

Western Electric Company, Inc.,  
Equipment Engineering Branch,  
Hawthorne.

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## METHOD OF OPERATION SENDER SELECTOR

For Stuck Senders - To be used with Subscribers Districts, and Operator's Dialing Districts - Panel Machine Switching System.

### DEVELOPMENT

#### 1. PURPOSE OF CIRCUIT

This circuit is used to find district selectors which are held up by stuck senders.

#### 2. WORKING LIMITS

This circuit is adapted for use in offices where the battery voltage is from 45 to 50 volts.

### OPERATION

#### 3. PRINCIPAL FUNCTIONS

3.1 To locate a district selector associated with a stuck sender.

3.2 To test succeeding districts after stuck district has been released before circuit is restored to normal.

#### 4. CONNECTING CIRCUITS

4.1 Any standard Subscriber's Sender.

4.2 Any standard Subscriber's or Operator's Dialing Districts.

### DESCRIPTION OF OPERATION

5. Upon receiving notice of a stuck sender from the sender monitor, the trouble man operates a start key associated with the group of senders in which the particular sender, which is stuck, is located. The operation of this key places ground on a circuit to the (TO-1) and (TO-2) relays which operate from battery on their windings. The operation of these relays opens leads to the (T-1), (T-2), (T-3), (T-4), and (T-5) relays, insuring their release in case any of them happen to be operated. The operation of the start key also closes a circuit from ground through the break contact of the (S-1) relay and make contact of the (ST) key to battery thru the winding of the (ST-1) relay, and selector lamp 1 in series with the 240 ohm resistance. The (ST-1) relay operates and locks thru its make contact to ground at the normal (S-1) relay ("A" wiring) or continuity



contacts of the (ST-2) relay, normal (S-2) relay to ground. Selector lamp 1 lights as a signal that the first selector is now being used. When the start key is released, ground is closed thru the break contacts of the keys, make contact of the (ST-1) relay, break contact of the selector magnet, winding of the (MD-1) relay to battery and the (TO-1) and (TO-2) relays release. The (MD-1) relay operates and connects ground thru its make contact operating the selector magnet. The operation of the magnet opens the circuit thru the winding of the (MD-1) relay which releases and removes the ground from the winding of the magnet. The release of the magnet advances the selector to terminal 1 and again closes the circuit thru the winding of the (MD-1) relay, repeating the operation as before. The circuit continues to function in this way, advancing the selector step by step until a grounded terminal is encountered in the group associated with the particular key depressed.

#### 6. TERMINAL SELECTED

When a grounded terminal is found, a circuit is established thru the selector brush, and the contacts of the (TO-1) or (TO-2) relay to battery thru the winding of the (T) relay corresponding to the selector bank in which the grounded terminal is located. The (T) relay operates and connects ground from the (ST) keys thru the make contacts of the (ST) relay which is operated at that time, to battery thru the winding of an (MD) relay. This holds the (MD) relay operated, and ground from the make contact of the (MD) relay holds the corresponding selector magnet operated, preventing the selector from advancing. The (MD) relays are slow in releasing to allow the (T) relay sufficient time to operate before the selector magnet can release, and advance the selector to the next position. The operation of the (T) relay also closes ground thru an R lamp brush and terminal of arc 6 of the associated selector to battery thru the corresponding (T) lamp. The number of the selector is indicated by the selector lamp, the bank of the selector by the (R) lamp, and the terminal by the (T) lamp.

#### 7. TERMINAL CLEARED

When the ground has been removed from the terminal, the (T) relay is released, extinguishing the (T) and (R) lamps and releasing the (MD) relay. The release of the (MD) relay removes the ground from the selector magnet, which releases and advances the selector to the next terminal. Ground from the start keys through the contacts of the (ST) relay and the magnet again operates the (MD) relay, and the selector starts hunting until another ground is found or terminal 21 of the selector reached.

#### 8. TRANSFER TO SECOND SELECTOR

When terminal 21 is reached a circuit is closed from ground at the normal start keys, through terminal 21 and the brush of selector bank 1, contacts of the (TO-1) relay, to battery through the winding of the (T-1) relay. The (T-1) relay operates and connects ground



through the break contacts of (ST) keys through make contact of the (T-1) relay (R-1) lamp, brush and terminal #21 of selector bank 6, to battery through the winding of the (S-1) relay, operating the (S-1) relay. The ground through the other make contact of the (T-1) relay and make contact of the (ST-1) relay and the winding of the (MD-1) relay, holds the (MD-1) relay operated, which in turn holds the selector magnet operated, preventing the selector from advancing. The (ST-1) relay is held operated to ground at the normal (S-2) relay, the (S-1) relay operated connects ground through its make contact, contacts of the (ST-1) relay, winding of the (ST-2) relay and the selector lamp 2, to battery operating the (ST-2) relay and lighting the lamp. The (ST-2) relay locks through its make contact, break contact of the (ST-3) relay to ground through the contacts of the (S-3) relay, releasing the (ST-1) relay, releasing the (ST-1) relay. The (ST-1) relay released, opens the circuit through the (MD-1) relay, which also releases and disconnects ground from the selector magnet. The magnet released, advances selector 1 to its normal position releasing the (S-1) and (T-1) relays and extinguishing selector lamp #1. Ground from the (ST) keys, through the contacts of the (ST-2) relay and the selector magnet 2 operates the (MD-2) relay which connects ground to the magnet. The magnet operates opening the circuit through the (MD-2) relay, which releases, opening the circuit through the magnet. The magnet releases, advancing the selector brushes to position 1, and the hunting is repeated as for selector 1.

9. TRANSFER TO THIRD SELECTOR

The operation of the circuit for transferring from selector #2 to #3, is the same as from selector #1 to #2, and when a grounded terminal is found the transfer takes place after the ground has been removed. If it is necessary to test the remaining terminals, before clearing the first ground, operation of the start key will remove the ground from the (MD) relay, and the selector will advance to the next terminal and resume hunting. The SC leads from the senders are grounded momentarily in normal operation of a premature release and the stuck sender selector may step momentarily on such a terminal but unless the ground is permanent, the selector will pause and then resume its hunting until a permanent ground is encountered.

10. RESTORING TO NORMAL

When terminal 21 of the last selector is reached, the (T-1) relay operates operating the (S-1), (S-2) or (S-3) relay as in paragraph 8. Under this condition the operation of the (S-1), (S-2) or (S-3) releases the (ST-1), (ST-2) or (ST-3) since no holding ground is provided as in paragraph 8. The release of the (ST-1), (ST-2) or (ST-3) relay de-energizes the stepping magnet stepping the selector to terminal 22, releasing the (T-1) and (S-1), (S-2) or (S-3) relays and extinguishing the lamp restoring the circuit to normal.

ENG.--EJS  
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CHK'D--JI

APPROVED - H.L. MOYNES  
E.R.C.



