

N.E.CO. SINGLE-COIL COIN RELAY
DESCRIPTION

1. GENERAL

1.01 This section describes the Northern Electric Co. P10E786 coin relay and its operation. This relay, which forms a part of the P11E964 relay and hopper assembly, is a single-coil device of considerably greater sensitivity than the conventional two-coil relay presently supplied on A.E. Co. coin telephone sets arranged for prepay service. It is provisionally accepted as System standard for replacement purposes in situations requiring extended loop operation or increased hopper capacity over that afforded by the two-coil mechanism. The N.E. Co. unit will be superseded by an equivalent A.E. Co. assembly when available.

1.02 Illustrations in this section show a relay and hopper assembly of domestic manufacture. Slight variations in construction may be noted in the Canadian product.

2. CONSTRUCTION

2.01 The P10E786 coin relay is assembled on a solid, stamped-iron E-form frame and provided with a flap-type armature similar to that found on W.E. Co. U-type relays (see Figure 1). Contact springs are mounted on the inner side of the frame and actuated by a phenol fibre lift which protrudes through the frame. A rocker arm connected to the armature at its pivot point provides vertical movement to a nylon selector card (see Figure 2) which is slidably supported on a U-shaped mounting bracket on the rear of the frame. This movement is imparted to a nylon cam, the top of which pivots approximately 40° to the left or right of vertical as the armature and selector card are operated. A horizontal rectangular opening in the selector card transfers the vertical motion of the card to the coin trap lever of a new style coin hopper, while a square opening in the top of the cam engages the stem of the hopper vane and moves it radially to the refund

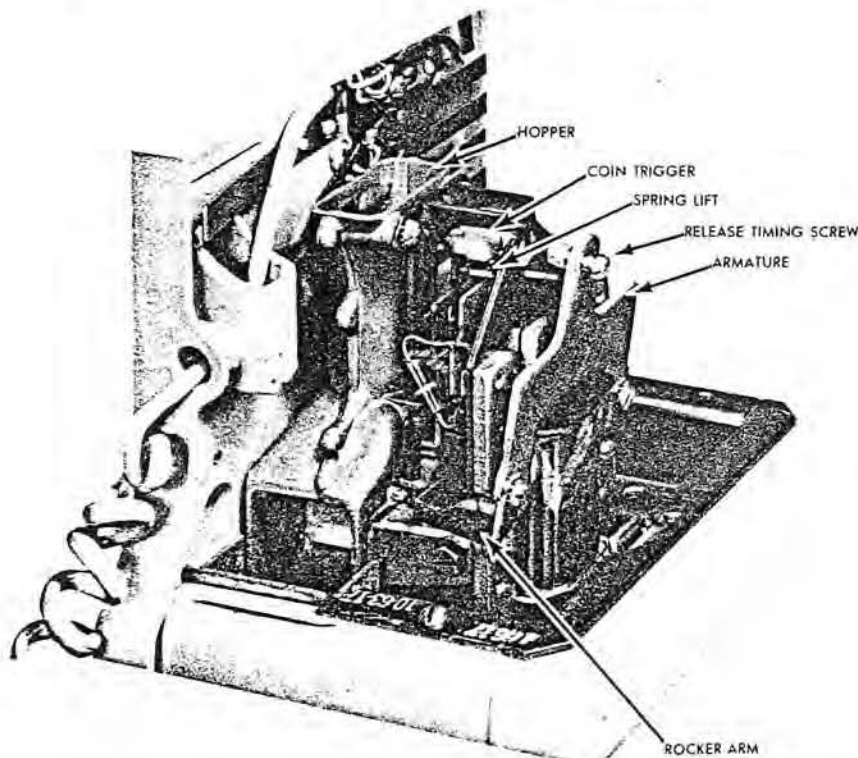


Figure 1. Single-Coil Coin Relay, Shown Installed,
With Cover Removed.

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or collect position. At the top of the relay assembly, a nylon coin trigger controls a group of contacts at the rear of the spring pile which are restored by the fibre spring lift when the armature is operated.

2.02 All connections to the relay are made at screw terminals located at the right side of the contact spring pile. A 1000Ω resistor controlled by the contacts is soldered to similar terminals at the left side of the pile, with the relay coil connected in like manner to terminals on both sides. At the very top of the armature tab, above its point of contact with the spring lift, a Phillips-head screw with a nylon stop insert can be adjusted to protrude through a hole in the frame-supporting member when the armature reaches the limit of its travel. A nylon stud on the end of the screw displaces a phosphor-bronze spring strip mounted to the frame behind the hole, permitting factory adjustment of relay release time. A P10E783 styrene cover (see Figure 3) shields the contacts and armature.

3. OPERATION

3.01 Passage of a coin into the hopper forces the coin trigger downward in the hopper slot, tripping it to permit the coin-operated contacts at

the rear of the spring pile to assume their rest position. The first-operating contact set removes a short-circuit from the dial pulse springs or a low-resistance shunt from the oscillator of the Touch Calling unit connected at terminals 1 and 2 (see Figure 4). The other contact set connects ground from terminal G in series with the relay coil to the line by way of terminal 3. After the coin has passed, the trigger is prevented from restoring fully by the tit of the lever spring of the make contact set.

3.02 If -110 volt refund potential is applied to the line, the polarity of the flux generated in the core of the relay coil is such as to cause the left end (right end as seen in Figure 2) of a small bar magnet molded into the top of the selector card to be attracted to the left (right in the figure) extension of the core, or pole piece. This tilts the card slightly, so that as it is moved down by the rocker arm it moves the cam, and thereby the nylon hopper vane, to the right. Meanwhile the downward motion of the card is imparted to the trap lever, which pivots on its pin and moves its upper edge outward. This permits the nylon coin trap pivoted above the lever to swing down inside the hopper, so that the coin deposit falls against the left side of the vane and passes into the refund chute.

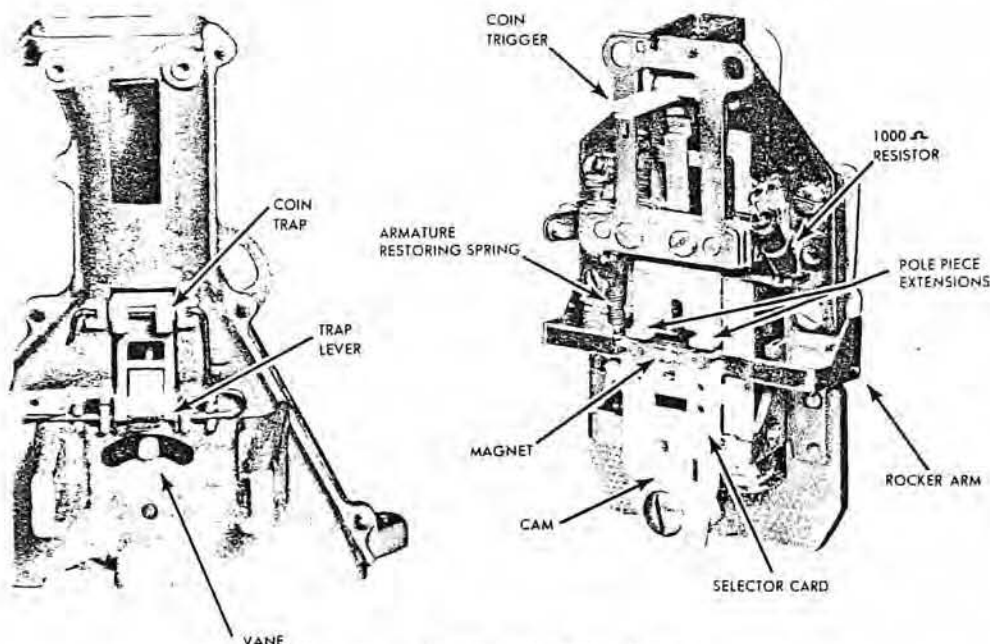


Figure 2. P10E755 Hopper, and Rear View of P10E786 Relay.

3.03 If +110 volt collect potential is applied to the line, the flux generated at the pole piece extensions is such as to attract the right end (left as seen in Figure 2) of the selector card magnet, tilt the card to the left, operate the cam and vane to the left, and drop the coin deposit against the right side of the vane into the coin receptacle.

3.04 As the relay armature operates the selector card through the rocker arm, it also moves the spring lift toward the hopper, actuating a set of transfer contacts which insert a 1000Ω resistance in series with the coil and then short-circuit the coil. The resistance thus takes the place of the coil in the path of the coin control current, stabilizing the latter to prevent damage to the ground contacts when they open and to resistance lamps in the supply circuit at the central office. At the end of its stroke the spring lift provides substantial follow to the coin operated ground contacts, so that the tilt of the lever spring no longer interferes with the trigger, which restores completely to normal under the force of a coil spring in torsion. The dial-or TC unit-shunting springs are forced closed.

3.05 With the relay coil shorted, the current induced by the collapsing field tends to retard the decay of the flux in the core and makes the armature slow to release. As it begins to restore, the spring lift permits the coin-operated springs to return from their over-travel position. With the trigger normal, the lever spring of the make contact set is prevented from returning to its rest position. This in

turn prevents the break (dial-or TC unit-shunting) contact set from reopening and allows the make (ground) contact set to open. As the ground path is opened, the relay is disconnected from the coin battery circuit, thus extinguishing the coin pilot lamp if collection or refund is being controlled from a manual switchboard, and preventing reoperation of the relay if the operator or control circuit continues application of coin battery to the line. Finally, the transfer contact set is restored to remove the short-circuit from the relay coil and bypass the series resistor. The upward motion of the selector card during release acts to return the coin trap to horizontal and the hopper vane to its neutral vertical position in preparation for the next deposit.

3.06 In conjunction with its associated P10E755 hopper, the P10E786 coin relay provides performance superior to that of the two-coil mechanism by virtue of its lower power requirement for operation, greater coin capacity and ability to operate on shorter applications of coin potential. The latter property results from the fact that the time required for complete disposal of a coin deposit is provided during the slow release of the relay, rather than entirely during the period when coin control potential is applied to the line. This is also due in part to the fact that the relay controls the operation of the coin trap and synchronizes its movements with those of the hopper vane, so that contact between the two, and possible lodging of coins on the trap, are avoided.

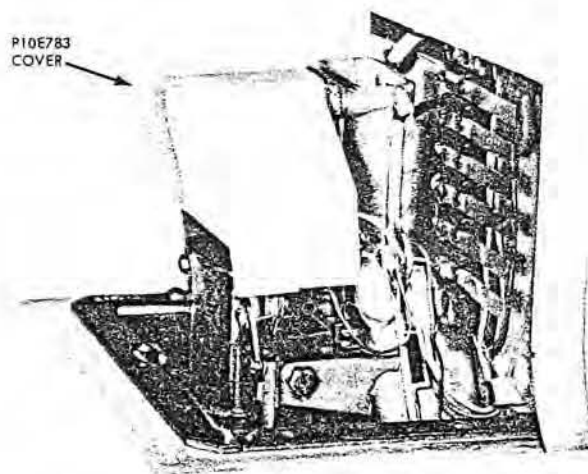


Figure 3. P11E964 Relay and Hopper Assembly
Installed in A. E. Co. Coin Telephone
Set.

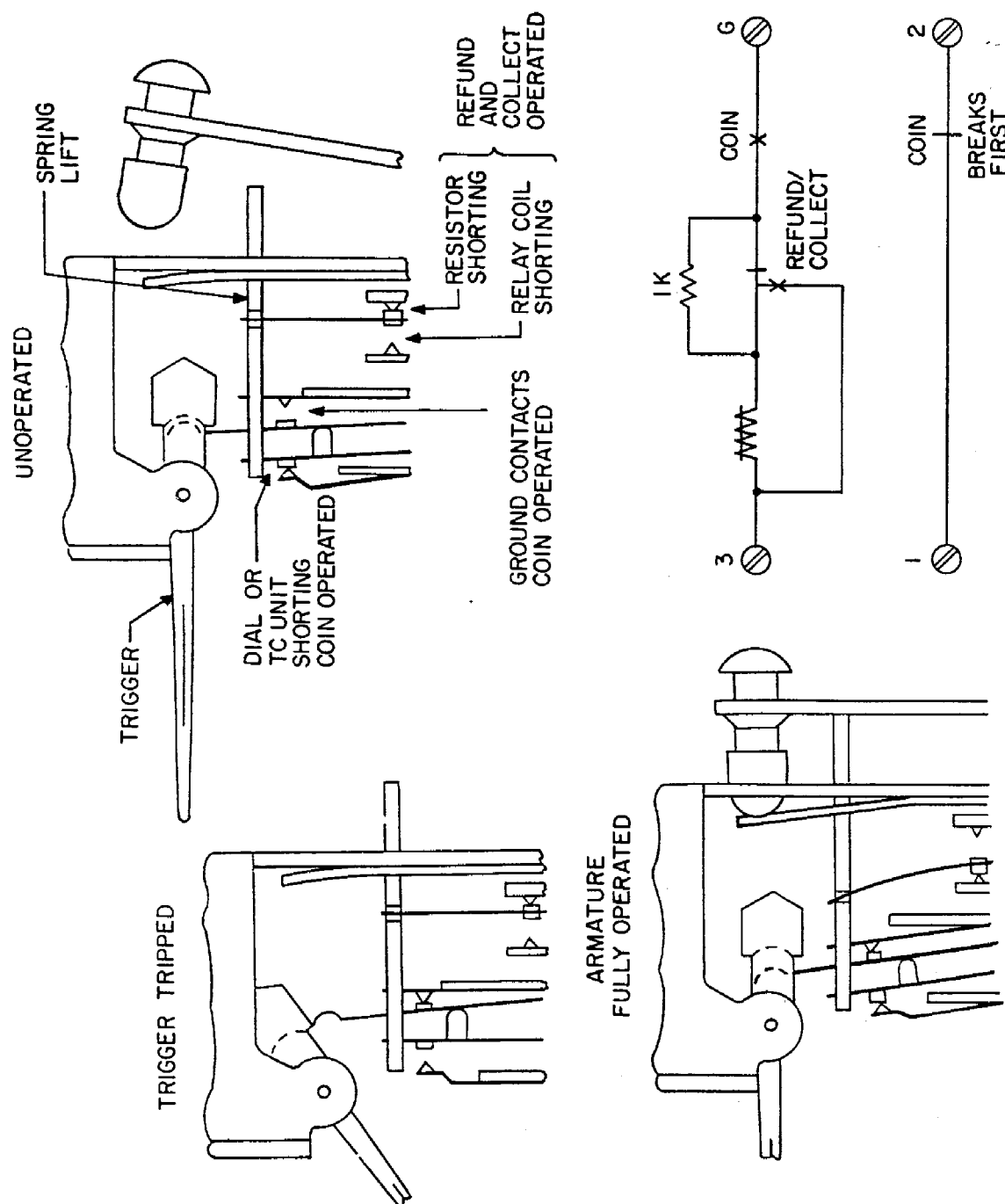


Figure 4. Coin Relay Contact Spring Assembly and Schematic.