ESCON

INSTALLATION INSTRUCTIONS

MODEL E-A

TYPEWRITER MAGNET ASSEMBLIES

VOLUME 1 OF 2

Instructions

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MODEL E-A

TYPEWRITER MAGNET ASSEMBLIES

Instructions and figures are bound separately
for more convenient use.

GENERAL

Work in a clean, well-lighted place.

Use a small tray or box to hold parts removed.

If you drop a part into the mechanism, remove it before proceeding further. Otherwise, it may damage the mechanism when the machine is run. Parts can sometimes be shaken out by picking up the mechanism and turning it over.

Be sure that the power cord is not plugged in.

The following tools are recommended:

Soldering iron with 1/8-inch tip

Long-nosed pliers

Screwdrivers with 1/8 and 3/16-inch blades

1/4-inch nut driver

Tweezers

3/16-inch open-end wrench or another pliers

Pliers for cutting and stripping wire

Flashlight

A screw-holding screwdriver is convenient but not necessary

Read these instructions all the way through before starting work.

It is a good idea to check off the instructions as they are completed.

Follow the instructions in the order stated. Even though you know what has to be done, you can get into trouble if you don't make the steps in the proper sequence.

PARTS LIST

Select and Function Magnet Assembly (Figure 1)

Shift Magnet Assembly (Figure 1)

Shift Fork - modified IBM part (C, Figure 14)

Late Return Interlock Rod (B, Figure 10)

Large (1/4-inch) screw (E, Figure 7)

2-56 Nuts (E, Figure 14)

6-32 Self-tapping Screw (C, Figure 7)

6-32 Flat Head Screw (B, Figure 14)

Wire

Shrink Tubing

Plastic Sleeve

Solder

Solder wick to remove excess solder

Waxed string

Cable

Plug

Labels for marking wires

Electrical tape

A few extra screws, nuts, springs, and clips are included.

MACHINE MODELS AND DESIGN VARIATIONS

The ESCON equipment covered by these instructions fits all IBM office type Selectrics of all line lengths. If your machine has a manual velocity control, contact the factory for special instructions.

The two IBM models are the Selectric (often called Selectric I) and the Selectric II. The Selectric I has a "curved" case; the Selectric II case is angular.

Design changes have been made from time to time in both models. Some of these changes affect the installation as will be described in the appropriate section.

The ESCON typewriter kit is shipped in two sub-assemblies as shown in Figure 1. Before starting the installation, separate the large sub-assembly into three pieces by removing the four screws, AA and BB. Also remove the screw C and the clip D, Figure 2. There are now four sub-assemblies as shown in Figure 2.

Note that the select levers are tied with string. This is to assist in assembly. Do not remove the ties until instructed to.

When the typewriter mechanism is in the vertical position, the directions referred to as up-down and left-right assume you are facing the bottom of the mechanism. Behind means farther away from you and in front means closer to you.

INSTALLATION STEPS

1. Prepare the magnet wiring as follows:

1.1 Referring to Figures 3 and 4, cut and strip the white wires from the three function magnets and join them to a 12-inch length of the white wire provided with the kit as shown at A Figure 3. Make the joint about an inch from the return magnet. WHEN STRIPPING WIRES, HOLD THE WIRE BY HAND OR WITH THE LONG-NOSED PLIERS. NEVER PULL ON THE WIRE WHERE IT IS ATTACHED TO THE MAGNET. Twist and solder the wires together and cover the joint with shrink tubing as shown in Figure 4.

1.2 Connect the white wires from three of the select magnets to another 12-inch length of white wire, B Figure 3. Make the joint about two inches from the R5 magnet.

1.3 Connect the white wires from the remaining three select magnets to a 12-inch length of white wire, C Figure 3. Make the joint about three inches from the R5 magnet.

1.4 Mark labels PR, SP and RE to identify the three function magnets as shown in Figure 3. Attach the labels to the corresponding black wires near their ends.

INSTALLATION STEPS - Continued

1.5 Mark labels R1, R2, R2A, R5, T1, and T2 for the six select magnets. Attach the labels to the corresponding black wires near their ends.

1.6 Mark a label S for the shift magnet. Attach it near the end of the black wire.

INSTALLATION STEPS - Continued

2. Remove the mechanism from the case and set it on end as follows:

2.1 Lift the carriage cover, Figure 5.

2.2 Remove the platen by pressing down on the levers at each end of the platen and lifting the platen out of the case.

2.3 Remove the metal tray which was under the platen.

2.4 Lift the left and right margin stop levers, A Figure 6, so they point upward or to the rear.

2.5 Lift the carriage position-indicator pointer.

2.6 Note the two levers inside the case at both sides of the opening, B Figure 6. Push the ends of these levers toward the front as far as they will go. These levers lock the upper part of the case to the base. Early models did not have these levers. If they are missing on your machine, look for a screw at the center rear of the case. Unscrew this screw to release the upper part of the case.

2.7 Lift the upper part of the case off the base and set it aside.

INSTALLATION STEPS - Continued

2.8 Note the lever at the left side of the mechanism below the keyboard, C Figure 6. Move the end of this lever to the front as far as it will go. This lever locks the mechanism to the base.

On early machines, the mechanism is attached to the base by screws through two "outriggers" on each side. Remove these screws if you have one of these machines.

2.9 Grasp the mechanism by the side plates of the keyboard, being careful not to bend any of the parts. Lift the front of the mechanism about an inch and draw the mechanism forward to the ends of the guides.* Then tilt the front of the mechanism up and toward the rear until it stands in the upright position as shown in Figure 7. (The mechanism can sometimes be drawn forward more easily if the front end is moved slightly from side to side until the rear supports come out of the rubber blocks.)

*Late machines have guides at the rear of the base to support the mechanism in the upright position. Early models do not have these guides but the mechanism can rest on end on the base without them. Do not rest the machine on the rubber blocks.

INSTALLATION STEPS - Continued

3. Note the right-hand support bracket, B Figure 7. With a lead pencil draw a line on the side frame around the bracket, as shown in Figure 8, to permit its replacement in the same position.

4. Remove the right-hand support bracket by removing the two hex-head screws. This can be done conveniently with a 1/4-inch nut driver.

IDENTIFICATION OF PARTS

Note the horizontal rod connected to the AC power switch, A Figure 9. This is called the switch interlock rod. It locks the keyboard when the switch is off. Also note the smaller diameter horizontal rod, E Figure 9, which extends from the right side frame to the mechanism at the center. Rod E is the shift interlock rod. It prevents printing during a shift. Finally, note if there is a vertical rod, I, the return interlock rod, which contacts the shift interlock rod. The return interlock rod prevents a print operation during carriage return. It is not on early machines and there are early and late designs of the rod itself. There are thus three possibilities: no rod, the early rod, and the late rod. The two rods can be identified by Figure 10.

INSTALLATION STEPS - Continued

If your machine has the early vertical rod, it is to be replaced with the late rod furnished with the kit. If your machine has no return interlock rod or the late rod, discard the rod furnished with the kit.

5. Remove the switch interlock rod, A Figure 9, as follows:

5.1 Unhook the far end of the coil spring, B, near the left end of the rod using the long-nosed pliers.

5.2 Note the link rod, A Figure 11, between the lever attached to the switch key and the clamp, C Figure 11, and also shown at C Figure 9, attached to the right-hand end of the interlock rod. Operate the switch key, E, a few times to observe the motion. Referring to Figure 11, mark the hole on the switch lever into which the fork (B) is attached, to assist correct reassembly.

5.3 Remove the link, Rod A, from the key lever by spreading the fork, B, with a screwdriver. Don't spread it more than necessary to remove it. The link will come out of the clamp by itself.

5.4 Loosen the clamp screw, D Figure 11, and remove the clamp, C, from the rod.

INSTALLATION STEPS - Continued

5.5 Remove the left end of the rod from its socket by bowing the rod toward you as shown in Figure 9. Remove the rod taking care not to lose the spring, B, which is attached to the rod.

5.6 If the rod has a spring clip, D Figure 9, used to guide the return interlock rod, remove this clip. This can be done with the fingers.

INSTALLATION STEPS - Continued

6. Remove the shift interlock rod, E Figure 9, as follows:

6.1 If there is a coil spring, G, attached to the clip at the left end of the rod, remove it. Use the tweezers to remove the spring.

6.2 Remove the spring clip, F Figure 9, from the rod just inside the right side frame. Hold the clip with your fingers while you pry it off so it doesn't get lost.

6.3 If your machine has a spring clip, H, on the interlock rod, E, used to guide the return interlock rod, remove it. This can be done with the fingers.

6.4 Slide the shift interlock rod, E, through the right side frame until the clip at its left end is against the frame. (On early machines, the shift interlock rod goes through a hole in the shift lever outside the frame. On later machines, the rod rests against the lever. If the rod goes through a hole in the lever, the rod must be moved first to the right to disengage its left end, then to the left to disengage its right end and then to the right.)

INSTALLATION STEPS - Continued

7. If your machine has a return interlock rod, I Figure 9, remove it as follows:

   7.1 If the rod is the early design, disengage the clip, J Figure 9, by sliding it off the rod and removing the rod from the hole in the actuating lever (not shown in the figure). This can be done with the fingers.

   7.2 If the rod is the late design, remove the rod by spreading the fork, J, at its lower end. This can be done by inserting a screwdriver blade inside the fork and twisting the screwdriver. Do not spread the fork more than necessary to disengage it from the lever.

INSTALLATION STEPS - Continued

8. Install the select lever assembly, F Figure 2, as follows:

8.1 Remove the two screws, DD Figure 7.

Note the dimension, X, of the switch interlock rod at the top of Figure 9. If X is approximately 3 inches, follow 8.2 and 8.3 below. If X is approximately 2 inches, it is not necessary to thread the rod through the lever assembly. In this case, install the rod after step 8.4.

8.2 Thread the switch interlock rod through the select lever assembly between the aluminum bar and the print lever as shown at the upper left of Figure 12. Be sure the spring, B Figure 9, is still on the rod.

8.3 Set the lever assembly with the switch interlock rod in place on the machine, guiding the rod through its hole in the right side frame and the hook, A Figure 12, between the third and fourth interposers from the right and above the nickel-plated horizontal rod.

8.4 When the assembly is in place, insert the two screws, DD Figure 7, leaving them about a half-turn loose.

8.5 Engage the left end of the switch interlock rod by bending it slightly as you did to remove it.

INSTALLATION STEPS - Continued

8.6 Hook the spring, B Figure 9, to the interposer behind it.

8.7 Hold the switch interlock rod to the left and press the clip or clips, K Figure 9, against the right side frame. Check that the rod has little or no end play.

8.8 Engage the hook, A Figure 12, with the nickel-plated rod by pulling forward on the rod while pushing back on the hook.

8.9 Remove the string used to hold the select levers in place during assembly. The levers should all move freely. If not, check for parts binding against each other. If this occurs, the assembly is not in the proper position and must be removed and replaced.

9. Install the function magnet assembly as follows:

9.1 Note the hole in the aluminum bar, C Figure 7. If it is not threaded, screw the self-threading screw furnished with the kit into the hole and remove it. (The self-threading screw can be identified by a slot cut lengthwise through its threads.)

9.2 Set the function magnet sub-assembly in place guiding the return lever, A Figure 13, between the two function latches as shown in the figure. (These are the levers operated by the BACKSPACE and RETURN keys.) If necessary, lift the key lever as shown in the figure to permit the return lever to pass behind the key lever and between the two function latches. Guide the plunger attached to the select lever sub-assembly into the left-hand function magnet.

9.3 Insert the self-tapping screw, C Figure 7, and leave it about half a turn loose.

When this sub-assembly is in place, all three levers will be free. If there seems to be an interference, remove the sub-assembly and replace it. The sub-assembly must not be forced into place. If that is done, parts may be bent and the proper adjustment lost.

INSTALLATION STEPS - Continued

10. Replace the shift interlock rod, E, Figure 9, as follows:

10.1 Slide the rod to the left through the side frame and engage its left end in the support bracket. On the early machines, see that the rod enters the hole in the shift lever outside the side frame. On late machines the right end of the rod is behind the shift lever.

10.2 Replace the spring clip, F Figure 9, on the rod and holding the rod to the left push the clip against the right side frame.

10.3 If there was a coil spring, G, attached to the clip at the left end of the rod, replace the spring.

10.4 Replace the clamp, C Figures 9 and 11, at the right end of the switch interlock rod outside the right side frame, leaving the clamp screw, D, loose. Replace the link rod, A Figure 11, in the holes from which it was removed.

10.5 Place the switch in the "on" position and note that the switch interlock rod is in its lowest position, resting against the end of the notch in the function magnet support. Place the clamp even with the end of the switch interlock rod. Tighten the clamp screw.

10.6 Move the switch on and off. The switch should snap on and off and the link rod should not touch other parts. If necessary move the clip on the interlock rod to obtain this condition.

INSTALLATION STEPS - Continued

11. If your machine had a vertical return interlock rod, I Figure 9, of the late design, replace it as follows. If it had a rod of the early design, replace it with the rod furnished with the kit. (See Figure 10 to identify these rods.)

11.1 Slide the rod, I Figure 9, upward in back of the mechanism frame and enter its top end in the hole in the prong, E Figure 2, extending from the select lever assembly.

11.2 Spread the fork, J Figure 9, at the lower end of the rod and engage the pin in the hole in the actuating lever. Do not spread the fork more than necessary.

11.3 Adjust the "butterfly" at the top of the link, if necessary, to just touch the horizontal shift interlock rod. Upward motion of the link must rotate the interlock rod. The butterfly can be easily moved by the fingers by pinching the wings together and sliding it along the rod.

INSTALLATION STEPS - Continued

12. Install the shift magnet assembly as follows:

12.1 Remove the coil spring attached to the index key, A Figure 14, just outside the right side frame. Use the tweezers for this.

12.2 Remove the screw, B Figure 14.

12.3 Set the magnet assembly in place. Be sure that the lip on the magnet bracket enters the square hole in the side frame.

12.4 Insert the flat-head screw furnished with the kit in place of the screw, B Figure 14, removed. Tighten the screw while checking that the magnet bracket comes flat against the side frame.

12.5 Replace the coil spring, A Figure 14.

12.6 Thread the magnet wires through the square hole in the side frame.

12.7 Remove the fork C by spreading it with a screwdriver to disengage the pin from the clip D. Do not spread the fork more than necessary. Unscrew the fork from the rod.

INSTALLATION STEPS - Continued

12.8 Screw nuts E on to the rod to the end of the threads. Lock the nuts by tightening them against each other with light finger pressure on the open-end wrench. Too much force will strip the thread in these small nuts.

12.9 Place the fork furnished with the kit on the end of the rod and engage its pin in the clip, D. The new fork has no threads and slides freely on the shaft.

12.10 Lock the shift key in upper case.

12.11 As shown in Figure 14, pull the shift rod outward just beyond the end of the forked lever. Move the lever down to the energized position and release the rod. It will enter the proper slot in the lever.

12.12 Wrap the wires from the function and shift magnets with electric tape ending about four inches from the RETURN magnet.

INSTALLATION STEPS - Continued

13. Install the select magnet assembly as follows:

13.1 There may be a support screw at E Figure 7. If there is, remove it.

13.2 Thread the wires from the function and shift magnets through the sleeve attached to the select magnets.

13.3 Pass all the wires behind the frame at the left of the select magnet assembly as shown in Figure 15.

13.4 Slide the plastic tube over the wires where they pass behind the side frame. Pass a piece of waxed string, about 2 feet long, through the tube. Pass the upper end of the string behind the frame and out through the hole, C Figure 15, in the select magnet bracket. Pull about a foot of string through the hole so that it doesn't pull out while setting the magnet assembly in place.

13.5 Set the magnet assembly in place guiding the plungers into the magnets. If the machine has the vertical return interlock rod, the left prong of the magnet assembly goes in front of the horizontal shift interlock rod and the right prong goes behind the rod. If there is no vertical interlock rod, the horizontal interlock rod is almost straight and both prongs go in front of the rod. The right prong goes behind the wires to the function and shift magnets.

INSTALLATION STEPS - Continued

13.6 Insert the large screw furnished with the kit at E Figure 7 or replace the screw that you removed. Leave the screw slightly loose.

13.7 Attach the clip, D Figure 2, to hold the lower left corner of the assembly against the frame. Leave the screw slightly loose.

13.8 Replace the four screws, A A and B B Figure 1, that fasten the assemblies together. Tighten all screws firmly.

13.9 Check that all the levers operate freely and that none are tight in their non-operated position. See that all the interlock rods operate and that the two function latches trip. See Figure 13. The function latch positions can be seen at B. If a latch is tripped as at C, its prong is below the others. The latch can be reset by pushing upward on the prong.

No adjustments should be necessary. If binding occurs, it will be due to incorrect assembly or damaged parts.

13.10 Tie the function and shift wire bundle to the side frame at A Figure 15 passing the string through the square hole and the large notch in the side frame.

INSTALLATION STEPS - Continued

13.11 Tie the wires to the prong of the magnet bracket at E.

13.12 Tie the wires to the frame at the right of the select magnet bracket as shown at F.

13.13 Pull the string tight through hole C and notch D Figure 15, and the plastic tube and tie it as shown. This will hold the tube against the typewriter frame and to the right, out of the way of the mechanism.

INSTALLATION STEPS - Continued

14. Complete the wiring as follows:

See Figure 3 for the wiring diagram. See Figures 15 and 16 for the arrangement of the wires.

14.1 Bring the 14 wires from the magnets through the opening in the frame, B Figure 15.

14.2 Bring the cable behind the frame through the opening B Figure 15.

14.3 Strip the cable sheath 8 inches back from the end. Be careful not to cut the insulation on the wires. The 25-wire cable includes 7 additional wires for accessories not included in Kit E-A. The colors of these 7 wires are:

White-black
White-brown
White-yellow
White-orange
White-grey
White-red-black
White-purple

If the accessories are not to be installed at this time, tape the ends of these 7 wires to cover the conductor and tie or tape these wires to the other wires.

INSTALLATION STEPS - Continued

14.4 Separate the 6 motor wires. Twist them in two sets of three wires each. Leave them long.

14.5 Cut the remaining wires at the distances in inches from the end of the sheath shown in Figure 3.

14.6 Solder the 14 magnet wires to the 12 wires of the cable in opening, B Figure 15, following the diagram in Figure 3. To do this, cut the magnet wires to match the cable wires with the cable sheath ending at the bottom of opening B, the positions of the joints will be staggered as shown in Figure 3. Match the wire colors to the labels on the wires. Cut and solder the magnet wires one at a time so as not to lose track of the marking. Pull the wires toward you through the opening, B, to make the joints. Slide shrink tubing over the wires to be joined, twist the wires together, solder and then shrink the tubing over each joint as shown in Figure 4.

14.7 Wrap the bundle of magnet wires with electric tape from the top of opening B Figure 15 to the end of the cable sheath. Include the five spare wires in the bundle but keep the six motor wires separate.

14.8 Pass the motor wires behind the frame and bring them out below the frame at the bottom.

14.9 Tie the magnet wires with waxed string at G Figure 15. Check that the wires all clear the typewriter mechanism.

14.10 Replace the mounting foot, B Figure 8. Position it according to the pencil mark and tighten the two screws firmly.

14.11 Move the mechanism back to its horizontal position. Push it back into its rear supports. Check that lever C, Figure 6, is forward as far as it will go. Check that the mechanism is all the way down. Then move lever C to the rear to lock the mechanism down. Turn the machine around.

14.12 Pass the cable and the motor wires under the motor cord as shown in Figure 16.

14.13 Tie the cable and the motor wires to the cord with the waxed string on both sides of the cord clamp as shown in Figure 16.

INSTALLATION STEPS - Continued

14.14 Remove the insulation from the existing wires between the switch and the motor about 2 inches to the left of the motor. Solder the two sets of twisted motor wires from the cable to the existing motor wires where you have removed the insulation. Tape the joints with electrical tape. (On early machines the motor switch is at the front, at the side of the keyboard. In this case, pass the wires to the switch through the oblong hole, H Figure 15, in the select magnet bracket.)

14.15 Pass the cable through the plastic grille at the rear of the machine.

14.16 Place the receptacle cover over the end of the cable with the cover facing in the proper direction. If the cover is attached to the receptacle, pull out the two pins and remove it.

14.17 Solder the 18 active wires of the cable to 13 pins of the plug. Follow the diagram of Figure 3 and Figure 17.

14.18 Attach the cover to the plug with the drive pins provided.

15. Electrical Check

15.1 Referring to Figure 3, using an ohmmeter read the resistance between pin 15 and pins 1, 2, 3, 4, 5,6, 7, 8, and 9. All should read approximately 55 ohms.

15.2 Read the resistance between pin 15 and pin 10. This should read approximately 100 ohms.

15.3 Read the resistance between pin 11 and 14. This should be approximately 16 ohms (the motor resistance).

15.4 Read the resistance between pin 15 and pin 11. This should show an open circuit.

15.5 Read the resistance between pin 15 and the typewriter frame. This should show an open circuit.

15.6 Read the resistance between pin 11 and the typewriter frame. This should show an open circuit.

16. Shift key adjustment

16.1 After completing the electrical check and with the upper part of the case still off, plug in the typewriter and turn on the motor.

16.2 Try the shift key. A small motion of the key should occur before the shift to upper case occurs. When the key is released, a small motion should also occur before the shift back to lower case. If these motions do not occur, readjust the nuts, E, or the clamp, D Figure 14, until they do. Do not tilt the clamp so far that the clamp nut touches the fork C when the key is released. Otherwise, it will prevent the rod sliding freely inside the clamp.

17. Replace the case by following steps 2.1 through 2.7 in reverse order.

OPERATION

The typewriter mechanism is operated by ten solenoid magnets. Six of the magnets set the selectric mechanism to the code word of the character position on the type ball. One magnet trips the mechanical clutch which produces the print cycle and the remaining three control the space, carriage return, and shift to upper case.

There are 88 positions on the ball which are selected by the six select magnets and the shift magnet. The code is shown on the table in Figure 18. The ball positions are designated by rotate and tilt angles. Rotate units (angles) are the sum of the increments produced by magnets labeled R1, R2, R2A, and R5. R5 is actually a negative angle. The shift magnet rotates the ball a half-turn. R2 and R2A each cause two units of rotation. They are used together to obtain four units. Forty of the 128 possible combinations of the six bits (including shift) are unused.

Spacing is produced mechanically by the print magnet operation, the space magnet operation is required for spacing only when no printing occurs.

The carriage return magnet operation also causes the line feed.

All magnets except the shift magnet are pulsed. The shift magnet is held on continuously in upper case.

TIMING

Timing requirements are diagrammed in Figure 19. Timing of the print and select magnets is important. Incorrect timing of these magnets can break the tape which controls the ball rotation. Replacing a broken tape is a difficult operation not recommended for an amateur. Printing or spacing during carriage return will not cause damage.

MAGNET VOLTAGE

Magnet voltage is 30 to 40 volts. Magnets must be protected by diodes against reverse voltage spikes. (This is provided for in the ESCON power supply.)

Voltage must not be applied to any magnet before the typewriter motor comes up to speed. (This is also provided for in the ESCON power supply.)

MECHANICAL ADJUSTMENTS

The only mechanical adjustment required at assembly of the kit on the typewriter is setting the clearance between the fork and the nut on the shift rod—installation step 12.13. Magnet plunger travels have been adjusted at the factory. However, if defects appear in the typewriter's output, the mechanical adjustments should be checked as described below.

Before examining the magnet adjustments, operate the magnet plungers by hand and observe the motions of the mechanism.

Do not operate the magnets electrically during adjustment. The magnet plungers can all be moved by hand.

The plunger travel can be measured by a small and accurately marked ruler placed against the magnet. A machinist's scale is best for this purpose.

All the magnets operate levers by means of wire links. Some operate two levers in series. In all cases, the final lever contacts an IBM part which is a latch or operates a latch.

1. With the magnets released, all the levers operated by the magnets should have a slight clearance both from their stops and from the IBM part that they operate. In the released position, the levers should have barely perceptible looseness.

2. The plunger travel of the space and return magnets must trip the latch and travel slightly beyond the trip point. The trip point should occur at about 1/32 inch travel of the plunger from the released position. The total travel should be about 1/16 inch.* The space and return latches can be reset by pressing upward on the levers as shown at the upper left of Figure 13.

3. The R1, R2, R2A, T1, and T2 select magnets move latches which are operated by a bar which rises under them (with the mechanism in the vertical position as shown in Figure 7.) At the full travel of the magnet, the latches should clear the bar by 1/16 inch.

4. The R5 select magnet moves a latch which is operated by the head of a screw. When the R5 magnet pulls in, the latch should clear the screw head by 1/32 inch.

5. The shift magnet operates a latch which releases the cog wheel at the right side of the machine. When the latch is tripped, the wheel will move counterclockwise for a fraction of a turn. It can be turned back by hand to re-engage the latch after releasing the magnet plunger.

*Excessive travel will also cause trouble. Excessive return plunger travel will cause a delayed return resulting in printing the first characters of the next line during the return. Excessive space travel will operate the continuous spacing feature that is produced by full depression of the space bar. This results in double or triple spacing.

The shift wheel latch should trip after 1/32 inch motion of the magnet plunger from the released position. The total plunger motion should be 1/16 inch or slightly less.

6. The print magnet plunger should trip the print clutch after 1/32 plunger travel from the released position. The total plunger travel should be 1/16 inch. The print clutch must be reset by running the typewriter motor (unless an operating handwheel, available from IBM, is available). The typewriter can be operated in the vertical position.

The plunger motion is adjusted by bending the wire links to lengthen or shorten them and by bending the prongs which stop the levers in the released position as shown in the following figure (page 37). The links are pre-bent through an angle of about 30 degrees so that adjustment can be made in either direction. The links can be most easily bent by holding them with two pairs of long-nosed pliers, one on each side of the bend and twisting the pliers.

Rev. 1/19/78

TROUBLE SHOOTING - Using ESCON power supply

Magnets do not operate at all

Check for:

Typewriter motor running.

Power supply plugged in.

Fuse OK.

Signal from computer - Input signal to input ground must be below 2 volts to turn driver transistors full on. If signal is above 2 volts, drive is inadequate and driver transistor will overheat.

+35 DC volts to ground on pin of typewriter plug - lack of voltage may be relay coil or contact failure. Purpose of relay is to delay magnet operation until typewriter motor is up to speed. Without this delay, typewriter mechanism can be damaged.

One magnet does not operate

Check for 35 volts DC between magnet pin and ground pin on typewriter receptacle on power supply.

Check for signal from computer below 2 volts on input receptacle pin.

Check resistance of magnet circuit normally approximately 50 to 60 ohms each magnet, except shift magnet which is about 120 ohms.

Look for mechanical binding in levers driven by magnet.

Typewritten copy shows defects

Using Selectric Code Table, find which magnets coming on or off would cause the errors. For example, if the R5 magnet fails to pull, A C will print as a K. If the R5 magnet holds in, a K will print as a C.

If a particular magnet fails to pull in, it may be due to:

Excessive magnet travel

Low power supply voltage

Bad driver transistor

Weak drive from computer

Low line voltage

Bind in mechanism

If a magnet holds in, it may be due to:

Lack of pretravel

Bind in mechanism

Leaking power transistor

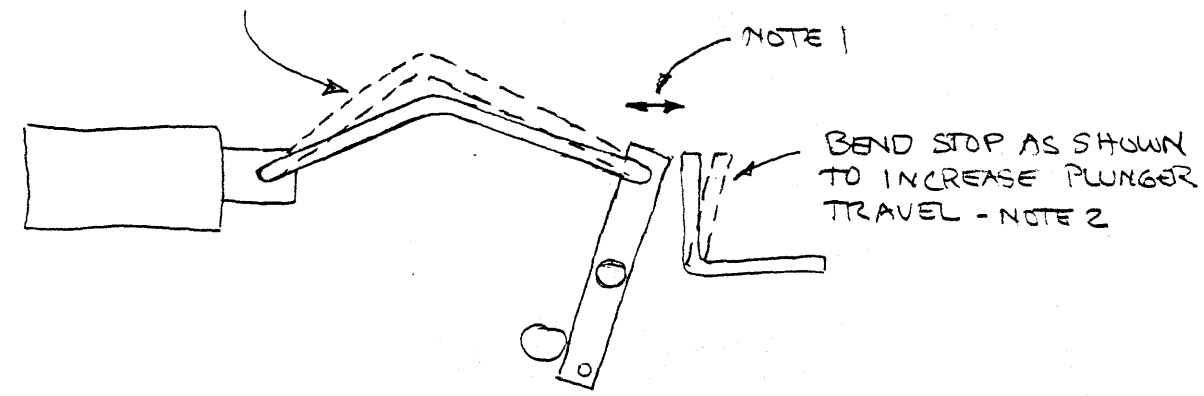
Continuous drive from computer

Brass shim missing from magnet

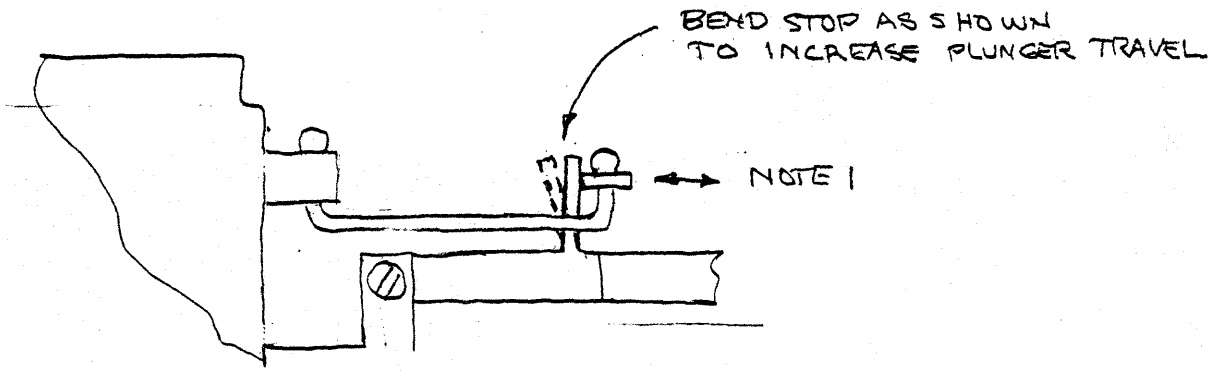
Unusual noise

Unusually loud clicks during operation indicate timing errors and select latches "popping" off their actuating bar. The typewriter should be stopped immediately and the cause investigated.

MAGNET ADJUSTMENTS



TYPICAL MAGNET ADJUSTMENT (EXCEPT R5)



STOP ON LEFT HAND (R5) MAGNET VIEWED FROM BOTTOM OF MECHANISM

NOTE 1 — IN RELEASED POSITION LEVER SHOULD HAVE BARELY PERCEPTIBLE SHAKE IN THIS DIRECTION

NOTE 2 - THERE IS NO STOP ON THE SHIFT MAGNET