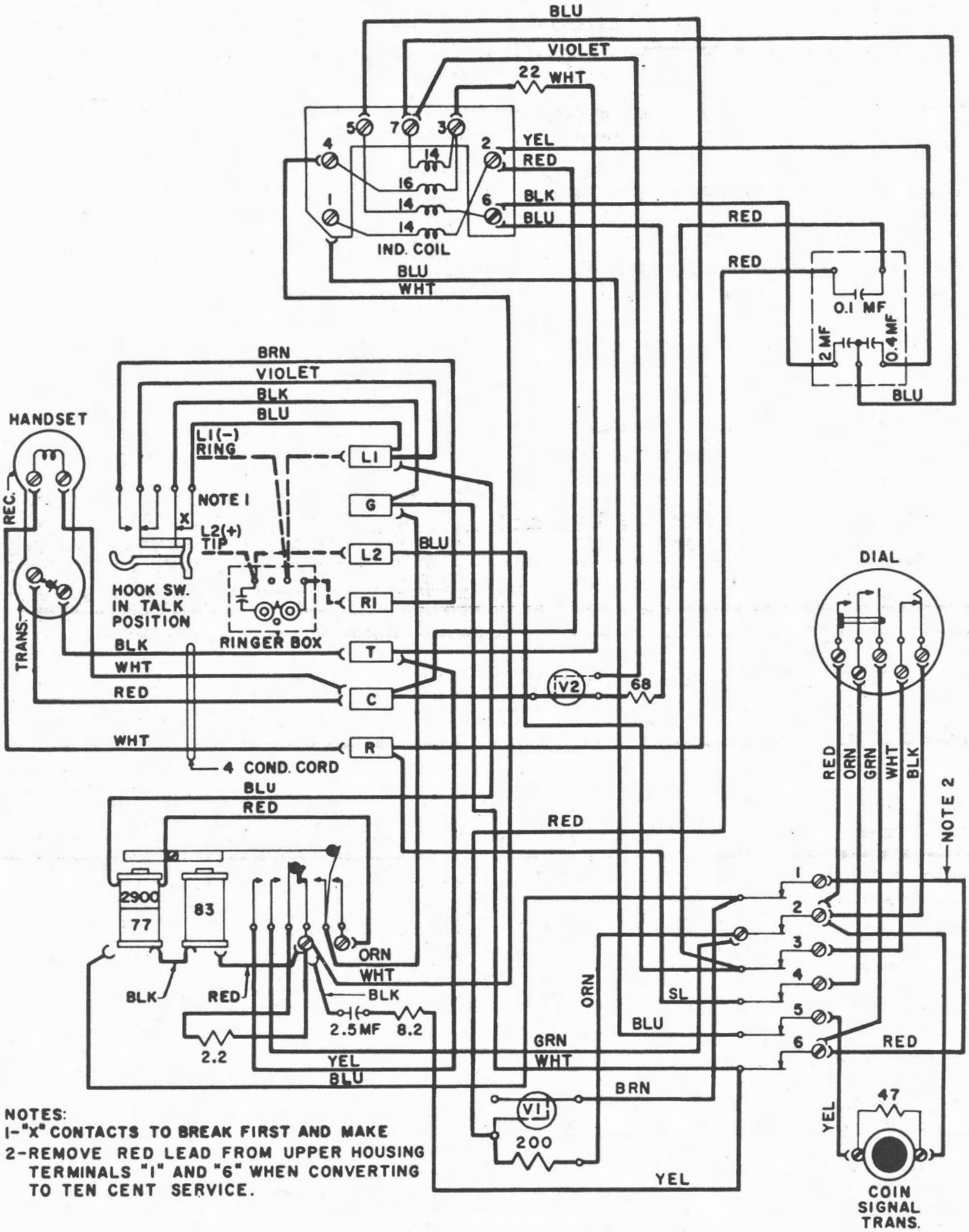
(a) Transfer springs 2 and 3.

Note: On Type LPB 86-10 and LPB 86-55 only: positive side (+) of ohmmeter at transfer spring 1, negative (-) at transfer spring 6 reads approximately 78 ohms.

Dial off normal.

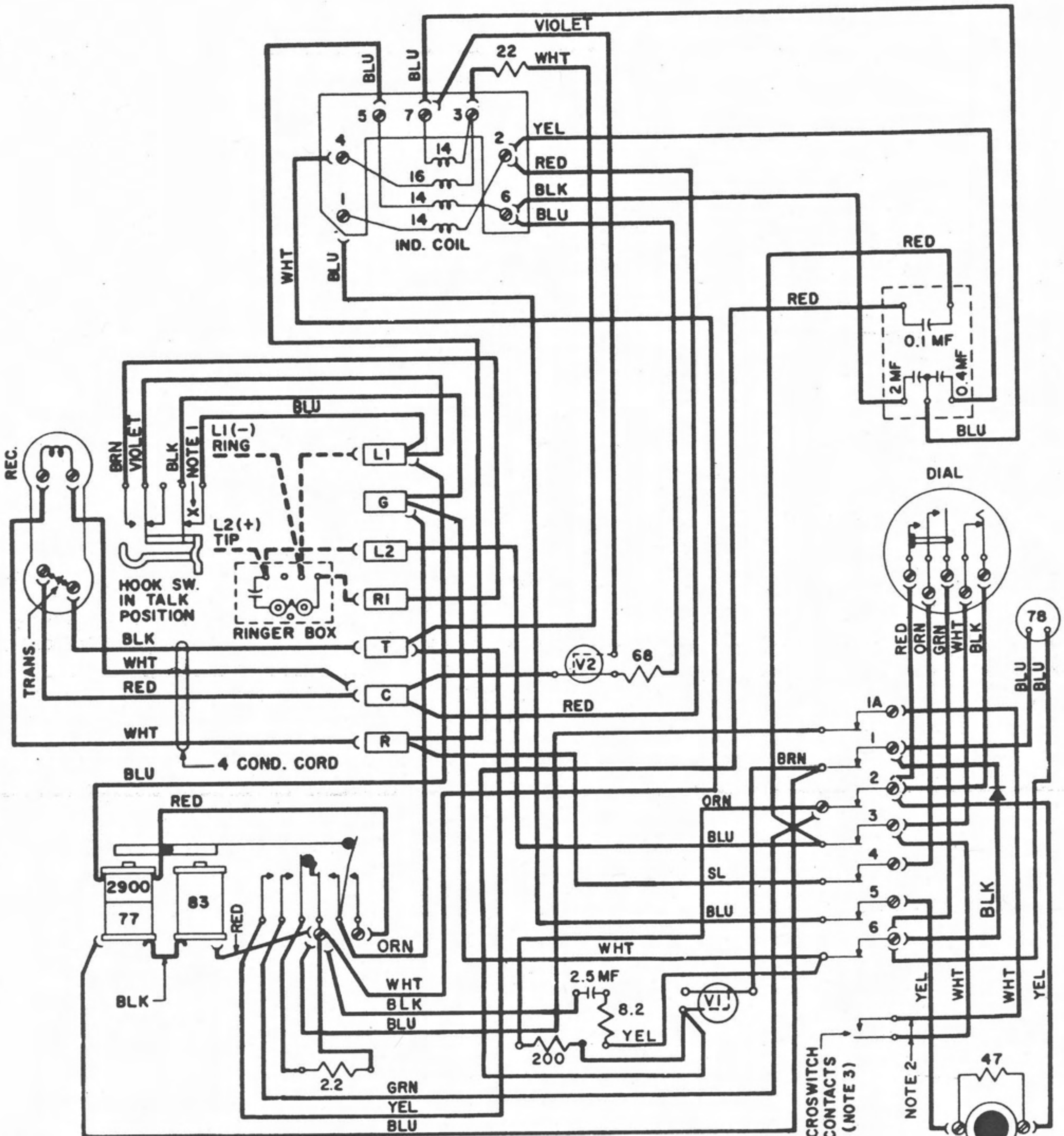
(a) Transfer springs 6 and 2.

7.2.3 Type LPA 96, LPA 96-10 and LPA 96-55.



NOTES:
1-"X" CONTACTS TO BREAK FIRST AND MAKE
2-REMOVE RED LEAD FROM UPPER HOUSING TERMINALS "1" AND "6" WHEN CONVERTING TO TEN CENT SERVICE.

Figure 19. Type LPA 96 wiring diagram.



NOTES:

1-"X" CONTACTS TO BREAK FIRST AND MAKE LAST.

2-FOR TEMPORARY NICKEL SERVICE DISCONNECT MICROSWITCH LEADS & TAPE.

3-ON LPA 96-10 PAYSTATIONS (DIME ONLY SERVICE) MIRCOSWITCH CONTACTS ARE NOT INSTALLED.

Figure 20. Type LPA 96-10 and LPA 96-55 wiring diagram.

Dial normal.

(a) Transfer springs 2 and 3.

Note: On Type LPA 96-10 and LPA 96-55 only: positive side (+) of ohmmeter at transfer spring 1, negative (-) side at transfer spring 6 reads approximately 78 ohms.

Dial off normal.

(a) Transfer springs 6 and 2.

8. CONVERSION TO TEMPORARY FIVE-CENT SERVICE

For temporary 5-cent local service on Type LPA 86-10, LPB 86-10, or LPA 96-10 paystations, block the nickel-rejector mechanism as follows:

(a) Press the relay armature arm tightly against the mounting bracket of the nickel-rejector assembly.

(b) Wedge a paper clip tightly in the slot in the mounting bracket through which the armature arm passes. This holds the wire rejector arm away from the nickel channel of the coin chute, so that nickels may be collected until the clip is removed. It is virtually impossible to dislodge the clip by striking the paystation housing.

When reconverting to dime-only service, simply remove the paper clip, and check that the rejector arm rejects nickels deposited when the relay is restored.

9. CONVERSION TO TEMPORARY FIVE-CENT MANUAL SERVICE

For temporary 5-cent manual service on Type LPA 86-10, LPB 86-10, or LPA 96-10 paystations, perform the following operations:

(a) Remove and tape the blue lead from L1 on the terminal block.

(b) Loosen the screw terminal on line-switch spring 4 (figures 16, 18 and 20) and slip out the spade-tipped black lead to the 2.5 mf capacitor. Reconnect it to screw terminal G on the terminal block.

(c) If dial is to be retained during manual service, strap transfer springs 2 and 3 in upper housing.

(d) Block the nickel rejector mechanism as stated in section 8.

10. TYPE 66-E AND TYPE 96-E PAYSTATIONS

This bulletin may be used for installation and maintenance of Type 66-E and Type 96-E paystations. Operation and adjustment of these paystations is identical to those outlined for the corresponding Type LPA 86 paystations. Circuit differences, to be noted in figures 21 and 22; result in variations in continuitytesting (section 7). Other parts of paragraphs 6 and 7 apply both to Type 66-E and Type 96-E paystations.

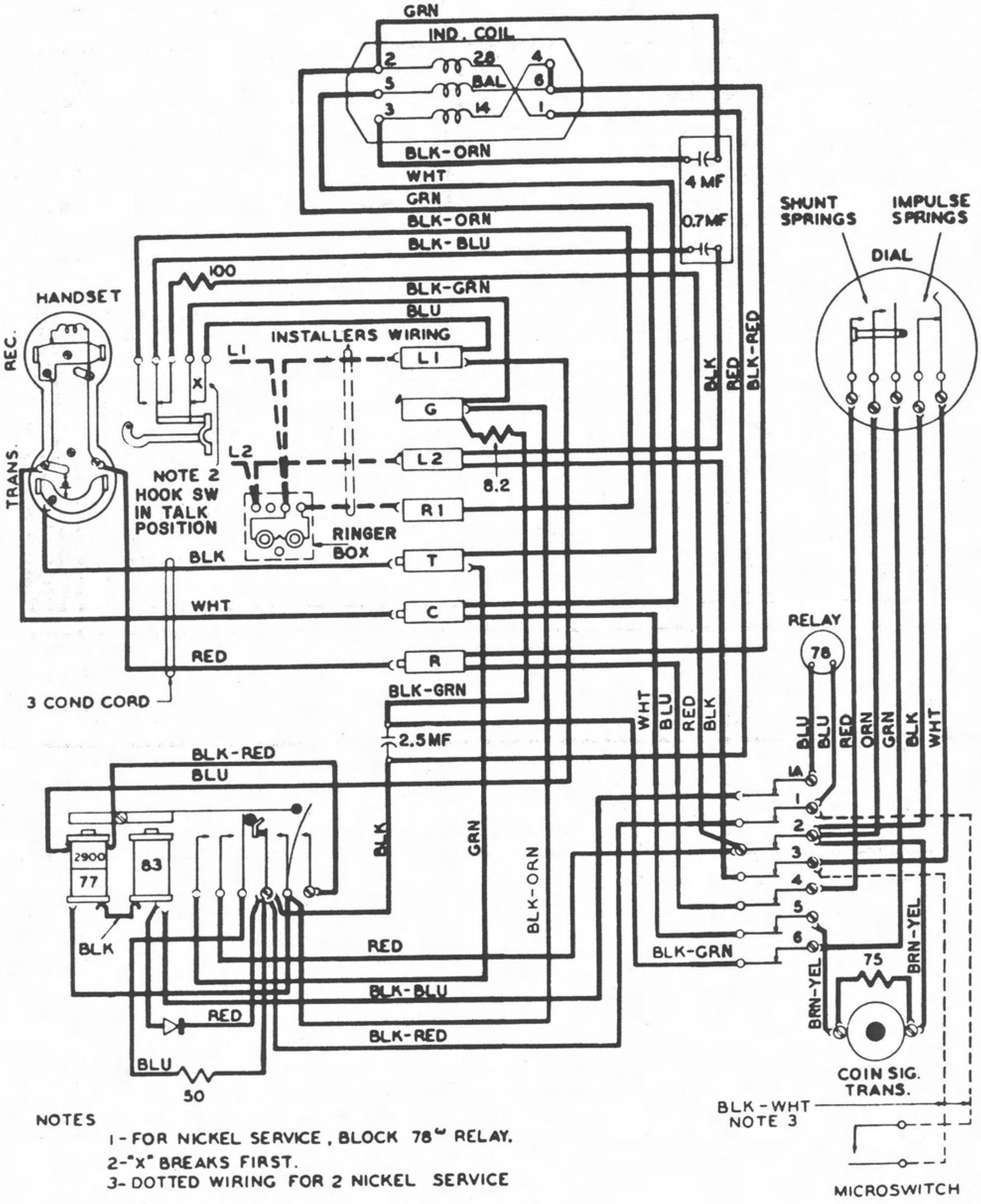
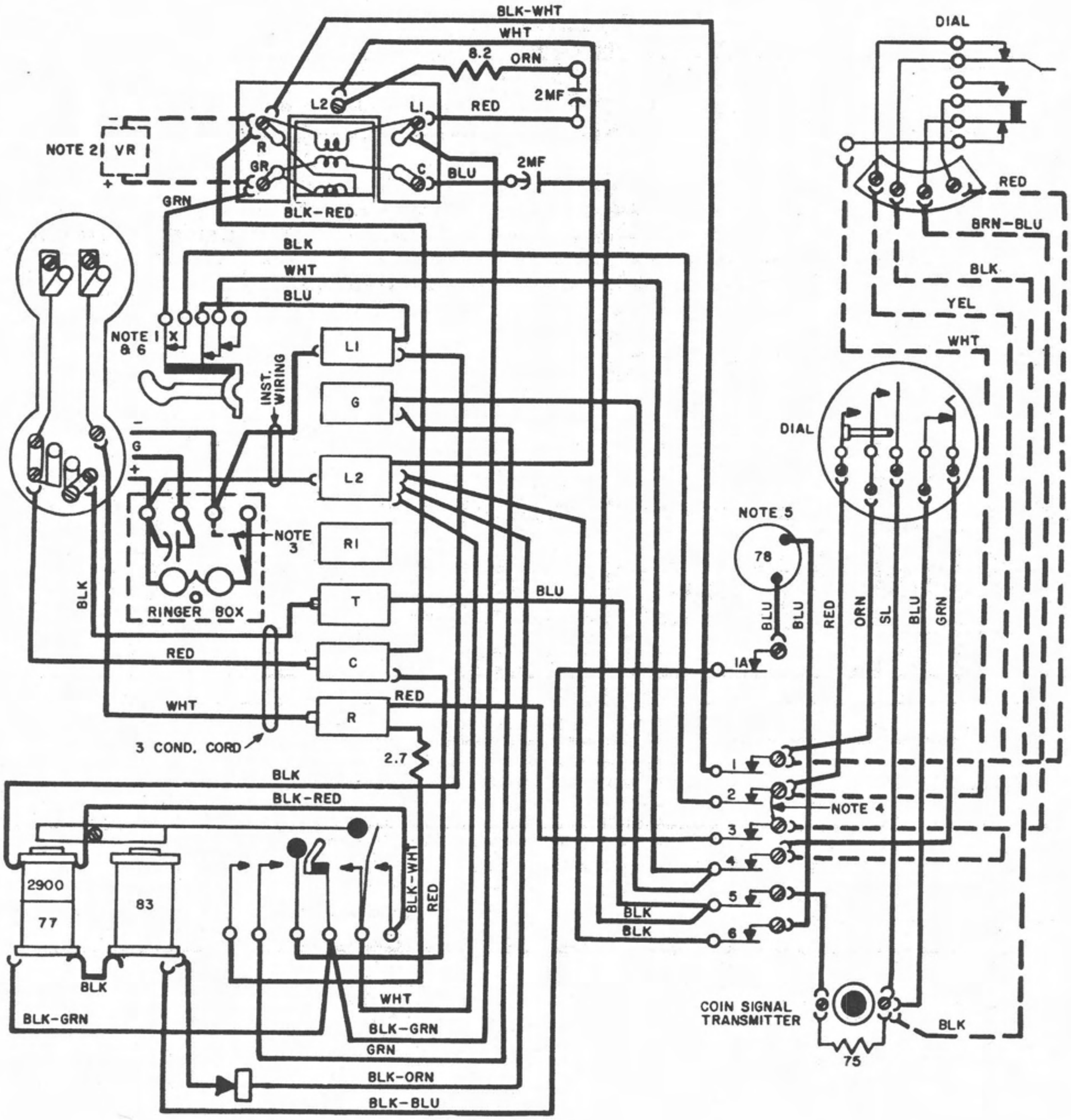


Figure 21. Type 66-E wiring diagram.



NOTES:

1. CONTACTS X TO BREAK FIRST AND MAKE LAST.
2. VARISTOR VR USED ONLY WHEN SPECIFIED.
3. FOR GROUNDED RINGING CONNECT PER DOTTED LINE.
4. DOTTED WIRING FOR W.E. CO. DIAL. REMOVE JUMPER BETWEEN TRANSFER TERMINALS 2 & 3 WHEN W.E. CO. DIAL IS USED.
5. FOR NICKEL SERVICE, BLOCK 78 OHM RELAY.
6. HOOK SW IN TALK POSITION.

Figure 22. Type 96-E wiring diagram.

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