

American Telephone and Telegraph Company

BELL SYSTEM PRACTICES
Teletypewriter and Manual
Telegraph Systems and PBX
Installation and Maintenance

SECTION P31.907
Issue C, 3-1-52
Long Lines Department
Dist. Class. 400AC-600AC

RECORDING ARRANGEMENTS TO MEASURE
USED OR IDLE TIME ON POLAR OR
NEUTRAL TELETYPEWRITER CIRCUITS

1. GENERAL

1.00 This supersedes Section P31.907, Issue B.
This section is reissued to change requirements
in paragraphs involving installation and main-
tenance. Changed paragraphs are indicated by *.

1.01 This section describes and furnishes informa-
tion on the operation, installation, and main-
tenance of the recording arrangement per B.S.P.
Section P90.956 to measure used or idle time on
polar, or 20 mil or 60 mil neutral, teletypewriter
circuits.

2. DESCRIPTION

2.01 General. In this recording arrangement a
polar relay is connected in series with
the line, and its contacts control two slow release
relays which in turn control the power to a self-
starting electric clock. Optional wiring provides
for recording on a cumulative basis either the
idle or the busy time on the teletypewriter circuit.
Two options for terminating the clock circuits are
available. With one option the clock circuits are
terminated on miscellaneous jacks in the loop
switchboard in which the teletypewriter circuits
are terminated. With the other option the clock
circuits are terminated on jacks in a special jack
field, usually mounted on the same relay rack as
the clocks, and each of the teletypewriter circuits
is looped through a line jack in this same jack
field. In either case patch cords are used to

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connect the clock circuits to the desired teletypewriter circuits. The clocks are provided with a manual reset knob. A switch is provided on the A-C power distribution panel to enable the power to be connected or disconnected from all clocks simultaneously. Provision is made for adding radio frequency induction suppression filters on the polar relay when required. It is not expected that filters will be required on the other relays. The apparatus is normally mounted on 23-inch relay rack panels.

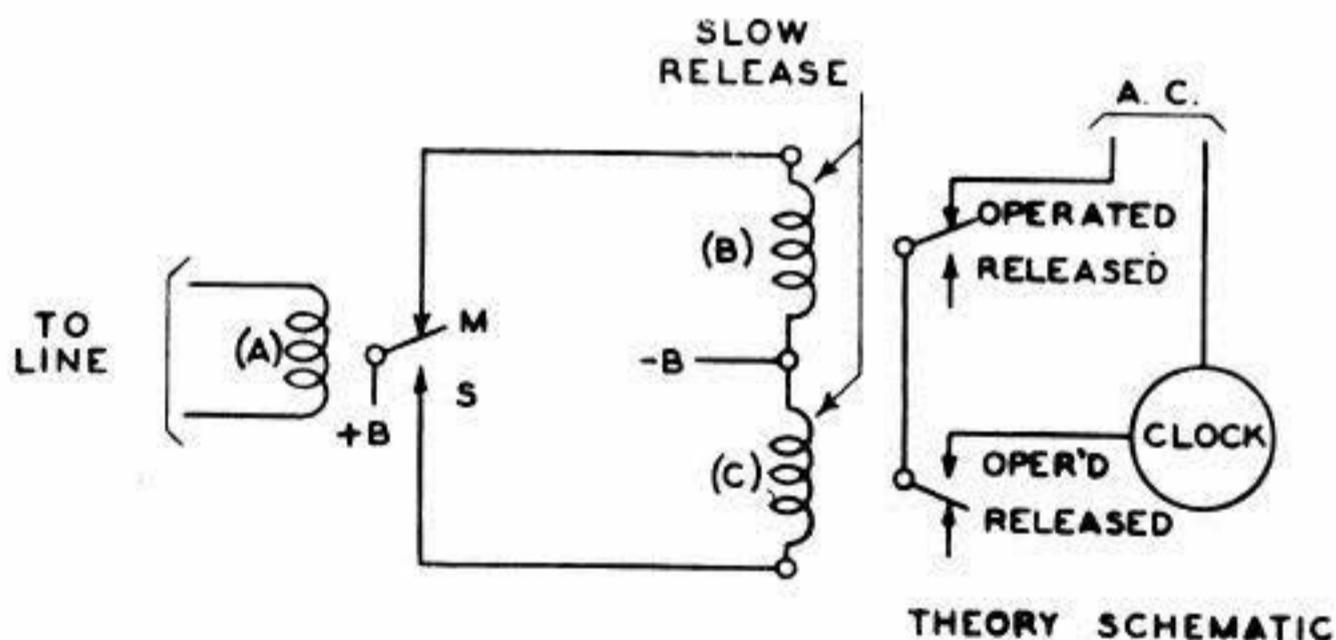
2.02 Drawings. The drawings covering the clock arrangement when the apparatus is to be mounted on 23-inch relay rack panels are as follows:

<u>Subject</u>	<u>Covered by L.L. Dept. Dwg.</u>	<u>Number of BSP Section Re- produced from Dwg.</u>
Circuit Schematic	21260-SD-131	P90.956
Circuit Wiring	21260-T-105	P90.957
Equipment Assembly and Mounting	21260-ED-106	None

For special cases where the PLS Order calls for mounting 4 clocks on a 19-inch panel, L.L. Dept. Drawing S-9560-142 is available showing the special mounting panel required for the clocks and the necessary changes in wiring.

2.03 Circuit Description. Section P90.956 shows the armature of the A relay on Contact No. 2 as would be the case when the A relay is connected in series with either a polar or neutral telegraph loop in the marking condition. When the telegraph loop is in the spacing condition the armature of relay A will move to its No. 3 contact under the influence of the biasing spring on this relay, in the case of neutral circuits, or under the influence of reversal of current in the case of polar circuits. Thus the Armature 5 of Relay A will follow teletypewriter signals in the loop. When the armature of Relay A is on its marking or No. 2 contact, it closes a d-c circuit through the winding of Relay B causing Relay B to operate. Similarly, when the armature of Relay

A is on its spacing or No. 3 contact, it closes a d-c circuit through the winding of Relay C causing Relay C to operate. Relays B and C are of the slow release type and both will remain operated when Relay A is following teletypewriter signals. Assuming "X wiring" is used (so as to measure "used" time), the operation of Relays B and C closes the a-c power circuit to the electric clock so that the clock, which is of the self-starting synchronous type, will run while Relay A is following teletypewriter signals. When a long spacing signal is received, the armature of Relay A remains on its spacing or No. 3 Contact and Relay B will release, opening the power circuit to the clock. In case the loop should be idle and closed, the armature of Relay A remains on its No. 2 Contact and Relay C will release, likewise opening the a-c circuit to the electric clock. With "Y wiring" the electric clock will record only the idle or unused time of the circuit. With "Y wiring" the a-c circuit to the electric clock is opened at Relay B when long spacing signals are received or is opened at Relay C during the reception of teletypewriter signals. A simplified self-explanatory description of the circuit arranged with X wiring so as to measure "used" time, is shown in Figure 1.



LINE	RELAY A	RELAY B	RELAY C	CLOCK
STEADY MARK	M	OPERATED	RELEASED	STOPPED
STEADY SPACE	S	RELEASED	OPERATED	STOPPED
SIGNALS	M AND S	OPERATED	OPERATED	RUNS

FIG. 1

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3. OPERATION

3.01 Patch cords are used to connect the clocks to the teletypewriter circuits. This patching may be done at the regular loop board or at the special jack field provided for the purpose on the relay rack on which the clock equipment is mounted, depending on which method of terminating the clocks has been provided.

3.02 To measure the used time on any circuit an idle clock (with X-wiring) is selected and its hands reset to 12 o'clock by means of the knob on the front of the dial. The jack corresponding to the clock should bear the same number in its designation strip as is stenciled on the clock panel above the clock. One plug of a patch cord is inserted in the clock jack and the other plug is inserted in the jack corresponding to the line on which measurements are to be made. In making these connections the patch is always made to the clock jack first and removed from the clock jack last in order to avoid the introduction of hits on the working circuit.

3.03 Power for the clock motors may be connected to or disconnected from all clocks simultaneously by means of a switch on the a-c distribution panel.

4. INSTALLATION

*4.01 Equipment. The drawings available are listed in Part 2. Those drawings provide only the basic information required for making an installation. Detailed engineering must be provided for each specific job.

4.02 The equipment assembly is designed for the provision of the clocks in units of six, the associated relay circuits in units of six, the d-c resistance panel to supply d-c power to 24 relay circuits and two sizes of a-c power supply units, one to supply up to 36 clocks and one to supply up to 72 clocks. Where a direct current supply is not available a KS-5928 rectifier is used to supply d-c

power for up to 36 relay circuits. For small installations not exceeding 6 relay circuits a KS-5579 rectifier may be used.

4.03 The various units are arranged for mounting on standard relay rack framework or in suitable cabinets. Cabinets, however, are to be provided only when specified on the PLS Order. A typical installation of equipment for 12 recording clocks is shown on Drawing 21260-ED-106. The apparatus is normally mounted on 23-inch mounting plates. However, to meet a special requirement, Drawing S-9560-142 has been prepared covering the mounting of 4 clocks on a 19-inch panel but this arrangement is for use only when specified on the PLS Order.

4.04 The ordering information for the apparatus is shown on the ED drawing.

5. MAINTENANCE

5.01 The relays in the clock circuit shall be maintained in accordance with standard instructions and shall be adjusted in accordance with the circuit requirement table shown on B.S.P. Section P90.956.

*5.02 It is expected that the clocks will operate for long periods with very little or no trouble. No attempt shall be made to repair a clock in the field. In case a clock develops trouble it shall be replaced with a new or a repaired clock. Spare clocks for replacement purposes shall be held at strategic locations in the same manner as other types of maintenance spare equipment. The damaged or defective clock shall be returned to the supply point from which the replacing clock is being obtained. The supply points shall return damaged or defective clocks to the manufacturer, via the Western Electric Co., for repair. The manufacturer's address is:

Hayden Manufacturing Company, Inc.,
Forestville, Connecticut

The clock used in this recording arrangement is coded "No. 1814 Haydon clock for 24-volt 60-cycle a-c operation."

5.03 When a KS 5928 or a KS 5579 Rectifier is used, its d-c voltage shall be adjusted to approximately 120 volts, measured at one of the 91102 D. & W. fuse cutouts, with the (A) relays of all clock circuits in the spacing condition, as will be the case when none of the clock circuits is connected to any line.