A. T. & T. Co.'s
Specifications 4797

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TELEPHONE TYPEWRITER STATIONS

No. 12 TYPE PAGE PRINTER

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TELEPHONE TYPEWRITER STATIONS

No. 12 TYPE PAGE PRINTER

SCOPE

These specifications cover the standard apparatus and materials to be used at telephone typewriter stations employing the No. 12 type printer, the standard telephone typewriter station wiring plans and the methods of installing these plans. Methods for testing these stations after installation are also included. The methods of installing protection are covered in specifications for Substation and Private Branch Exchange Protector Installation and shall be followed except as hereinafter specified.

GENERAL

Installations of printer equipment at telephone typewriter stations may be divided into two general classes: installations having only a single machine and those having two machines, a regular and a spare set. In the case of the latter, the machines will usually be operated in a circuit appearing at the station as a loop. If the circuit is operated to ground locally, it shall be carried back to the central office for connection to the central office ground unless otherwise specified. Where a single machine is installed or in special cases with two-machine installations, the circuit may be grounded at the customer's office.

APPARATUS AND MATERIALS

PRINTER APPARATUS

For units or sets employing a motor, the type of motor desired should be specified in the order. Either 110 volts d-c. or 110 volts 50 cycle or 60 cycle a-c. motors are available. In the designations which follow, the letter "B" indicates that the apparatus is provided with a control relay for starting and stopping the set. The letter "L" indicates apparatus for low speed operation and the letter "H" for high speed. The speed of operation of the sets or any distributor unit ordered separately should be specified in the order so that the proper units equipped with suitable targets will be supplied. A table showing the standard speeds is given in the field maintenance handbook covering No. 12 type sets and in Section III-B of Printing Telegraph Practices. **The No. 215-A line relay is not part of the set and should be ordered separately.**

PRINTER SETS

The following underlined headings are the ordering designations for the various sets available.

No. 12-A Receiving and Direct Sending Printing Telegraph

Set with	Motor for	Operations per Minute
Consisting of	No. 12-A Printer Unit	
	No. 12-AL (or 12-AH) Keyboard Distributor	
	No. 12-A Printer Base	
	No. 12-A Printer Stand	
	No. 12-S Printer Cover	
	(No. 215-A Relay to be ordered separately)	

This designation covers equipment for a station arranged for receiving and for sending by direct keyboard. Control relay equipment is not provided.

Where 110 volt d-c. power supply is not available, order power equipment as outlined under "Power Supply for Printer Set."

No. 12-B Receiving and Direct Sending Printing Telegraph Set with Motor for Operations per Minute

Consisting of No. 12-A Printer Unit
No. 12-AL (or No. 12-AH) Keyboard Distributor
No. 12-B Printer Base
No. 12-A Printer Stand
No. 12-S Printer Cover
(No. 215-A Relay to be ordered separately)

Where 110 volt d-c. power supply is not available, order power equipment as outlined under "Power Supply for Printer Set."

This set is identical with the one above, except that the No. 12-B printer base, equipped with control relay and accessories, is provided instead of the No. 12-A printer base.

No. 12-A Receiving Only Printing Telegraph Set with Motor for Operations per Minute

Consisting of No. 12-A Printer Unit
No. 12-AL (or No. 12-AH) Receiving Distributor
No. 12-A Printer Base
No. 12-A Printer Stand
No. 12-S Printer Cover
(No. 215-A Relay to be ordered separately)

Where 110 volt d-c. power supply is not available, order power equipment as outlined under "Power Supply for Printer Set."

This set is for receiving only stations and is identical with the No. 12-A receiving and direct sending set, except that it is equipped with a No. 12-AL or No. 12-AH receiving distributor instead of the No. 12-AL or No. 12-AH keyboard distributor. Control relay equipment is not provided.

No. 12-B Receiving Only Printing Telegraph Set with Motor for Operations per Minute

Consisting of No. 12-A Printer Unit
No. 12-AL (or No. 12-AH) Receiving Distributor
No. 12-B Printer Base
No. 12-A Printer Stand
No. 12-S Printer Cover
(No. 215-A Relay to be ordered separately)

Where 110 volt d-c. power supply is not available, order power equipment as outlined under "Power Supply for Printer Set."

This set is the same as the No. 12-A receiving only set, except that the control arrangements are provided on the printer base.

INDIVIDUAL UNITS OF PRINTER EQUIPMENT

No. 12-A Page Printer Unit with Motor

For this unit the motor must be specified, since motors are available for 110 volts d-c., 110 volts 50 cycles a-c. and 110 volts 60 cycles a-c.

No. 12-AL Keyboard Distributor with Motor for Operations per Minute

This unit is provided with the sending keys and the receiving distributor mechanism, and is intended for speeds up to 263 operations per minute. A suitable target will be provided for the speed specified. The motor must be specified, since motors are available for 110 volts d-c. and 110 volts 50 cycles and 110 volts 60 cycles a-c. The driven gear has 42 teeth.

No. 12-AH Keyboard Distributor with Motor for Operations per Minute

This unit is the same as the one just above, except that it is suitable for speeds above 265 operations per minute. The driven gear has 30 teeth.

No. 12-AL Receiving Distributor with Motor for Operations per Minute

This is the low speed unit for receiving stations only. A filler plate for closing the keyboard opening in the printer cover is provided as a part of this receiving distributor unit. Motors are available for 110 volts d-c. and 110 volts 50 cycles and 60 cycles a-c. The driven gear has 42 teeth.

No. 12-AH Receiving Distributor with Motor for Operations per Minute

This is the high speed unit for receiving stations only, and except for gear ratio is similar to the No. 12-AL unit. The driven gear has 30 teeth.

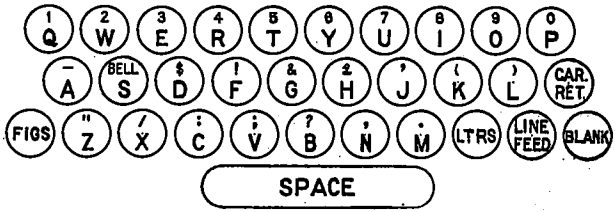


Diagram Showing Standard Keyboard.

Fractions Type

Printer sets or units ordered under the designations given above will be equipped with standard type and key-caps, shown in the diagram above.

Printers equipped with fractions type, as shown in the diagram below, may be ordered by specifying after the standard code designation:

"Equipped with fractions type."

A set of eight types for the letters B, C, F, H, K, L, N and V, which have fractions for upper case instead of punctuation marks, may be ordered as

"Catalog 72718 (M) Set of Fractions Type."

Keyboards equipped with key-caps having designations corresponding to the set of fractions type shown in the diagram below may be ordered by specifying after the approved designation for ordering:

"Equipped with 72703 (M) Set of Fractions Key-tops."

The complete set of key-tops, including those with fractions, may be ordered by specifying:

"Catalog 72703 (M) Set of Fractions Key-tops."

Individual key-tops bearing any standard designation may be ordered from available catalog information.

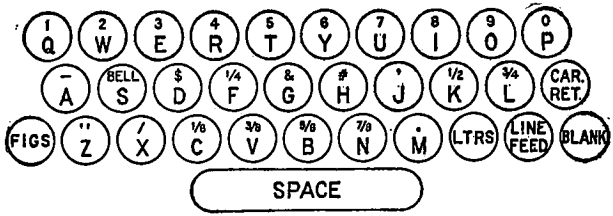


Diagram Showing Fractions Keyboard.

No. 12-A Printer Base

This piece of apparatus mounts the individual units and is intended for stations where the control feature is not required. The printer stand mentioned below is ordinarily bolted to this base to form a table. The base, however, may be provided with rubber feet and used separately on a desk or table in which case space must be provided for the paper feed. The connections required for operation on alternating current or on direct current are shown in the printer wiring plans.

No. 12-B Printer Base

This is identical with the base above, except that the control relay and accessories are provided.

No. 12-A Printer Stand

This is essentially a framework of four steel table legs to support the printer base. These legs are drilled for the brackets used to support the small motor-generator set.

No. 12-A Printer Cover

This is a two-piece cover which encloses the major part of the printer unit and the accessory apparatus. Since the standardization of the No. 12-S cover it is not stocked but is made up on special order. Its use is recommended only where carbon copies must be made and where the noise of the printer is not a factor. The copy holder may be located in either of two positions, one in the center of the cover, and the other somewhat to the right of this position. For receiving only sets, the copy holder is removed and the filler plate (furnished with each receiving distributor) is fastened by screws

to the front of the cover. When the filler plate is used, the bracket holding the "Line-Test" and "Break" keys must be moved back ¾" and remounted in holes provided for this purpose.

No. 12-S Printer Cover

This is a one-piece silencing cover which is recommended for general use. It will be furnished except on orders which specifically call for the No. 12-A cover. The copy holder may be located in either of two positions, one in the center of the cover, and the other somewhat to the right of this position. For receiving only sets, the copy holder is removed and the filler plate (furnished with each receiving distributor) is fastened by screws to the front of the cover. When the filler plate is used, the bracket holding the "Line-Test" and "Break" keys must be moved back ¾" and remounted in holes provided for this purpose.

No. 7113 (M) Control Relay and Accessories

This consists of the control relay assembly, control circuit fuses, spark-killer resistance and condenser, condenser strap and mounting screws. This equipment is intended for use in cases where it is desired to change a No. 12-A set to a No. 12-B set.

No. 71508 (M) 30-Watt Motor-Generator Set with Accessories —50 Cycles

This designation covers the additional equipment required at a station having 50 cycle a-c. power supply and consists of the motor-generator set, brackets, power cable required on the printer set itself, wires and screws. The motor is designed for operation on 110 volts single phase supply. Full load current of generator is 280 milliamperes. The generator is compound wound, developing not less than 105 volts at full load, nor more than 135 volts at full load, cold. Its regulation is such that the voltage under any normal conditions should lie between 105 and 145 volts.

No. 71510 (M) 30-Watt Motor-Generator Set with Accessories —60 Cycles

This is similar to the above, except that the motor-generator set is designed for 60 cycle a-c. supply.

No. 7114 (M) 30-Watt Motor-Generator Set with Accessories —60 Cycles

This is a single-unit two-bearing motor-generator set of approximately the same characteristics as the machines described above. It is no longer obtainable on order, but a number are at present in use in the field.

No. 8651 (M) Clip to Prevent Unshift on Space

This is a small clip which is placed on the comb guide and over the space bar of the No. 12-A printer unit to block the space bar from an upward motion and thus prevent the machine from unshifting on a space signal.

No. 73790 (M)—Set of Parts for Margin Signal Bell.
Printer units now supplied are drilled for mounting this bell.

No. 73393 (M)—Set of Parts for Providing Keyboard Lock.
Parts readily installed in the field for preventing at will accidental sending by depression of the keys while receiving. Normally required only on the longer circuits.

TWO-UNIT FOUR-BEARING MOTOR-GENERATOR SETS WITH FORT WAYNE BOX-TYPE PANEL

Description

The sets consist of two similar units mounted on a common sub-base and direct connected by a flexible insulating coupling. Between the two units and over the inner bearings a panel framework is mounted upon the sides of the sub-base. A field rheostat is mounted on the top of the panel. On the front of the panel is a voltmeter with a suitable cover for protecting the meter from mechanical injury. The meter fluctuations which may be observed when the printer is typing or sending should be neglected as they represent largely overswinging of the voltmeter needle due to rapid variations in voltage caused by the action of the printer. There are three knock-outs in each side of the panel framework near the top, through which the power supply and printer leads may be brought to the fuse blocks located directly back of the removable cover above the meter on the panel.

Voltage and Frequency

The motor-generator sets will operate satisfactorily with a voltage variation of ± 5 per cent. and a frequency variation of ± 2 per cent. for the alternating-current driven sets and with ± 5 per cent.

voltage variation for the direct-current driven sets. These outfits are rated at three amperes normal continuous output and six amperes output for one-half hour. Under the six-ampere load condition the voltage should not drop below 100.

Sets are readily available for use where the power supply is one of the following:

FREQUENCY	PHASE	VOLTAGE
60	1	110/220*
60	2	220
60	3	110
60	3	220
40	1	110/220*
25	3	220
D.C.	—	220

*Each single phase motor is arranged for connection to either 110 or 220 volt circuit.

Sets for use on other commercial power supplies can usually be obtained with somewhat greater delay.

Ordering Information

The motor-generator sets are obtainable from the Western Electric Company by specifying as follows:

1. Where the available power is alternating current:
   "Two-unit, four-bearing motor-generator set with Fort Wayne box-type panel containing voltmeter, field rheostat and fuse blocks. Motor (alternating current) rated ——— volts ———phase ———cycles. Generator 110 volts, 3 amperes, compound wound."
2. Where the available power is 220 volts direct current:
   "Two-unit, four-bearing motor-generator set with Fort Wayne box-type panel containing voltmeter, field rheostat and fuse blocks. Motor (direct current) rated 220 volts. Generator 110 volts, 3 amperes, compound wound. One General Electric Company's Type CR-1003, Catalog No. 2021100-G-9 motor starter with enclosing cabinet for wall mounting."

Rheostat Adjustment

The generator is compound wound and since the starting current of the printer and distributor motors is approximately 7 to 9 amperes while the full load current of the generator is 3 amperes, the generator is considerably overcompounded when the printer motors are started. Under these conditions the voltage of some of the generators rises to such an extent that the voltmeter needle may be damaged

unless proper caution is observed. When starting the set for the first time, or until the generator rheostat setting has been determined, it is essential not to raise the voltage above 85 volts before the load of a printer set has been applied, unless the printer set will not start on this voltage. In such cases try starting up successively on voltages of 90, 95 and 100 volts until the printer set does start. With a printer set running, adjust the generator voltage to 115 volts while the generator is cold. Once the generator voltage has been properly adjusted, little or no rheostat adjustment should be required from day to day and the voltage of the generator running without load may or may not be less than 115 volts, depending entirely on the characteristics of the particular machine. After the voltage has been set in this way it should not be necessary to change the field rheostat adjustment in normal starting or stopping of the unit.

OTHER APPARATUS AND MATERIALS

The names of the standard apparatus and materials required for use with the apparatus covered by these specifications are given below in alphabetical order. These items are listed for the convenience of the field forces in ordering and checking supply of the apparatus and materials required for the work covered by these specifications.

Bracket:

No. 5870 (M) RELAY BRACKET
Used for mounting the No. 215-A relay.
Provided on No. 12-A and No. 12-B printer bases.

No. 71164 (M) RELAY BRACKET
Used for mounting No. 206-AH relay.

Connecting Block:

No. 18-B CONNECTING BLOCK
Used for mounting No. 215-A relay.
Provided on No. 12-A and No. 12-B printer bases.

Cords:

No. 493 CORD
Double conductor white cord used with No. 47-A plug to terminate telegraph sets on 4 loop jack switchboard. Length 2 feet.

No. 637 CORD
Single conductor white cord used with No. 47-B plug on each end as a patching cord on 4 loop jack switchboard.

No. 511 CORD
Single conductor white cord used with No. 116 plug on 4 loop jack switchboard as ground cord. Length 2 feet.

No. 516 CORD
Double conductor red cord used with a No. 47-A plug on each end as a patching cord on 4 loop jack switchboard. Length 2 feet.

LAMP CORD
Tirex SJ Portable Cord, 16 B & S gauge, black finish.

Fuses:

3 AMP. 125 VOLT FUSES (National Electric Code Standard)

6 AMP. 125 VOLT FUSES (National Electric Code Standard)

10 AMP. 125 VOLT FUSES (National Electric Code Standard)

No. 55-A FUSES

Key:

No. 6018-A KEY
For terminating and switching a maximum of two loops and two printers.

Mounting Plates:

No. 629-A MOUNTING PLATE
Used for mounting No. 18 or No. 19 type resistances.

No. 629-B MOUNTING PLATE
Used for mounting No. 18 or No. 19 type resistances.

No. 823-B MOUNTING PLATE
Used for mounting No. 215-A relay. Provided on No. 12-A and No. 12-B printer bases.

Plugs:

No. 47-A PLUG
Used with No. 493 and No. 516 cords. Has red shell.

No. 47-B PLUG
Used with No. 637 cord. Has black shell.

No. 116 PLUG
Used with No. 511 cord. Has red shell.

No. 165 PLUG
Wood plug. Used on 4 loop jack switchboard.

Relay:

No. 206-AH RELAY
A polar relay used with Control Wiring Plans C and F.

No. 215-A RELAY
Used as line relay with No. 12 type printer set. May be used as repeating relay in special installation plans. Not supplied with No. 12-A printer base and should be ordered separately.

Signal Plug:

No. 2-D SIGNAL PLUG
Used with 4 loop jack switchboard.

Switchboards:

4 LOOP JACK SWITCHBOARD
For terminating and switching by means of cords and plugs a maximum of 4 loops and 4 printers. Furnished completely equipped.

Trouble Cap:	**No. 2-A TROUBLE CAP** Used with 4 loop jack switchboard.
Wire:	**No. 22 GA. SINGLE INSIDE WIRE** **No. 22 GA. PAIR INSIDE WIRE** **No. 522-M PRINTER WIRE** Specify color and length. Red, black and red-white are carried in stock.

Key Assembly for Telephone Typewriter Station Switching Coded as No. 6018-A Key

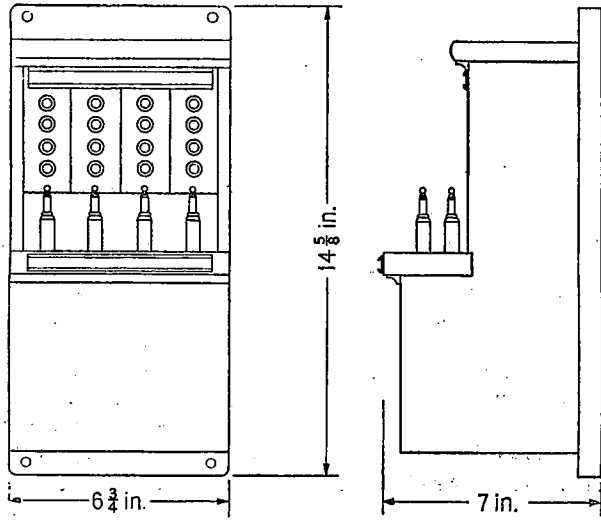
This key assembly is used for terminating and switching a maximum of two loops and two printers. It consists of two completely wired key units mounted in a box which is normally attached to the table or stand at the right of the operator, but which may, if desired, be attached at the left. A terminal strip is located inside the box for making the external connections to the key assembly. Space at the bottom of the box may be used for mounting a third key if necessary. Termination Plan "A" shows the wiring of the key assembly.

The top key is equipped with a black handle and controls switching the No. 1 printer set from the regular to the spare loop, or vice versa. The lower key has a red handle and controls switching the No. 2 printer set to either of the two loops. When the handle of the key is up, the corresponding printer is connected to the regular loop, while when the handle is down the printer is connected to the spare loop. With the key handle in mid-position the printer is disconnected from both loops. The telephone is normally connected to the spare loop unless a printer is connected to it, in which case the connections for the telephone are automatically transferred to the regular loop. If printers are connected to both loops the telephone will be disconnected. To operate both printers in series in a particular loop, the keys for the printers should be thrown to the positions for that loop.

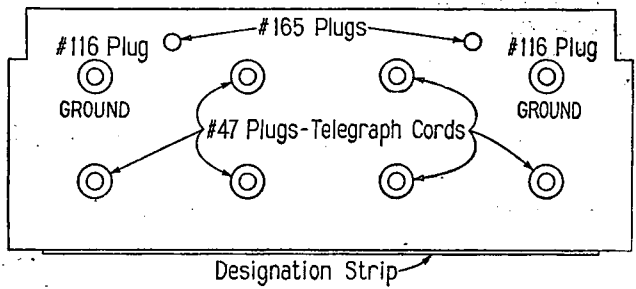
Four Loop Jack Switchboard

This switchboard is used for terminating and switching by means of cords and plugs a maximum of four loops and four printer sets.

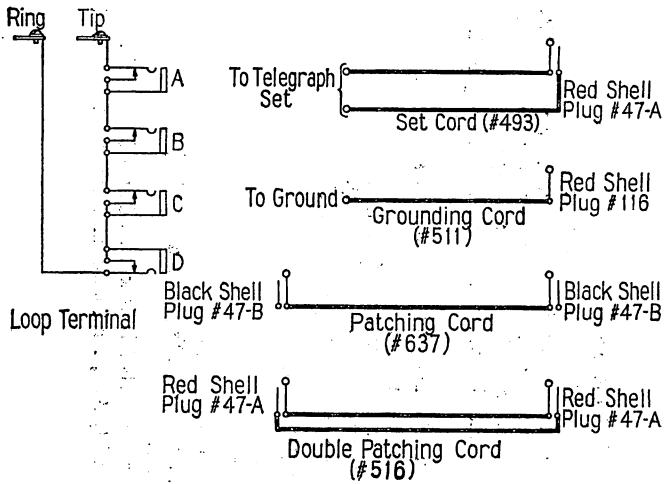
For reference, diagrams of the four-loop jack switchboard are given below, showing the dimensions and general features of the board.



Four Loop Jack Switchboard.



Plug Shelf for Four Loop Jack Switchboard.



Circuits of Four Loop Jack Switchboard.

CIRCUIT DIAGRAMS OF No. 12 TYPE PRINTER SETS

For reference, the circuit diagrams of the No. 12-A and No. 12-B printer sets are given below. These diagrams and the wiring plans show the printer base as furnished after September 1, 1927. For reference, diagrams are also given below showing the wiring of printer bases furnished prior to that date.

Notes on Circuit Diagram of No. 12-A Printer Set

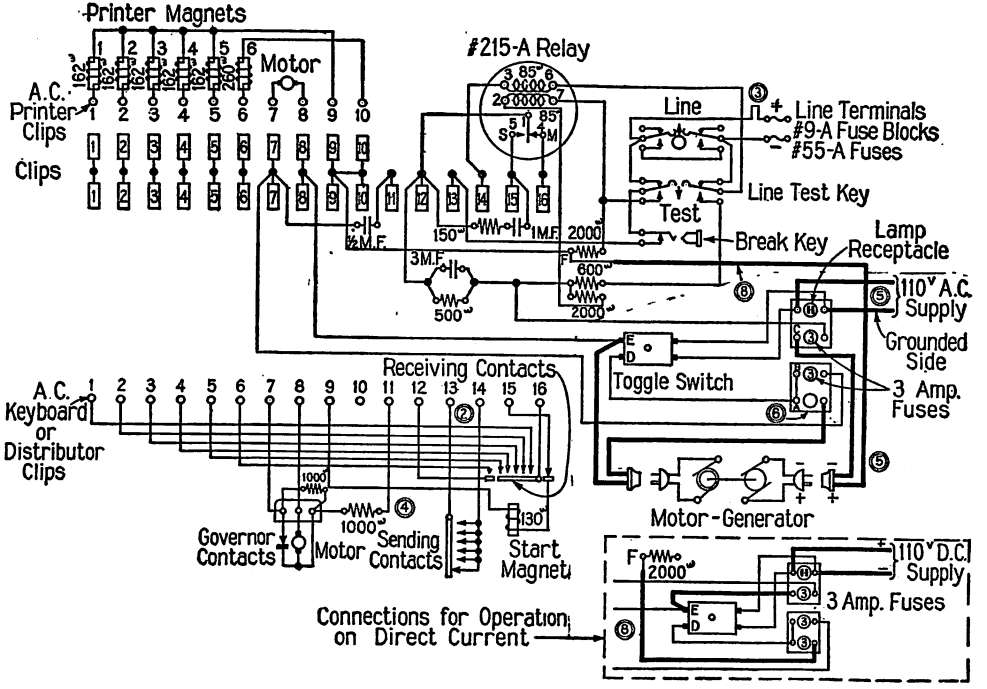
1. Connections shown by heavy lines are to be made by installer.
2. Connections are shown for printer set employing keyboard distributor unit. Connections for set employing receiving distributor are the same as shown, except that the sending contacts are omitted and distributor terminals 13 and 14 are strapped.
3. Loop of wire is provided here for connecting to line resistances when required.
4. Omitted on A.C. units.
5. These connections for A.C. supply. For D.C. see drawing at lower right.
6. Use 6 ampere fuse for 7114 (M) motor-generator.
   Use 10 ampere fuse for 71508 (M) motor-generator (50 cycles).
   Use 10 ampere fuse for 71510 (M) motor-generator (60 cycles).
7. Line relay current values should be approximately as follows:

   LINE TEST KEY IN "LINE" POSITION

   Biasing Current = .029 ampere.
   Line Current to be = .060 ampere.

   LINE TEST KEY IN "TEST" POSITION

   Biasing Current = .012 ampere (with signaling current flowing).
   Signaling Current = .036 ampere.
8. End of wire from F on new bases as supplied is dead-ended near fuse block.
9. Printer bases supplied prior to April 1, 1927, had 1000 ohms instead of 600 ohms in the local test circuit.



Circuit Diagram of No. 12-A Printer Set.

Notes on Circuit Diagram of No. 12-B Printer Set

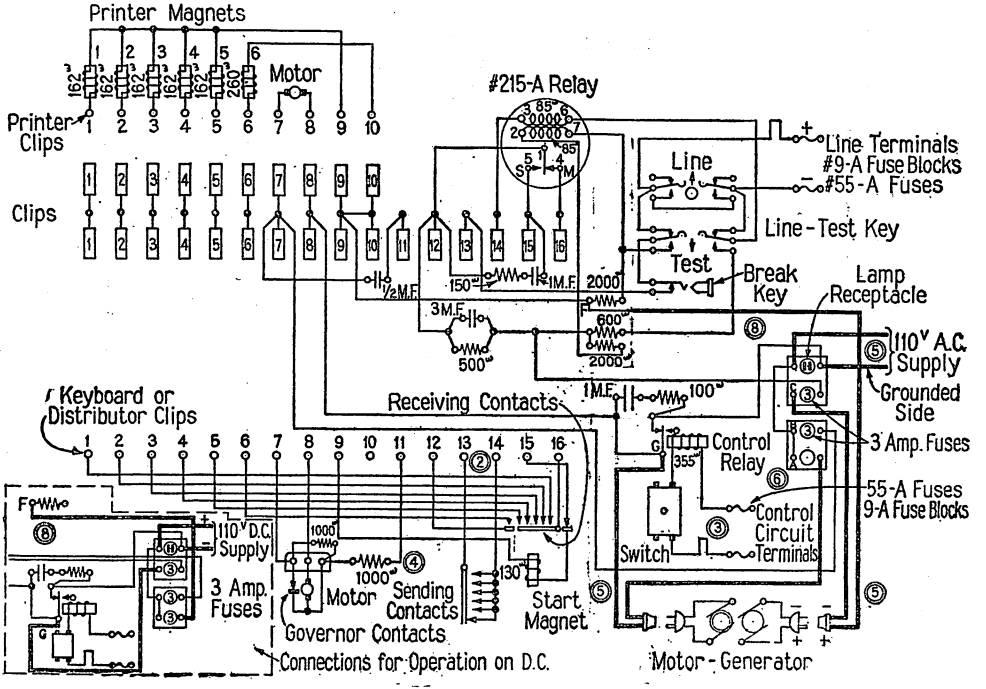
1. Connections shown by heavy lines are to be made by installer.
2. Connections are shown for printer set employing keyboard distributor unit. Connections for set employing receiving distributor are the same as shown, except that the sending contacts are omitted and distributor terminals 13 and 14 are strapped.
3. Loop of wire is provided here for connecting to line resistances when required.
4. Omitted on A. C. units.
5. These connections for A.C. supply. For D.C. see drawing at left.
6. Line relay current values should be approximately as follows:

   LINE TEST KEY IN "LINE" POSITION

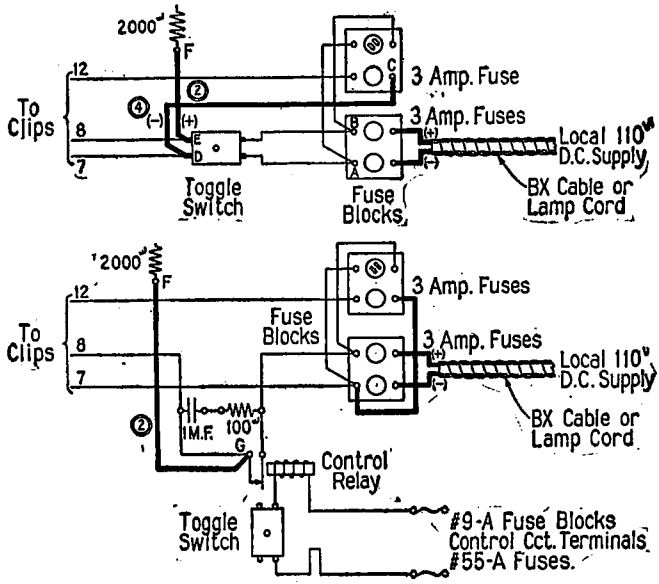
   Biasing Current = .029 ampere.
   Line Current to be = .060 ampere.

   LINE TEST KEY IN "TEST" POSITION

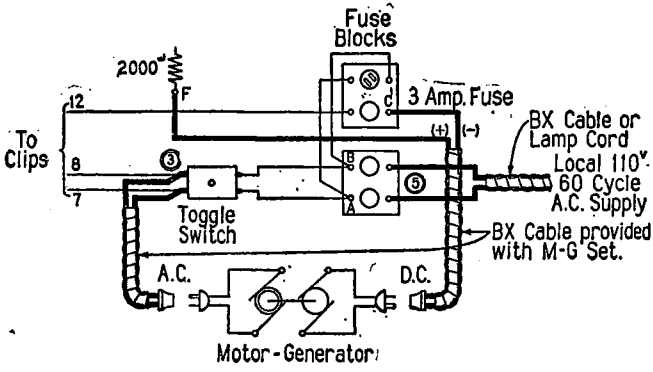
   Biasing Current = .012 ampere (with signaling current flowing).
   Signaling Current = .036 ampere.
7. End of wire from F on new bases as supplied is dead-ended near fuse block.
8. Printer bases supplied prior to April 1, 1927, had 1000 ohms instead of 600 ohms in the local test circuit.

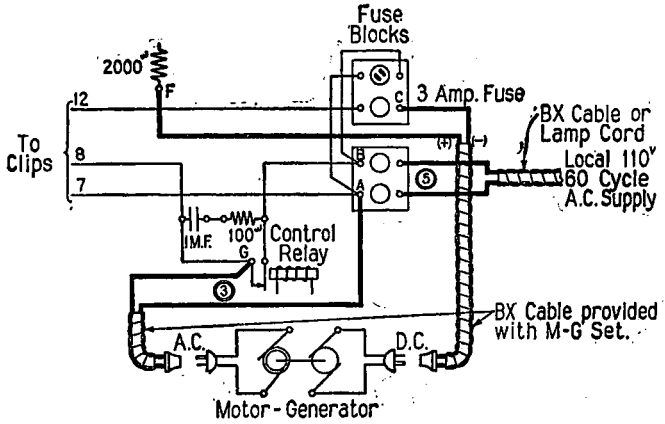


Circuit Diagram of No. 12-B Printer Set.



Power Supply Connections for No. 12 Type Printer Bases Arranged for Direct Current Furnished Prior to September 1, 1927.





Power Supply Connections for No. 12 Type Printer Bases Arranged for Alternating Current Furnished Prior to September 1, 1927.

Notes on Diagrams Showing Power Supply Connections for No. 12 Type Printer Bases Furnished Prior to September 1, 1927

1. Connections shown in heavy lines are to be made by installer.
2. Connecting wire here used may be No. 18 Gauge "Deltabeston" fixture wire or other approved electric light wire.
3. If motor-generator is used to supply line current in addition to its regular printer load and it is desired that the line current be not interrupted when the printer set is shut down, it will be necessary to connect the A.C. leads for the motor-generator to fuse terminals "A" and "B" through a suitable snap switch mounted on the side of the table top for controlling the starting and stopping of the motor-generator.
4. In case it is desired to use this 110-volt D.C. source to supply line current, it may not be possible to connect polarity as shown.
5. Use 6 ampere fuse for 7114 (M) motor-generator.
   Use 10 ampere fuse for 71508 (M) motor-generator (50 cycles).
   Use 10 ampere fuse for 71510 (M) motor-generator (60 cycles).

POWER SUPPLY FOR PRINTER SET

General

The current required for a No. 12 type set when typing is about .6 ampere at 110 volts for a set operating on direct current and about 2.5 amperes at 110 volts for a set operating on alternating current, excluding the small motor-generator. The power current required for the small motor-generator set is about 3.0 amperes at 110 volts. The starting current will be in excess of this figure. In order to avoid interruption to the power supply, the power lead should be fused at the panel box at not less than 5 or 6 amperes for the direct current set and 15 amperes for the alternating current set.

Under the contract for the service, the subscriber provides the power wiring up to the terminals on the printer set. Where the power wiring has to be run and the subscriber refuses to provide it, take up the matter through the regular channels before proceeding with any further work.

The procedure recommended for stations having power supply of the different types commonly met with is outlined below for each case.

1. **110 Volt Direct Current Power Supply**
   Order printer and distributor units equipped with 110 volt direct current motors.
2. **220 Volt Direct Current Power Supply**
   Use potentiometer per Power Plan A and order printer and distributor units equipped with 110 volt direct current motors.
3. **110 Volt 60 Cycle Alternating Current Power Supply**
   Order printer and distributor units equipped with motors for operation on 110 volts 60 cycle alternating current. Also order No. 71510 (M) 30 watt motor-generator with accessories (60 cycles), to provide direct current for operating the printer magnets.
4. **110 Volt 50 Cycle Alternating Current Power Supply**
   Order printer and distributor units equipped with motors for operation on 110 volts 50 cycle alternating current. Also order No. 71508 (M) 30 watt motor-generator with accessories (50 cycles), to provide direct current for operating the printer magnets.

5. **110 or 220 Volt Alternating Current Power Supply of Frequencies Not Listed Above**

Order printer and distributor units equipped with 110 volt direct current motors. Order Two-unit Four-bearing Motor-Generator Set with Fort Wayne Box-Type Panel for operation on power supply involved.

Selection of Power Supply

(Do not connect to power supply the voltage of which is subject to fluctuations because of elevator load or heavy motor load.) Where the voltage at the outlet box nearest the printer is subject to fluctuations for these reasons, a special lead shall be run for the printer from the main panel box in the building.

Wiring Between Outlet Box and Printer

Where a single set is to be installed the installer may run lamp cord of an approved type between the printer set and the nearest suitable outlet box or baseboard receptacle, provided the distance involved is less than 15 feet. On all installations of two or more printer sets, or with single sets where a run of more than 15 feet is required, BX or other approved metal conduit shall be used for the power leads and the connection to the power supply shall be permanent.

All work shall be done in accordance with all local rules and regulations.

The size of conductor used for power supply when more than one printer is installed shall be in acco dance with all local rules and regulations, figuring the current drain for each printer at 1 ampere for a set on direct current and 5.5 amperes for a set on alternating current.

CURRENT SUPPLY FOR LINE CIRCUIT OR CONTROL CIRCUIT

Current supply for operating line circuits or control circuits may be obtained from:

(a) Local 110-120 volt direct current lighting circuits.
(b) Motor-generator equipment installed at the station when an a.c. set is used.
(c) 48 or 24 volt central office battery.
(d) Telegraph battery.

Local direct current lighting circuits should not be used where one side of the 110 volt supply or the neutral wire of 220 volt three wire supply is not permanently grounded. 48 volt central office battery should be used in preference to 24 volt battery.

Undue loading of the small motor-generator set will result in impaired signals, which may be serious on long circuits and may even in some cases be apparent on the shorter circuits. For this reason it is recommended that circuits involving a current drain of more than 60 milliamperes in addition to the normal current for the printer set shall not be connected to the printer motor-generator set.

The current in line circuits operated with neutral (open and close) signals should be adjusted to 60 to 65 milliamperes except when otherwise specified.

The current in line circuits operated with polar transmission should be adjusted to about 35 milliamperes.

The current in control circuits should be adjusted to 50 milliamperes when control relays of the present standard type are used.

PROTECTION

Line Circuits

All line circuits shall be equipped with No. 55-A fuses mounted on No. 9-A fuse blocks, as shown in the figures covering line circuit arrangements. No. 9-A fuse blocks are provided on the No. 12-A and No. 12-B printer bases. Where protectors are required (see Station Protection, Including Private Branch Exchanges), line circuits shall be equipped in the same manner as for a manual telegraph station served by similar line facilities, except that the No. 60-A fuses normally required at telegraph stations need not be installed since the No. 55-A fuses have very closely the same rating.

Install protectors in accordance with specifications for Station and Private Branch Exchange Protector Installation.

Control Circuits

The same protection shall be used as specified above for line circuits.

24 or 48 Volt Current Supply Leads

All current supply leads from 24 or 48 volt central office batteries requiring protection (see Station Protection, Including Private Branch Exchanges) shall be equipped in the same manner as for battery supply leads to manual telegraph stations. Install protectors and fuses in accordance with Specifications for Station and Private Branch Exchange Protector Installation.

Electric Lighting Circuit Current Supply

When current is taken from a building panel box, the fuses in the panel box, on the branch circuit used, shall be in accordance with all local rules and regulations.

LOCATING APPARATUS

The installer shall be guided by the subscriber's wishes in locating equipment, so far as they are consistent with the instructions given below. If the subscriber's wishes cannot be followed, explain the reason therefor and if satisfactory arrangements cannot be made, the installer shall consult his supervisor before proceeding with the work.

The mounting plate of the No. 12 Type set measures 22" x 21½" and the printer paper roll overhangs the mounting plate about 5½" at the rear. When the supporting legs are used, a table is formed, having overall dimensions (including the apparatus) of 22" x 27" x 39" high. The top of the mounting plate is then about 28" from the floor. When the base is used without the stand, space in which the paper can hang down must be available.

No. 12 Type printer equipment should be so located that it is easy of access and that plenty of light is available. It should be placed in clean and dry rather than damp, dirty, dusty or unheated surroundings. If possible, the equipment should be located so that errors in copy can be promptly detected. This is of special importance in the case of receiving only apparatus. Where more than one page printer is installed, the printers may, if necessary, be placed side by side in a line with no space between them. Care should be taken not to place a printer so that persons passing will brush against or

interfere with the paper feeding arrangements. Page printer equipment not mounted on the stand should be located on a table or desk clear of other objects as noted above, and so that the paper feeding will not be impeded.

The printer unit is most easily removed or replaced from the back of the printer set. Because of its size and weight and its location in the set, personal injury may result from handling it from the front or side of the set when only one man is lifting it. For this reason installations should preferably be made with sufficient room for a man to get in behind the set for maintenance purposes.

WIRING

Line circuit or control circuit wiring external to the printer set shall be done in accordance with Specifications for Station Wiring.

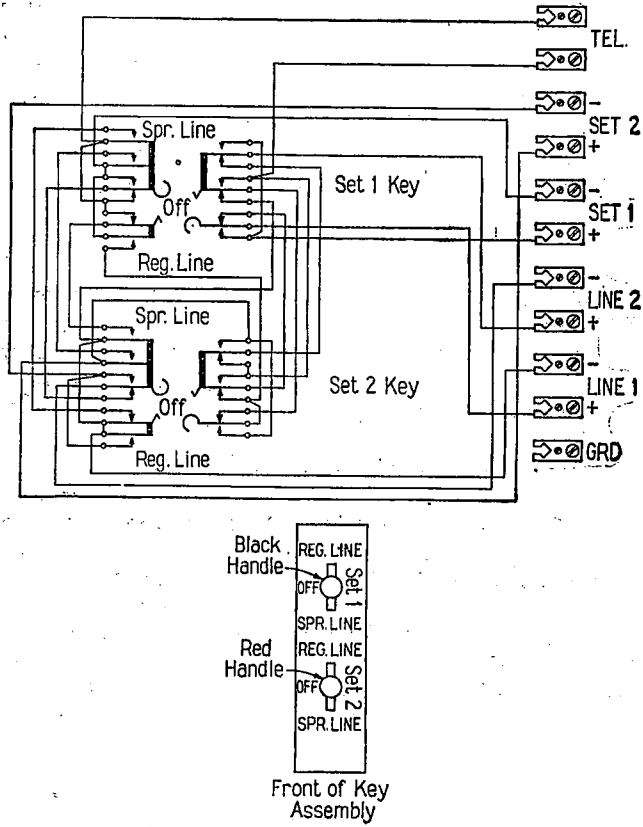
Any special wiring in or around a printer set should be done with Deltabeston fixture wire, or, if a color code is desired, with No. 522-M printer wire.

TERMINATION PLANS

In connection with service over the longer circuits, both a regular and a spare machine will usually be installed at a station. In such cases the working machine is operated in a circuit extending to the nearest telegraph repeater point and it is necessary to provide simple switching arrangements so that the patron can connect either machine to the regular circuit or to the emergency circuit where one is provided. The arrangements most commonly employed are shown below under the heading "Termination Plans." The wiring of the printer line circuit and power supply employed with any of these termination plans will normally be as shown in Printer Wiring Plans B or G. Other Printer Wiring Plans may be used if desired.

TERMINATION PLAN A

Key Switching Arrangement for Two Printer Sets and Two Loops. Providing Emergency Service and Trouble Telephone



Key Assembly Used Is Coded as No. 6018-A Key.

The key assembly shall be located with the front edge flush with the front edge of the front leg and the top up against the lower side of the printer table base or table top, using the front two holes and the upper rear hole of the cover plate for attachment. The location of the mounting holes required in the printer stand may be obtained by holding the unit in place on the table. The holes drilled should be approximately 3/16″ in diameter. Two spacing washers should be used between the box and the table leg for each of the front holes and one washer for the rear hole.

The key assembly is normally mounted at the right of the operator but if so specified may be mounted at the left by interchanging the two cover plates and drilling one mounting hole in the plate next the stand.

TERMINATION PLAN B

Key Switching Arrangement for Two Printer Sets and One Loop

Key assembly used is coded as No. 6018-A key.

For diagram of key assembly and method of mounting it, see Termination Plan A. Connect loop to terminals for "Line 1."

TERMINATION PLAN C

Key Switching Arrangement for One Printer Set and Two Loops with Trouble Telephone

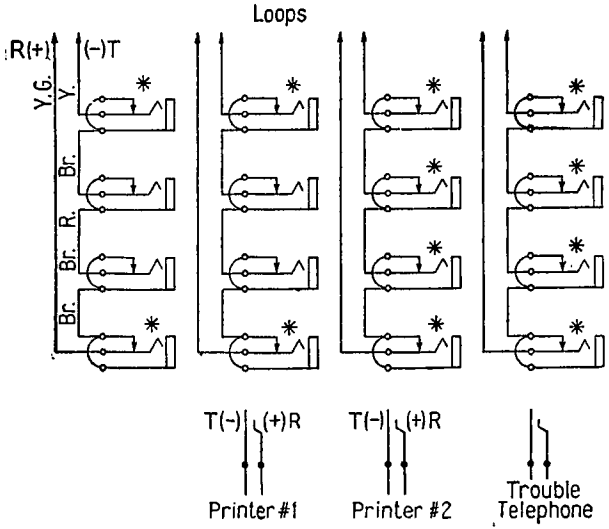
Key assembly is coded as No. 6018-A key.

For diagram of key assembly and method of mounting it, see Termination Plan A.

Connect printer to terminals for "Set 1" and strap terminals for "Set 2."

TERMINATION PLAN D

Four Loop Jack Switchboard, Arranged to Permit Patron to Run More Than One Machine on One Loop



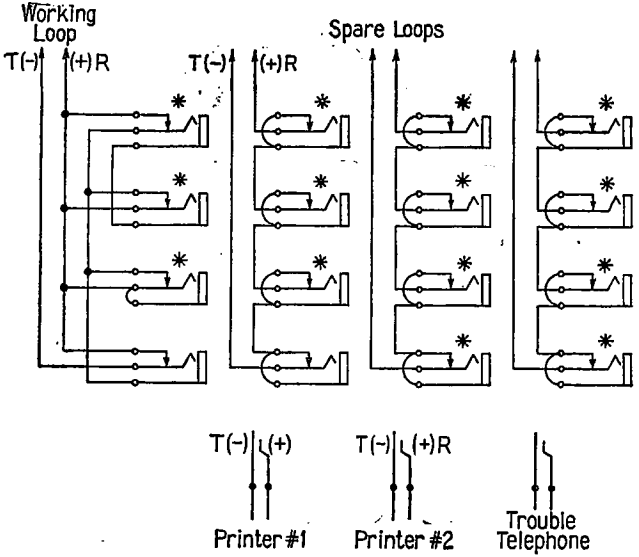
Use Four Loop Jack Switchboard without modification.

With the arrangement shown above, any one of the top three jacks of any vertical row may be used for connecting a printer set to the loop associated with that vertical row of jacks. The bottom jack, which is poled in the opposite direction to the three top jacks, may be used to check the poling of the loop, since if a printer set connected to that jack operates properly, the loop has been improperly poled.

*Place No. 2-D (black) signal plugs in jacks marked with an asterisk. Place No. 2-A (black) trouble caps on the plugs which will not be used.

TERMINATION PLAN E

Four Loop Jack Switchboard, Arranged to Permit Patron to Run Only Single Machine on Line at a Time



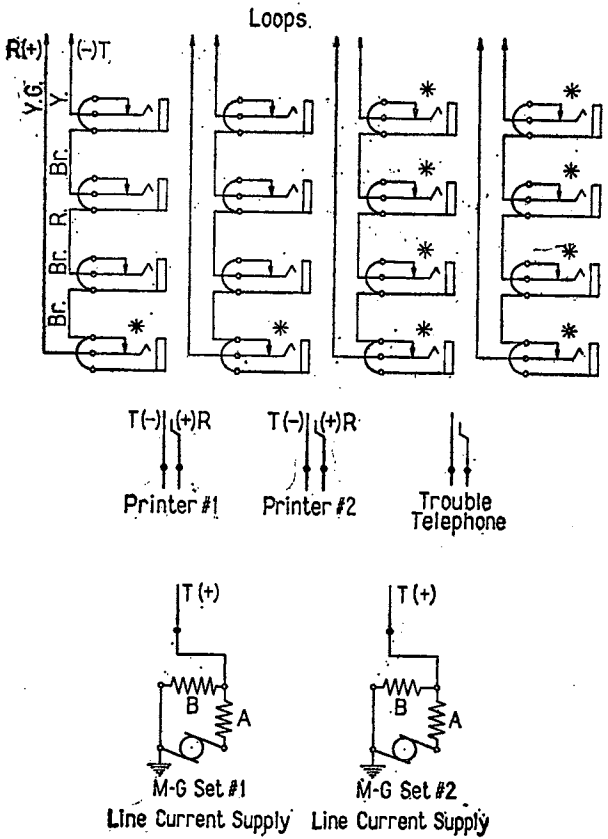
Use Four Loop Jack Switchboard modified as shown above.

With this arrangement, the plug for the working machine must be inserted in the bottom jack of the left-hand strip of jacks for normal operation. To run a second machine in series with the working machine, the two middle jacks should be connected together with a double-conductor patching cord and the plug for the second machine inserted in the top jack.

*Place No. 2-D (black) signal plugs in jacks marked with an asterisk. Place No. 2-A (black) trouble caps on the plugs which will not be used.

TERMINATION PLAN F

Four Loop Jack Switchboard, Arranged for Printer Motor-generator Set to Furnish Current Supply to the Line Circuit. (May also be used where a Two-Unit, Four-Bearing Motor-Generator Set with Fort Wayne Box-type Panel is Employed)



Use Four Loop Jack Switchboard without modification.

With the arrangement shown above, either motor-generator set of the two provided may be used to supply power for the line circuit.

The printer plug must always be placed in an upper jack of the vertical row and the motor-generator plug below it.

*Place No. 2-D (black) signal plugs in jacks marked with an asterisk. Place No. 2-A (black) trouble caps on the plugs which will not be used.

Resistance B to be 1500 ohms. Resistance A to be of such value that voltage applied to the line circuit is approximately 90 volts.

PRINTER WIRING PLANS

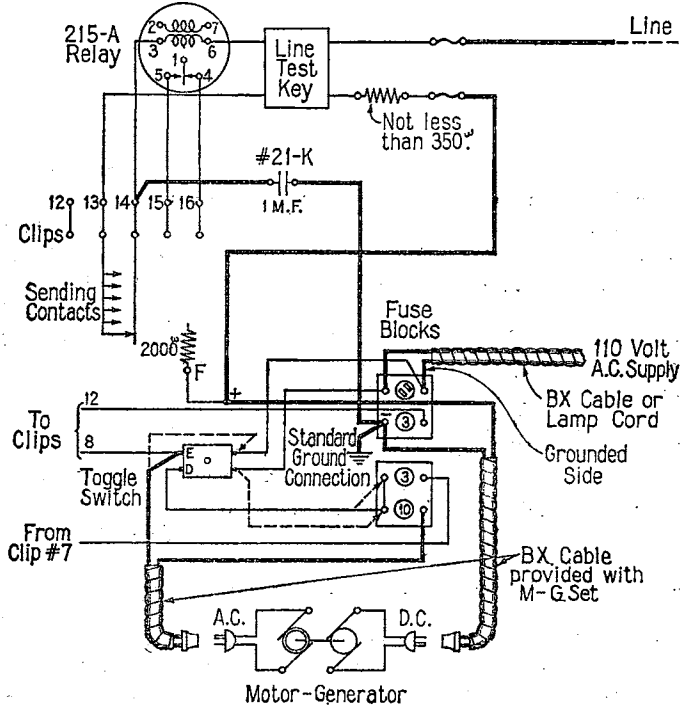
The printer wiring plans shown in the pages following show the printer set wiring for the cases most frequently encountered. Printer plans A and F show the wiring of a sending and receiving set connected to the line circuit at a point where power associated with the printer set is used to provide line current. Plans B and G show the wiring of a set in the loop circuit of a repeater or connected in series in a line circuit. Plans C and H show the wiring of a sending and receiving set at the grounded end of a line circuit, while Plans D and I show the wiring of a receiving only set at the grounded end of a line circuit. Plans E and J show the wiring of a receiving only set operated with the one-way polar telegraph system.

Plans A, B and C would, for instance, be specified for sets operating on alternating current in a circuit having in it three sending and receiving printer sets, line current being supplied at one end of the circuit and the circuit being grounded at the other end.

In the case of sending and receiving sets, the arrangement shown is required in all cases so that the connection of the condenser indicated provides a noise-killer, preventing interference with adjacent telephone circuits.

PRINTER PLAN A

No. 12 Type Set Connected Directly to Line Circuit. Set Operating on Alternating Current and Used to Supply Current to the Line. To Be Used Only on Short, Stable Circuits



Wiring shown in heavy lines to be run by installer.

Line wire should be connected to the line fuse which connects through line-test key directly to line relay.

Wire loops are provided in the set for connection to line resistances.

If it is desired to have the line circuit remain closed when the printer set shown above is not running, connect the a. c. leads for the motor-generator to the live side of the toggle switch and install an approved snap switch on the printer base for controlling the motor-generator. Wire as shown in dotted lines and remove strap on lower fuse block.

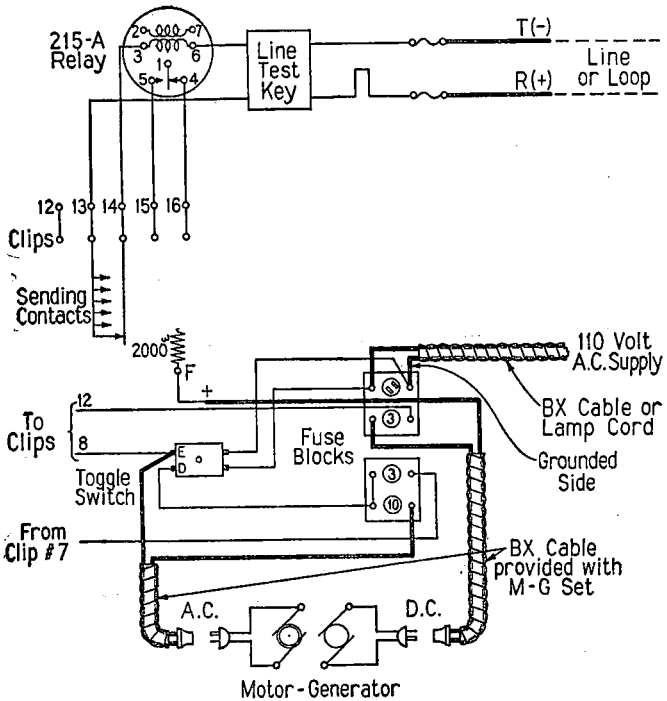
Connections for set arranged for receiving only are the same as above, except that the sending contacts are omitted and distributor terminals 13 and 14 are strapped on the receiving distributor. Condenser shown in diagram is to be omitted if set is arranged for receiving only.

Connections shown are for case where positive battery is supplied for the line circuit (negative side of power supply grounded). If it is desired to supply negative battery for the line circuit it will be necessary to interchange wires connecting to terminals 4 and 5 of the relay connecting block and to reverse the polarity of the d. c. supply so that "F" is negative.

Impairment of signals which may be noticeable except where there is ample operating margin may result if circuits involving a total drain of more than 60 milliamperes are connected to a small motor-generator set which is also used to supply current for printer set operation.

PRINTER PLAN B

No. 12 Type Set Connected in Series with Line or Loop Circuit. Set Operating on Alternating Current

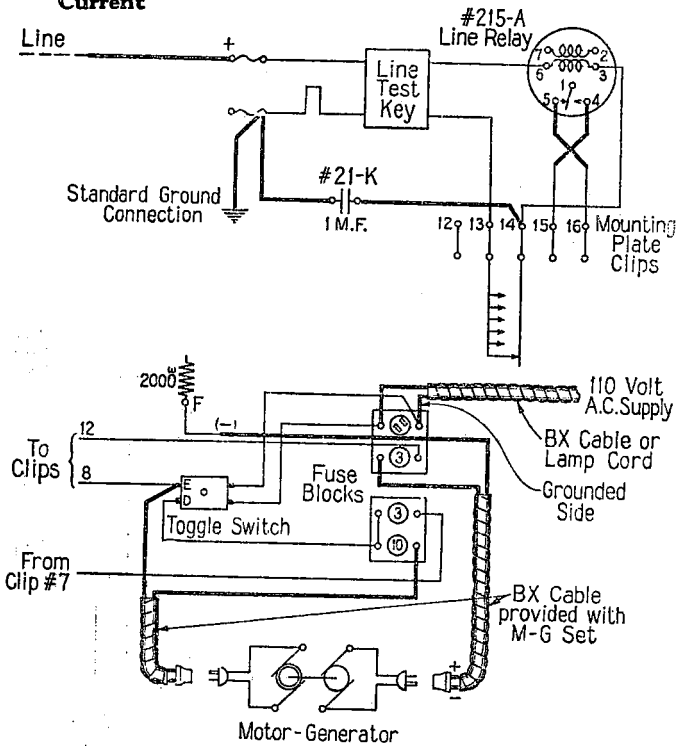


Wiring shown in heavy lines to be run by installer.

Connections for set arranged for receiving only are the same as above, except that the sending contacts are omitted and distributor terminals 13 and 14 are strapped on the receiving distributor.

PRINTER PLAN C

No. 12 Type Sending and Receiving Set Connected Directly to Line Circuit at Grounded End of a Circuit Operated with Open and Close Signals. Set Operating on Alternating Current



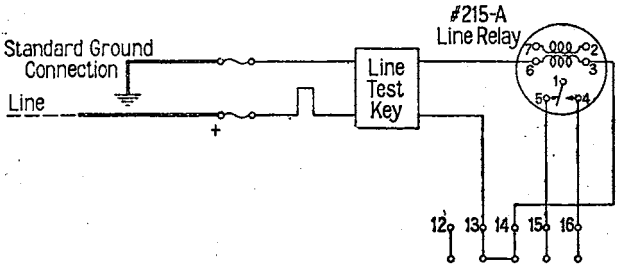
Wiring shown in heavy lines to be run by installer.

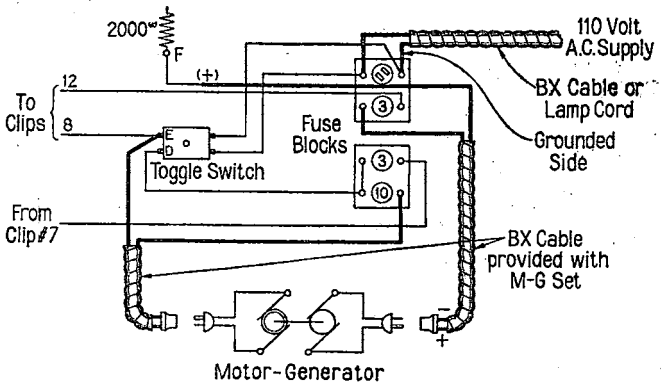
Line wire should be connected to the line fuse which connects through line-test key directly to line relay.

Connections shown are for circuit with positive battery at distant end of line. If negative battery is supplied at distant end of line, no change will be required from the power or relay connections provided on sets supplied from the factory.

PRINTER PLAN D

No. 12 Type Set Arranged for Receiving Only Connected Directly to Line Circuit at Grounded End of a Circuit Operated with Open and Close Signals. Set Operating on Alternating Current



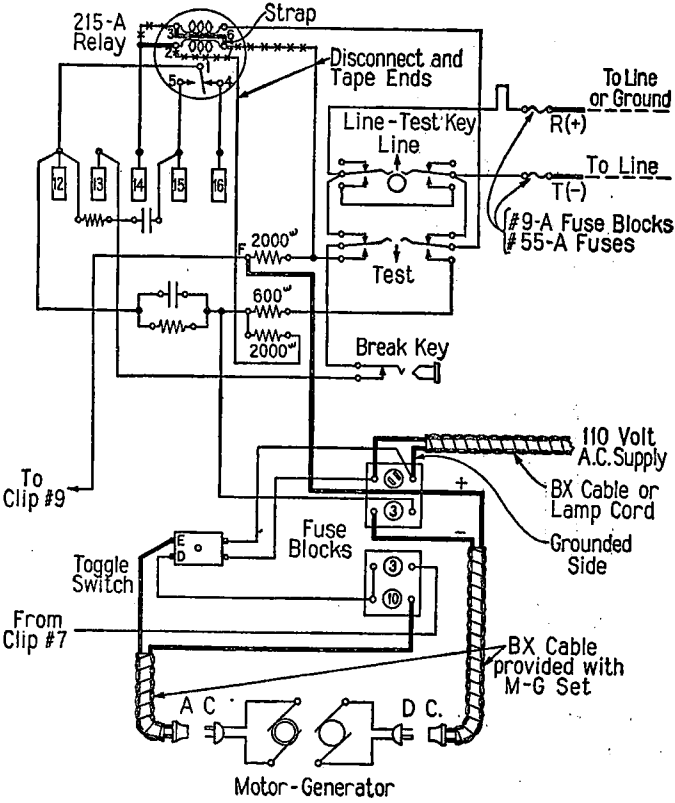


Wiring shown in heavy lines to be run by installer.

Connections shown are for circuit having positive battery at distant end of line. If negative battery is supplied at distant end of line, the line and ground connections shown above shall be reversed.

PRINTER PLAN E

No. 12 Type Set for Receiving Only Arranged to Operate with the One-Way Polar Telegraph System. Set Operating on Alternating Current



Wiring shown in heavy lines to be run by installer.

As shown in the diagram above, the wires connecting to terminals 2 and 7 shall be unsoldered and taped up separately. The wire connecting to terminal 3 should be moved to terminal 2 and terminals 3 and 7 shall be strapped. Care must be taken to connect the line wires as indicated so that the signals will not be received reversed.

At a station where the printer is connected between line and ground, unless otherwise specified, connect a No. 18-AC resistance (500 ohms) in series in each line circuit on the line side of any switching equipment.

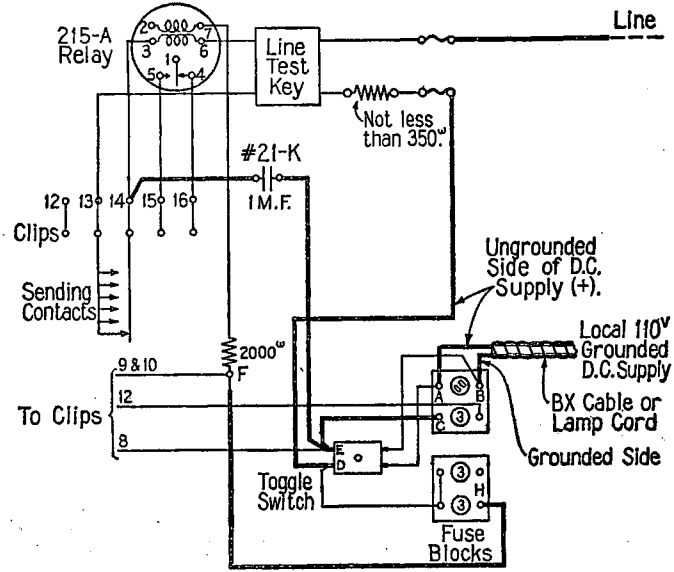
Where No. 6018-A key is used, this resistance shall be mounted in the printer resistance mounting plate.

Where a 4 loop jack switchboard is used, this resistance shall be mounted in the switchboard, using a No. 682-A mounting plate.

At an intermediate station, resistance shall not be connected in the line circuit.

PRINTER PLAN F

No. 12 Type Set Connected Directly to Line Circuit. Set Operating on 110 Volts Direct Current, Which Is Used for Line Battery



Wiring shown in heavy lines to be run by installer.

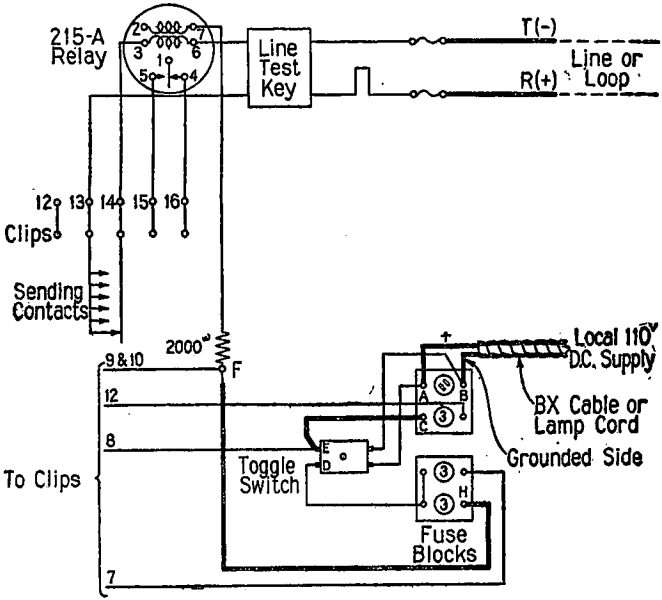
Line wire should be connected to the line fuse which connects through line-test key directly to line relay.

Connections for set arranged for receiving only are the same as above, except that the sending contacts are omitted and distributor terminals 13 and 14 are strapped on the receiving distributor. Condenser shown in diagram is to be omitted if set is arranged for receiving only.

Connections shown are for case where positive battery is supplied for the line circuit (negative side of power supply grounded). If positive side of power supply is grounded, it will be necessary to interchange wires connecting to terminals 4 and 5 of the relay connecting block and to reverse the polarity of the d.c. supply so that "F" is negative and "C" is positive

PRINTER PLAN G

No. 12 Type Set Connected in Series with Line or Loop Circuit. Set Operating on 110 Volts Direct Current

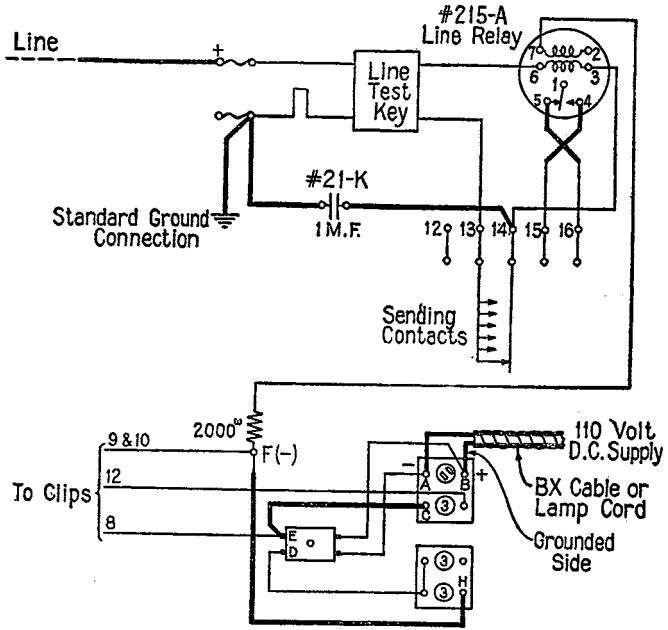


Wiring shown in heavy lines to be run by installer.

Connections for set arranged for receiving only are the same as above, except that the sending contacts are omitted and distributor terminals 13 and 14 are strapped on the receiving distributor.

PRINTER PLAN H

No. 12 Type Sending and Receiving Set Connected Directly to Line Circuit at Grounded End of a Circuit Operated with Open and Close Signals. Set Operating on 110 Volts Direct Current



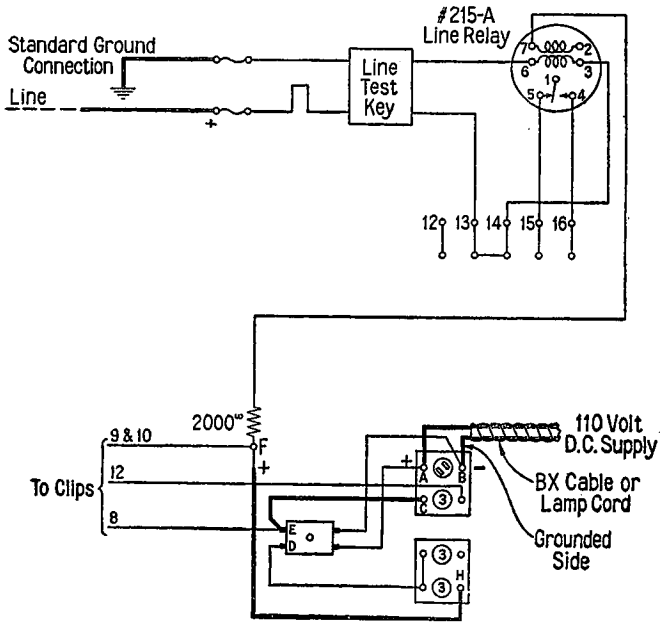
Wiring shown in heavy lines to be run by installer.

Line wire should be connected to the line fuse which connects through line-test key directly to line relay.

Connections shown are for circuit with positive battery at distant end of line. If negative battery is supplied at distant end of line, no change will be required from the power or relay connections provided on sets supplied from the factory.

PRINTER PLAN I

No. 12 Type Set Arranged for Receiving Only Connected Directly to Line Circuit at Grounded End of a Circuit Operated with Open and Close Signals. Set Operating on Direct Current

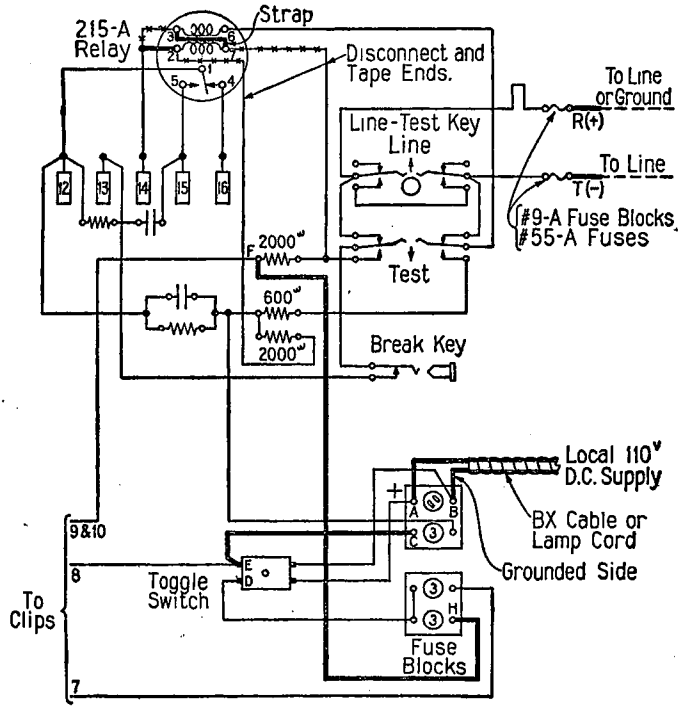


Wiring shown in heavy lines to be run by installer.

Connections shown are for circuit having positive battery at distant end of line. If negative battery is supplied at distant end of line, the line and ground connections shown above shall be reversed.

PRINTER PLAN J

No. 12 Type Set for Receiving Only Arranged to Operate with the One-Way Polar Telegraph System. Set Operating on Direct Current



Wiring shown in heavy lines to be run by installer.

As shown in the diagram above, the wires connecting to terminals 2 and 7 shall be unsoldered and taped up separately. The wire connecting to terminal 3 shall be moved to terminal 2 and terminals 3 and 7 shall be strapped. Care must be taken to connect the line wires as indicated so that the signals will not be received reversed.

At a station where the printer is connected between line and ground, unless otherwise specified, connect a No. 18-AC resistance (500 ohms) in series in each line circuit on the line side of any switching equipment.

Where No. 6018-A key is used, this resistance shall be mounted in the printer resistance mounting plate.

Where a 4 loop jack switchboard is used, this resistance shall be mounted in the switchboard, using a No. 682-A mounting plate.

At an intermediate station, resistance shall not be connected in the line circuit.

SUBSCRIBER'S SIGNALING PLANS

For Single Printer

When a single printer is installed at the subscriber station, the facilities normally provided consist only of the regular printer circuit. The subscriber should be instructed to call a specified number in case of trouble with the equipment or the line circuit, using any convenient telephone.

An alternative which is possible when the printer is operated in the loop circuit of a telegraph repeater is to have the subscriber signal the repeater office in case of trouble by operating the signal associated with the loop circuit, reply being made by means of the monitoring printer at the repeater office, or by telephone. This method, however, is normally feasible only for circuits without intermediate drops, since it is liable to cause interruption to the whole circuit in case of trouble at only one station.

For Installation Consisting of Regular and Spare Printer Sets

Where both a regular and a spare printer set are installed (notably on the longer circuits) the working printer will normally be connected to a loop circuit extended from an adjacent telegraph repeater station. In such cases it is customary to provide in addition to the regular loop an emergency loop which, except in case of trouble on the regular loop, is used as a special telephone circuit from the customer's office to the telegraph board. A telephone set used solely with this circuit is installed in a convenient location near the printers. The circuit arrangements used with this telephone set at the customer's office are shown in the Termination Plans. The telephone set may be a local battery or a common battery set as specified.

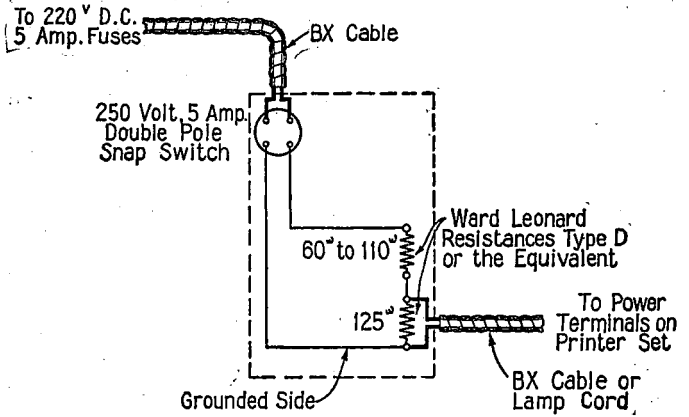
POWER PLANS

The arrangements for power supply in special cases which cannot be taken care of by the usual wiring plans shown above are outlined in the Power Plans which follow.

POWER PLAN A

USE OF POTENTIOMETER FOR POWER SUPPLY FOR PRINTER MOTORS AT POINTS HAVING 200-260 VOLT D-C SUPPLY

Where the power supply is 200-260 volts direct current, and 110 volts direct current is not available, a potentiometer may be employed to reduce the voltage applied to the printer motors. A printer set equipped with 110 volt direct current motors should be used.



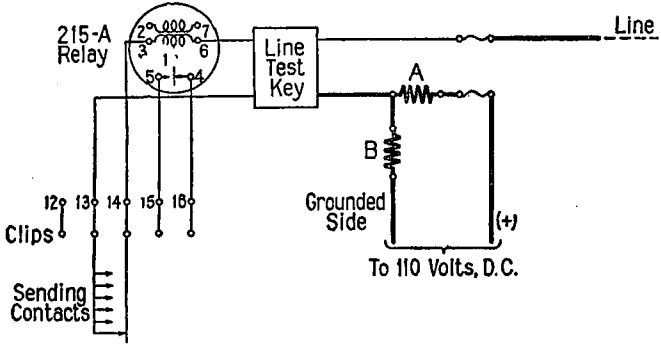
Resistances to be Ward-Leonard type "D" or the equivalent, mounted in a wire enclosure, not in a box, power wiring and mounting of resistances to be in accordance with all local rules and regulations. Locate resistances so that heat dissipated will not cause comment from the printer operator. Snap switch shown shall be used for starting and stopping motors. Power switch on printer shall be cut out and left dead. Do not use this potentiometer for current supply for the line circuit.

Resistance of 125 ohms to be fixed for all cases. Other resistance to be of such value (between 60 and 110 ohms) that voltage at power terminals on printer set with printer motors running idle is 120 volts.

POWER PLAN B

POTENTIOMETER ARRANGEMENT FOR LINE CURRENT SUPPLY FOR CIRCUIT OPERATED WITH "OPEN AND CLOSE" SIGNALS

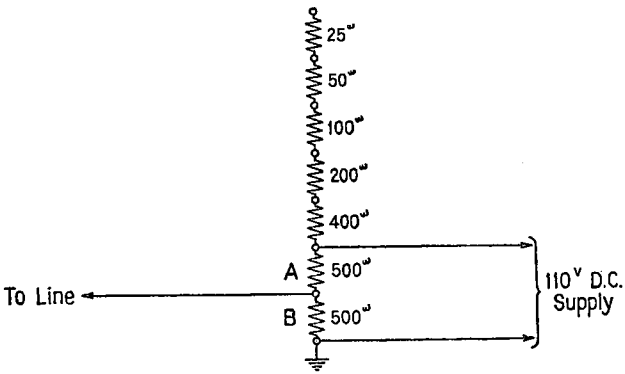
This arrangement shall be used when specified to improve signal transmission in connection with a single No. 12 type printer set located at a point where line current is supplied to a circuit operated with "open and close" signals.



Resistances may be "Ward-Leonard Special Resistor per Ward-Leonard Company's 'D' Specification 4259" or may be No. 18 or No. 19 type.

Resistance A to be not less than 350 ohms.
Resistance B to be either 500 or 1400 ohms as specified.

Caution: The small motor-generator set mounted on the printer stand and used for supplying current should be used as the source of direct current for this arrangement only when there is ample operating margin. It is recommended that where this motor-generator is used, the resistance B be made 1500 ohms.



Wiring when Ward-Leonard Special Resistor per Ward-Leonard Company's "D" Specification 4259 is used.

SPECIAL POWER ARRANGEMENTS

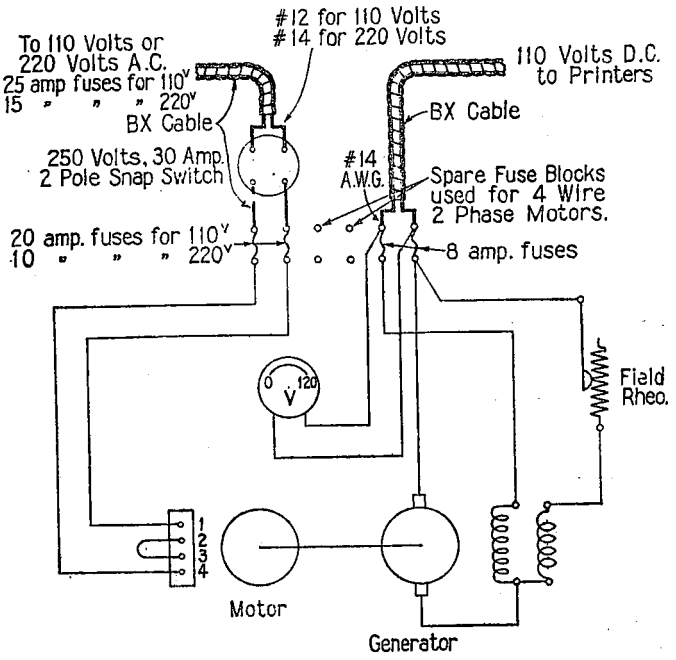
USE OF TWO-UNIT, FOUR-BEARING MOTOR-GENERATOR SET WITH FORT WAYNE BOX-TYPE PANEL

At points having alternating current power supply at voltage and frequency other than 110 volts 60 cycles or 110 volts 50 cycles, it will be necessary to use No. 12 type printer sets equipped with 110 volt direct current motors together with a two-unit four-bearing motor-generator set with Fort Wayne Box-Type Panel. The generator of this set is rated at 110 volts, 3 amperes full load, and will carry a 6 ampere load for one-half hour.

Unless otherwise specified, a single motor-generator set of this type shall be installed at a printer station, any emergency sets being held at some convenient location.

POWER PLAN C

Connection Diagram of Type RSA-SD Two-Unit Four-Bearing Motor-Generator Set 110 or 220 Volt Single Phase A-C Motor—110 Volt D-C Generator

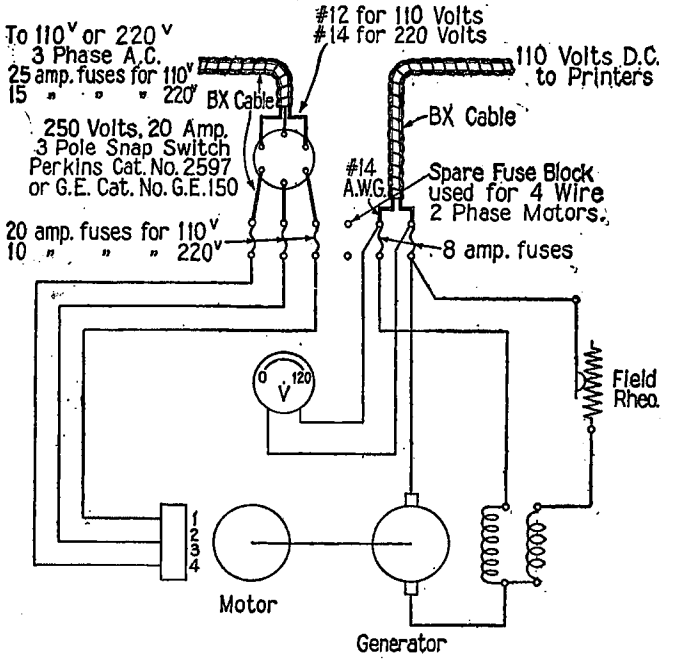


Notes

1. Heavy lines show wiring and equipment to be provided by customer.
2. Fuses are Cartridge Type N.E. Code Standard.
3. Motor shown connected for 220 volts.
   For 110 volts connect Terminals 1 and 2 to one line lead and Terminals 3 and 4 to the other line lead.

POWER PLAN D

Connection Diagram of Type RKT-SD Two-Unit Four-Bearing Motor-Generator Set 110 or 220 Volt 3 Phase A-C Motor—110 Volt D-C Generator

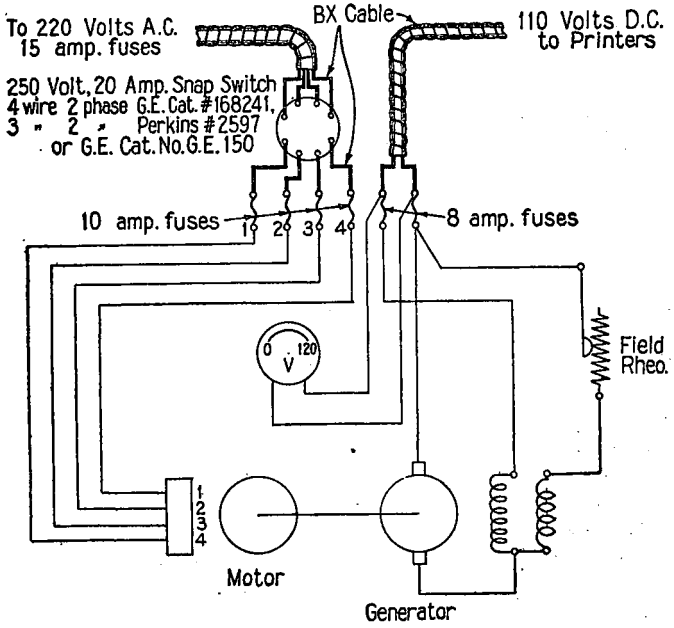


Notes

1. Heavy lines show wiring and equipment to be provided by customer.
2. Fuses are Cartridge Type N.E. Code Standard.

POWER PLAN E

Connection Diagram of Type RKG-SD Two-Unit Four-Bearing Motor-Generator Set 220 Volt 2 Phase A-C Motor—110 Volt D-C Generator



Notes

1. Use No. 14 gauge wire on all circuits.
2. Heavy lines show wiring and equipment to be provided by customer.
3. Fuses are Cartridge Type N.E. Code Standard.
4. Connect fuses 2 and 3 on line side for 3 wire 2 phase installation.

CONTROL WIRING PLANS

Diagrams are given showing the wiring for the more common methods of control. The power and line connections for the printer set should be made as indicated in the printer wiring plan specified for the installation.

Control arrangements may involve the use of a separate circuit specifically for control purposes or may use the line circuit itself. The arrangements shown below include "break contact" and "make contact" control which require a separate circuit, and "polar" control which does not require a separate circuit. None of the methods discussed is normally applicable to the longer circuits.

"Break contact" control allows any station on the circuit to start and stop all of the other stations on the circuit. Current flows in the control circuit when the printers are stopped and the circuit is opened to start them.

"Make contact" control allows the main station only to start and stop all of the other stations on the circuit. Current flows in the control circuit only when the printers are running.

"Polar" control allows the main station only to start and stop all of the other stations on the circuit. Make and break signals of one polarity are used to operate the printers and connecting the other polarity to the circuit at the main point stops all the machines. Since when this method of control is used a switchboard is usually employed at the main station, the diagrams following showing polar control cover only the outlying station arrangement.

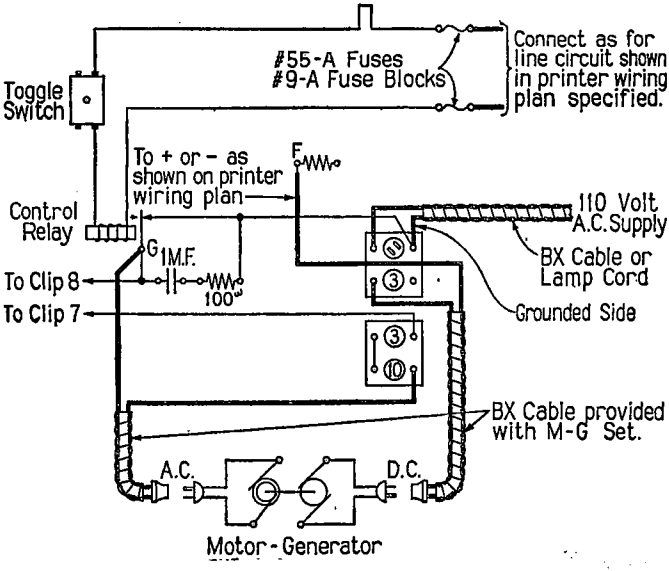
In cases where the control relay is used to start and stop the motor-generator on the printer stand as well as the motors of the printer set, the control relay should be of the latest type, having copper leaf contacts.

Where the motor-generator set furnishes power for the control circuit or line circuit, it may be desirable to keep the motor-generator set running continuously throughout the service period. Where the motor-generator set is to be kept running separately from the printer motors, the toggle switch on the printer base shall be used to control it if this is available. If the toggle switch is used in connection with the control wiring plan and is, therefore, not available for this purpose, a snap switch of an approved type shall be furnished to control the motor-generator set. This switch shall be mounted in a convenient place on the printer stand.

Data on the adjustment of control relays is given in the field maintenance handbook covering No. 12 type printer sets.

CONTROL WIRING PLAN A

"Break Contact" Control for Use with Alternating Current Power Supply Where Two or More Stations Are in Series and Where Each Station Is to Be Able to Control All the Other Stations



Connections shown in heavy lines to be made by installer.

Diagram shows wiring of No. 12-B printer base.

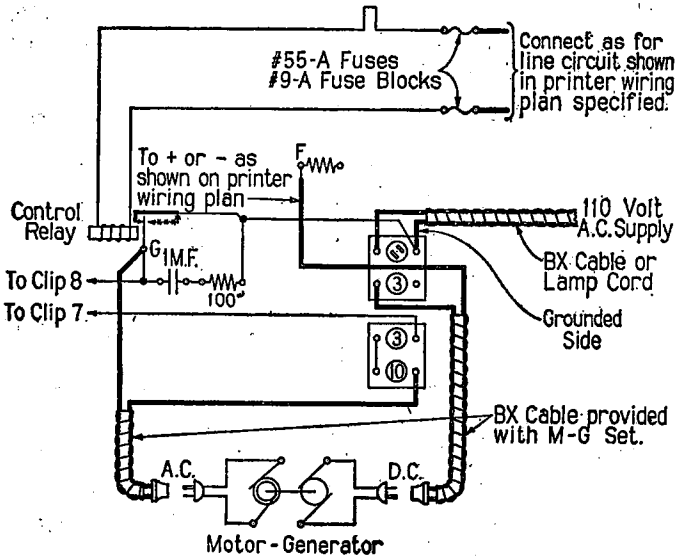
Control circuit is closed while printer motors are shut down and opened while printer motors are running.

Unless otherwise specified, toggle switch on printer base at each station shall be inverted so that when thrown to the "ON" position it opens the control circuit. At points where current supply for the control circuit is provided by a motor-generator set, this must be kept running and a separate switch of an approved type shall be provided in the power leads to the motor-generator set.

CONTROL WIRING PLAN B

"Make Contact" Control for Use with Alternating Current Power Supply Where a Main Station Is to Control One or More Outlying Stations Connected in Series

Wiring for Outlying (Controlled) Station.



Connections shown in heavy lines to be made by installer. Control relay contact lead must be connected to "make" contact.

Diagram shows wiring of No. 12-B printer base and connections at an outlying station.

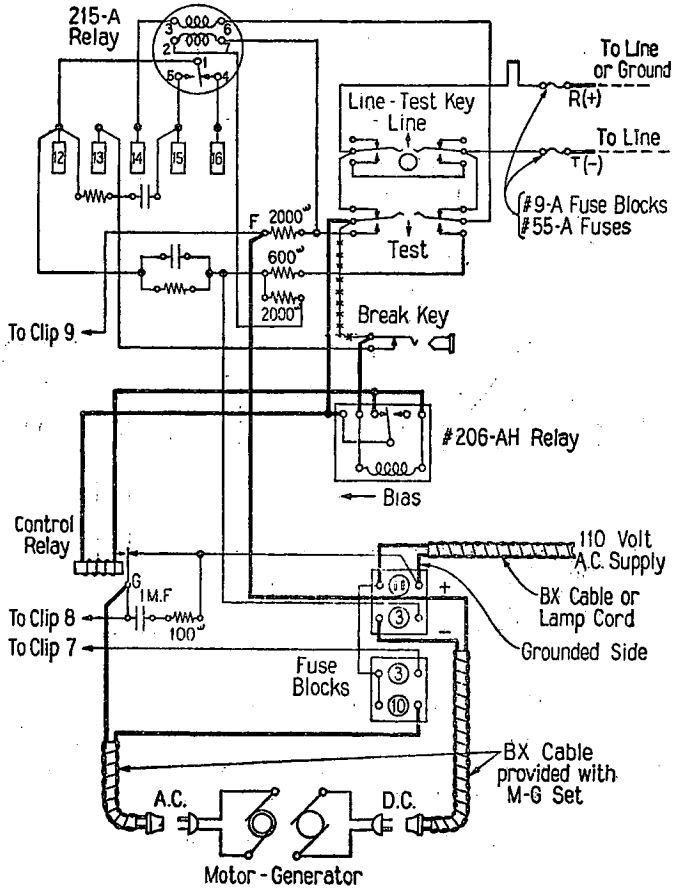
Control circuit is open while printer motors are shut down and closed while printer motors are running.

Toggle switch on printer set or other suitable means to be used at main station to open and close control circuit.

CONTROL WIRING PLAN C

Printer Control for Use with Alternating Current Power Supply Where a Main Station Is to Control Over the Line Circuit One or More Outlying Stations Connected in Series ("Polar" Control)

Wiring for Outlying (Controlled) Station.



Wiring shown by heavy lines represents the connections and changes to be made by installer.

Diagram shows wiring of No. 12-B printer base at an outlying station.

Line circuit must be operated with "open and close" signals.

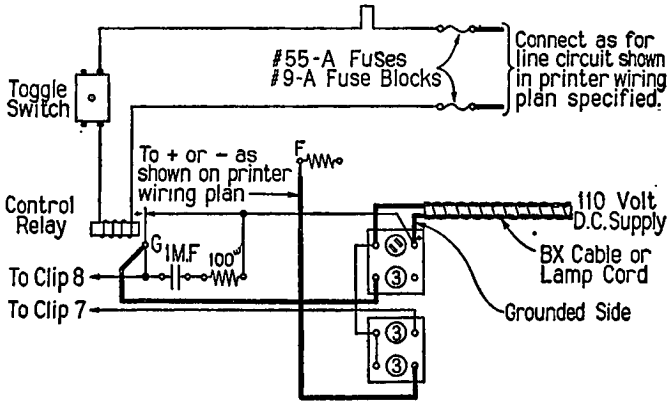
Wiring at the main station will be covered in connection with information on switching arrangements.

Main station will supply positive battery while printer motors are shut down and negative battery for signals when the printer motors are running.

Polar relay 206-AH is to be mounted on bracket of Catalog 71164 (M) assembly which should be fastened to printer base using mounting holes provided beneath printer motor.

CONTROL WIRING PLAN D

"Break Contact" Control for Use with Direct Current Power Supply Where Two or More Stations Are in Series and Where Each Station Is to Be Able to Control All the Other Stations



Connections shown in heavy lines to be made by installer.

Diagram shows wiring of No. 12-B printer base.

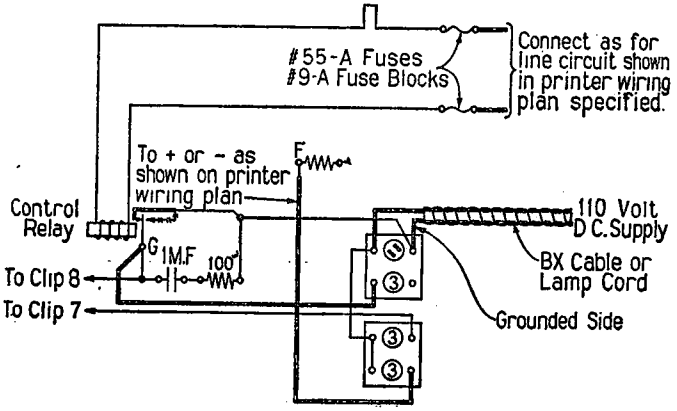
Control circuit is closed while printer motors are shut down and opened while printer motors are running.

Unless otherwise specified, toggle switch on printer base at each station shall be inverted so that when thrown to the "ON" position it opens the control circuit. At points where current supply for the control circuit is provided by a motor-generator set, this must be kept running and a separate switch of an approved type shall be provided in the power leads to the motor-generator set.

CONTROL WIRING PLAN E

"Make Contact" Control for Use with Direct Current Power Supply Where a Main Station Is to Control One or More Outlying Stations Connected in Series

Wiring for Outlying (Controlled) Station.



Connections shown in heavy lines to be made by installer. Control relay contact lead must be connected to "make" contact.

Diagram shows wiring of No. 12-B printer base and connections at an outlying station.

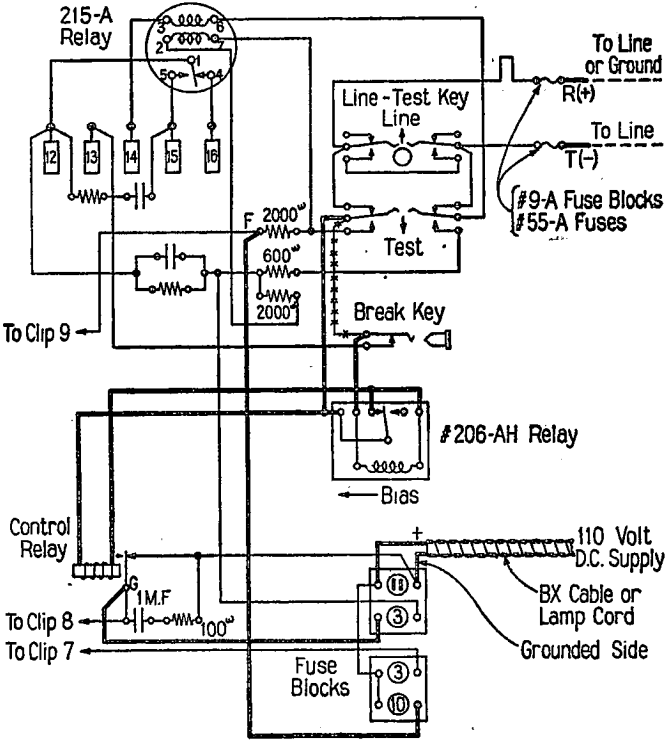
Control circuit is open while printer motors are shut down and closed while printer motors are running.

Toggle switch on printer set or other suitable means to be used at main station to open and close control circuit.

CONTROL WIRING PLAN F

Printer Control for Use with Direct Current Power Supply Where a Main Station Is to Control Over the Line Circuit One or More Outlying Stations Connected in Series ("Polar" Control)

Wiring for Outlying (Controlled) Station.



Wiring shown by heavy lines represents the connections and changes to be made by installer.

Diagram shows wiring of No. 12-B printer base at an outlying station.

Line Circuit must be operated with "open and close" signals.

Wiring at the main station will be covered in connection with information on switching arrangements.

Main station will supply positive battery while printer motors are shut down and negative battery for signals when the printer motors are running.

Polar relay 206-AH is to be mounted on bracket of Catalog 71164 (M) assembly which should be fastened to printer base using mounting holes provided beneath printer motor.

Caution: Make sure that power is turned off the set before removing or replacing a printer or distributor unit. Where control arrangements are provided it will be necessary to ensure that the machine will not be started from a distant point while work is being done on it.

1. Adjust line or loop current and control circuit current

As soon as the wiring in connection with an installation is completed, check the current in the line or loop and in the control circuit, if one is provided. Where the set is operated in the loop circuit of a telegraph repeater, or where battery for the line circuit is supplied by the telegraph battery, the current will be adjusted by the test room forces. In other cases the line current should be adjusted by using the proper resistance at one or more stations, in accordance with standing instructions. Check the voltage of the motor-generator set where one is provided.

2. Check the poling of the set wiring.

3. Lubricate the printer unit, distributor, and motor generator set (if one is provided) as called for in the handbook specifications covering field maintenance of No. 12 type printer set and associated apparatus.

4. At stations having a keyboard, throw the "Line-Test" key to the "Test" position and check the **operation of the machine.** This should be done for all of the characters, both upper and lower case. Note the operation of the bulletin bell. Special attention should be paid to checking the line feed and ribbon reverse operations and the feeding of the paper. At receiving only stations the operation of the machine should be checked by signals from another station, after the speed has been checked.

5. Check the Speed

Set the speed of the distributor for the proper number of operations per minute. First count the number of black spots on the target to ensure that the correct target has been supplied. Then count the teeth on the gear. Next count the operations for a period

of twenty or thirty seconds, and set the speed to *reasonable accuracy* by this method. Then use the tuning fork to obtain the proper setting for actual operation. In counting the speed, use the "free speed" method at receiving only stations.

Information on checking speed is given in handbook specifications covering field maintenance of No. 12 type printer set and associated apparatus.

6. Determine the best orientation setting of the distributor

This should be done as outlined in the maintenance handbook. Tests of orientation range should be made when receiving from each of the other stations on the circuit and the installation work should not be considered complete until a satisfactory margin, as called for in standing instructions, is obtained for all stations.

7. Check the ribbon oscillator mechanism

At keyboard sending stations the ribbon oscillator mechanism shall be adjusted so that visible typing is secured.

At receiving only stations the cam operating the ribbon oscillator mechanism shall be inverted so that the mechanism is made inoperative. Do not remove this cam.

8. Adjust the keyboard to meet service requirements

At keyboard sending stations where the work of the operator will be facilitated by using repeat keyboard operation, adjust the keyboard mechanism to provide this feature.

9. Before leaving a station, check the following points to make sure that the machines involved are equipped as specified in the service order. All stations on the same circuit should be similarly equipped.

a. Standard type or fractions type.
b. Margin signal bell.
c. Keyboard locking device.
d. Unshift on space or equipped with clip to prevent unshift on space.

MAINTENANCE AND ADJUSTMENT DATA

Complete maintenance information and adjusting data are given in specifications entitled "Field Maintenance of No. 12 Type Printer Set and Associated Apparatus."

REFERENCE SPECIFICATIONS

The following handbook specifications (including any supplements thereto) are referred to herein, and installers and repairmen should have these specifications for use in connection with this work.

STATION AND PRIVATE BRANCH EXCHANGE PROTECTOR INSTALLATION.

FIELD MAINTENANCE OF NO. 12 TYPE PRINTER SET AND ASSOCIATED APPARATUS.

STATION WIRING.

START MAGNET CONTINUEOUSLY ENERGIZED:—

LOOK FOR BRD 1-MF CONDENSER