

2617A
Line Printer
Preventive Maintenance Manual



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2617A Line Printer Preventive Maintenance



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PREVENTIVE MAINTENANCE PROGRAM I - OPERATOR DUTIES

PRINTER USAGE

One Shift
Two Shifts
Three Shifts

PERFORM MAINTENANCE

Once per week
Twice per week
Once per day

CAUTION:

PRINTER POWER SHOULD BE TURNED OFF
BEFORE PERFORMING MAINTENANCE PROCEDURES

- I. Remove Ribbon.
- II. Vacuum paper and ribbon dust from:
 - a. Hammer bank area
 - b. Drum gate area - including Ribbon Drive gears
 - c. Air intake on inside Right-hand pedestal
 - d. Area around VFU Reader
- III. Using soft cloth moistened with Isopropyl Alcohol, carefully clean the print drum of paper and ribbon dust.

NOTE: A dirty drum will cause poor print quality.

PREVENTIVE MAINTENANCE PROGRAM II - CUSTOMER ENGINEER DUTIES

PRINTER USAGE

MAINTENANCE INTERVAL

0 to 50 print hours per Month -----	Once per Month
50 to 100 print hours per Month -----	Twice per Month
100 to 150 print hours per Month -----	Three times per Month

- I. A. Perform Maintenance Program I.
- B. Perform the following inspection and cleaning precedures.
1. Verify blower is operational - Ensure air intake on inside of right hand pedestal is not blocked.
 2. Verify that all connectors are tight.
 3. Verify miscellaneous hardware is secure.
 4. Examine paper guides for deformities or burrs and replace if necessary.
 5. Inspect drum and paper drive belts for wear or cracking, replace any defective belts using the appropriate method as prescribed in the Technical Manual.
- C. Power Regulator Voltages
1. Remove the power from printer by turning off circuit breaker and disconnecting printer from main power.
 2. Gain access to power regulator by removing rear electronics access cover.
 3. Remove power supply load by disconnecting J1 thru J14 from power regulator.
 4. Re-connect main power and turn circuit breaker to ON.
 5. Connect the DVM leads between 4.75V test point (on regulator PCA) (positive lead) and ground (negative lead), and adjust R31 until the meter indicates $+4.75 \pm .01$ VDC.
 6. Remove the positive DVM lead from +4.75V test point and place on the +5V test point. Adjust R7 until DVM indicates $+5.0$ ($-.02$, $-.00$) VDC.



7. Remove the positive DVM lead from the +5V test point and place on the +12V test point. Adjust R29 until DVM indicates +12.0 (+.02, -.00) VDC.
 8. Check VCL test point for $+3.60 \pm .03$ VDC (not adjustable).
 9. Change polarity of DVM and verify -11.8V test point reads $-11.8 \pm .4$ VDC.
 10. Verify the -4V test point reads $-4.00 \pm .2$ VDC.
 11. Turn off circuit breaker and remove the main power from printer. Re-connect J1 thru J14.
 12. Re-connect main power and turn on circuit breaker.
- D. Verify the performance of the following assemblies:
1. Operator control panel indicators (including fault indicators)
 - a. POWER ON indicator Will illuminate approximately four seconds after MAIN POWER circuit breaker is set to ON, indicating dc voltages are stabilized.
 - b. ALARM indicator Will illuminate when any fault is detected and when PRINT INHIBIT switch is set to ON position.
 - c. READY indicator Will illuminate when all fault circuits are cleared, even when PRINT INDICATOR switch is set to ON position.
 - d. ON LINE indicator Will illuminate when printer is in ready state and ON/OFF LINE switch is activated.
 - e. HAMMER FAULT While printing, set PRINT INHIBIT switch to ON, then to OFF. HAMMER FAULT and ALARM indicator will illuminate, indicating hammer fault circuit is operating properly. To clear, set MAIN POWER circuit breaker to OFF, then ON.

NOTE

For the following tests, set PRINT INHIBIT switch to ON position. Verify POWER ON, ALARM, and READY indicators illuminate.

f. FORMAT Fault

While stepping paper, alternately place 6LPI/8LPI switch on operator control panel in the 6LPI and the 8LPI positions. The FORMAT Fault indicator will illuminate, indicating the format fault circuit is operational. To clear, press FORMS RESET switch on operator control panel.

g. RIBBON Fault

With power off, remove back panel, raise printer cover, and remove paper deflector and electronics assembly cover. Remove A14P15 and A14P16 from the servo board (A14) to remove drive to the ribbon motors once power is re-applied. Lower the electronics assembly cover and turn power on.

Place the printer on-line in order to step paper. The RIBBON fault indicator will illuminate, indicating the ribbon fault circuit is operational. To clear, press CLEAR switch on the operator control panel. (Reinstall A14P15 and A14P16 on the servo board and reinstall electronics assembly cover upon completion of test). Reinstall paper deflector, lower printer cover, and reinstall back panel.

h. GATE Fault

GATE fault indicator will illuminate as soon as drum gate latch is pulled and will go out as soon as the gate is latched again.

i. PAPER fault

PAPER fault indicator will illuminate as soon as paper is removed from left tractor. Reinstall paper and indicator should stay illuminated. This indicates fault and latch circuits are operational. To clear, press CLEAR switch.

j. TAPE Fault

From exerciser Box, or user system, select tape channel 15 (Bits 1 through 4 High). The FORMAT and TAPE fault indicators should illuminate, indicating tape fault circuit is operational. To clear, press Tape Manual Start switch on VFU tape reader.

2. Paper Feed Servo

- a. Turn printer power off and remove paper.
- b. Verify paper feed system moves freely in both directions. There should be no mechanical binding in either direction.
- c. Turn printer power on and reload paper.
- d. Verify 6 LPI/8LPI switch on operator control panel switches the printer between 6 and 8 lines per inch. (FORMS RESET switch must be pressed and released each time format is changed).

NOTE: For convenience, the off-line test box can be programmed to print using the step count method. The switches on the test box should be in the following positions:

1. Function switch to "Normal"
2. Pattern switch to "Sliding"
3. Column switch to "Both"
4. Data switches - 1 and 7 on - 2 thru 6 off.

3. Hammer Bank

Examine print samples for acceptable line straightness, print density and character phasing. Line straightness may be verified by viewing down the line of print from either side edge. If any back-stops now require adjustment and during this P.M. period have been adjusted or require more than 1/4 turn to obtain the correct flight times, the backstop screw should be removed and carefully examined for excessive wear or damage.

4. Paper Tractor Tension

In order to check tractor chain tension, the tightest point on chain must be found. To do this, check each tractor chain as follows:

- a. Lift Printer Top Cover

- b. Unlatch and open drum gate to 90°

CAUTION: If power was applied, wait for printer drum to stop rotating before proceeding.

- c. Rotate tractor chain to position yielding minimum slack.
- d. With a force gauge, apply a force of 2 lbs at a point on the tractor chain link midway between the drive sprockets and in a direction away from the tractor body (Reference figure 1). Using a Feeler Gauge, measure the space between the chain and the tractor body directly under the feed pin at which the force is being applied. Dimension should be .100 (GO) .125 (NOT GO).

CAUTION: Do not force .125.

- e. As a final check, slide tractors back and forth along the spline and support shafts to ensure no binding occurs. Binding will confirm improper adjustment.
- f. Repeat for each tractor.

NOTE

If adjustment is required to meet dimension of Step d, loosen eccentric bushing locking set screw (Reference, figure 2) and rotate eccentric bushing to tighten or loosen chain. Secure bushing with locking set screw and repeat step d. Repeat if deminsion specified in Step d is not achieved.

NOTE

Tightening locking set screw may also tighten chain an additional amount. Compensation for this amount may be required.

5. Tractor Phase Check and Adjustment

- a. Set MAIN POWER circuit breaker to ON.

NOTE

Ensure single part paper is loaded, ribbon installed, and drum gate closed and latched.

- b. Press and release ON/OFF LINE switch; verify that ON/OFF LINE indicator lights.
- c. Enter E pattern from exerciser box, or user system to start print cycle. Ensure all columns are printing (136).
- d. After a minimum of one form of print, press and release ON/OFF LINE switch to stop print cycle.
- e. Set MAIN POWER circuit breaker to OFF. After character drum stops rotating, open the drum gate and remove paper from tractors.
- f. Fold printed form so as to align the left hand drive holes with right hand drive holes (figure 3).
- g. Hold the folded form up to a bright light source and verify that the tops and bottoms of the E's on both ends of the printed line are on the same plane. If the E's are not on the same plane, tractors are out of phase.
- h. If folded form with printed E's appears as in example A, figure 4, measure dimension "X" and adjust right hand tractor as follows: if not, proceed to step i.
 - (1) Loosen right hand tractor lock (figure 1).
 - (2) Loosen one of the two sprocket phasing screws figure 1).
 - (3) Rotate tractor spline shaft 180 degrees to provide access to second sprocket phasing screw.
 - (4) Place pencil marks on tractor guide plate above and below one link of the tractor chain for reference (as shown in figure 1).
 - (5) Loosen second sprocket phasing screw.
 - (6) Using the reference pencil marks, raise tractor chain an amount equal to dimension "X" measured in step h.
 - (7) Lock one sprocket phasing screw while holding chain in new position.
 - (8) Rotate tractor spline shaft 180 degrees and lock second sprocket phasing screw.

- (9) If an insufficient amount of adjustment of the tractor chain prevents full movement to dimension "X", proceed to step J.
- i. If folded form with printed E's appears as in example B (figure 4), measure distance "X" and adjust right tractor as follows:
 - (1) Loosen right hand tractor lock (figure 1).
 - (2) Loosen one of the two sprocket phasing screws (figure 1).
 - (3) Rotate tractor spline shaft 180 degrees to provide access to second sprocket screws.
 - (4) Place pencil marks on tractor guide plate above and below one line of the tractor chain for reference as shown in figure 1.
 - (5) Loosen second sprocket phasing screw.
 - (6) Using the reference pencil marks, lower the tractor chain an amount equal to dimension measured in step i.
 - (7) Lock one sprocket phasing screw while holding chain in new position.
 - (8) Rotate tractor spline shaft 180 degrees and lock second sprocket phasing screw.
 - (9) If an insufficient amount of adjustment of the tractor chain prevents full movement to dimension "X", proceed to step j.
 - j. Repeat steps h or i for left hand tractor, adjusting its tractor chain in a direction opposite to that of the right hand tractor chain previously adjusted. The combined total movement of both tractor chains should equal dimension "X".
 - k. Repeat steps a through g. If printout meets requirements of step g. alignment is then complete. Close the drum gate and lower the printer cover.
6. Ribbon Servo System

While stepping paper insure ribbon is running smoothly and reverses at the end of each spool.

7. Ribbon Deskew Mechanism (If installed).
 - a. On the logic PCBA, place the Print Inhibit switch in the Print Inhibit position. The correct position can be determined by the alarm indicator on Control panel. When the switch is in the ON position the alarm indicator should light.
 - b. Load paper and place the printer on-line.
 - c. Use the exercise box to cause the printer to move paper in single line increments.
 - d. Verify that ribbon deskew mechanism maintains the ribbon in front of the hammers.

8. Verify proper operation of the Static Eliminator.

- a. Static Eliminator Test Procedure

The static eliminator system can be checked for proper operation by observing the voltage drop across a resistor. Each emitter pin on the static eliminator wand should be checked for proper output. Proper output wave forms are shown on figure 6. Figure 5 shows the required connections.

PROCEDURE:

1. Set the oscilloscope controls as follows:

Horizontal deflection to 5 msec/cm.
Vertical deflection to .1 volt/cm.
2. Set the printer circuit breaker on and measure all the emitter pins on the static eliminator wand as shown on Figure 5.
3. The measured voltage, at the respective 50/60 Hz frequency, shall be a minimum of 2.5 volts peak to peak and a maximum of 7 volts peak to peak.
4. If the resistor probe is not making a good connection with the emitter pins distortion will occur at the peaks of the wave forms.
5. Figure 6 Waveforms:

Waveform A: Current waveform of an acceptable static eliminator pin.

Waveform B: Current waveform of a defective static eliminator for one or more of the following reasons.

1. If all pins on the wand have low output, transformer is defective.
2. If only certain pins are low output, wand is defective.

Waveform C: Current waveform of a defective transformer. High amplitude spikes are visible near the zero voltage areas on the waveform. Spike (s) may not occur every cycle or half cycle. Typically any spikes can cause intermittent printer problems.

Waveform D: Current waveform of a defective static eliminator for any or all of the previous reasons.



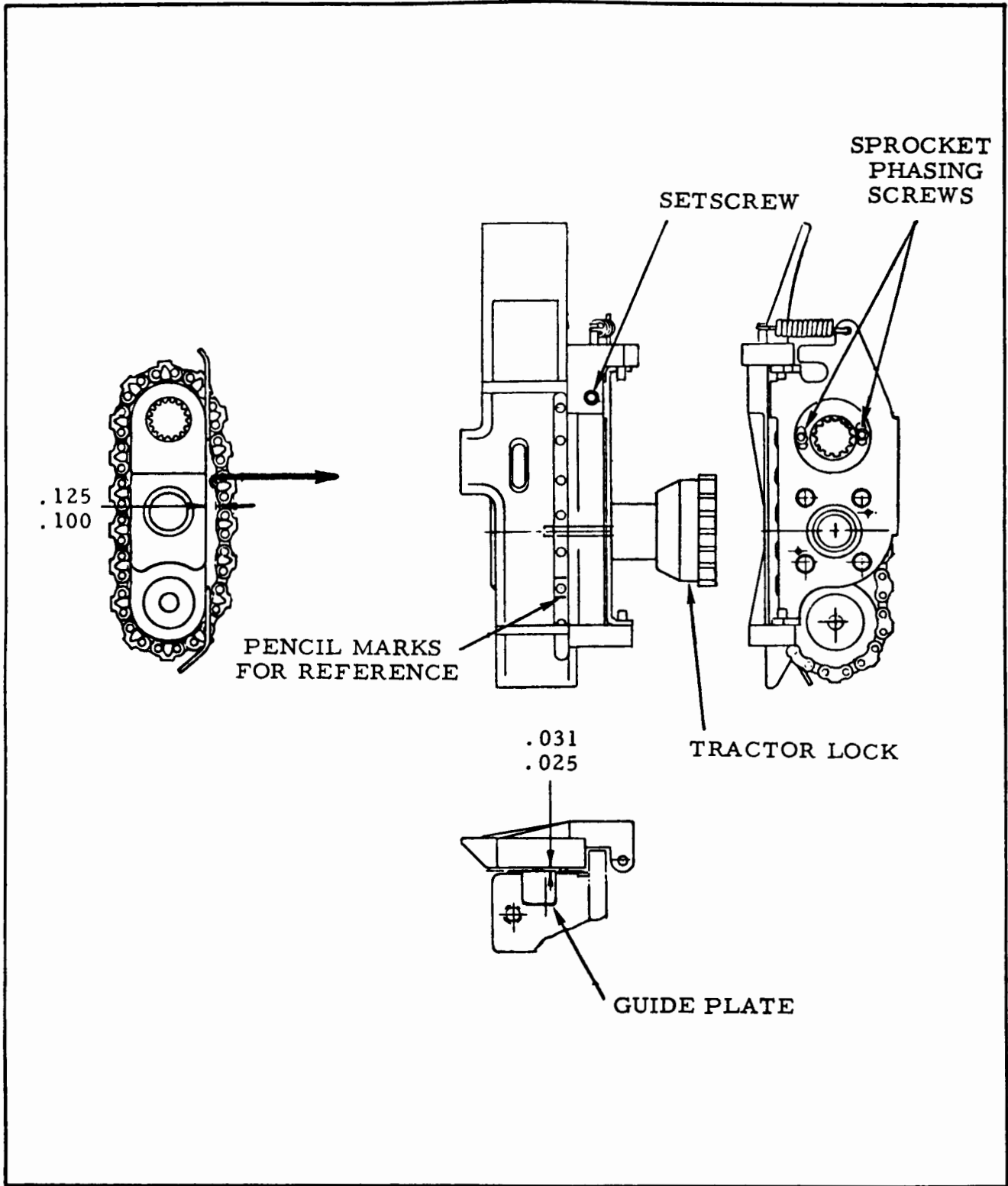


FIGURE 1
 Tractor Chain Tension Adjustments

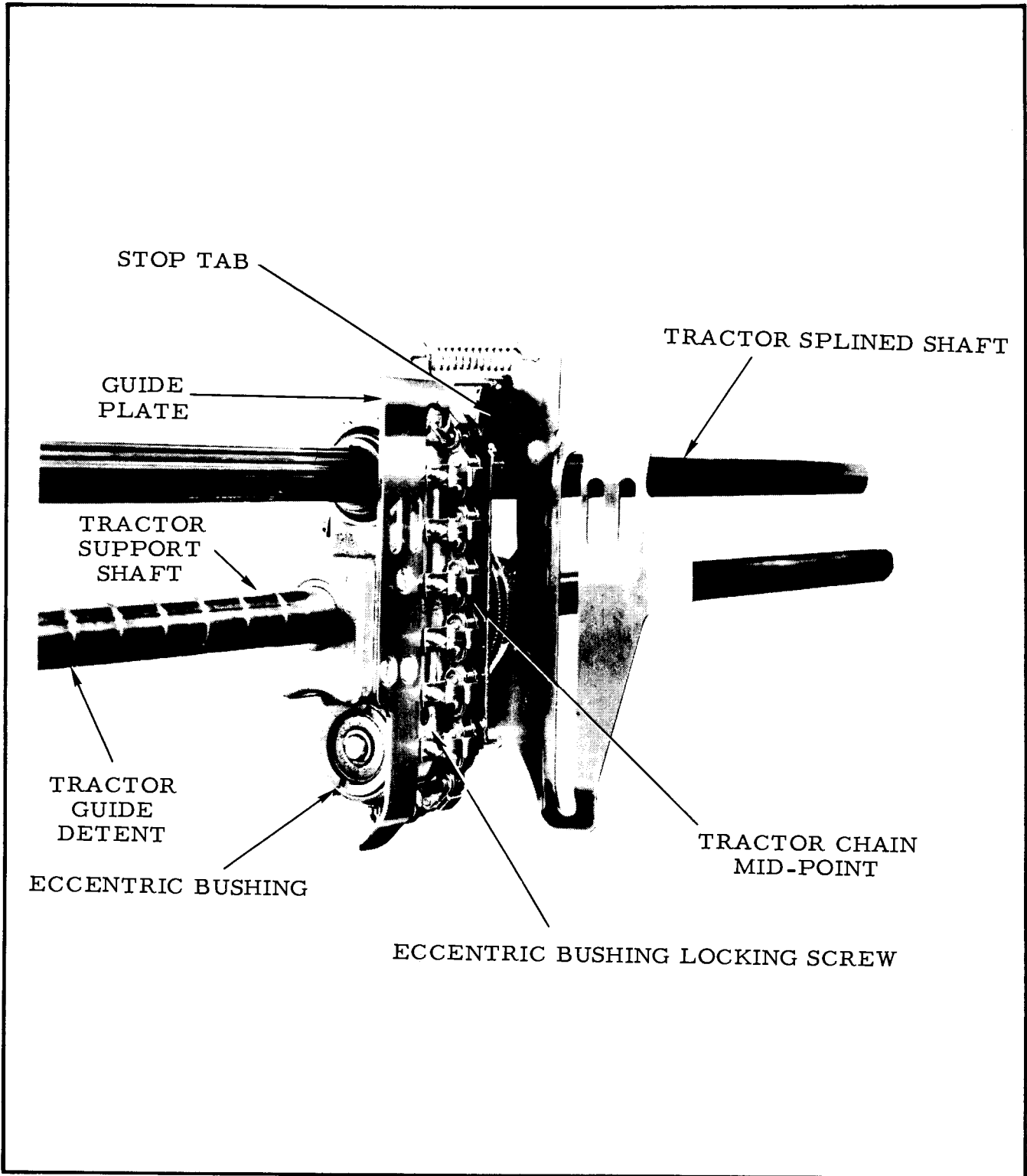


FIGURE 2
Tractor Components

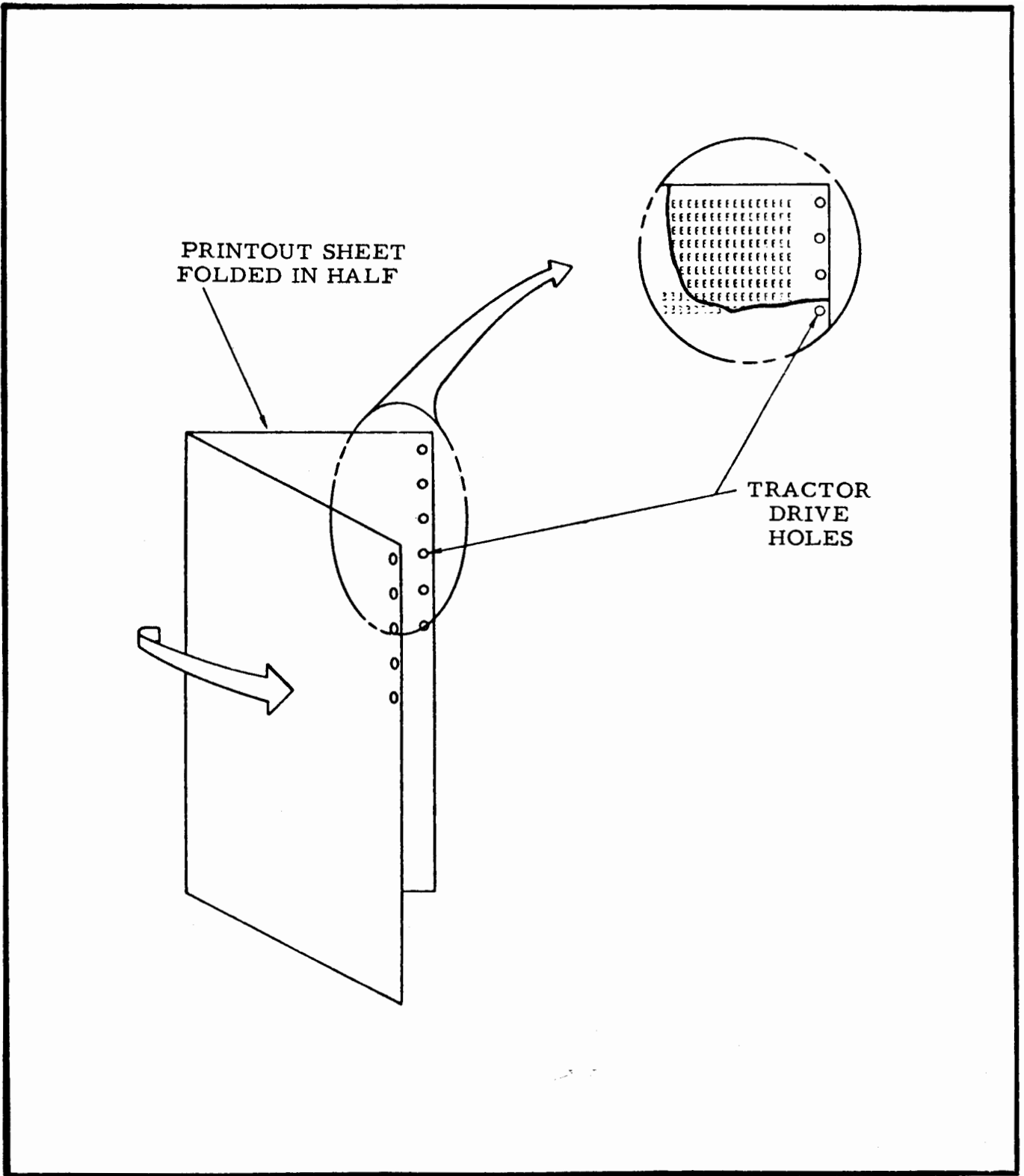
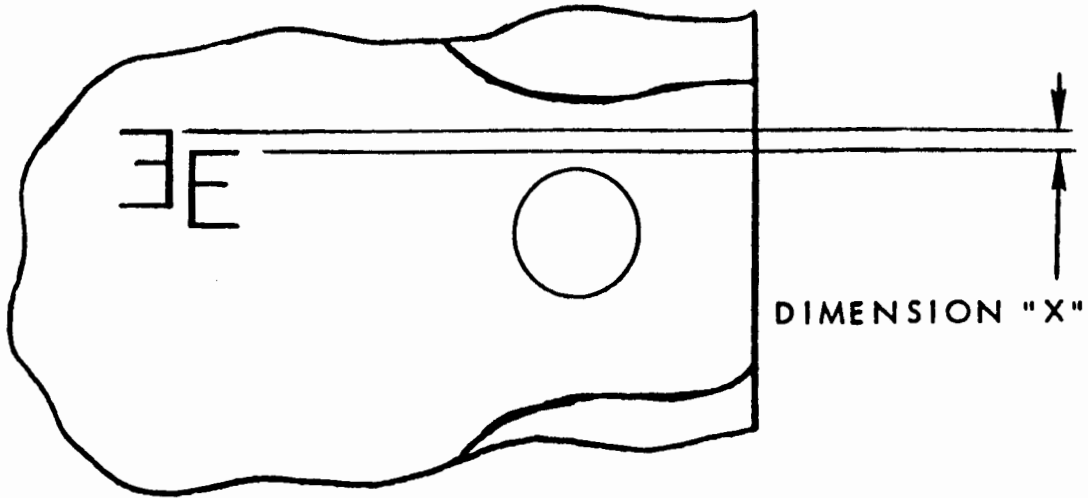
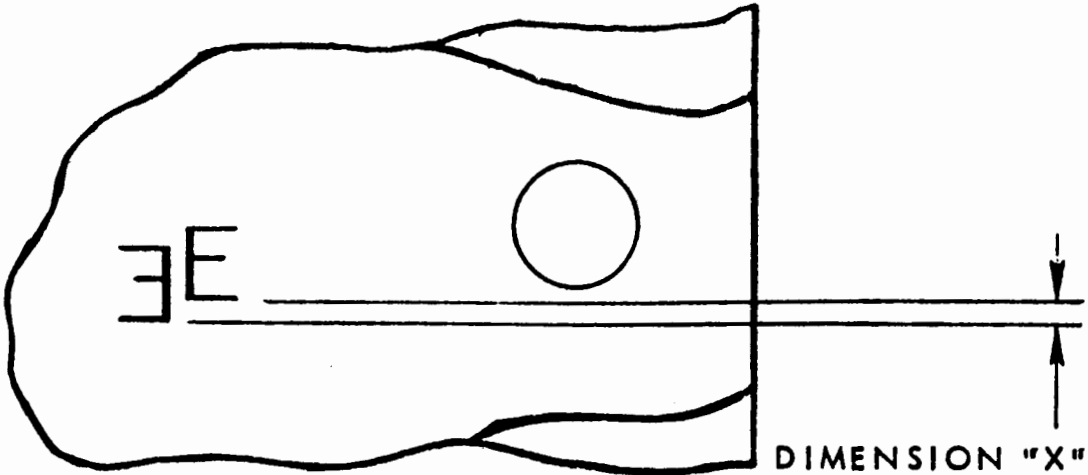


FIGURE 3
Printout Tractor Phasing Check

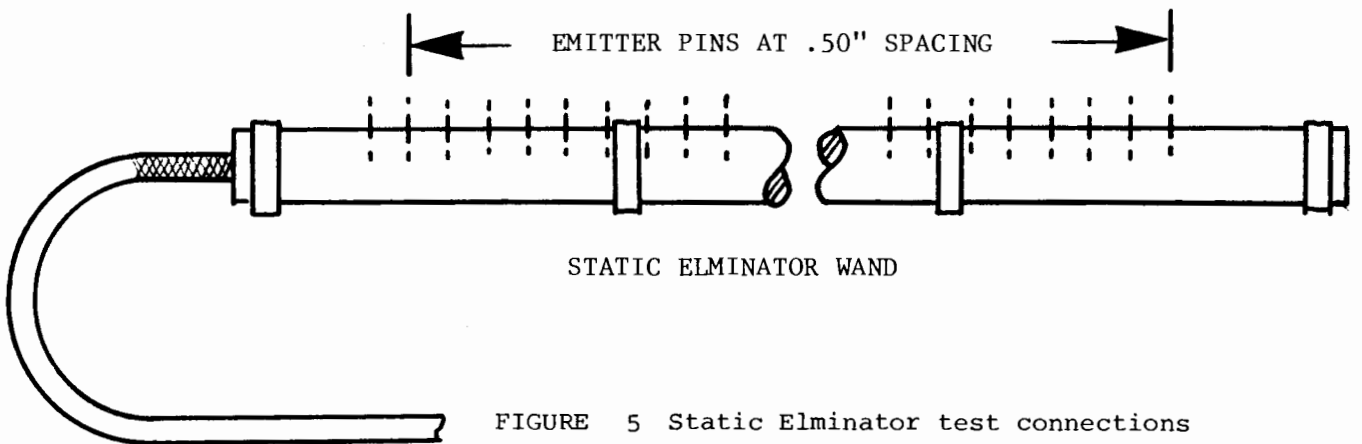
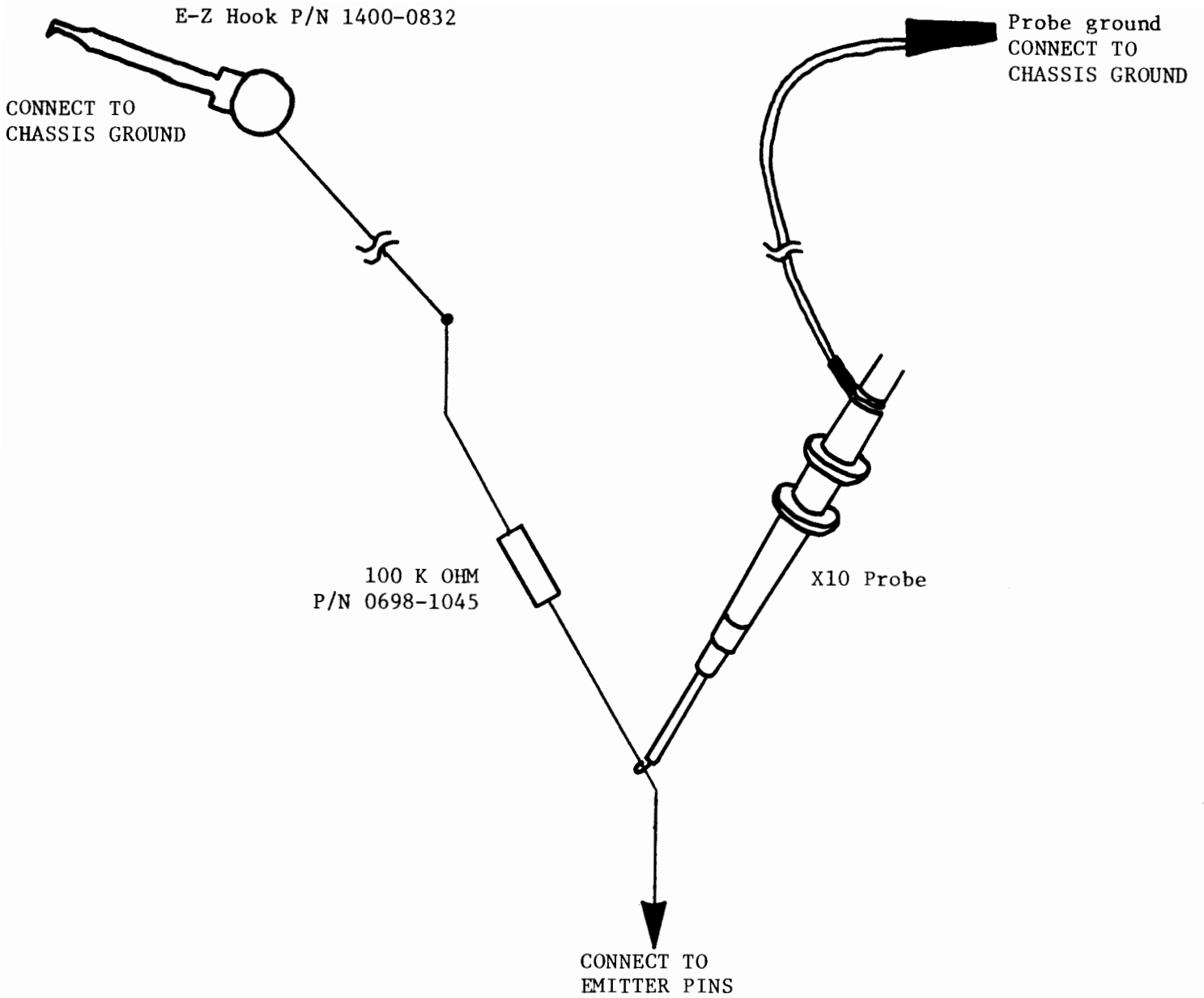


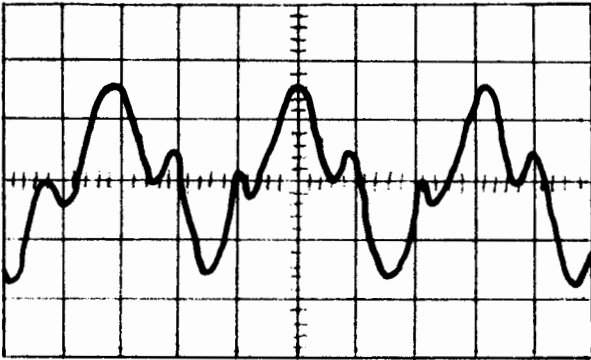
EXAMPLE A



EXAMPLE B

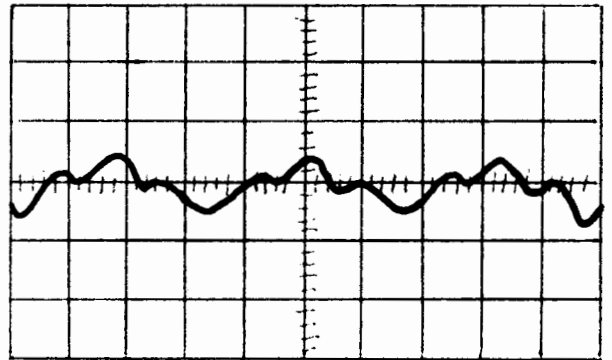
FIGURE 4
Tractor Phasing Measurements





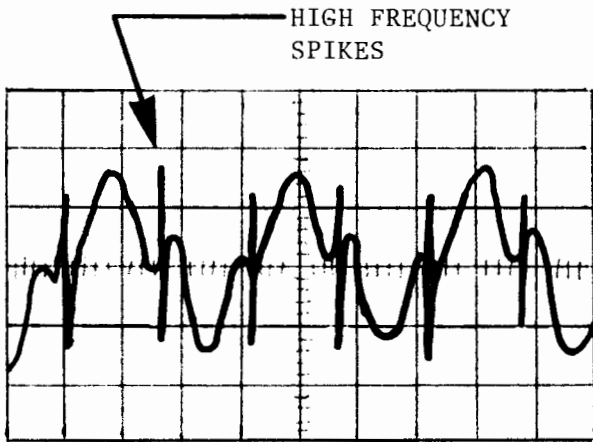
GOOD TRANSFORMER
 GOOD WAND (PIN)
 VOLTAGE ABOVE 2.5 VOLTS (PEAK TO PEAK)

A



GOOD TRANSFORMER
 DEFECTIVE WAND (PIN)
 VOLTAGE BELOW 2.5 VOLTS (PEAK TO PEAK)

B



DEFECTIVE TRANSFORMER
 GOOD WAND (PIN)

C



DEFECTIVE TRANSFORMER
 DEFECTIVE WAND (PIN)

D

CURRENT WAVEFORMS AS MEASURED ACROSS A 100 K OHM RESISTOR

FIGURE 6 Static Eliminator waveforms

PREVENTIVE MAINTENANCE PROGRAM III - CUSTOMER ENGINEER DUTIES

RECOMMENDED INTERVALS: This preventive maintenance procedure should be performed by customer engineer every six (6) months.

- A. Perform Maintenance Program II.
- B. Perform the following mechanical adjustment procedures.
 - 1. Adjust the paper feed drive belt tension as specified in the Technical Manual, Volume 1.
 - 2. Adjust character drum drive belt tension as specified in the Technical Manual. Volume 1
 - 3. Check hammer bank to character drum alignment as specified in the Technical Manual, Volume 1.
 - 4. Perform paper tension spring check as specified in the Technical Manual, volume 1.
 - 5. Verify pressure plate adjustment as specified in the Technical Manual, Volume 1.
- C. Perform the following electrical adjustments.
 - 1. Adjust the paper feed Servo as specified in the Technical Manual, Volume 1.
 - 2. Adjust Hammer flight times as specified in the Technical Manual, Volume 1.

