mechanism, called the "Automatic Typer." A convenient wiring change in the Power Distribution Panel and an optional readjustment of the selector armature spring will adapt the printer to the desired line current.

Some models of the 28KSR, such as those supplied to the military, are provided with a.c. governed motors and a built-in stroboscope for speed adjustment. Synchronous motors are ordinarily supplied for American power line use. A motor control feature which stops the motor every time that the signal line becomes idle for a period not longer than two minutes may readily be disabled when not required.

The green keyboard keys of a Model 28 are in the conventional three-bank configuration with numerals, punctuation marks, and special symbols available in the upper case positions. Special red keys for linebreak, keyboard lock, keyboard unlock, repeat, and local carriage return and line feed are located in a line directly above the regular green keys.

Just to the rear of the typing unit, a narrow but deep chassis extends across the width of the machine. This is called the Power Distribution Panel. This panel mounts, as separate sub-panels, the line shunt relay, the plug-in 255A polar line relay, a line test key assembly, the electrical motor control mechanism, and the local loop d.c. power supply. On the right side of the Power Distribution Panel proper there are two fuse posts for the power line fuses, a copy light switch, and a convenience receptacle or a.c. outlet.

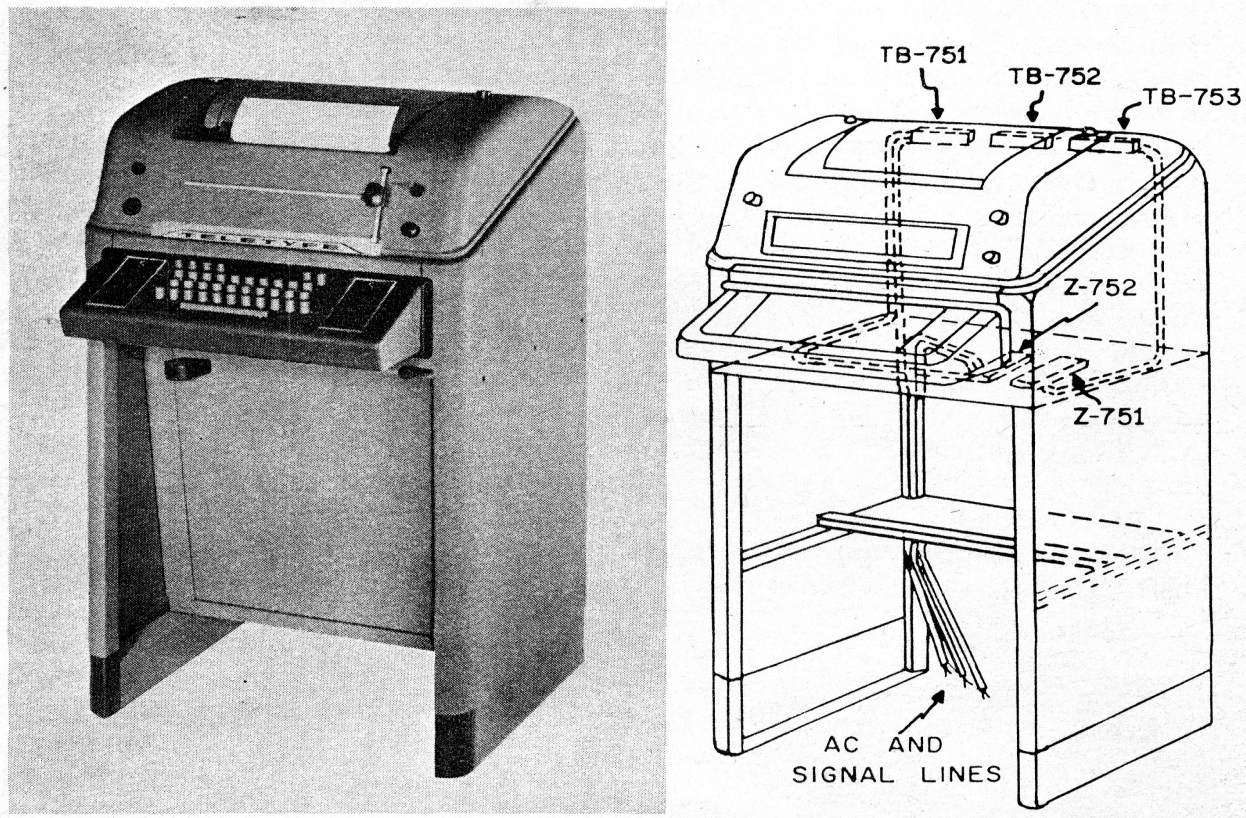


**Fig. 2.2d1—(Left) Model 28KSR page printer. (Right) Terminal strips and line filter locations**

## Connections

Across the back of the cabinet, above the Power Distribution Panel, there is a line of terminal strips, TB-751, TB-752, and TB-753. There are usually 30 terminals on these strips; 40 on some of the later commercial versions. Fig. 2.2d1 shows the location of these strips. Also shown on this drawing is the location of the power line filter or electrical noise suppressor Z-751 and the telegraph line filter or electrical noise suppressor Z-752.

To bring power and telegraph lines into the cabinet, first remove the panel that extends across the front of the lower section by removing the four mountings screws. Raise up the domed lid and remove the insulating covers that cover the terminal strips. To bring in a.c. power, insert the cable through the large opening in the left rear corner of the lower shelf and up through the right BX connector in the center of the upper shelf. Connect the leads to the screw terminals of the line filter Z-751. When a simple single telegraph loop is used (keyboard and receiving mechanism in series) insert the telegraph line cable through the same opening in the lower shelf but through the left BX connector in the center of the upper shelf. This brings the line into the telegraph line filter box Z-752. Connect the positive lead to the upper terminal and the negative lead to the lower terminal. For separate lines to the keyboard and to the receiving mechanism, connect the keyboard line to the line filter Z-152 as described above. The receiving line has to be brought all the way up to the terminal strip by TB-751 by inserting it through the large opening in the left rear corner of the lower shelf and up through the 7/8-inch hole in the upper shelf. On TB-751, remove the white wire from the upper screw of terminal 5 and connect it to terminal 7. The black wire on terminal 10 is removed and connected to terminal 8. The positive side of the receiving line then goes to terminal 5 and the negative side goes to terminal 10. Terminal strips TB-751, TB-752, and TB-753 and the cable connections are shown in Fig. 2.2d2. Keep in mind that the above connection information is for local loop operation, with the polar relay being used.

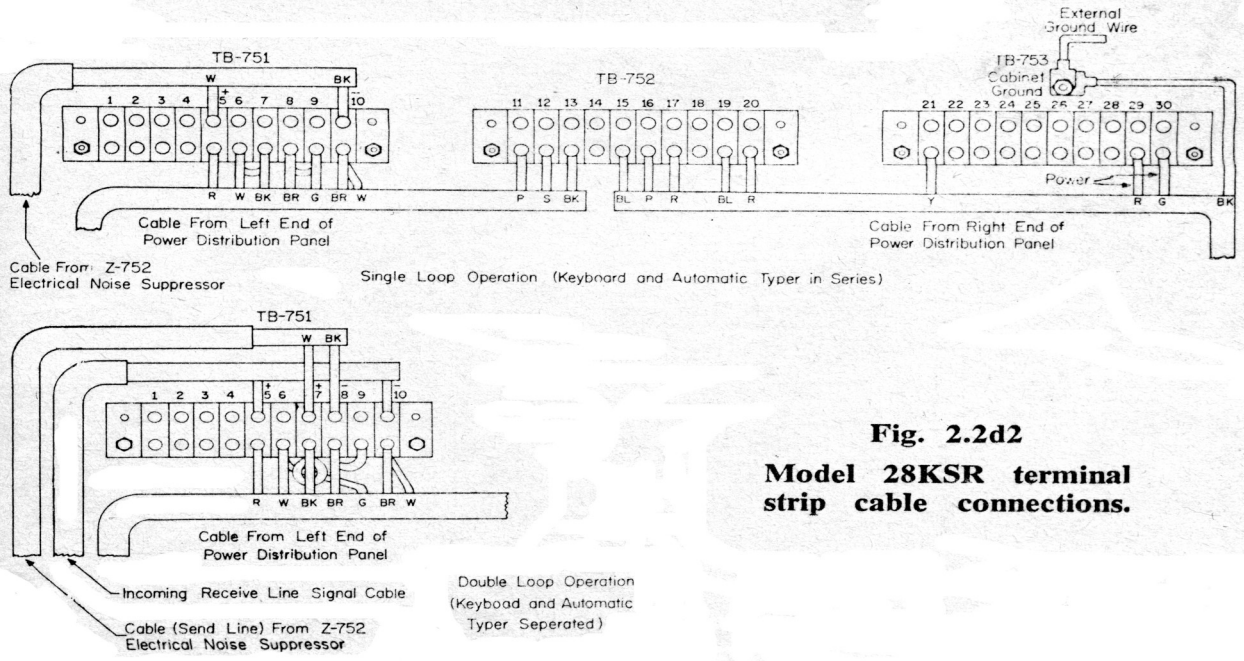


**Fig. 2.2d2**
**Model 28KSR terminal strip cable connections.**

For RTTY operation, the usual simple procedure is to operate the selector magnets directly from the TU, and to key the v.f.o. frequency-shift circuit directly from the keyboard. To operate the Model 28 in this manner it is necessary to up-end the Power Distribution Panel to gain access to the terminal strip TB-1102 to get at the selector magnet connections. Begin by removing the purple wire from terminal 1 and taping it. Also remove the jumper between terminals 2 and 8. For 20 ma operation, jump terminals 1 and 2, and run a pair of wires from terminals 3 and 4 up to terminals 3 and 4 on TB-751, which terminals should have been unused. Connect the TU to these terminals, but not through the line filter. For 60 ma direct operation, connect one jumper between terminals 1 and 4, and another between terminals 2 and 3. Run a pair of wires from 3 and 4 up to 3 and 4 on TB-751 for connection to the TU. It is a good idea, too, to remove the jumper between terminals 6 and 7 as well as the jumper between 8 and 9 on TB-751 to make sure the motor control is disconnected. This also disables the time delay mechanism for stopping the motor.

The keyboard contacts are available on terminals 7 and 8 on TB-751; however, it will be noted from the circuit diagram, Fig. 2.2d3, that a complex filter, Z-101, appears in the circuit. If a local d.c. loop is being keyed this filter can remain in the circuit, but if the v.f.o. or a.f.s.k. oscillator is going to be keyed directly, Z-101 should be by-passed. (This filter is located in the keyboard assembly.) Disconnect terminals 1 and 4 on the filter, connect them together and tape. Do the same with terminals 2 and 3.

## Motors

When the Model 28 is supplied with an a.c. governed motor, its speed should be checked. It will be noted that a target for speed checking is painted on the motor governor. A screwdriver opening is provided to facilitate this speed adjustment. The rotating spots on the governor target are viewed through the shutters of a vibrating (120 vibrations per second) tuning fork. These spots appear stationary if the motor is on speed. If not, stop the motor and remove the plug from the governor cover, then rotate the shaft until the opening in the target lines up with the opening in the cover. To increase

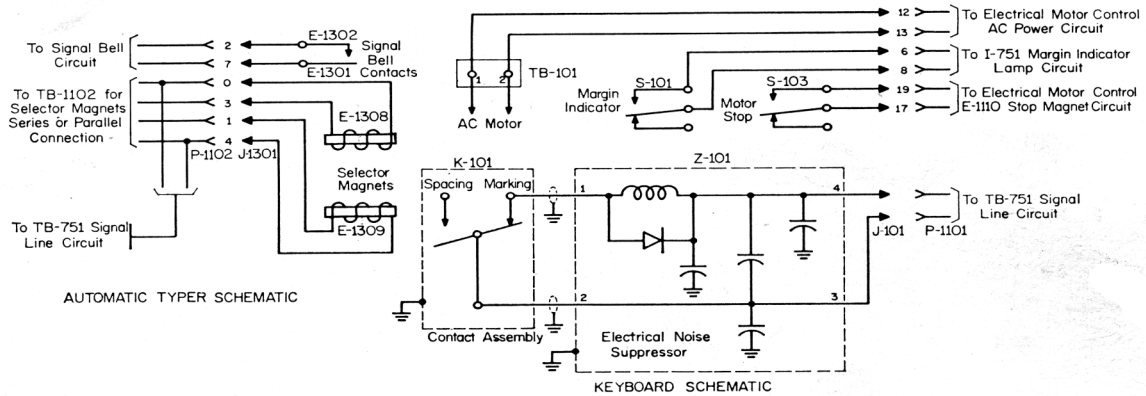


**Fig. 2.2d3—Model 28KSR cabinet wiring diagram.**

the speed, turn the adjusting screw clockwise; or, to decrease the speed, turn it counterclockwise. If not more than 12 spots pass a given point in ten seconds, the motor may be considered close enough to the desired speed. If a fork is not available, an approximate check can be made with a watch or a clock with a second hand. With the machine connected in a local loop, simply hold down the repeat key and a character key simultaneously. Now, time the number of characters printed. Sixty characters should be printed in ten seconds.

The synchronous motor has a thermal overload cutout to protect the motor if an overload does not blow the fuses. The reset button must be operated manually. It is located partially under the motor frame, to the rear, and on the mounting plate of the motor.

## Minor Notes

Standard communications practice sets the length of a line at 72 characters, and the margin indicator lamp to the right of the copy holder, lights six characters before the end of a line. To adjust loosen the three screws on the margin indicator cam disk on the spring drum and move the cam disk slightly in relation to the drum. The automatic carriage return and line feed function

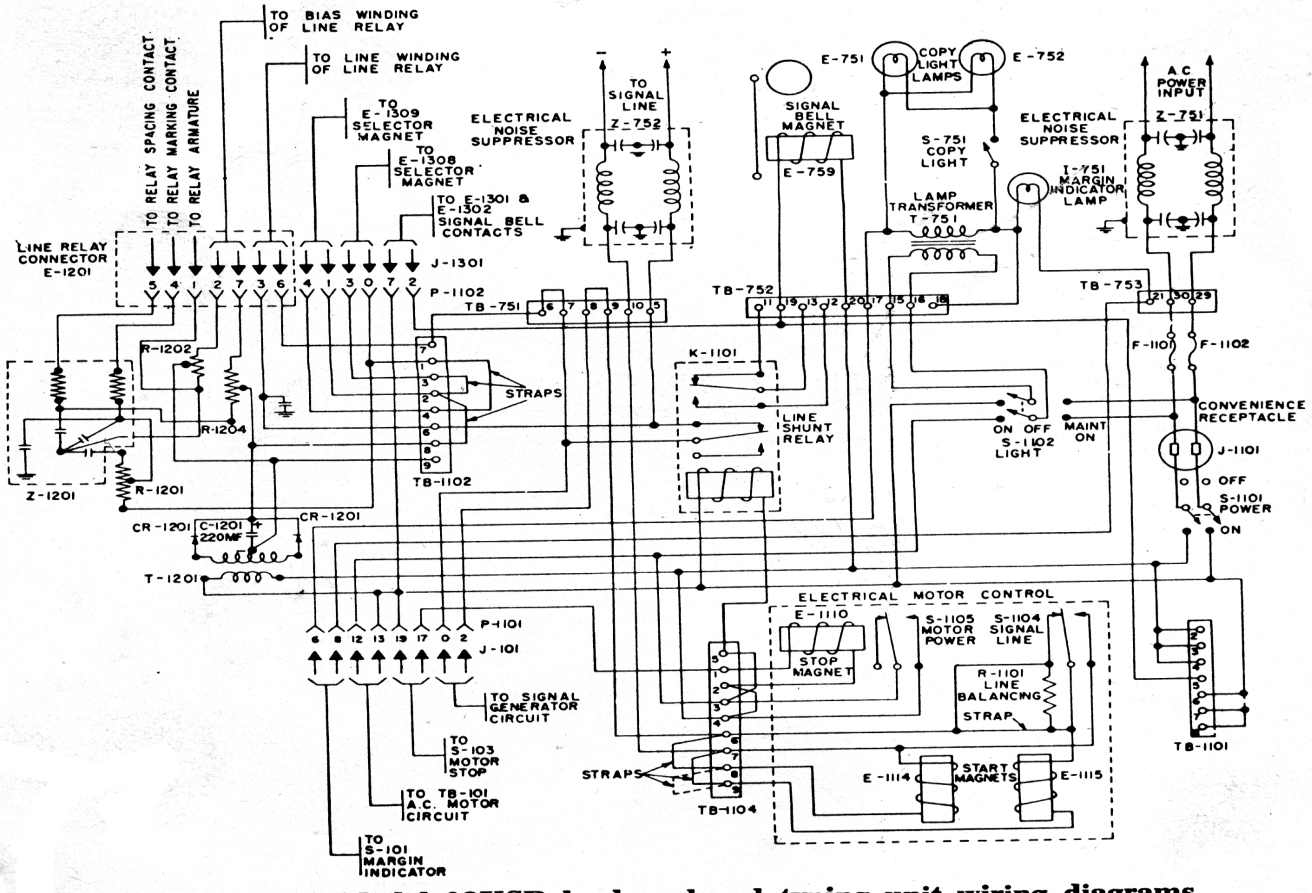


**Fig. 2.2d4—Model 28KSR keyboard and typing unit wiring diagrams.**

is usually set to operate between the 66th and the 73rd character. This adjustment is made on the spacing drum. With the carriage in position to print the 72nd character, the three mounting screws that hold down the automatic carriage return arm is loosened and the clearance between the leading end of the automatic carriage return arm and bell crank should be between 0.040-inch and 0.055-inch.

Referring to the Cabinet Wiring Diagram, Fig. 2.2d4, resistors R-1201 and R-1202 are 2000 ohms plus 600 ohms; and, resistor R-1204 is 2000 ohms plus 810 ohms. The unmarked resistors in Filter Z-1201 are each 400 ohms. Referring to the Keyboard Wiring Diagram in Fig. 2.2d3, the diode is a 1N65 and the inductor is 0.22 mhy. On the Automatic Typer Schematic diagram, the selector magnets each have 132 ohms d.c. resistance.