

PORTABLE 500-LINE TRAFFICORDER



Technical
bulletin **840-349**

AUTOMATIC ELECTRIC

Subsidiary of

GENERAL TELEPHONE & ELECTRONICS





Factory, development laboratories, and general office at Northlake, Illinois, U.S.A.

AUTOMATIC ELECTRIC COMPANY is an organization of designing, engineering, and manufacturing specialists in the fields of communication, electrical control, and allied arts. For more than sixty years the company has been known throughout the world as the originator and parent manufacturer of the Strowger Automatic Telephone System. Today Strowger-type equipment serves over 75% of the world's automatic telephones. The same experience and technique that have grown out of the work of Automatic Electric engineers in the field of telephone communication are also being successfully applied on an ever-increasing scale to the solution of electrical control problems in business and industry.

PRINCIPAL PRODUCTS

Strowger Automatic Telephone Systems—Complete automatic central-office equipment for exchange areas of any size, from small towns to the largest metropolitan networks.

Community Automatic Exchanges—Unattended automatic units for small rural or suburban areas, with facilities for switching into attended exchanges.

Automatic Toll Boards—An adaptation of Strowger principles to toll switching, resulting in simplification of operators' equipment and greater economy of operating and toll-circuit time.

Private Automatic Exchanges—Available in various capacities, with or without central-office

connections, and with facilities for special control services to meet the needs of the user.

P.B.X. Switchboards—A complete range of cordless and cord types for the modern business.

Telephone Instruments—Modern designs for automatic or manual exchanges, including the Monophone—the world's most attractive and efficient handset telephone.

Exchange Accessory Equipment—Auxiliary exchange and substation equipment, including manual desks, testing apparatus, transmission equipment, and all accessories needed for the operation and maintenance of the modern telephone exchange.

Makers also of electrical control apparatus for industrial, engineering, and public utility companies, telephone apparatus for railroads and pipe-line companies, private telephone systems of all types, electrical and communication devices for aircraft and airways control, and special communication apparatus for military and naval departments.

PORTABLE 500-LINE TRAFFICORDER

1. INTRODUCTION

The Portable 500-Line Trafficorder is an automatic, self-contained electromechanical traffic recording device designed for obtaining accurate switch count data to determine the efficiency and adequacy of existing equipment in a telephone central office. The Trafficorder is illustrated in figures 1 through 3.

A battery cable and an a-c power cord for connection to external sources of power are furnished with the Trafficorder. Connections to the Trafficorder are easily and quickly made.

1.1 Features

The following features are provided in the Portable 500-Line Trafficorder:

- a. Start and stop control of the Trafficorder may be manual or automatic.
- b. All trunks in 20 groups of 25 trunks each are scanned every 10 seconds and registered on trunk-group peg count meters, indicating the total traffic flow in "unit calls" with an accuracy of one-tenth of a unit call.

A "unit call" is defined as a single conversation lasting 100 seconds. As a practical measurement unit for the traffic load of the observed switchtrains, the number of unit calls is equivalent to the accumulated number of seconds each and every switchtrain is held, divided by 100.

- c. A count of the number of scans made is registered on the TEST CYCLES peg count meter.
- d. A white supervisory lamp indicates when count is in progress and when motor is running. A red supervisory lamp indicates count is finished if the one-hour automatic timing feature has been employed.
- e. The simplicity of operation of the Trafficorder allows telephone employees with a minimum of training to make traffic observations, and requires a minimum hook-up time by using double plug terminated access cords and rack-mounted terminal unit.
- f. Two-position switch sets Trafficorder for one hour, or for continuous recording, as desired.

2. DESCRIPTION

2.1 Housing

The Trafficorder (figure 1) is housed in a portable, all metal cabinet with standard gray baked enamel finish. The cabinet measures 16-1/2" deep at its base, 21-1/2" wide and 15-7/8" high. The cabinet is provided with a removable cover for easy accessibility, handles at both ends to facilitate movement, and a sloping control panel for ease of observation. The unit weighs approximately 100 pounds.

2.2 Components

The cabinet contains a chassis on which are mounted a synchronous (constant speed) motor with reducing gears, two-level rotary switches, two 10-level rotary switches, 21 peg count meters, relays, and related components and wiring.

A terminal panel at the rear of the cabinet has 500 terminals for connections to the C terminals of the trunks to be checked. The terminals on the terminal panel may be screw-type (figure 2) or plug-type (figure 3), depending on the customer's specification upon ordering. The connector receptacles for connecting to exchange battery and commercial power are also located on the terminal panel.

2.3 Front Panel

The front panel of the Trafficorder contains the 21 peg count meters, control switches, fuse holder, and supervisory lamps. Panel designations and operation are as follows:

- a. MOTOR SW switch opens and closes the a-c circuit to the synchronous motor. Operating the switch closes the circuit to start the motor in operation.
- b. CONT/1 HR test selector switch (double-throw toggle) determines whether the test will run for one hour and stop (1 HR position) or run continuously (CONT position) until the switch is returned to its normal (off) position.
- c. MOTOR FUSE holder contains a .5-ampere fuse which provides protection to the synchronous motor.
- d. CHECK supervisory lamp (white) will flash when motor is running but count is not in

progress (before and after count); lamp will glow while count is in progress. The CHECK lamp glows for the first 8-2/3 seconds of every 10-second cycle, then flashes 4 times toward the end of the cycle.

- e. FINISHED supervisory lamp (red) will light when one-hour automatic count is completed and continue to glow until the CONT/1 HR test selector switch is returned to its normal (off) position.
- f. TEST CYCLES peg count meter registers the number of 10-second scanning periods completed.
- g. Trunk-group peg count meters register the total traffic in "unit calls". A maximum of 500 lines may be observed through use of 20 trunk-group peg count meters of 25 lines per group. The Trafficorder counts, every ten seconds, the number of busy switches in each group and accumulates these counts on the peg count meters. Each peg count meter's right-hand number-wheel (white) registers tenths of unit calls (number of 10-second uses of a switch) and the other number-wheels (black) read directly in unit calls (number of 100-second uses of a switch).

2.4 Accessories

An a-c power cord and a battery cable are furnished with each Trafficorder. In addition, twenty 25-conductor cords for making terminal connections are supplied with each Trafficorder having a plug-type terminal panel. If the Trafficorder having screw-type terminals is going to be used with a rack-mounted terminal unit, a plug and cord assembly may be furnished with spade terminals on the Trafficorder end and a plug on the other end for plugging into the rack-mounted terminal unit. This arrangement is available on special order only.

The 20-foot power cord for the synchronous motor is terminated to fit the Trafficorder power plug and a commercial 120 volts 60 cycle a-c outlet.

The 20-foot battery cable is terminated to fit a 48-volt d-c battery supply jack circuit and the battery jack at the rear of the Trafficorder.

The 20 trunk-access cords furnished with the Trafficorder are 5-feet long with plugs on each end for plugging into the rack-mounted terminal unit and terminal panel of the Trafficorder.

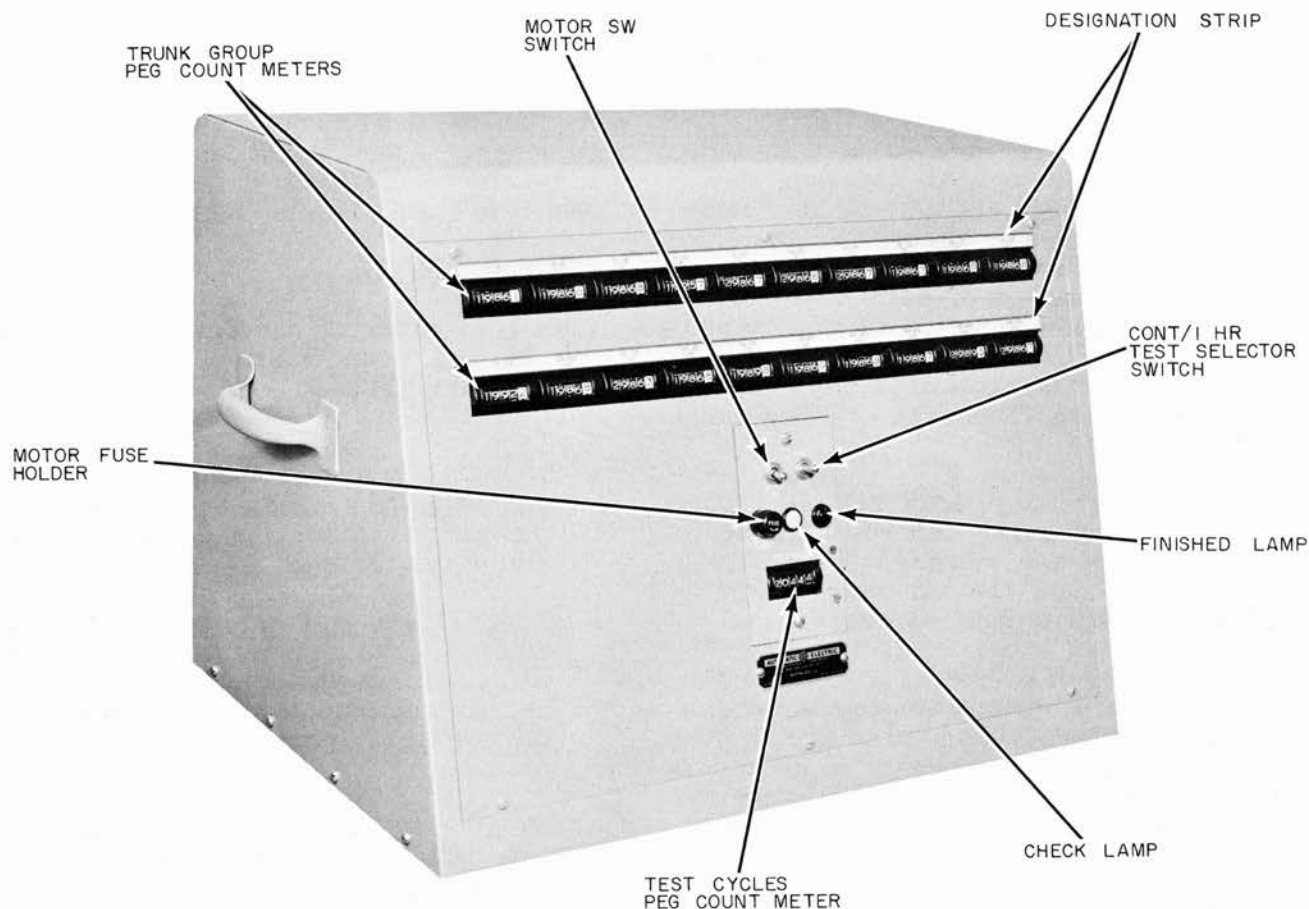


Figure 1. Portable 500-Line Trafficorder.

3. CONNECTIONS

3.1 Power Connections

The power requirements of the Trafficorder are satisfied by connection of a battery cable and an a-c power cord. Connect the battery cable furnished to the upper receptacle on the right-hand side of the terminal panel at the rear of the Trafficorder; connect the opposite end to the exchange battery supply jack circuit (48 volts d-c). Connect the a-c cord to the lower receptacle on the right-side of the Trafficorder terminal panel; connect the opposite end to the 120-volt, 60 cycle a-c outlet. The Trafficorder is now ready to be attached to the equipment to be checked.

3.2 Equipment Connections

If the Trafficorder has screw-type terminals, use regular jumper wire to connect a given terminal on the terminal panel to terminal C of a given trunk circuit. A horizontal row of 25 terminals is available for each group of switches to be observed. If the groups have fewer switches, make only as many connections as needed, leaving the remaining terminals unused. If a group has more than 25 switches, use two rows of terminals and add together the meter readings for both rows to arrive at the total number of unit calls for the group. Be certain to keep jumpers from a designated group together in a given row so that the meters will record the intended group.

If the Trafficorder has plug-type terminals, use the 25-conductor cords furnished with the unit. One end attaches to the Trafficorder terminal panel and the other end to a rack-mounted terminal unit on which the trunk C leads are terminated.

4. OPERATION

4.1 Preparation

Before beginning an observation period, the readings of the peg count meters must be noted as these are not set back to zero after each use. A suggested form for recording the readings and making the computations is shown in figure 4.

4.2 Starting

With the CONT/1 HR test selector switch in the center (off) position, place the MOTOR SW switch in the MOTOR SW position. The white CHECK lamp will flash, indicating the motor is running but count has not yet started.

4.3 One-hour Observation

When the observation is to begin, place the

CONT/1 HR test selector switch in the 1 HR position. After a moment, scanning begins and the CHECK lamp will stop flashing and glow steadily, indicating counting is in progress. The lamp glows for the first 8-2/3 seconds of every 10-second cycle, then flashes 4 times toward the end of that cycle. The Trafficorder will automatically stop the scanning at the end of one hour and the red FINISHED lamp will light. Restoration of the CONT/1 HR test selector switch to its normal position will extinguish the red FINISHED lamp.

Restore the MOTOR SW switch to its normal position. If the CHECK lamp remains lighted after the switch is returned to its normal position, operate the switch momentarily and restore it again.

Enter the meter readings on the record form immediately. The peg count meters read in 100-second unit calls and in tenths of a unit call; the tenths are shown on the white number-wheel of each meter.

4.4 Continuous Observation

When ready to begin an observation period other than one full hour, place the CONT/1 HR test selector switch in the CONT position. Trafficorder action will be the same as explained in paragraph 4.3 except that it will be necessary to manually stop the Trafficorder at the end of the desired observation period. This is accomplished by restoring the CONT/1 HR test selector switch to its normal (off) position while the CHECK lamp is flashing. This insures full count for the last registered cycle of the interval. Restore the MOTOR SW and enter the peg count meter readings as previously explained in paragraph 4.3.

5. CIRCUIT OPERATION

5.1 Timing Sources

When the MOTOR SW switch and the CONT/1 HR test selector switch are operated, the timing and counting mechanism start. Two motor-driven cams generate timing pulses. One cam has three lugs and is rotated directly by the 60-rpm synchronous motor. It thus generates 180 ppm (pulses per minute). The other cam has one lug. Through a worm gear arrangement with a 10:1 ratio, the 60-rpm output of the motor is reduced to revolve this one-lug cam only 6 rpm. We thus have a source for regularly timed pulses, one of 180 ppm and another of 6 ppm, or a pulse every 1/3-second and every 10 seconds, respectively. As a safeguard against the Trafficorder being started in the midst of pulses or of a ten-second scanning cycle, certain relays are interlocked through pick-up relays which insure accurate timing and count.

5.2 Scanning

The 1/3-second pulses step two 10-level rotary switches which scan the bank contacts upon which are terminated the terminal-board screw-type (or plug-type) terminals to which have been extended the control or sleeve leads of the telephone switches being observed. Current from a busy trunk momentarily flows through the bank contact to which it is assigned and then, by way of the wiper, to the peg count meter for its group. While the wipers are scanning the bank contacts, the CHECK lamp glows steadily for the 8-2/3 seconds it takes the 10-level rotary switches to make 26 steps; i.e., 25 steps for contacts leading to trunks and one step to return the switches to their home positions. During the remaining 1-1/3 seconds of a 10-second cycle the CHECK lamp flashes 4 times while the relays are preparing for a new scan.

5.3 One-hour Observation

The pulses spaced 10 seconds apart actuate two sets of relays. One set initiates the

scanning cycle by providing the initial grounds for the 1/3-second pulses to step two 10-level rotary switches. It also actuates the TEST CYCLES register. The other set of relays operates only when the CONT/1 HR test selector switch is in the 1 HR position. This set of relays then provides circuits for two 2-level rotary switches which stop the scanning after one hour. One 2-level rotary switch completes 24 steps every 4 minutes, and then steps the other 2-level rotary switch one step. This second 2-level rotary switch completes 15 steps in one hour, and then operates a relay which stops all scanning, homes the rotary switches, and lights the FINISHED lamp. The TEST CYCLES peg count meter will show a reading 36.0 (360 ten-second cycles or 36 hundred-second cycles) higher than the reading at the start.

6. LUBRICATION AND MAINTENANCE

6.1 Type 45 Rotary Switches

Automatic Electric Type 45 rotary switches should be lubricated at 50,000, 100,000, and

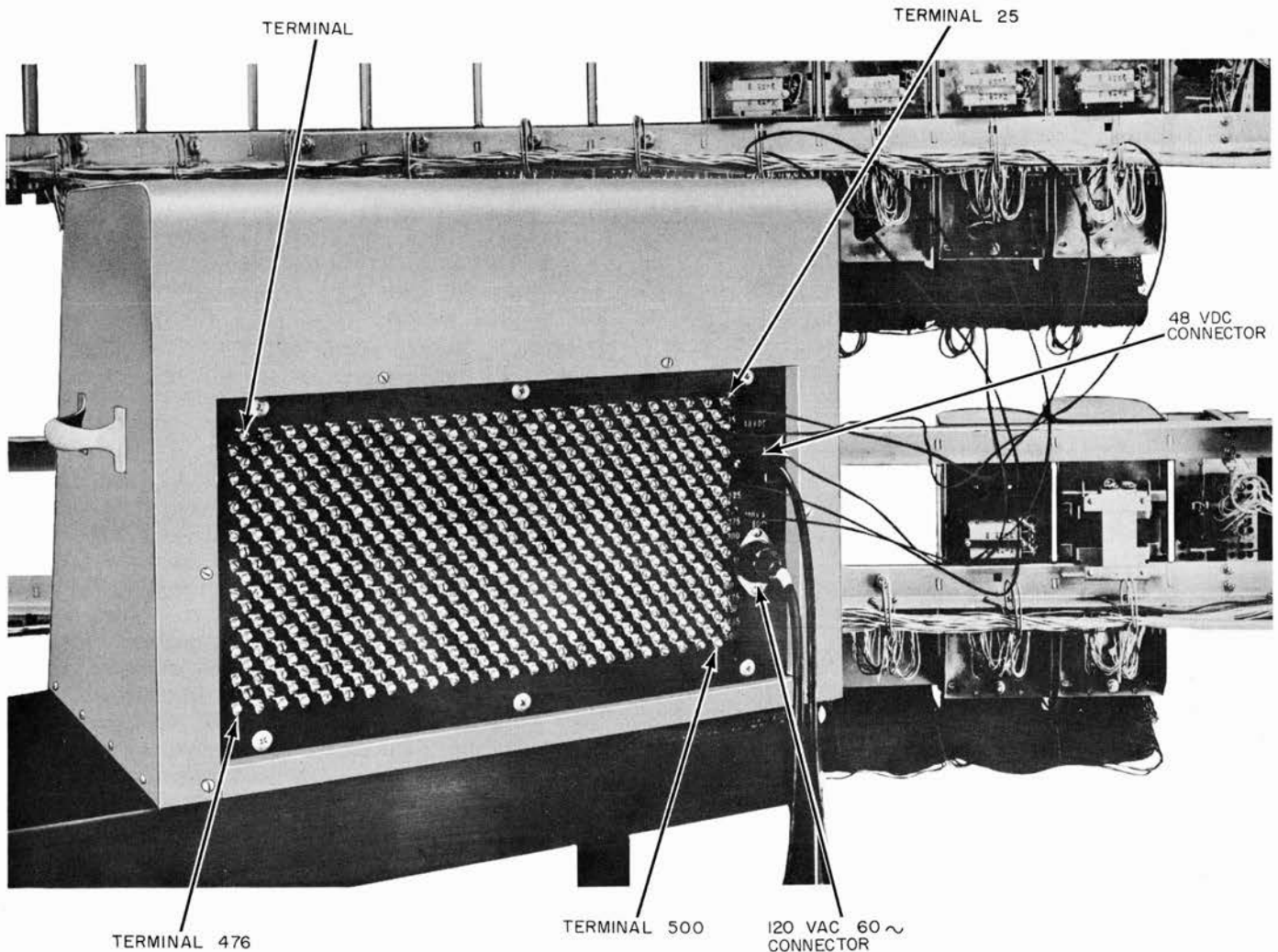


Figure 2. Rear view of Trafficorder showing terminal panel with screw-type terminals.

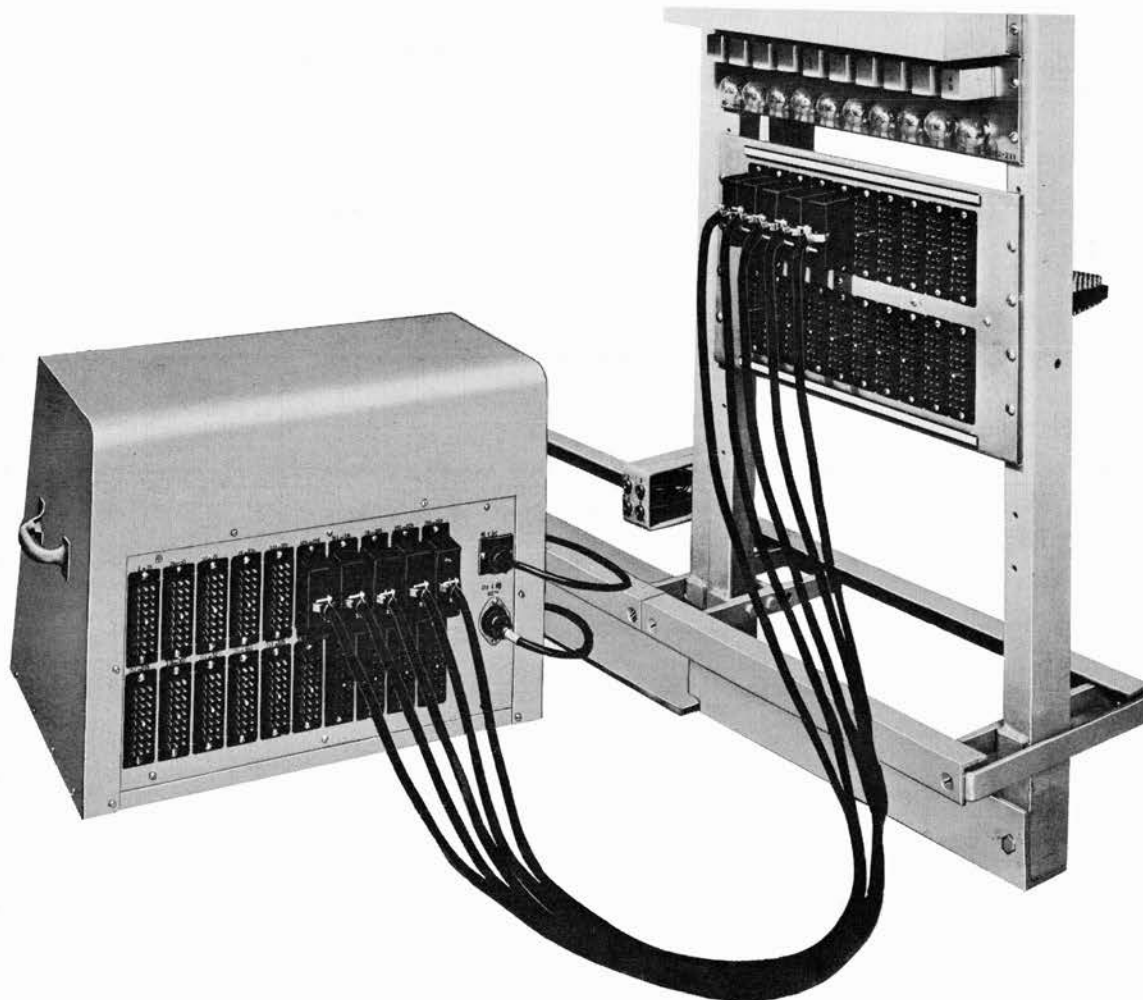


Figure 3. Rear view of Trafficorder showing terminal panel with plug-type terminals and associated rack-mounted terminal unit.

250,000 half-revolutions and after every 500,000 half-revolutions thereafter. Complete lubrication data is contained in Technical Bulletin 505. Additional adjustment and maintenance data is contained in Technical Bulletin 961-473 which also includes lubrication data for Type 45 rotary switches.

6.2 Synchronous Motor

The motor bearings should be lubricated once every 4 to 6 months. Ten drops of LO-17 oil should be applied to each of the oil holes.

One drop of LO-17 should be applied to each "secondary shaft" bearing. NOTE: Lubricant LO-17 may be obtained from Bodine Electric Co., 2254 W. Ohio Street, Chicago, Illinois, or may be purchased as Stanoil #35 from the Standard Oil Co. of Indiana.

One dip of lubricant Spec. #5232 Grade C should be distributed evenly over the worm gear. NOTE: A dip is the amount of lubricant adhering to a #4 Artist's Sable Rigger brush

when the brush has been dipped approximately 3/8" into the lubricant and scraped on the side of the container to remove the excess lubricant. There should not be enough lubricant remaining in the brush to form a drop.

6.3 Type 57 Relays

Field readjustment of the Type 57 twin-contact relays used in the Trafficorder will rarely be required; however, if it becomes necessary to readjust any relay, refer to Technical Bulletin 538 which contains detailed information on inspection and adjustment of Type 57 relays.

7. ORDERING INFORMATION

There are two versions of the portable Trafficorder - one version has a terminal panel with 500 screw-type terminals. The stock number of this version is H-881349-1. The other version has plug-type terminals, and is ordered as H-882580-1. A rack-mounted terminal unit with plug-type connectors is available as stock number H-883570-1.

Local Telephone Company

Time: 9:30 to 10:30 a.m.

Date: November 2, 1954

Weather: 37° F, overcast

Remarks: Busy hour test

Test cycles

Day of week: Tuesday

Event (if any): Election day

Reading at finish 19121

Reading at start 18761

No. of cycles 360

Group number	1	2	3		20
Group identity	Conn. 200 krf.	Conn. 300 krf.	Conn. 400 krf.		1st Sel. Bay 3
Switches per group	9	10	10		25
Reading at finish	2295.5	5563.8	3645.3		7718.7
Reading at start	2154.5	5396.1	3512.1		7610.4
Unit calls	141.0	167.7	133.2		108.3

Figure 4. Typical data sheet.

Printed in U.S.A. by American Printers & Lithographers.

TCI Library www.telephonecollectors.info

AUTOMATIC ELECTRIC



Subsidiary of

GENERAL TELEPHONE & ELECTRONICS

Makers of Telephone, Signaling, and Communication Apparatus . . . Electrical Engineers, Designers, and Consultants

Factory and General Offices: Northlake, Illinois, U.S.A.

ASSOCIATED RESEARCH AND MANUFACTURING COMPANIES

Automatic Electric Laboratories, Incorporated - - - - - Northlake, Illinois, U. S. A.
Automatic Electric (Canada) Limited - - - - - Brockville, Ontario, Canada
Automatique Electrique, S.A. - - - - - Antwerp, Belgium
Automatic Electric, S.p.A. - - - - - Milan, Italy

DISTRIBUTOR IN U.S. AND POSSESSIONS

AUTOMATIC ELECTRIC SALES CORPORATION

Northlake, Illinois, U.S.A.
Sales Offices in All Principal Cities

GENERAL EXPORT DISTRIBUTOR

AUTOMATIC ELECTRIC INTERNATIONAL

INCORPORATED
Northlake, Illinois, U.S.A.

REGIONAL DISTRIBUTING COMPANIES

Automatique Electrique, S.A.
Boomgaardstraat—
Antwerp; BELGIUM

Autômatic Electric do Brasil, S.A.
Caixa Postal 9212
São Paulo, BRAZIL

Automatic Electric Sales (Canada) Ltd.
185 Bartley Drive
Toronto 16, Ontario, CANADA

Automatic Electric de Colombia, S.A.
Apartado Aéreo 3968
Bogotá, COLOMBIA

Automatic Electric de Colombia, S.A.
Casilla Postal 1388
Quito, ECUADOR

Automatic Electric International, Inc.
Apartado Postal 313
San Salvador, EL SALVADOR

General Telephone & Electronics
International, Inc.
1103 Central Building
HONG KONG

Automatic Electric, S.p.A.
Via Bernina 12
Milan, ITALY

General Telephone & Electronics
International, S.A. de C.V.
Apartado 20735
México 6, D.F., MEXICO

Cia. General de Telefonía y Electrónica, S.A.
Apartado 1896
Panamá, REPUBLICA DE PANAMA

General Telephone & Electronics
International, Inc.
P.O. Box 12251
Santurce, PUERTO RICO

Automatic Electric International, Inc.
40, Rue du Rhone
Geneva, SWITZERLAND

Automatic Electric International, Inc.
730 Third Avenue
New York 17, New York, U.S.A.

Automatic Electric de Venezuela, C.A.
Apartado 9361
Caracas, VENEZUELA

Sales Representatives and Agents Throughout the World

Portable 500-Line Trafficorder 840-349
ISSUE 3