MOTOR CONTROL UNITS

USED WITH 14 AND 15 TELETYPEWRITERS

DESCRIPTION AND PRINCIPLES OF OPERATION

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1. GENERAL

1.01 This section gives the description of remote motor control units used with 14 and 15 teletypewriters. These units provide a means for a distant attendant to turn on and off a machine at an unattended station.

1.02 The motor control units described in this section stop the motor on receipt of a motor stop signal which is FIGS H, FIGS BLANK H, or FIGS M, depending on how the mechanism is arranged. The method of starting the motor also differs for the various devices as described in this section.

2. DESCRIPTION AND PRINCIPLES OF OPERATION OF THE BUILT-IN MECHANICAL MOTOR CONTROL (15 TELETYPEWRITER ONLY)

2.01 The built-in mechanical motor control (Manufacture Discontinued) is associated only with the pulling-magnet selector of the 15 typing unit. It is used for closed-loop operation. The term "built-in mechanical" refers to the fact that the device which opens or closes the contacts in the motor-power circuit is an integral mechanical part of the typing unit.

2.02 The distant operator or attendant starts an idle machine by first opening the line and then closing it, usually by means of the Break key. The resulting succession of operations of the mechanical parts on the machine closes the motor-stop contacts and turns on the power.

2.03 The motor is turned off by the motor-stop signal, which in this case may be either FIGS H, FIGS BLANK H, or FIGS M.

CAUTION: THE MANUAL POWER SWITCH SHOULD NOT BE TURNED OFF BEFORE THE KEYBOARD SENDING SHAFT COMES TO REST.

A. FIGS H Operation

2.04 Motor Running: Line closed, left-hand motor-stop contacts open, right-hand motor-stop contacts closed, armature extension released from inner and outer motor-stop pawls. See Figure 2, Section 572-007-700.

2.05 Motor Stop

(1) When a FIGS H signal is received, selecting the motor-stop function lever, the motors of all machines connected in the circuit that are equipped with FIGS H motor stop will be automatically stopped. See Figure 17, Section 572-007-700.

(2) As the motor-stop function lever is moved forward in the vanes, its lower rear extension raises the motor-stop lever; this latches the inner motor-stop pawl onto the thick part of its latch on the armature extension. See Figures 1, 2, and 4 in Section 572-007-700.

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(3) Simultaneously, the front extension of the motor-stop function lever moves down, allowing the left-hand motor contacts to close. As the rear extension of the motor-stop contact lever moves up, the front extension moves down against the tension of its spring, and opens the right-hand motor-stop contacts. See Figures 2, 4, and 5, Section 572-007-700.

(4) Since both pairs of contacts are wired in multiple, the motor will not stop until the motor-stop function lever is restored to its normal position and the left-hand motor-stop contacts open. The purpose of the left-hand contacts is to hold the motor circuit momentarily closed until the main-bail cam sleeve comes to rest, which insures the disengagement of the main-shaft clutch before the motor stops.

2.06 Motor Start: To start the motor, the switchboard operator first opens the line by means of the Break key and then closes it. The following sequence of operations takes place.

(1) When the line is opened, the selector armature extension is moved downward by the armature spring and the upper end of the motor-stop lever, having moved forward a slight distance, is again stopped when its outer pawl catches the cut-away portion of the motor-stop-pawl latch. See Figures 1 and 2, Section 572-007-700.

(2) When the operator again closes the line, the armature moves to its operated position, the outer motor-stop pawl unlatches the armature extension, and the motor-stop lever returns to its running position. The extension on the lower portion of the motor-stop lever, which has been holding the motor-stop contact lever away from the right-hand motor-stop contacts, will now permit the spring to move the front extension of the motor-stop lever upward, closing the right-hand motor-stop contacts. The motor is now operating and the teletypewriter ready for sending or receiving. See Figures 2 and 5 in Section 572-007-700.

B. FIGS Blank H Operation

2.07 Motor Stop: When the FIGS BLANK H signal is received, the motor will be stopped. The FIGS selection moves the 6th vane to the FIGS position and the BLANK selection moves the blank function lever and its extension down. The extension then moves the left arm of the T-lever down. The upper part of the T-lever, the intermediate lever pivot, the spring bracket, and the reset lever all move to the left. The lower end of the intermediate lever is then moved against the right side of the blank function-lever extension and the blocking lever is carried to the left by the blocking-lever operating spring on the spring bracket, turning the complete lever in a clockwise direction. The motor-stop function lever is then free of the blocking lever and allowed to move forward into the vanes when the H signal is received. (The blocking lever will not block the motor-stop function lever again until the next spacing operation, and the universal function lever and its extension is moved down; every spacing operation of the printer moves the universal function lever and its extension down. This causes the right arm of the T-lever to move down, moving the upper part of the T-lever, the intermediate lever pivot, the spring bracket, and the reset lever to the right.) See Figures 5 and 6, Section 572-007-700.

2.08 The rest of the motor-control operations are the same as the FIGS H operations described in 2.04, 2.05 (2 and 3), and 2.06.

C. FIGS M Operation

2.09 This mechanism operates the same as the FIGS H mechanism described in A. Except for the TP74038 FIGS M motor-stop function lever and the TP82994 nameplate, the operating components are the same.

3. DESCRIPTION AND PRINCIPLES OF OPERATION OF THE ELECTRICAL MOTOR CONTROL (14 AND 15 TELETYPEWRITER)

3.01 This motor control is associated with either pulling or holding magnets on 14 and 15 teletypewriters. It is only used for closed-loop operation. It consists of a set of contacts on the typing unit and a relay-unit, consisting of a start magnet and a stop magnet, in the base, which switches the power supply. The contacts, and the methods of operating them, are different for the 14 and 15 typing units.

3.02 The distant operator or attendant starts the machine by a break, which actuates the start magnet in two steps so that the motor is turned on.

3.03 The motor stops when the motor-stop signal is received. FIGS H or FIGS BLANK H, as the case may be, close the contacts on the

typing unit momentarily, just long enough for the stop magnet in the base to pull up and open the power circuit.

A. FIGS H Operation (14 Teletypewriter)

3.04 Typing-Unit Contact Mechanism: The typing unit contacts, for this mechanism, are mounted on the left-hand ribbon spool bracket and are operated by a lug on the H typebar. The FIGS selection moves the platen to the FIGS position. Then the H selection selects the H typebar. The lug on the H typebar strikes the operating lever as the pallet on the H typebar strikes the platen. The operating lever then moves the latch lever down, moving the latch-lever extension to the right, and away from the lower latching surface of the contact lever. At the same time the main bail starts to move upward in its travel, releasing its pressure upon the contact lever. This allows the contact-lever spring to pull the contact lever down; then the latch-lever extension is latched by the upper latching surface of the contact lever and the contact-lever adjusting-screw is moved upward, closing the upper pair of contacts. See Figures 7 and 12 in Section 572-007-700.

3.05 At the same instant that the lug on the H typebar has completed striking the operating lever, and is returned to its normal position, the main bail moves downward. When the main bail has reached its downward position against the contact lever, the contact-lever adjusting-screw is moved down, opening the upper pair of contacts and moving the contact lever up, against the tension of the contact-lever spring. This allows the latch-lever extension to be pulled to the left side by the latch-lever spring. The latch-lever extension is now returned to the lower latching surface of the contact lever.

3.06 Relay Unit in the Base: The relay circuit to shut the motor off is actuated when the contacts on the typing unit are momentarily closed. The operation of the relay unit is similar to the operation of the unit for the 15 teletypewriter discussed in 3.08.

B. FIGS H Operation (15 Teletypewriter)

3.07 Typing Unit H Contacts: The typing unit H contacts are similar to the left-hand motor stop contacts of the built-in motor control mechanism. See Figure 5 in Section 572-007-700.

(a) When the FIGS H signals are received, the motor-stop (H) function lever is selected.

(b) As the motor-stop function lever moves into the vanes, its extension moves down, closing the left-hand motor-stop contacts momentarily. Closure of the contacts actuates the motor-stop relay circuit located in the base. The contacts are opened when the motor-stop function lever moves out of the vanes and its extension moves upward.

3.08 Relay Unit (See Figure 1)

(a) TTY Motor Running:

Note: TTY terminals shown in Figure 1 for 15D base with line relay. Solid lines indicate wiring within motor-control unit. All external wiring is shown in dotted lines.

(1) Start-magnet and stop-magnet not energized.

(2) Armature A fully released.

(3) Start-magnet shorted by contacts 1 and 2.

(4) Power circuit to the TTY motor closed by contacts 5 and 6.

(b) TTY Receives Motor-stop Function: Motor-stop contacts close momentarily. (Functions 1 to 6 inclusive take place during the momentary close of the motor-stop contacts.)

(1) Stop-magnet energized.

(2) Armature A pulls up.

(3) Contacts 5 and 6 open, stopping TTY motor.

(4) Contacts 3 and 4 close, shorting TTY sending contacts.

(5) Contacts 1 and 2 open, removing short from start-magnet which is then energized by line current.

(6) Armature B pulls up, latch follows armature B through spring link.

(7) Stop-magnet de-energized, armature A held in position by latch.

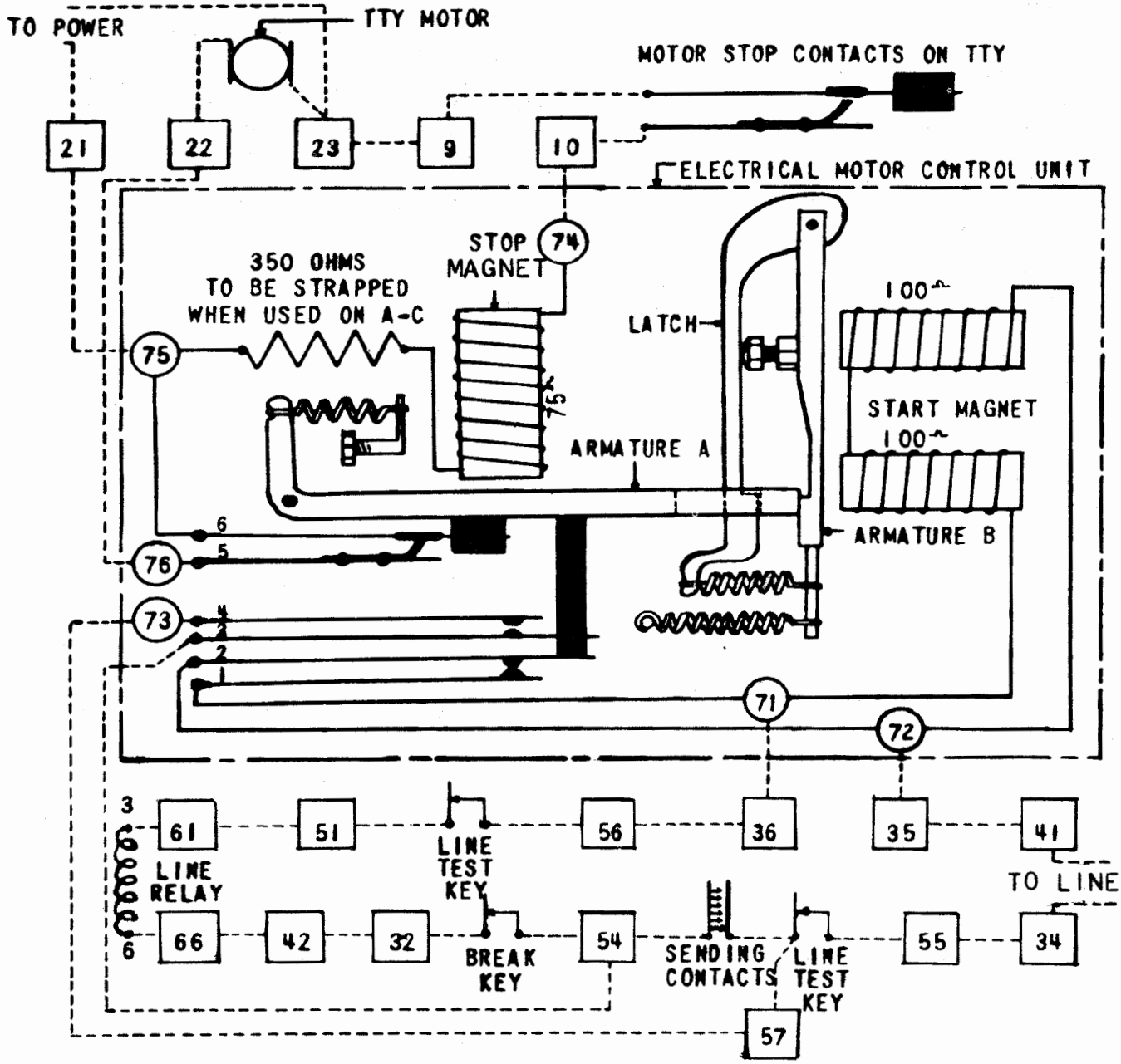
TO POWER
TTY MOTOR
MOTOR STOP CONTACTS ON TTY
21
22
23
9
10
ELECTRICAL MOTOR CONTROL UNIT
350 OHMS
TO BE STRAPPED
WHEN USED ON A-C
STOP
MAGNET
74
LATCH
100~
START MAGNET
100~
75
75
ARMATURE A
ARMATURE B
6
5
76
73
4
3
2
1
71
72
3
61
51
LINE
TEST
KEY
56
36
35
41
TO LINE
LINE
RELAY
6
66
42
32
BREAK
KEY
54
SENDING
CONTACTS
LINE
TEST
KEY
55
34
57

Figure 1

(c) TTY Motor Starts by Opening and Closing of Line

Line Circuit Opens

(1) Start-magnet de-energized.

(2) Armature B releases, causing latch to release armature A.

(3) Armature A held in operated position by notch in armature B.

Line Circuit Closes.

(1) Start-magnet energized by line current.

(2) Armature B pulls up releasing armature A to its unoperated position.

(3) Contacts 5 and 6 close, starting TTY motor.

(4) Contacts 3 and 4 open, removing short from TTY sending contacts.

(5) Contacts 1 and 2 close, shorting start-magnet which then releases.