AUTOMATIC ELECTRIC
Northlake, Illinois, U.S.A.

Technical
Bulletin 702-86
Issue 1, November, 1957

SEMI-POSTPAY PAYSTATIONS
TYPE 86, 86-10, 86-55, 96 AND 66.

1. DESCRIPTION

This type of paystation is designed for use in an automatic exchange equipped for reversal of transmission battery at the connector when the called party answers.

Figure 1. Semi-postpay paystation.

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. Thus, the caller may deposit any combination of nickels or dimes for long distance calls.

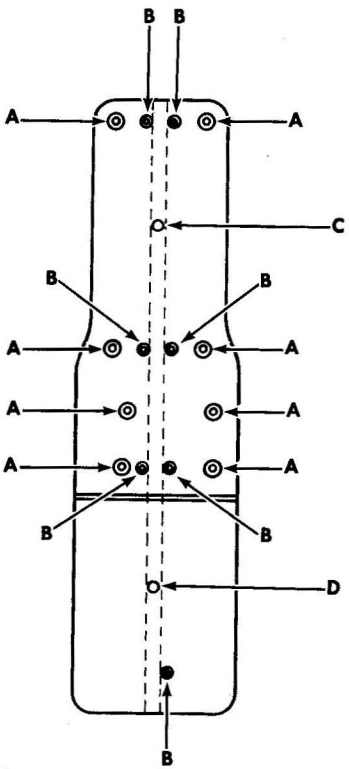


Figure 2. Backboard.

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 his 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.

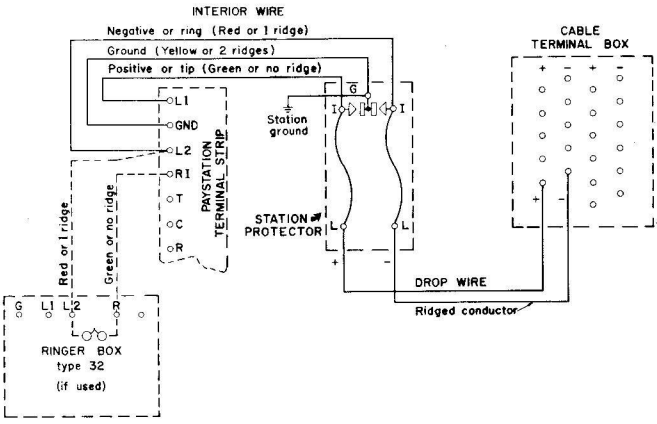


Figure 3. Connection diagram. (Polarities are important.)

2. INSTALLATION

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

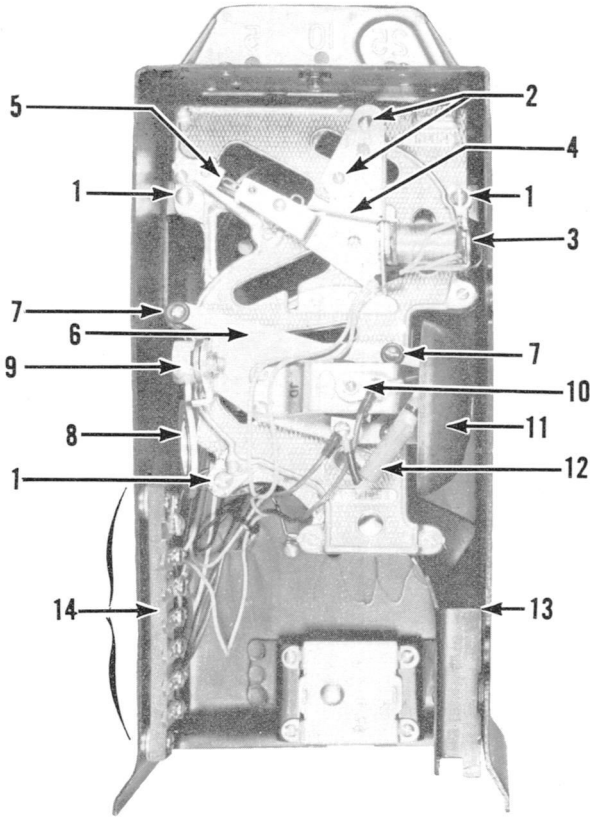
(2) Mark through backboard holes *B* onto the wall, per figure 2.

(3) Drill holes in the wall where marked to take anchors, either Ackerman-Johnson or Rawl-Taper ¼"–20.

(4) Mount the anchors in the wall.

(5) Push a loop of the interior wire through the hole in the backboard marked *C*, figure 2.

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



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

Figure 4.

(7) Push the end of the interior wire through the backboard hole marked *D* in figure 2. (If the interior wire runs along the bottom of the paystation booth or enclosure, reverse the order of steps 5-6-7.)

(8) Mount the backboard using the anchor screws.

(9) Unlock the upper housing of the paystation and remove it.

(10) Mount the lower housing and backplate onto the backboard with ¼"–20 flat-head machine screws, using holes *A*, which have threaded inserts to take these screws.

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

(12) Remove the cover from the ringer box.

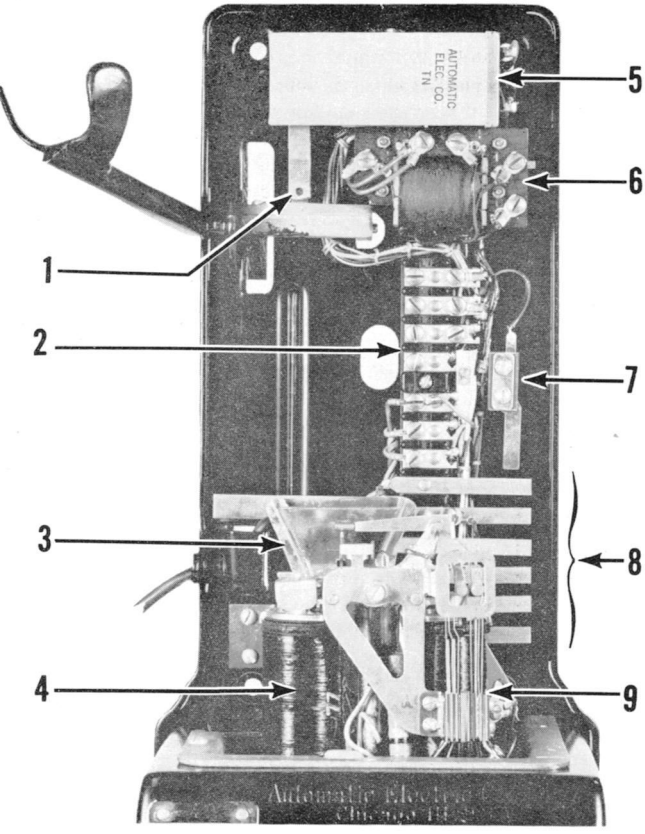
(13) Mount the ringer box on the bottom part of the backboard, using wood screws.

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

(15) Connect as shown in figure 3.

(16) Replace cover on ringer box.

(17) Replace upper housing on paystation and lock.



1. Hookswitch springs
2. Terminal block
3. Coin hopper
4. Coin relay
5. .4 MF/ 5 MF capacitor
6. Induction coil
7. Auxiliary jack spring terminal
8. Jack spring terminals
9. Lineswitch

Figure 5.

3. TESTS

(1) Unlock cash compartment.

(2) Dial the paystation number and wait for busy tone.

(3) Hang up.

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

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

(b) For 86-55, deposit one nickel to check that transmission is still blocked. Then deposit the second nickel to check that transmission block is removed.

(5) When conversation is finished, hang up.

(6) Dial operator and advise her that you are testing coin signals. Have her identify all coins deposited. Check to make sure that *all nickels deposited* are collected while operator is on the line.

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

Note. If cash compartment keys are not available, it is assumed that arrangements are made to provide the tester with coins to follow the required testing procedure as outlined.

4. MECHANISM

4.1 **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.

4.2 **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 in the lower housing.

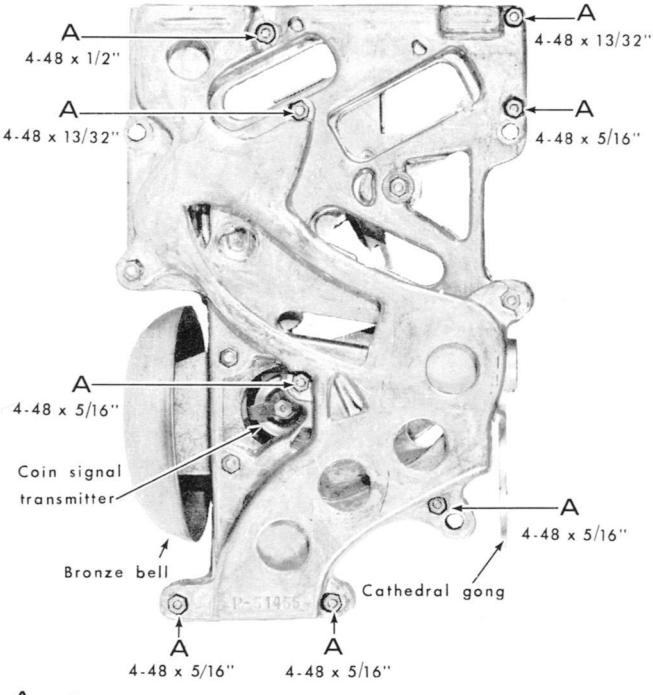
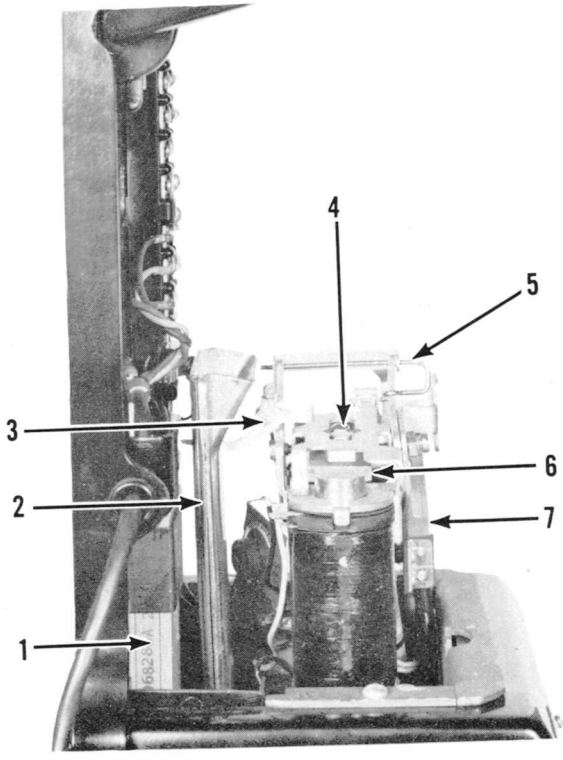


Figure 6. Coin chute.

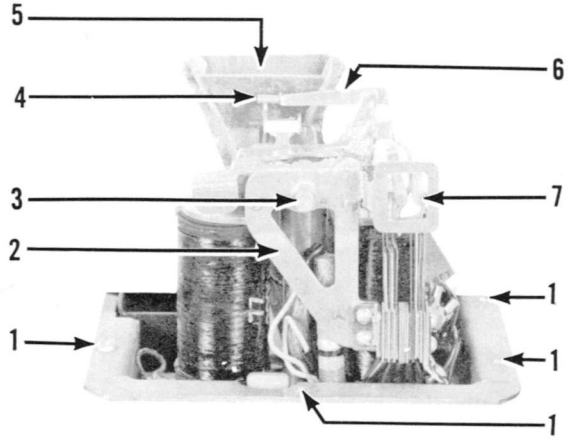
4.3 **Coin signals.** The three channels of the coin chute are arranged so that nickels, dimes, and quarters are directed either to the top or bottom of the bell, or to the cathedral gong, mounted on opposite sides of the coin chute. A nickel strikes the bell once, at the bottom of the bell; a dime strikes 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. See figure 6.



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

Figure 7.

4.4 **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 armature pivots in the center and has a permanent magnet

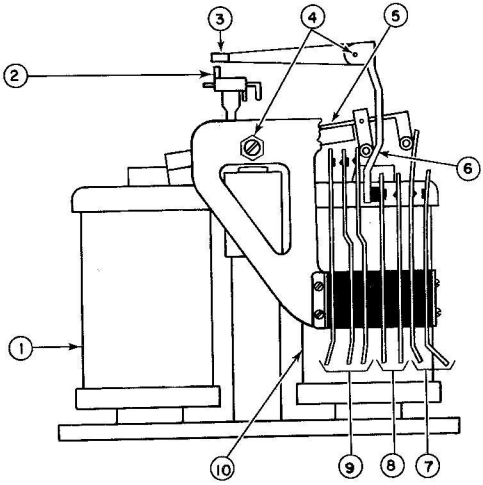


1. Mechanism base mounting screws
2. Frame assembly
3. Armature pivot screw
4. Stop arm stud
5. Coin hopper mouth
6. Switch lever
7. Armature roller buffers (2)

Figure 8.

attached to the underside. The right hand side of the armature terminates in two pairs of roller-type buffers, which engage the line-switch springs 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.



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

Figure 9. Coin relay.

(In "normal" position: paystation idle, caller awaits answer, etc.)

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. See figures 10 and 11. The coin trigger is unbalanced 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.

4.5 **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 tilted to the left, coin trigger normal,

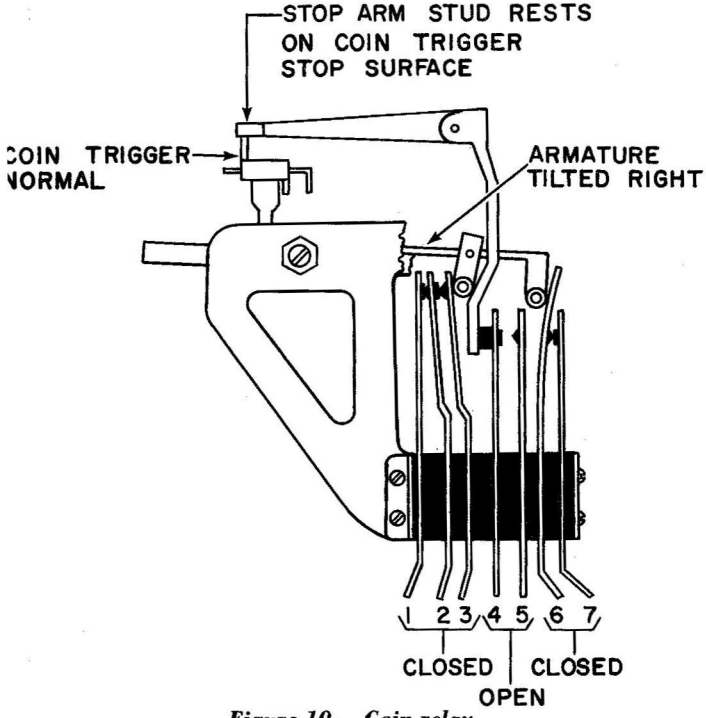


Figure 10. Coin relay.
(Position after called party answers. No coins deposited.)

and all lineswitch contacts open. Under these conditions line polarity is normal (—48 volts d.c. applied to the —line). Current in the pay-station circuit (figure 12) flows from L2, dial impulse springs, coin signal transmitter, regular transmitter and receiver, induction coil, 78 ohm magnet, 83 and 77 ohm coin relay windings, to hookswitch "*X*"

contacts and L1. The 78 ohm magnet is part of the "dime-only" mechanism in type 86-10 and the nickel-counter in type 86-55 pay-stations. See sections 4.6 and 4.7.

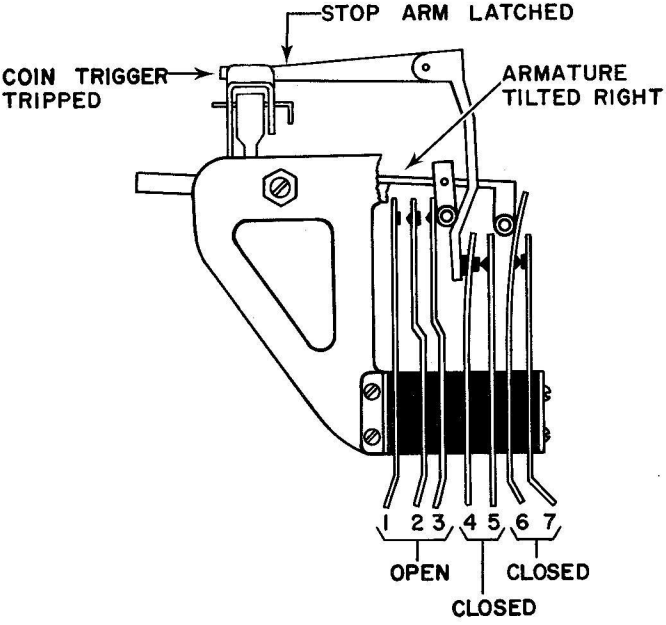


Figure 11. Coin relay.
(Position during conversation. Proper coins deposited.)

(b) When the called party answers, the connector reverses line polarity on the calling line, reversing flow of current through the coin control mechanism. 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 he may faintly hear the called party answer. 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, 77 and 83 ohm windings, rectifier, shunting contacts 1-2-3, dial impulse springs to L2 (figure 12). Enough current flows through the 38 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.

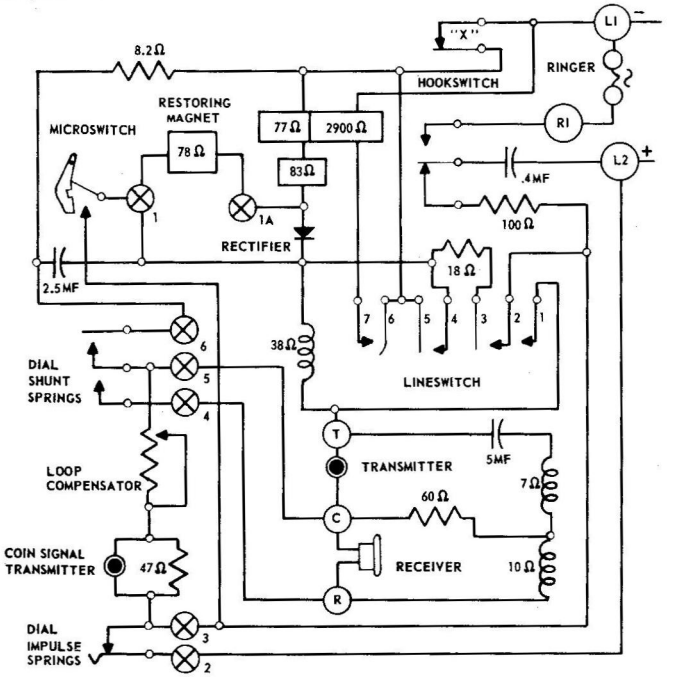


Figure 12. Type 86-55 schematic.

(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. 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.

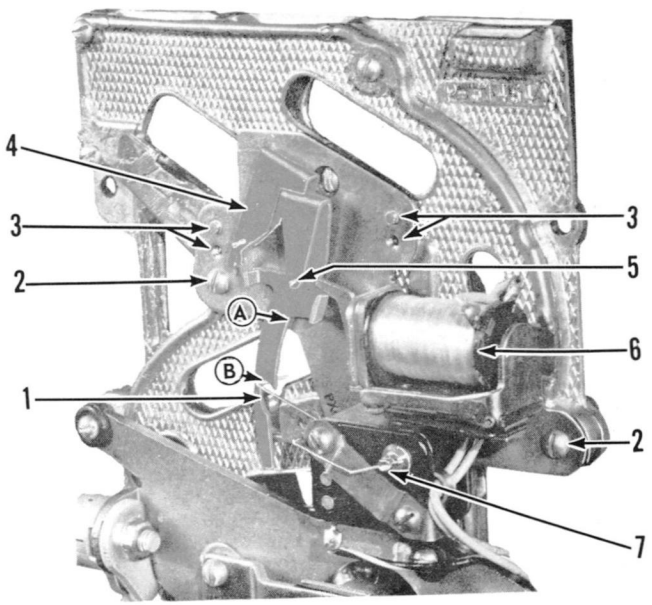
(d) If the calling party hangs up first, hookswitch "*X*" contacts open to remove short from the 2900 ohm winding of the coin relay. Reversed line polarity prevents its operation until the called party also hangs up. Then the central office connector reverses line polarity (to normal) and the relay armature is attracted to the left. All line-switch 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).

4.6 **Ten cent service dime-only control.** Type 86-10 paystations 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 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, he must be forced to deposit one dime. 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.

During toll calls, line polarity remains normal, and coin collection takes place under direct supervision of the toll operator. The 78 ohm magnet remains energized, and the rejector loop remains withdrawn. Operator may thus collect nickels for toll service.



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. Microswitch operating arm (shown in latched position)

Figure 13. Microswitch assembly.

4.7 **Ten cent service two-nickel control.** Type 86-55 paystations 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 microswitch whose wire operating arm extends through the nickel channel of the coin chute, and a "pendulum" for latching the microswitch contacts in their operated position. The microswitch contacts, when closed, serve to short-circuit the transmitter and receiver of the paystation long enough to enforce deposit of the second of two nickels. If the caller elects to deposit a dime, the mechanism does not operate.

The 78 ohm relay is normally operated — as explained in section 4.6 — holding the pendulum slightly to the left of its position in figure 13 by means of its special armature. During this time the microswitch arm tip rests against the coin chute at "*A*" of figure 13, and is capable of operating and restoring instantly without latching in the pendulum notch. In this position, the microswitch 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 4.5 (b). 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 microswitch operating arm with sufficient force to carry it down the edge of the pendulum past the notch "*B*," figure 13. This action closes the microswitch contacts and short-circuits the transmitter and receiver as shown in figure 12. As the nickel passes on down the chute, restoring force in the spring-restored microswitch arm carries it up the pendulum edge to latch at "*B*" of figure 13. Although the first nickel trips the coin trigger, releasing the lineswitch shunting springs [section 4.5 (c)], the parties are still unable to converse.

The caller deposits the second nickel, which again strikes the tip of the microswitch 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*" of figure 13), opening the microswitch 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 microswitch arm as described above, any number of nickels may be deposited under supervision of the toll operator.

5. ROUTINE MAINTENANCE

5.1 Upper Housing.

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

(b) Coin chute. Inspect the coin chute for cleanliness, mutilation and stuck coins or slugs. If chute is dirty and 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 microswitch or nickel-rejector, if present.

(c) Dial. Check dial for bind-free operation and correct speed. See bulletin 700-52 for maintenance of type 52 dial.

5.2 **Lower housing.** When inspecting the lower housing check handset cord and hookswitch for ease of operation. Remove the spring clip from the coin relay pivot screw and remove the plastic dust cover.

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

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

(c) Lineswitch. Check lineswitch springs for proper contact and follow. Clean the contacts if necessary, using A.E. Co. contact cleaner #H-42962. (Never use paper or cloth for cleaning contacts.) When the armature is tilted left, coin trigger normal, all contacts must open at least .010″. When the armature is tilted right, coin trigger normal, contacts 1-2-3 and 6-7 must be closed. When the

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.

(d) Clean the mechanism unit thoroughly with a soft brush, removing any stray iron filings from the armature and coils.

(e) Voltage. Make certain that line voltage is between 44 (min.) and 54 (max.) volts d.c. Report variations from these limits.

(f) Coin relay adjustment. When testing the coin relay with the upper housing removed, use Automatic Electric Company pay-station test cord, No. P-60605 (figure 16). If this cord is used for testing type 86 paystations (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 d.c. to +line), reverse the spade-tipped leads L1 and L2 at the terminal block.

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

(2) Tilt the armature to the left and replace the handset, coin trigger normal. Apply the voltage to the plus (+) side of the line. The armature should remain tilted to the left. If the armature tilts to the right, move armature nearer to the left pole piece by means of adjusting screws, figure 8.

(3) Remove the handset. With the armature tilted left, coin trigger normal, apply the voltage to the minus (—) side of the line. Armature should tilt to the right. If the armature remains left, either shorting springs 4-5 are closed, or the armature is too near the left pole piece. If the former, bend springs to meet requirements stated in (c) above. If the armature requires adjustment, loosen the adjusting screws (figure 7), and move the armature slightly to the right.

(4) With the handset off hook, armature tilted to the right, coin trigger tripped, apply the voltage to the plus (+) side of the line. Hang up. Armature should tilt to the left. If it does not tilt, armature is either too near the right pole piece (see 2 above) or restoring springs 6-7 are not making contact. If the latter is the case, bend spring #7 to the left until this pair of contacts meets requirements

stated in (c) above. These springs must make contact when armature tilts to right to energize the 2900 ohm winding *previous* to opening of the lineswitch contacts. Residual magnetism in the restoring winding restores the armature.

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

(g) After completing all inspection and adjustments, *replace and lock* the upper housing. *Test* the coin mechanism as outlined in section 2.

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

6. SHOP OVERHAUL—UPPER HOUSING

Unlock the upper housing with the key provided. Pull the lower part of the upper housing toward you and lift. This will disengage the stud in the inside top of the upper housing from its socket on the backplate of the lower housing.

6.1 Upper housing disassembly.

(a) Coin gauge. The coin gauge is mounted with rivets. To disassemble remove these rivets after first removing the coin chute per (b) below. Install the coin gauge *before* the coin chute.

(b) Coin chute.

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

(2) Unscrew all leads to the jackstrip terminals.

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

(4) Pull the leads through the retaining brackets fixed to the housing.

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

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

(7) Unscrew the nut holding the cathedral gong and remove gong.

(8) Unscrew the mounting screws and nuts of the nickel rejector (if type 86-10). Note that the long screw is the one situated directly underneath the restoring magnet.

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

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

(11) Unscrew the nut holding the signal transmitter. Lift out the signal transmitter.

(12) Unscrew the 8 remaining screws and nuts on the coin chute (figure 6), so that the three parts can be separated.

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

*(14) Unscrew the 2 screws running through the microswitch and withdraw the microswitch, taking care not to damage the operating arm.

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

*(16) Remove carefully the pendulum and shock lever from their pivots.

*(17) Draw all pivots from the back plate.

*(18) Clean all parts and inspect thoroughly.

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

(20) Replace parts as necessary.

Note: Starred steps* are for type 86-55 only.

(c) Dial removal.

(1) Remove the coin chute per section (b).

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

(3) Unscrew the 3 remaining flat-head screws and pull the dial toward you, feeding the dial leads out through the inner mounting cup.

(d) Dial installation.

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

(2) Install the 3 long flat-head screws and tighten.

(3) Connect the dial leads to the jackstrip terminals per wiring diagram figure 14 or 15.

Note: If you have difficulty in locating the threaded holes in the dial, loosen the 3 round-head screws and align the holes. Do not forget to tighten the 3 round-head screws afterward.

6.2 **Tests and adjustments to upper housing.** Test slugs for coin gauge and coin chute must have the dimensions given in sections (a) and (b) following.

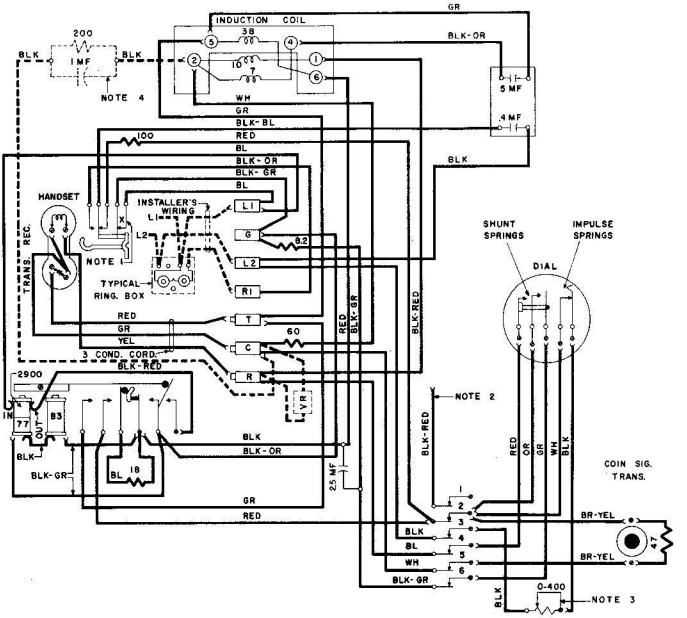
(a) Coin gauge.

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

(b) 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″

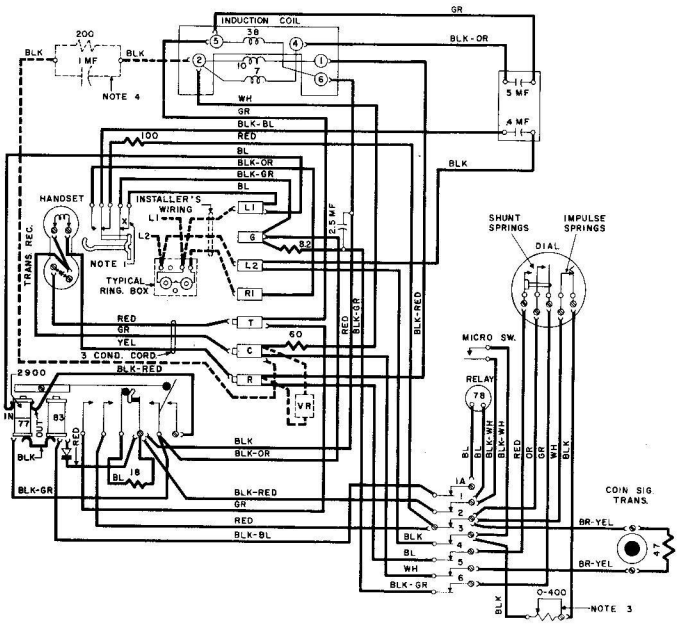
Note: The maximum slugs will not pass through the coin gauge. Coin chute must reject the slug dimensions given in the right-hand column.



NOTES:

1. "X" breaks first.
2. BLK-RED 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.

Figure 14. Type 86 wiring diagram



NOTES:

1. For nickel service, block 78 ohm relay.
2. "X" breaks first.
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.

Figure 15. Type 86-10 and 86-55 wiring diagram.

(c) 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 1690 ohms on 46 volts d.c. and should not operate in series with 1840 ohms on 46 volts d.c. 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.

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.

(d) Two-nickel mechanism adjustment. The magnet relay operating limits are as set forth in section 6.2 (c). 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 microswitch operating arm should operate freely and without bind, and rest against the pendulum and coin chute (or mounting plate) at normal ("*A*" of figure 13). When fully operated it should touch the bottom of the nickel channel.

Microswitch 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 microswitch 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.

6.3 To Reassemble Upper Housing Mechanism.

(a) Fit the 3 parts of the coin chute together. 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 the bronze bell. Make sure you place the flat brass washer between bell and bracket, with the countersunk side of the washer next to the bell. Tighten the screw.

(e) Test the coin chute with slugs. See section 6.2.

(f) If type 86-10 or equivalent:

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

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

(3) Thread the magnet relay leads through the hole in the mounting bracket, insulating the leads from the bracket with a short piece of spaghetti tubing.

(g) If type 86-55:

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

(2) Mount the microswitch on the mounting plate and tighten the screw. Thread the magnet leads through the loop on the microswitch.

(3) Remount pivots for pendulum and shock lever.

(4) Mount pendulum and shock lever on the pivots.

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

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

(h) Test coin gauge with slugs. (See section 6.2).

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

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

(k) Connect leads per wiring diagram, figure 15.

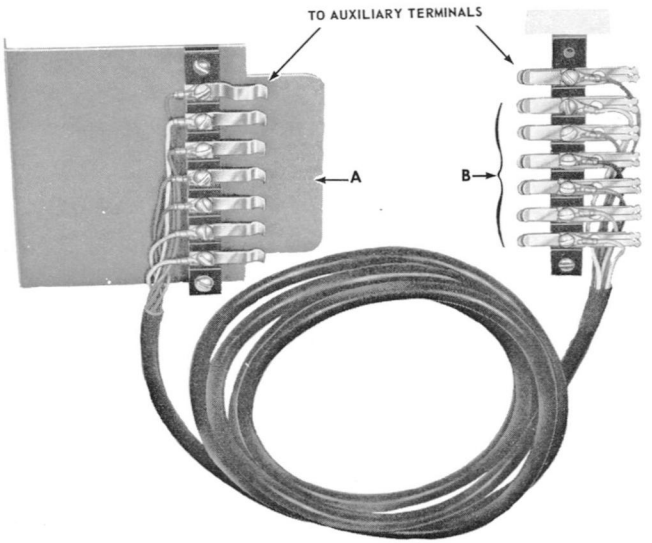


Figure 16. Paystation test cord.

7. SHOP OVERHAUL INSTRUCTIONS—LOWER HOUSING

7.1 **Mechanism unit disassembly.**

(a) Unlock and remove cash compartment.

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

(c) Disconnect the leads to the coin relay from each of the 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 the leads.

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

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

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

7.2 **Coin relay adjustments.** The coin relay must operate between 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 ohms). When the coin relay is unoperated, all lineswitch contacts should be open min. .010". Other specifications are given in section 5.2.

8. ELECTRICAL TESTING

8.1 **Upper housing continuity.** Set the loop compensator at 0 ohms. Ohmmeter should read short when connected between the following points: (readings may vary ±10%).

Transfer spring terminals #2 and #3.

Dial off normal:
Transfer spring terminals #6 and #4.

8.2 **Lower housing continuity.**

Hookswitch *down:*

BLK-BL wire on .4 mf capacitor to RI on terminal block — 0 ohms

Hookswitch *up,* armature to *left,* trigger *normal:*

L1 to lineswitch spring #7	2900 ohms
BLK-OR wire on 5 mf capacitor to transfer spg #4	17 ohms
Lineswitch spg #4 to GR wire on 5 mf capacitor	38 ohms
Transfer spg #2 to lug #6 on induction coil	18 ohms
Transfer spg #2 to terminal T	0 ohms

Hookswitch *up,* armature to *right,* trigger *normal:*

Transfer spg #6 to terminal L1	8.2 ohms
Terminal L1 to lug #6 on induction coil	160 ohms
Transfer spg #3 to BLK wire on .4 mf capacitor	0 ohms
Transfer spg #2 to BLK-BL wire on .4 mf capacitor	100 ohms
Transfer spg #4 to transfer spg #5	20 ohms
Transfer spg #5 to lug #5 on induction coil	28 ohms

Hookswitch *up,* armature to *right,* trigger *tripped:*

GND to lug #6 on induction coil	0 ohms

8.3 **Circuit test for type 86-10 only.**

Connect (+ side of) ohmmeter to screw terminal of 83 ohm coil to transfer spring #1....(reads)....10 ohms.

8.4 **Breakdown test for upper and lower housings.**

The insulation between all adjacent insulated metal parts shall withstand 500 volts a.c., 16-60 cycles/second, for ¼ second.

9. CONVERSION OF TYPE 86-10 FOR TEMPORARY FIVE-CENT SERVICE

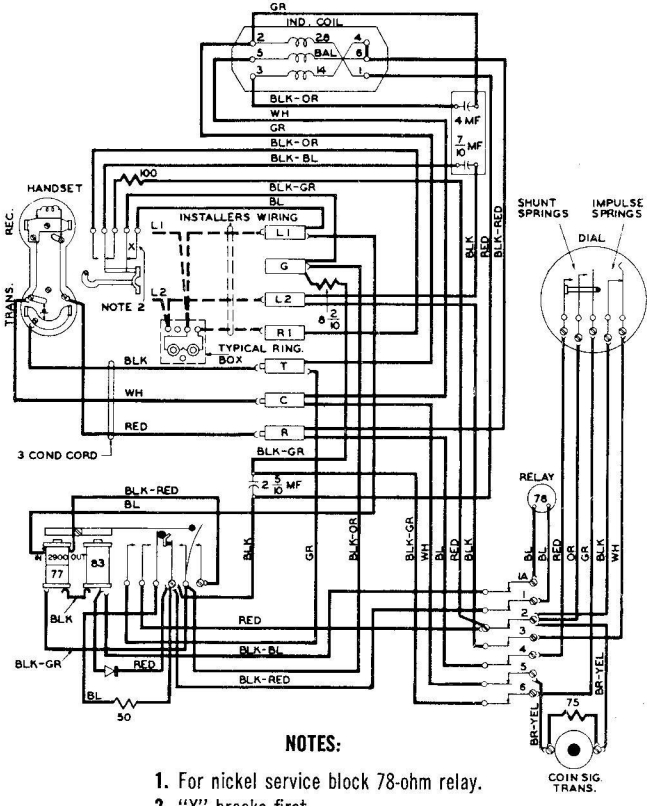
For temporary 5-cent local service, block the nickel-rejector mechanism as follows:

(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 withdrawn from the nickel channel of the coin chute, so

that nickels may be collected until the clip is removed. Notice that it is virtually impossible to dislodge the clip by striking the pay-station housing.

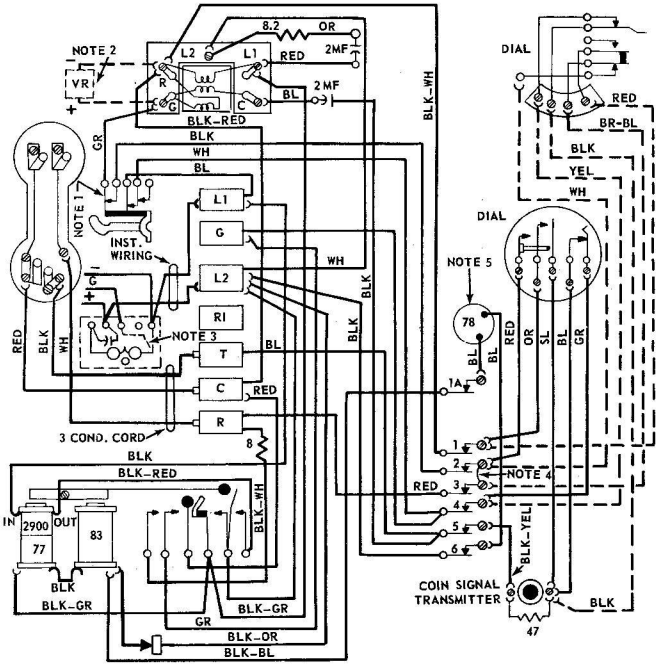
When re-converting to 10-cent dime-only service, simply remove the paper clip, and check that the rejector arm operates properly to reject nickels deposited when the relay is restored.



NOTES:

1. For nickel service block 78-ohm relay.
2. "X" breaks first.

Figure 17. Type 66-E-10 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 and 3 when W. E. Co. dial is used.
5. For nickel service, block 78 ohm relay.

Figure 18. Type 96-E-10 wiring diagram.

10. CONVERSION OF TYPE 86-10 FOR TEMPORARY FIVE-CENT MANUAL SERVICE

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

(b) Loosen the screw terminal on lineswitch spring #4 (figure 10) 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 jackstrip terminals 2 and 3 in upper housing.

(d) Block the nickel rejector mechanism as stated in section 9.

11. TYPE 66 AND TYPE 96 PAYSTATIONS

This bulletin may be used for installation and maintenance of type 66 and type 96 paystations. Operation and adjustment of these paystations are identical to those outlined for type 86. Circuit differences, to be noted in figures 17 and 18, result in variations in continuity testing (section 8.2). Other parts of section 8 apply both to type 66 and type 96 paystations.

12. ORDERING INFORMATION

When ordering these parts use the following identification numbers:

Coin gauge	P-60612
Coin chute assembly	P-60525-A
Coin chute, rejector and resonator assembly	P-60556-A
Coin chute and rejector	P-60555-A
Coin signal transmitter assembly	P-60013-A
Coin signal transmitter only	P-60654
Microswitch (2-nickel mechanism)	P-60530-A
Nickel-rejector assembly	P-60537
Switch hook	P-60047-B
Hookswitch assembly	P-60416
Handset	L-9024-DO (black)
Dial	D-84914-A (black)
Mechanism unit assembly	P-60579-A
Coin relay only	P-60549-A
Lineswitch assembly	P-60587-A
Coin hopper assembly	P-60179
Coin trigger	P-11466
Induction coil	P-60622-1
2½ MF capacitor	D-68286-A
5 MF/ .4 MF capacitor	D-68713-A
Paystation test cord	P-60605