Western Electric Co. Incorporated,
Equipment Engineering Branch, Hawthorne

(10 Pages, Page 1)
Issue 2 B. 502296
June 23, 1923. (*)
Replacing all previous issues. (*)

This M. of O. sheet was prepared from Issue 33 of T-502296

METHOD OF OPERATION
SIGNAL CIRCUIT

Motor Stop Alarm and Frame Busy on Selectors - For Use With Line Finders - Panel Machine Switching System.

DEVELOPMENT

1. PURPOSE OF CIRCUIT

1.1 These circuits are used to provide audible alarms and visual signals whenever a frame drive motor slows down below its normal speed, or stops, and also to provide means for automatically imposing busy conditions on the frames affected by the particular drive motor as long as the motor is running below its normal speed, or is stopped.

2. WORKING LIMITS

2.1 These circuits function with local circuits and have no working limits.

OPERATION

3. PRINCIPAL FUNCTIONS

The principal functions of these circuits are as follows:

3.1 To provide audible alarm signals when frame motors slow down below normal speed or stop.

3.2 To provide visual signals when motors slow down below normal speed or stop.

3.3 To make the frames affected busy when motors slow down below normal speed.

4. CONNECTING CIRCUITS

These circuits will function with the following circuits:-

4.1 Standard district selector circuits.

4.2 Standard "A" sender circuits.

4.3 Standard suburban sender circuits.

4.4 Standard "B" sender circuits.

4.5 Standard local tandem sender circuits.

4.6 Standard panel line finder circuits.

DESCRIPTION OF OPERATION

5. ALARM GOVERNOR FOR FRAME DRIVE MOTORS (FIGURE 1).

5.1 Each frame drive motor is provided with a centrifugal contact switch located on the motor shaft having a double throw, closing a stop contact below a certain critical speed of the motor and closing a run contact at and above that speed. The spring of the switch is adjustable to within certain limits and is to be so set that one or the other of its contacts closes at a speed between 75% and 95% of the normal motor speed.

6. PANEL LINE FINDER SELECTOR FRAME MOTOR STOP ALARM ON SIDE OF FRAME WHERE MOTOR IS LOCATED (FIGURE 2).

6.1 When a panel line finder frame drive motor slows down below the critical speed, the stop contact closes, operating the (MS) relay (Figure 3) from battery, winding, over lead B normal motor stop key located at the trouble desk, back over lead B-1, stop contact of the alarm governor on the motor shaft, to ground.

6.2 At the same time, the (FB) relays in one group on the same side of the frame operate from battery, winding, stop contact of the alarm governor to ground. The (FB) relays operated are held operated as long as the stop contact of the alarm governor is closed, connecting ground to the (MB) relays of all the line finders in the group on that side of the frame, transferring calls to the other side of the frame.

6.3 The (MS) relay operated, lights a red motor stop lamp at the floor alarm board and at the trouble desk over leads A-1 and L respectively, each in series with a relay operating a ringer at the floor alarm board and at the trouble desk, indicating by an audible and visual signal that a frame drive motor stopped.

6.4 The operation of the motor stop key opens lead B-1 from the stop contact of the alarm governor, releasing the (MS) relay extinguishing the alarm lamps and silencing the ringer. That the stop alarm has been removed is indicated by the operation of the motor stop key which also lights a white motor stop lamp at the floor alarm board.

6.5 When the motor again runs above the critical speed, the "stop" contact opens and the "run" contact closes. The (MB) relay releases when the stop contact opens in turn releasing the (MB) relays of the affected line finder circuits. The (MS) relay operates, if the motor stop alarm has been removed, as soon as the contact is closed from battery, winding of the (MS) relay, lead B, operated motor stop key, lead A, run contact of the alarm governor of the motor shaft to ground. The (MS) relay operated, lights the motor stop alarm lamps and operates the ringers, indicating that the motor is running with its stop alarm removed. The release of the motor stop key extinguishes the white stop guard lamp and release the (MS) relay, in turn extinguishing the motor stop lamps and silencing the ringers.

7. PANEL LINE FINDER SELECTOR FRAME MOTOR STOP ALARM ON SIDE OF FRAME WHERE NO MOTOR IS LOCATED (FIGURE 2 AND W WIRING.)

7.1 When the drive motor of a panel line finder selector frame slows down below the critical speed and if this motor furnishes power drive to the same side of an adjacent frame, the (FB) relay of the adjacent frame operates, connecting ground to the (MB) relays of all line finders in the group transferring calls to the other side of the frame, during the time the motor is stopped or running below the critical speed as described in paragraph 6.

8. DISTRICT FRAME USED WITH PANEL LINE FINDER MOTOR STOP ALARM (FIGURE 3).

8.1 When the drive motor of a district frame used with panel line finders slows down below the critical speed, the (MS) relay (figure 3), operates as described in paragraph 6.1, lighting the motor stop alarm lamps and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3. The operation of the motor stop key releases the (MS) relay extinguishes the alarm lamps, silences the ringers, and lights a white motor stop guard lamp as described in paragraph 6.4. If the motor again runs with its motor

stop key operated, the (MS) relay operates as soon as the run contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

9. MISCELLANEOUS FRAME MOTOR STOP ALARM (FIGURE 4).

9.1 This figure is used with sender frame for the motor stop alarm as hereinafter described and also used with the drive motors of office, make busy, translator, final, and incoming except cordless selector frames. When a sender or selector frame drive motor slows down below the critical speed, the stop contact closes operating the (MS) relay (Figure 4) as described in paragraph 6.1, lighting sender or selector frame motor stop alarm lamps and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3. The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps silences the ringers and lights a white motor stop guard lamp as described in paragraph 6.4. If the motor runs with its stop alarm removed, the (MS) relay operates as the run contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

10. 3 DIGIT "A" SENDER FRAME MOTOR STOP ALARM

WHERE MOTOR DRIVING TWO FRAMES IS LOCATED (FIGS. 1, 4 AND 5).

10.1 When the drive motor of a three digit "A" sender frame slows down below the critical speed, the (MS) relay operates (Figure 4), as described in paragraph 6.1, lighting an "A" sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3.

10.2 At the same time, the (FB) relay operates from battery, winding, stop contact of the alarm governor on the motor shaft to ground. The (FB) relay is held operated as long as the stop contact of the alarm governor is closed, connecting ground to the common MB leads of the "A" sender in the group on that side of the frame, operating the sender (MB) relays making them test busy.

10.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers and lights the white motor stop guard lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the

(FB) relay releases when the stop contact opens, releasing the sender (MB) relays and the (MS) relay operates if the motor stop key is operated as soon as the run contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released, as described in paragraph 6.5.

11. "B" SENDER FRAME MOTOR STOP ALARM

WHERE MOTOR IS LOCATED ON EACH SIDE OF FRAME, (FIGS. 1, 4 and 6).

11.1 When the drive motor of a "B" sender frame slows down below the critical speed, the (MS) relay operates (Figure 4) as described in paragraph 6.1, lighting a "B" sender frame motor stop lamp and operating a ringer at the floor alarm and at the trouble desk as described in paragraph 6.3.

11.2 At the time, the (SB) relay operates (Figure 6) from battery winding, stop contact of the alarm governor on the motor shaft to ground. The (SB) relay operated, is held operated as long as the stop contact of the alarm governor is closed, connecting ground to the (MB) jack of each sender on the same side of the frame, making the senders test busy and operating the (PB) relay of the cordless allotter circuit and the other cordless allotter on the same side of the frame, transferring the allottment of sender selectors to the other side of the cordless frame.

11.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers and lights the white motor stop guard lamp as described in paragraph 6.4. When the motor runs above the critical speed, the (SB) relay releases when the stop contact opens, releasing the (PB) relays of the affected cordless allotters and removes the busy condition from the sender MB jack. The (MS) relay operates, if the motor stop key remains operated, as soon as the run contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

12. "B" SENDER FRAME MOTOR STOP ALARM

ON SIDE OF FRAME WHERE NO MOTOR IS LOCATED (FIGS. 1 and 6 "Q" WIRING).

12.1 When a drive motor of a "B" sender frame slows down below the critical speed and if this motor furnishes power drive to the same side of an adjacent frame, the (SB) relay of the adjacent

frame operates, making the senders on the side of the frame test busy during the time the motor is stopped or running below the critical speed as described in paragraph 8.

13. "B" SENDER FRAME MOTOR STOP ALARM

WHERE FRAME HAS CAPACITY OF TEN SENDERS PER FRAME (FIGS. 1, 4 and 7).

13.1 When the drive motor of a "B" sender frame having a capacity of ten senders per frame slows down below the critical speed, the (MS) relay operates (Figure 4) as described in paragraph 6.1, lighting a "B" sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3.

13.2 At the same time the (SB) and (SB-1) relays operate (Figure 7) from battery, respective windings, stop contact of the alarm governor on the motor shaft to ground. The (SB) and (SB-1) relays are then held operated as long as the stop contact of the alarm governor is closed, connecting ground to the test terminals of the sender on the same side of the frame, making them test busy.

13.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers, and lights a white motor stop lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the (SB) and (SB-1) relays release, when the stop contact opens removing the busy condition from the sender and the (MS) relay operates if the motor stop key remains operated as soon as the run contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

14. TWO DIGIT "A" SENDER FRAME MOTOR STOP ALARM

ARRANGED FOR FIVE SENDERS PER FRAME. WHERE MOTOR IS LOCATED.

(FIGS. 1, 4 and 8).

14.1 When the drive motor of a two digit "A" sender frame having a capacity of five senders per frame slows down below the critical speed, the (MS) relay operates, (Figure 4) as described

in paragraph 6.1, lighting a two digit "A" sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3.

14.2 At the same time, the (FB-1) relay operated (figure 8) from battery, winding, stop contact of the alarm governor on the motor shaft to ground. The (FB-1) relay operated, is held operated as long as the stop contact of the alarm governor is closed connecting ground to the individual make busy leads of the sender circuits on the same side of the frame, making them test busy.

14.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers and lights a white motor stop guard lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the (FB-1) relay releases when the stop contact opens, removing the busy condition from the MB leads of the senders and the (MS) relay operates if the motor stop key remains operated, as soon as the rung contact closes, lighting alarm lamp and operating ringers until the motor stop key is released as described in paragraph 6.5.

15. TWO DIGIT "A" SENDER FRAME MOTOR STOP ALARM

ARRANGED FOR FIVE SENDERS PER FRAME WHERE NO MOTOR IS LOCATED AT FRAME (FIGS. 1 AND 8) "R" WIRING.

15.1 When the drive motor of a two digit sender frame slows down below the critical speed, and if this motor furnishes power drive to the same side of an adjacent frame the (FB-1) relay of the adjacent frame operates, making the senders on the side of the frame busy, during the time the motor is stopped or running below the critical speed as described in paragraph 11.

16. TEST FRAME MOTOR STOP ALARM (FIGS. 1 AND 9).

16.1 When the drive motor of a test frame slows down below the critical speed, the (MS) relay operates, (Figure 9) as described in paragraph 6.1, lighting a test frame motor stop alarm lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3. The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers, and lights

a white motor stop alarm as described in paragraph 6.4. If the motor runs with the motor stop key operated, the (MS) relay operates, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

17. "A" SENDER FRAME MOTOR STOP ALARM

WHERE MOTOR DRIVES ONE FRAME ONLY (FIGURES 1, 4 AND 10).

17.1 When the drive motor of an "A" sender slows down below the critical speed, the (MS) relay operates as described in paragraph 6.1, lighting an "A" sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3.

17.2 At the same time, the (FB) relay operates (Figure 10) from battery, winding, stop contact of the alarm governor on the motor shaft to ground. The (FB) relay is held operated as long as the stop contact of the alarm governor is closed, connecting ground to the MB-1 leads to the control circuit of the the "A" senders on the same side of the frame making them test busy.

17.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers and lights a white motor stop guard lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the (FB) relay releases. When the stop contact opens removing the busy condition from the MB-1 leads and the (MS) relay operates if the motor stop key remains operated as soon as the contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

18. "A" POSITION SENDER FRAME MOTOR STOP ALARM

2 POSITION SIDE IF FRAME (FIGS. 4 AND 11).

18.1 When the drive motor of a 2 position side of an "A" position sender frame, slows down below the critical speed, the (MS) relay operates as described in paragraph 6.1, lighting an "A" position sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3.

18.2 At the same time, the (FB) relay operates, (Figure 11) from battery, winding, stop contact of the alarm governor on the motor shaft to ground. The (FB) relay is held operated as long as the stop contact of the alarm governor is closed, connecting ground to the make busy back jack of each "A" position sender register control circuit on the same side of the frame.

18.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers and lights the white motor stop guard lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the (FB) relay releases as soon as the stop contact opens, removing the busy condition from the make busy jack and the (MS) relay operates if the motor stop key remains operated as soon as the run contact closes, lighting the alarm lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

19. LOCAL TANDEM SENDER FRAME MOTOR STOP ALARM (FIGS. 1, 4 AND 12).

19.1 When the drive motor of a local tandem sender frame slows down below the critical speed, the (MS) relay operates as described in paragraph 6.1, lighting a local tandem sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk as described in paragraph 6.3.

19.2 At the same time, the (E613) relay operates (Figure 12) from battery, winding, stop contact of the alarm governor on the motor shaft to ground. The (E613) relay is held operated as long as the stop contact is closed, connecting ground to the make busy jack of the local register and control circuit of each sender on the same side of the frame, making them test busy.

19.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers, and lights a white motor stop guard lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the (FB) relay releases when the stop contact opens, removing the busy condition from the make busy jacks and the (MS) relay operates, if the motor stop key remains operated, as soon as the run contact closes, lighting the lamps and operating the ringers until the motor stop key is released as described in paragraph 6.5.

20. "A" POSITION SENDER FRAME STOP ALARM (FIGS. 4 and 13)

20.1 When the drive motor of a one position side of an "A" position sender frame, slows down below its critical speed, the (MS) relay operates as described in paragraph 6.1, lighting an "A" position sender frame motor stop lamp and operating a ringer at the floor alarm board and at the trouble desk.

20.2 At the same time, the (FS) relay operates, (Figure 13) from battery, winding, stop contact of the alarm governor, on the motor shaft to ground. The (FS) relay is held operated as long as the stop contact of the alarm governor is closed, connecting ground to the make busy jacks of the register control circuit of the "A" position senders on the same side of the frame, making them test busy.

20.3 The operation of the motor stop key releases the (MS) relay and also extinguishes the alarm lamps, silences the ringers and lights the white motor stop guard lamp as described in paragraph 6.4. When the motor again runs above the critical speed, the (FS) relay releases when the stop contact opens removing the busy condition from the make busy jacks and the (MS) relay operates, if the motor stop key remains operated as soon as the run contact closes lighting the alarm lamps and operating the ringers, until the motor stop is released as described in paragraph 6.5.