

“DATASPEED®” PRINTER

RECORDER AND PAPER TRANSPORT

DESCRIPTION AND PRINCIPLES OF OPERATION

1. GENERAL

1.001 This addendum, which supplements Section 578-500-110, Issue 3, is issued to describe engineering changes incorporated in recent units. These include a single tire paper tensioner roller in place of the double tire and double roller assembly, a mechanical paper-out sensing device, a serrated edge provided on the paper plate to reduce the surface in contact with the paper which reduces paper lint, and a new version of the recorder. Arrows in margins indicate changes and additions.

1.002 Insert the attached pages in accordance with the filing instructions above.

Attached:

Page 1, dated October 1970, reissued
Page 2, dated October 1970, revised
Page 3, dated October 1970, revised
Page 4, dated October 1970, revised
Page 13, dated October 1970, revised
Page 14, dated October 1970, reissued

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1. GENERAL

1.01 This section provides description and principles of operation for the recorder and paper transport of the DATASPEED Printer. It is being reissued to change the title and to incorporate recent engineering changes. Since this is a general revision, marginal arrows ordinarily used to indicate changes and additions are omitted. This section was formerly designated 592-820-110, but this number is now cancelled. Since this issue of Section 578-500-110 is a revision of Section 592-820-110, Issue 2, it is designated Issue 3.

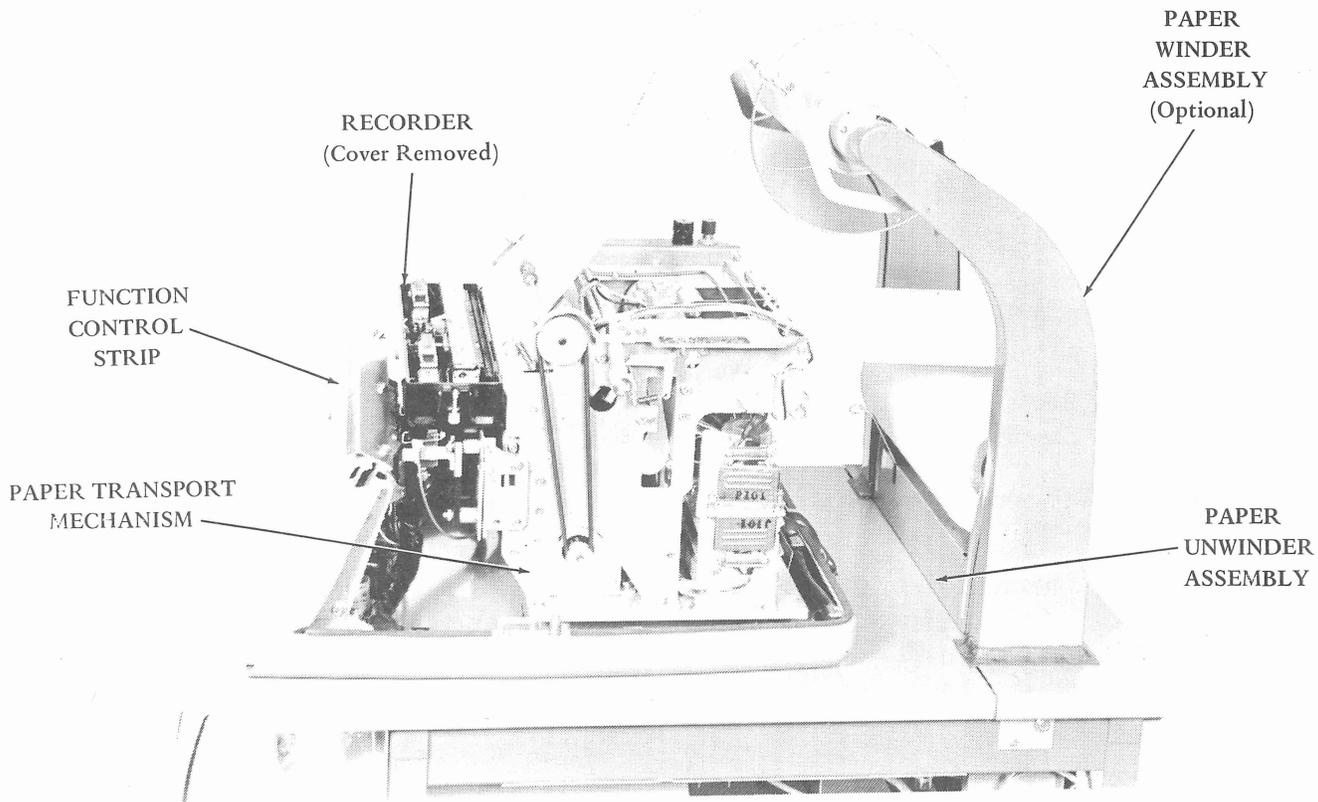
1.02 References to right or left, up or down, front or rear, apply to the unit as viewed from the front or tank side.

1.03 The DATASPEED system forms characters from a series of 40 nozzles (jets) located in a horizontal plane in front of the paper. A high potential charge on the platen, located directly behind the paper, attracts a stream of ink at high velocity from the selected nozzle. In transit, the stream breaks up into tiny droplets which are individually guided (electrostatically) in a vertical and a horizontal plane to form each character – one character every 8 milliseconds at 1200 words per minute. The nozzles are selected sequentially to print an 80-character line.

1.04 A cover protects the recorder and paper transport mechanism from damage. In addition, it shields the operator from the printer elements with the high potential charge. With the cover raised for inspection of the printer, the high voltage power supply is de-energized by the magnetic reed type interlock switches. Because of the high potential in these areas, only qualified personnel should service the set. Allow a 15 minute warm-up time before initiating the printing cycle. However, if the set is shut down only momentarily, a 30 second warm-up time is adequate.

CAUTION: (a) REMOVE POWER FROM SET PRIOR TO SERVICING (b) AVOID SPILLING INK. THIS INK HAS POWERFUL STAINING CHARACTERISTICS; AVOID TOUCHING ELECTRODE AREA AND TRANSFERRING INK RESIDUE TO SKIN, CLOTHING, OR OTHER MATERIALS.

1.05 In the receive-only model, the cabinet supports the recording unit and its cover on an extendable panel (Figure 1). Facilities for supplying a large volume of teletypewriter paper to the recorder and transport at high speed, and a motor driven take-up reel or paper winder (optional) to retrieve the printed copy from the unit, are provided by the external paper handling devices at the rear of the cabinet. In the receive-only model, the paper supply reel moves forward with the cover and cabinet top panel to facilitate the installation of a new supply of paper. The paper winder is secured to the rear cabinet frame. It remains stationary as the recorder and transport, cover and paper



Note: Late design recorder units have a hinged access lid above the electrode assembly with a white character position scale stamped on it (not shown in illustration), and the metal strip down the center of the cover is omitted. Also, an auxiliary mask is added to the electrode assembly to help shield the electrodes from paper lint. The hinged lid simplifies maintenance by permitting the electrodes to be cleaned without removing the cover from the set. Circuit Cards in lower right hand corner have been modified – refer to the appropriate section and wiring diagrams for the changes. Paper-out sensing switch located on the paper bail is an added feature (not shown) which is arranged to remove the high voltage on a paper-out condition. The improved paper handling mechanisms located on the cabinet are tied in with the circuit logic.

Figure 1 - Recorder and Paper Transport Mechanism in Receive-Only (RO) Model

supply are moved forward. Refer to Section 578-500-112 for further information on the paper handling mechanism and enclosures.

2. DESCRIPTION

2.01 The DATASPEED printer is capable of printing copy at speeds up to 1200 words per minute. This unit utilizes high potential fields to transfer ink to the paper, and with the exception of paper feeding, line feeding, and ink circulating (pump) mechanisms, it has no moving parts.

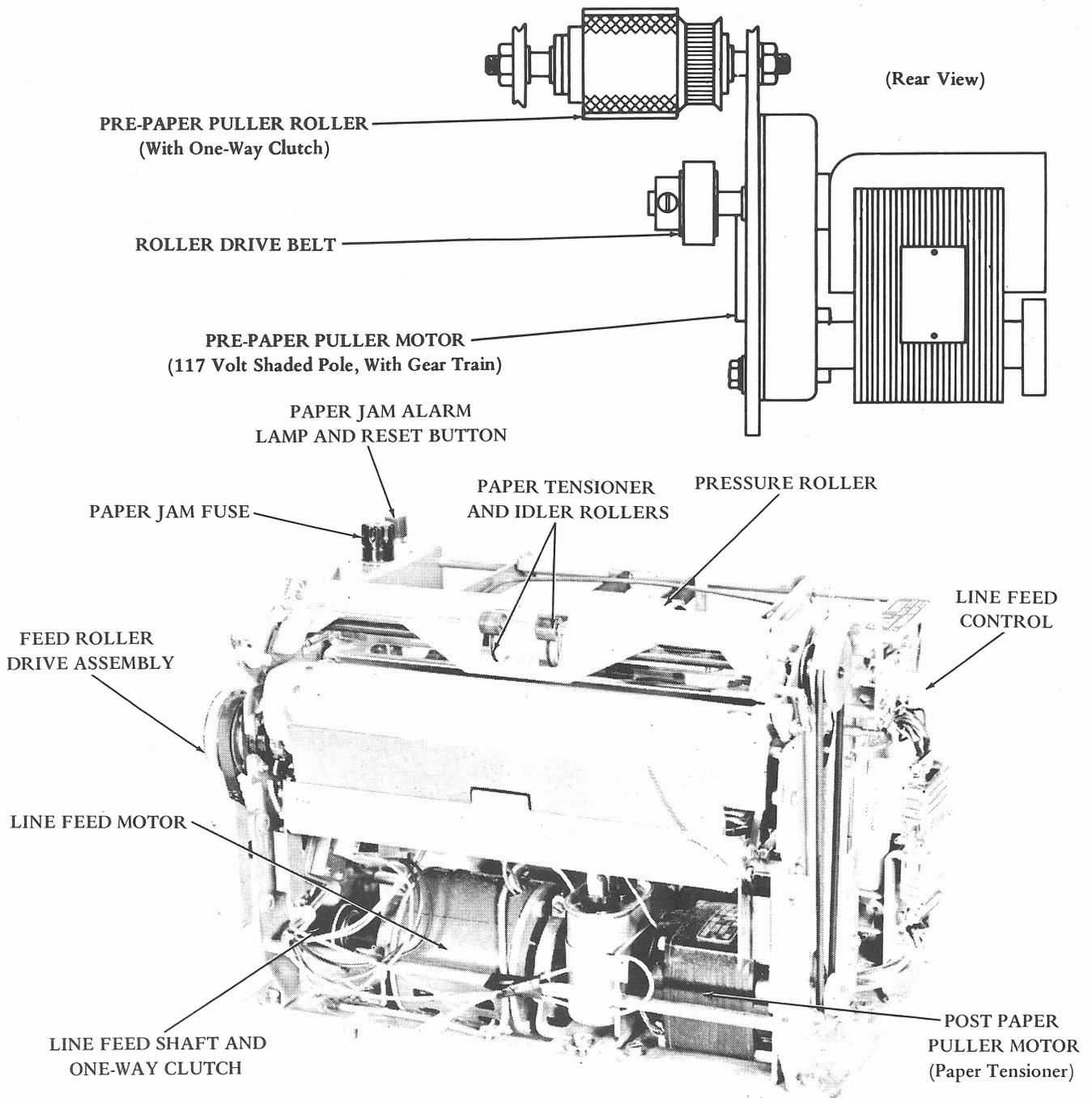
2.02 The printing function depends upon the initiation of a high velocity stream of ink from the selected nozzle, and deflection of this ink stream to form a character. The characters are formed on the paper at the platen. A series of 40 ink nozzles, located on a manifold in front of the platen, emit streams of small droplets of ink which are attracted by a highly positive charge on the platen. Printing takes place from left to right across the page under control of the recorder drive circuits. The recorder drive circuits

energize the valving electrodes, which control the flow of ink from the nozzles, as well as the sets of horizontal and vertical deflection electrodes, which shift the positions of the ink streams to form the characters. The maximum length of line is 80 characters.

2.03 Paper is fed from the supply roll, through the paper transport mechanism to the line feed mechanism, which feeds the paper past the ink nozzles. The paper tensioner assembly pulls the printed paper from the platen and also keeps it tight against the platen during printing.

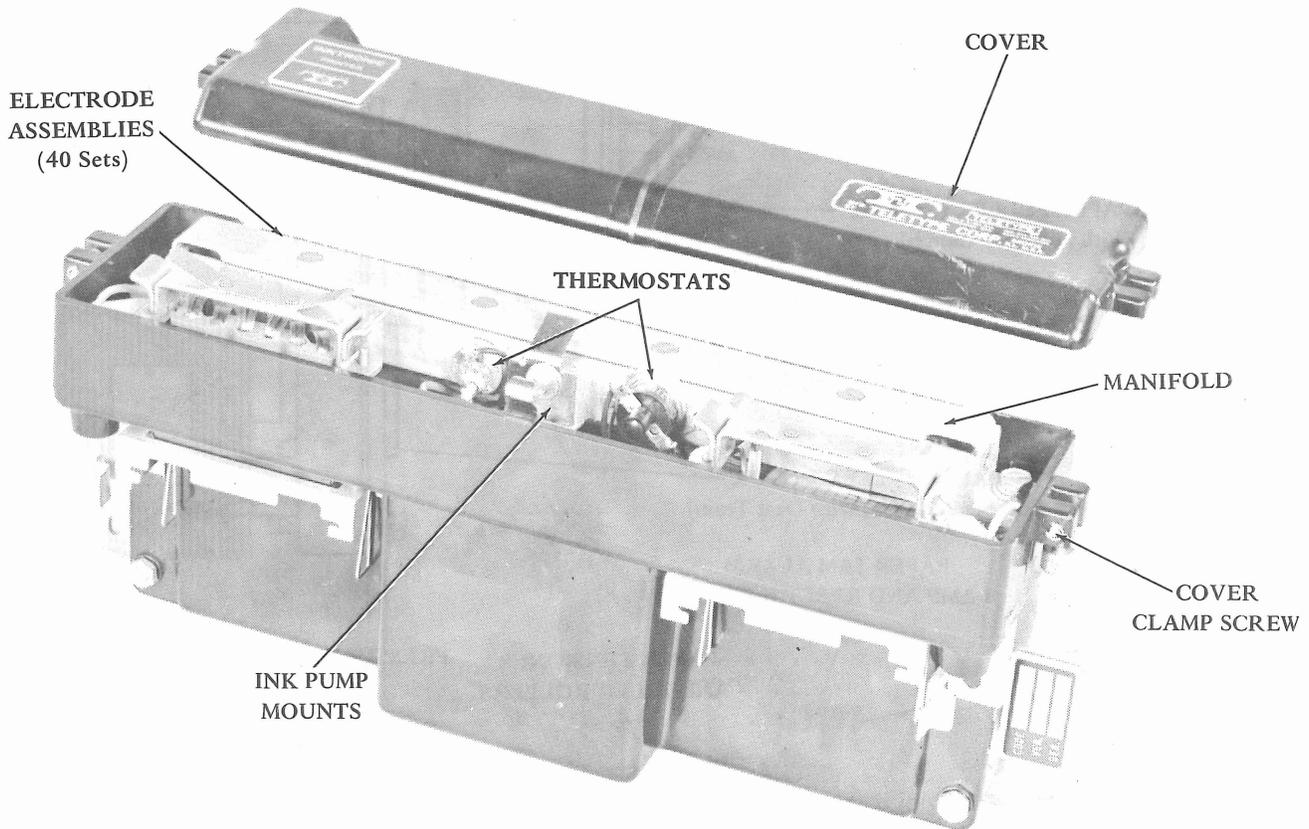
2.04 The recorder and paper transport mechanism is approximately 12 inches wide, 9-1/2 inches high, and 12 inches deep, and weighs approximately 33 pounds. The transport mechanism (Figure 2) includes three driving motors and the associated mechanical drive systems to step the paper across the platen at a prescribed rate. The recorder (Figure 3) includes an ink tank with an electrically driven pump, 40 nozzles and a set of electrodes aligned with each nozzle.

PRE-PAPER PULLER MOTOR ASSEMBLY



Note: The contour of the paper plate assembly has been serrated to reduce the surface contacting the paper (less paper lint generated). The detent arm located on the right side frame has been eliminated on the late design. A new lever is coupled to the pressure roller bail latch to guard against an accidental movement of the lever as the printer enclosure lid is closed. Note that the paper tensioner assembly becomes a single tire assembly in place of the double contact with the paper.

Figure 2 - Paper Transport Mechanism



Note: As pointed out previously the access lid (not shown) is arranged for the protection of the electrodes and to facilitate cleaning without removing the printer enclosure. Certain internal changes have been made in the tank such as the removal of the tank spring, modification of the pump, and double ink filters provided. Since this area requires factory adjustment no maintenance except keeping the ink supply and reservoir clean should be attempted.

Figure 3 - Recording Head

PAPER TRANSPORT (Pre-Paper Puller, Line Feed and Post Paper Puller)

2.05 As the paper is pulled from the supply roll, a controlled length or loop of paper is maintained within a recessed area of the transport mechanism. This loop is maintained in order to free the line feed mechanism of any drag on the paper as it is stepped through the printing station. Closing the pressure roller bail brings the loop forming mechanism into action. The loop forming switch forms the loop on initial threading of the paper over the recessed area. When the paper loop diminishes to a certain level, a sensing switch turns the pre-paper puller motor on to strip more paper from the roll. The switches operate in conjunction with the control circuit card located at the rear of the base.

2.06 A line feed motor and its associated control logic is used in conjunction with a magnetically-operated escapement to move a measured amount of paper (0.167 inch) over the platen in time for the next printing cycle. The line feed escapement magnets control the indexing of the

escapement wheel, which allows the friction type feed roller to advance the paper. The line feed assembly includes a one-way (antiback-up) clutch with a torsion rod, a friction feed roller, interconnecting tie tube, and a timing belt drive arrangement. Some manual adjustment of the line feed motor torque is provided by the rheostat on the right side frame. The torque is stabilized by a regulator circuit on the middle card in the card mounting assembly at the rear of the transport.

2.07 A third motor, a post paper puller motor or paper tensioner motor, is coupled to the paper tensioner roller and idler shaft by a round drive belt. This assembly moves the paper out of the printing station to the paper take-up reel.

2.08 The printing station is illuminated by a fluorescent lamp assembly on the underside of the cover. The plastic lens directs the light over the full width of the copy to be viewed.

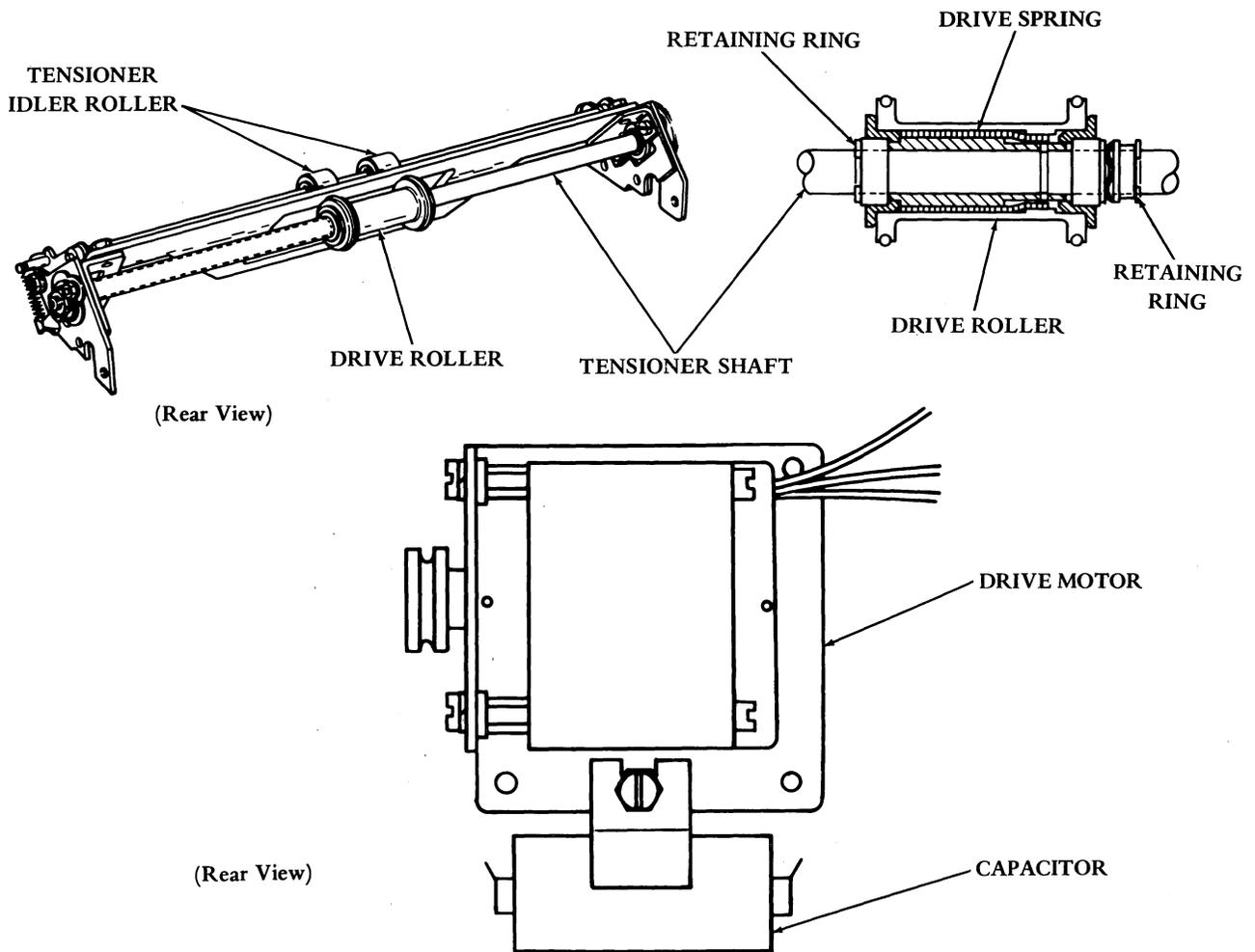
3.32 For filtering purposes, the ink inlet to the pump is covered with a screen which is secured by the filter retainer. The capacity of the tank is one bottle of ink – do not replenish the ink supply with more than 1/2 bottle unless the tank is drained, cleaned, and refilled.

3.33 When the manifold temperature falls below 130°F, the contacts of a thermostat close to forward bias the gate circuit of a triac (see wiring diagram 8344WD). With the triac turned on, 26 v ac is directed to the ink heating element until the ink temperature reaches 130°F. Then the thermostat contacts are opened and the triac becomes nonconductive. A second thermostat, with a manual reset button, is placed in one leg of the 26 v ac input to the heater and the pump. Should a malfunction occur in the ink heater thermostat which might cause the ink temperature to reach 160°F, the second thermostat opens to break the heater circuit.

3.34 The ink contains a violet toner and organic liquids. Exercise extreme care in handling to avoid any possibility of the ink or its residue coming in contact with clothing, skin, or most plastics. The violet toner has powerful staining characteristics. Therefore, the ink tank cover and the doors of the cover over the unit should be well seated in the recessed area provided to seal the components.

PAPER TENSIONER MECHANISM

3.35 The paper tensioner mechanism (Figure 12) consists of a drive roller and a pressure roller. The drive roller derives a constant torque through an internal overrunning spring clutch. The spring clutch is secured to a continuously rotating shaft. The tensioner provides for the instant take-up of the printed copy. In addition, it provides a positive drive to move the paper outward through the slot in the cover. The rapid take-up feature of the tensioner tends to



Note: The latest design mechanism becomes a single tire drive roller arrangement. Note that the clutch assembly is now permanently lubricated.

Figure 12 - Paper Tensioner Mechanism

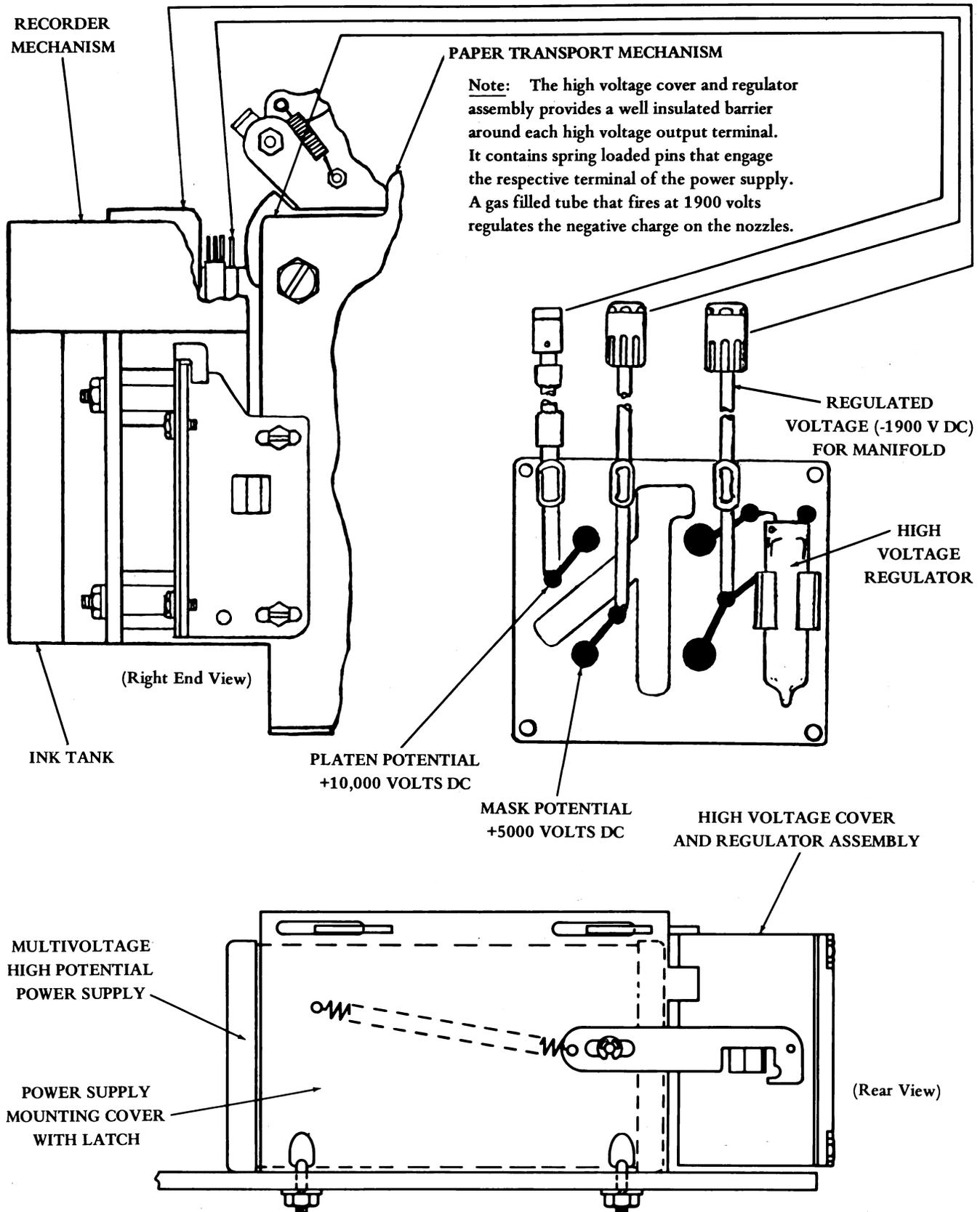


Figure 13 - Distribution of Electrostatic Charges to the Platen, Mask, and Nozzles