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Field Engineering Maintenance Manual

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1132 Printer

PREFACE

Users of this manual should have a knowledge of SLT circuits and a basic knowledge of stored programming and the instruction set of the system using the 1132 Printer as an output printer. The users should also have a general knowledge of the principles involved in program control of printing and tape-controlled carriage operations.

The manual includes descriptions of the following:

1. Diagnostic techniques and related information.
2. Maintainability features.
3. Preventive maintenance schedule.
4. Service checks, adjustments, and removal procedures for mechanical components.
5. Power requirements and sequencing.
6. Locations of units and components.

Additional description of 1132 operations is presented in the "IBM Field Engineering Manual of Instruction, 1132 Printer" (Form Y26-3622).

Major Revision (December 1966)

This manual (Form Y26-3621-2) makes the previous edition (Form 227-3621-1) obsolete.

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All safety precautions should be taken when servicing the 1132 printer. When the using system main line switch is on, both ac and dc voltages are being supplied to the 1132. When the 1132 machine power switch and the 1132 operator panel motor switch are on, the motor is running. Additional hazards from moving parts are present. It should be kept in mind that all personnel in the vicinity of the machine may be exposed to some hazards when machine covers are open or removed.

Voltages

Line voltage is present in the 1132 even though the machine power switch and operator motor switch are off. This is true if power is on in the using system. Also at this time 24 vac and dc voltages of +12, +6, +3, and -3 volts are being supplied to the 1132. When all switches are on, a ferroresonant transformer has line voltage on its input, and the 48 vdc supply in the 1132 is operating. This supply is designed to provide considerable current, so use caution when working in this area. The same transformer has another output rated at 20 vac.

Grounding

Convenience outlets are provided with a third wire for a ground. Any power tools and test equipment used in these outlets should be effectively grounded. It is important that if any machine of a group is grounded, all other equipment of the group must be grounded. Grounded machines must not be placed so that it is possible for a person to touch both a grounded machine and any ungrounded metal equipment.

Operating Mechanism

As a general rule, whenever machine covers are open the motor should not be running. Belt and gear guards and any other type of safety covers should be removed only when necessary. Replace the covers as promptly as possible. Sharp corners on machine parts and covers should be rounded off when it is practical to do so.

When power is on the 1132, both the print mechanism drive motor and the carriage drive motor are running. The operator panel motor switch is generally used to stop the machine for ribbon replacement. During service, the machine power switch on the power supply should be turned off. This insures that turning on the operator panel motor switch cannot start the drive motors. However, remember there are still dangerous voltages present in the 1132 printer at this time.

SECTION 1. REFERENCE DATA

None available as of November 1966.

SECTION 2. DIAGNOSTIC TECHNIQUES

1.1 DIAGNOSTIC PROGRAMS

A major portion of analysis of machine malfunctions is accomplished through the use of diagnostic programs furnished with the using system. These programs are designed to test and check as completely as possible the data paths and control lines to and from the 1132, as well as timing relationships, mechanical adjustments, and I/O interaction. The documentation with each program contains a more complete description of the program and its use.

1.1.1 Manual Program Control

Manual control of the maintenance program in the using system is provided as follows:

1. Stop or continue on error.
2. Loop program, loop routine, or loop function.
3. Bypass or allow error typeout.
4. Bypass or allow programmed manual intervention requests.

1.1.2 Error Messages and Documentation

The following items are included in either the error messages or program documentation or both.

1. The location in the program of the failing routine or function.
2. The cause of the program halt or error message.
3. The function or functions that failed.
4. Instructions for obtaining a detailed error print out which will give either cumulative error statistics or a comparison of the actual results to the expected results.

1.1.3 Analysis of Error Indications

After all possible information concerning the error has been obtained, if the cause is not obvious, try to duplicate the condition with the 1132 printer off-line. If the error can be diagnosed and corrected off-line, the system is available to the customer for programs not calling for 1132 printed output. Verification of any repair, however, should be on-line using the program or programs which failed.

1.2 MARGINAL CHECKING

Although there is no provision in the 1132 printer for marginal checking, signals to and from the 1132 are affected by varying the voltages in the using system. This procedure can be an effective means of increasing the frequency of intermittent troubles, though occasionally some other error is caused and this fact should be recognized. The maintenance manual for the using system should be checked for allowable voltage variations.

1.3 VOLTAGE CHECKING

All power for the 1132 is supplied by the using system. Always be sure that dc voltages are at operating levels within the 1132 (see 5.1).

1.4 OFF-LINE SERVICING PROCEDURES

These checks can be made off-line, using trouble indications to determine which checks should be made.

NOTE: Logic voltages are present when the CPU is turned on.

1.4.2 Printer Exit Lines

All printer exit line voltages and signals can be scoped off-line.

1.4.2.1 Steady State Voltages

Forms Contact: Manually operate the carriage forms contact. Check that the level of this line changes. The n/c points are closed when there are forms in the machine.

Motor Switch: The motor switch is a double-pole switch. Check that with the switch on, the A-pole provides a plus level on the printer motor on-line from the 1132. The B-pole is in the 24 vac pick circuit for sequencing relays.

Interposer Contact: Check that this line goes to a plus level if the interposer contact is manually closed. It should be closed for all carriage skip or restore operations.

1.4.2.2 Signal Pulses

Operator Panel Keys: Check with an oscilloscope that one and only one plus pulse occurs when an operator panel key is pressed. These pulses can be checked on the read brush latch card, shown on ALD page YA141 and PR121. If all keys fail, check voltage common connections thoroughly. If one key only fails and all connections in the circuit are good, individual components of that circuit should be checked.

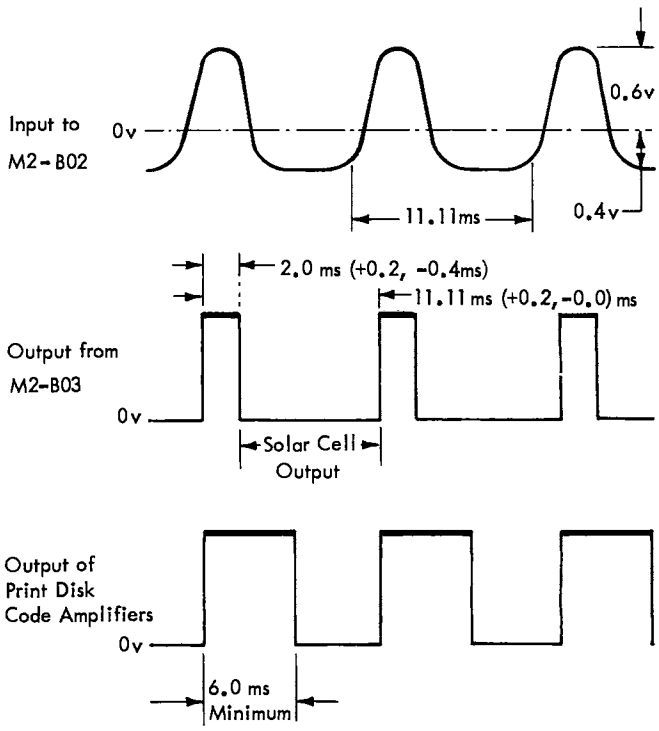
CB Clock and Print Disk Bit Lines: Whenever the printer drive motor is running, the print disk solar cells should be generating signals on these lines which can be scoped. The CB clock pulse is repeated 48 times per revolution of the timing disk at regular intervals. This pulse is not the direct output of the print disk clock solar cell amplifier but is developed through additional logic blocks.

Figure 1-1 shows the timing of the print disk solar cell output. These pulses can be scoped at M2-B02 (logic page PR101) and through succeeding logic blocks to check the generation of CB clock pulses on the 'printer exit' line.

The print disk bit pulses cannot be scoped as effectively as the print disk clock pulses because they are not repeated at regular intervals. Complete failure could easily be spotted, but an intermittent failure would be difficult to detect.

1.4.3 Printer Entry Lines

Printer entry lines are activated by using system circuits and only a few can be effectively checked with the printer power on and the 1132 not under



Note: Shown with print disk turning at approximately 112.5 rpm which results in a print clutch shaft speed of 300 rpm.

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● Figure 1-1. Solar Cell Output - Timing

program control. The following line levels can be checked.

Forms Indicator, Ready Indicator, and Motor On Indicator: These lines should be at ground level to light their respective lights.

Interposer Magnet Select and Carriage Magnet Select: These lines should be at ground level when their respective magnets are energized. The magnets can be energized by pressing the carriage restore key.

1.5 PRINTING FAILURE DIAGNOSIS

Caution

1. Do not remove print magnet driver cards without dropping power on the CPU. Card components will be weakened, resulting in print magnet failures.
2. Use extreme care when removing or replacing driver cards, because the R packs on the ends of the cards are very easily damaged.

NOTE: The illustrations in this manual have a code number in the lower corner. This is a publishing control number and is not related to the subject matter.

Following are some service procedures for analysis and repair of printing troubles.

1.5.1 Single Position Failures

1.5.1.1 Exchanging Leads

The familiar technique of "swapping" leads from the failing print position magnet to another print magnet may be used.

Caution

Shorting the magnet terminals usually results in damage to the print magnet driver. Grounding the common side of a magnet usually results in damage to the power transistor in the 48 v power supply. Grounding the input side of a magnet causes the print magnet to be energized each +48 v CB time.

When manually attracting a print magnet armature with power, always use an insulated or nonconductive tool.

1.5.1.2 Print Emitter

Emitter disk lamp intensity and contamination of the emitter disk can cause solid or intermittent failures. Check lamp voltage and keep emitter disk clean.

1.5.1.3 Forcing Printing

Limited off-line printing can be accomplished by disconnecting the signal cable and covering all but one slot in the print disk clock row of the emitter. All print magnets are energized to print the same character repeatedly. No carriage spacing occurs.

1.5.2 Multiple Position Failures

Look for a pattern of the positions failing.

Pattern	Check
1. Block of 16 or 8 positions.	1. 'Print select group' line from CPU.
2. Block of 10 positions.	2. SLT single card controlling those positions.
3. Positions 0, 16, 32, etc. or 1, 17 33 etc.	3. 'Print buffer' line from CPU or 'print bit' line in 1132.

1.6 PRINT QUALITY

1.6.1 Carriage Position

Poor print quality and extreme wear of the ribbon can be caused by improper carriage positioning. Once the carriage position adjustments have been properly factory-set, they should not be disturbed.

NOTE: If an adjustment is found wrong because of slippage or other cause, maintenance and adjustment specifications must be strictly adhered to (4.7.2).

Similar print and ribbon troubles may result if other than the specified hard platen is used.

1.6.2 Print Wheel to Drive Gear Clearance

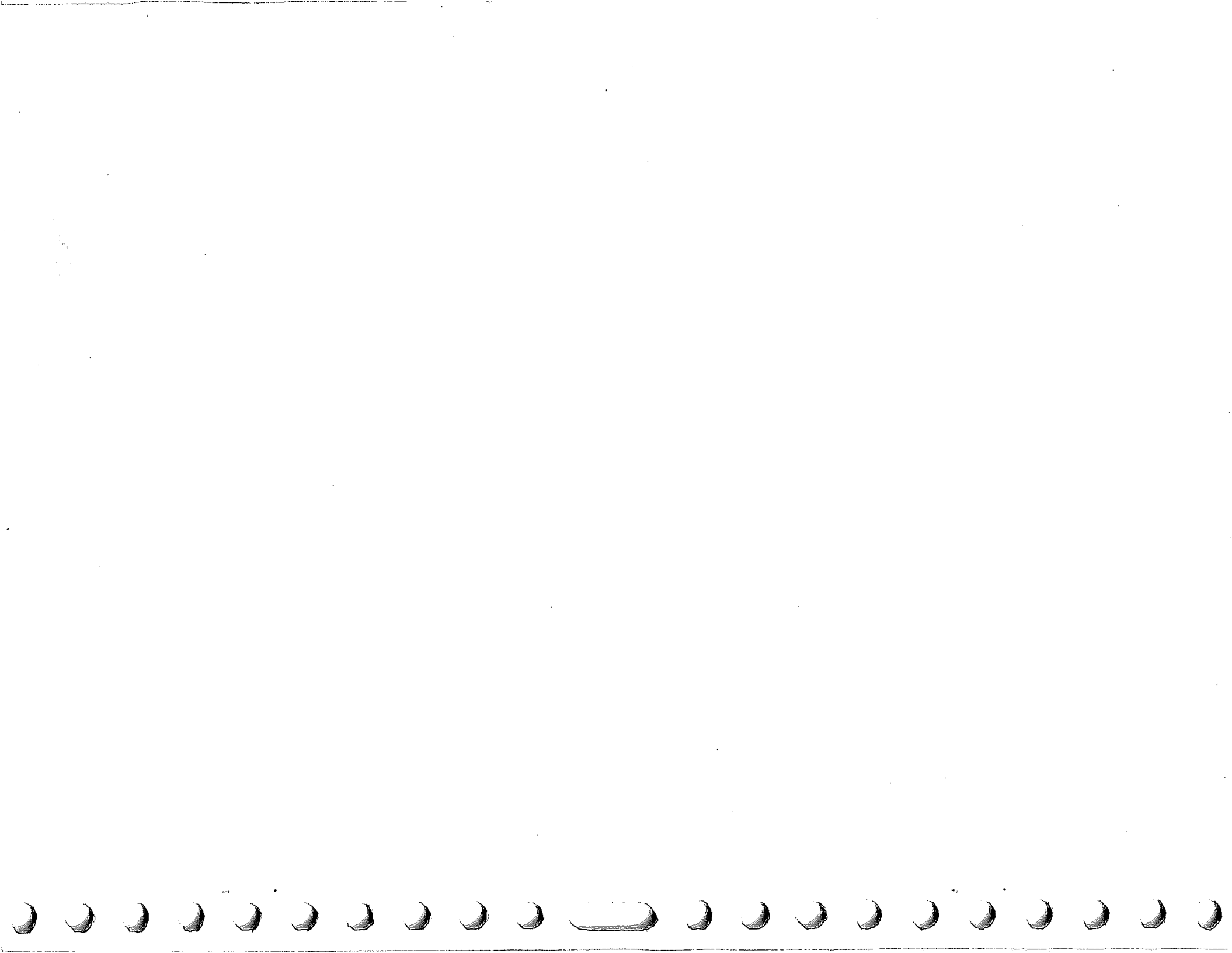
The print wheel speed of the 1132 requires that maximum clearance be maintained between all print wheels and the print wheel drive gear. This clearance allows the print wheels to be more nearly stopped at the time of impact with the platen. It is important that this clearance be maintained (Reference 4.4.1).

SECTION 3. SYMPTOM INDEX

Field Engineering generates and distributes the Symptom Index. Insert this index following this page.

SECTION 4. SERVICE AIDS

Field Engineering generates and distributes Service Aids. Insert these Service Aids following the Symptom Index.



SECTION 1. BASIC UNIT

2.1 DIAGNOSTIC PROGRAMS

This diagnostic programs which are provided with the using system must be considered maintenance features for the 1132 Printer. Because all printing is controlled by programs in the CPU, most trouble-shooting procedures require the use of these diagnostic programs.

2.2 OPERATOR PANEL

Indicator lights on this panel are useful in determining conditions within the 1132 Printer.

Keys on the operator panel can be used to initiate some carriage operations while the machine is in an off-line status. This allows scoping of many signal lines between the 1132 Printer and the CPU.

2.3 MACHINE POWER SWITCH

This switch is primarily a safety switch to stop the motors in the 1132 and drop the 48 vdc and 20 vac supplies. However, it should be noted that when the motor is running the printer emitter pulses can be checked.

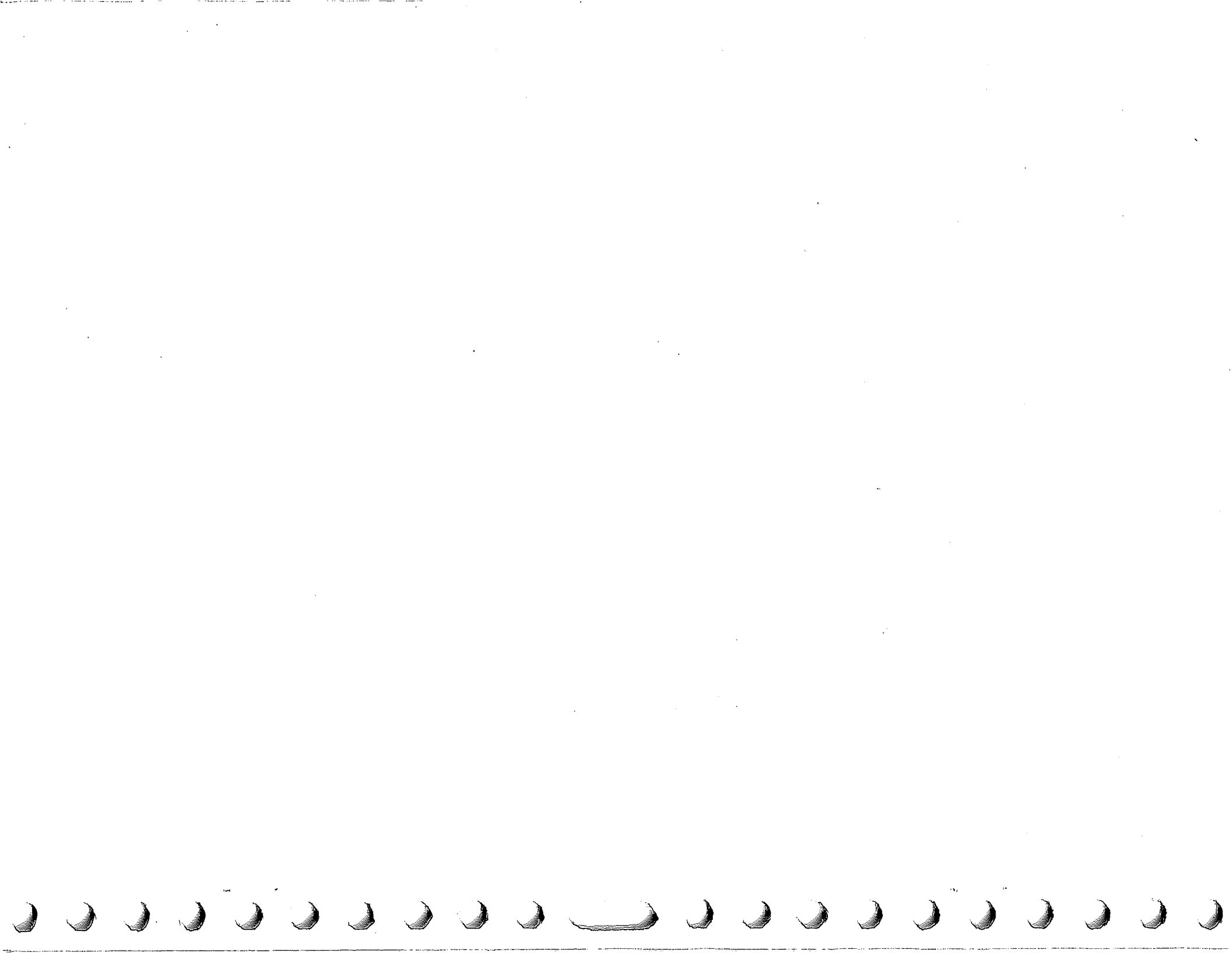
2.4 TOOLS AND TEST EQUIPMENT

In addition to the tools in the standard CE tool kit, the following are required:

1. Print wheel aligner service tool (shipped with machine) – P/N 220710.
2. CE oscilloscope for the using system.

SECTION 2. FEATURES

(Not applicable - no features as of November 1966).



SECTION 1. BASIC UNIT

3.1 APPROACH TO PREVENTIVE MAINTENANCE

The prime objective of any maintenance activity is to provide maximum machine availability to the customer. Unless a preventive maintenance operation contributes to the achievement of this objective, the operation is unnecessary.

3.1.1 Visual Inspection

An important part of any maintenance operation, either scheduled or unscheduled, is visual inspection of the unit. Always look for corrosion, dirt, wear, cracks, binds, and loose parts in mechanical units. Also watch for possible shorts, grounds, and loose connections in wiring. Alertness in noticing these items can minimize machine downtime.

3.2 PREVENTIVE MAINTENANCE PROCEDURES

Details of preventive maintenance operations are listed in Figure 3-1. During preventive maintenance, perform only those operations listed for that particular maintenance period. The frequency of scheduled maintenance must be based upon customer usage, environmental conditions, and other factors.

SECTION 2. FEATURES

(Not applicable - no features as of November 1966).

Code U	Code R	Location	Frequency	Operation	Observe
1		Print Cam	3	Lubricate print cams, detents, restore levers, and print clutch shaft. Spray with IBM #6.	Check for binds or wear.
3		Print Wheel	3	Lubricate print wheels and print wheel hangers. Spray with IBM #6.	Check for binds or wear.
5		Print Mech. Drive	3	Lubricate drive gears. Use IBM #17.	Check gears for proper backlash.
6		Ribbon Feed	3	Lubricate bronze brake shoes and linkage. Clean when necessary. Use IBM #6.	Check ribbon feeding in both directions.
8		Carriage	6	Lubricate motor drive worm. Use IBM #6.	
0		Print Magnet	12	Clean and lubricate armature pivots, knockoff springs. Use IBM #6.	Check for loose electrical connections. Check for binds or wear of parts.
2		Print Wheel	12	Clean print wheels and PW drive gear. After cleaning, lubricate unit thoroughly.	Print without ribbon long enough to remove excess oil.
4		Carriage	12	Clean and lubricate. Use IBM #6.	Check space, restore, and skip operations.
9		Print Emitter	12		Scope emitter pulses at least once per year.

* When print clutch shaft is removed for service, re-lubricate flutes before re-installing. Use IBM #17.

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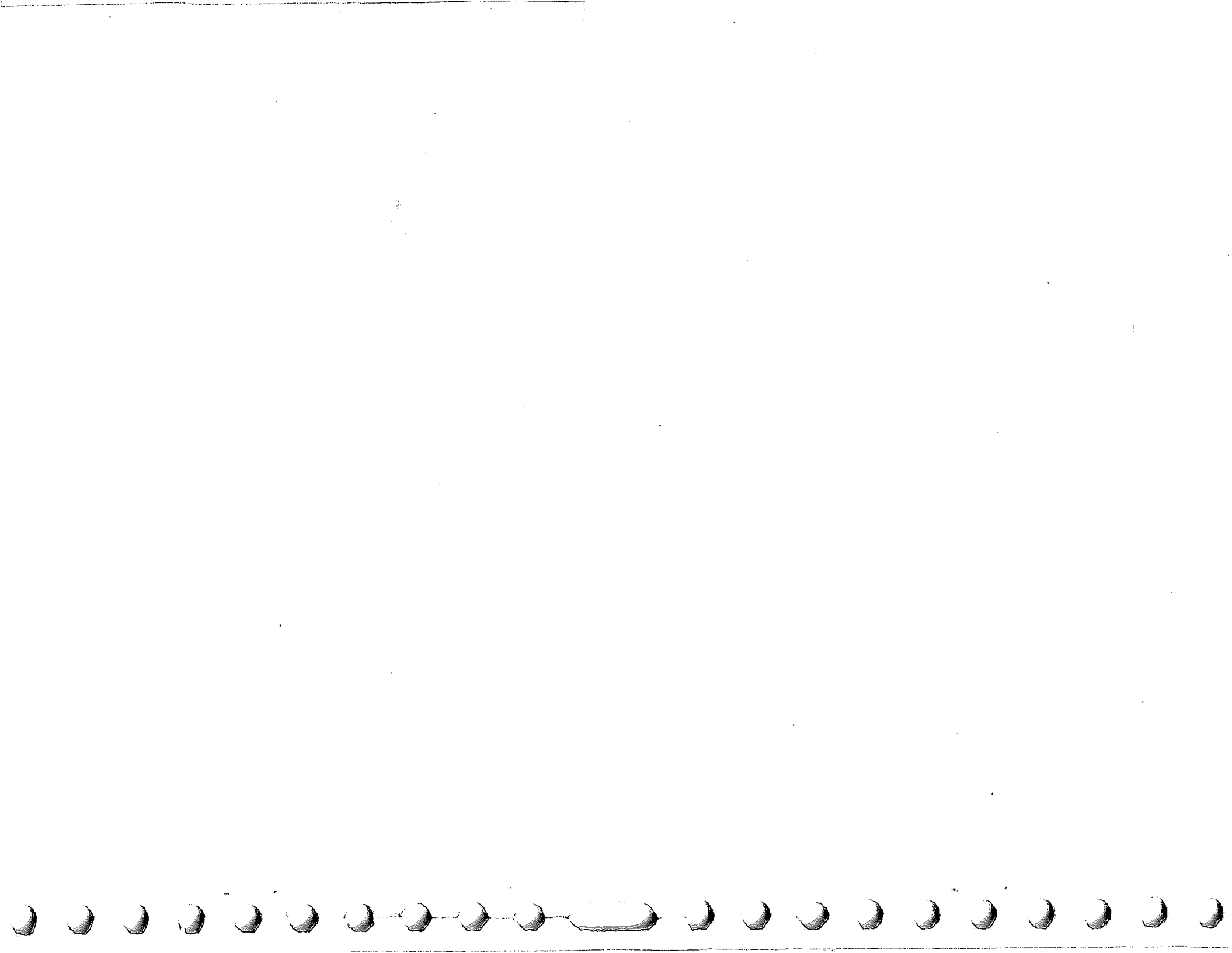
Figure 3-1. Preventive Maintenance Schedule



SECTION 1. BASIC UNIT

4.0 GENERAL INFORMATION

Where no means of adjustment is shown or described, the adjustments have been made and pinned at the time of assembly and are described here primarily for reference. When the adjustment cannot be obtained, check for worn or bent parts.

4.1 MOTOR AND DRIVE

4.1.1 Intermediate Drive Pulley Adjustment

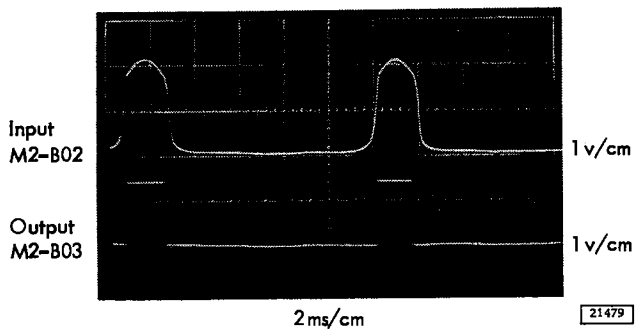
Loosen the set screws in the outer flange of the adjustable intermediate pulley enough to clear the threads of the hub. Position the flange on the hub to give a pulley diameter which results in driving the print clutch shaft at 300 rpm (+0 ; -5 rpm). This adjustment can be accomplished as follows:

NOTE: This procedure should give a print speed of approximately 112 lines per minute.

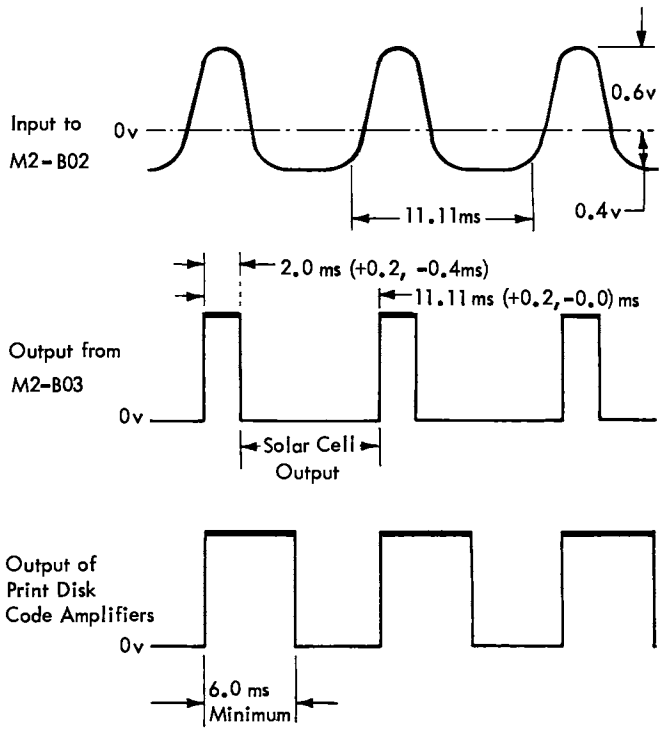
1. Loosen the nut holding the intermediate pulley bracket to the print unit left side frame. Position the bracket forward and down to obtain proper tension on both belts and tighten the holding nut.

   NOTE: Step 1 ensures proper belt tension before checking speed.

2. Set up scope and probe M2-B02(ALD page PR101).



3. Sync on internal (plus) and stabilize scope pattern.
4. Adjust the pulley until the output from M2-B03 looks as shown (11.11, +0.2; -0.0 ms). This timing provides an emitter disk speed of 112.5 rpm and a print clutch shaft speed of 300 rpm (+0; -5) rpm.



Note: Shown with print disk turning at approximately 112.5 rpm which results in a print clutch shaft speed of 300 rpm.

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5. If speed has been adjusted, repeat step 1.

4.1.2 Intermediate Drive Gear Adjustment

Adjust the eccentric pivot stud for 0.004" maximum backlash between the intermediate gear and each of the gears with which it meshes.

4.2 PRINT MAGNET UNIT

4.2.1 Print Magnet Armature Adjustment

NOTE: The print magnet armature can be removed from the print magnet assembly by loosening the armature pivot screw (armature pivot supports two armatures) and remove one pair of armatures.

1. Form the armature tip for 0.045" to 0.050" movement of the armature link (Figure 4-1).
2. Remove magnet unit for the rest of the check.
3. Check for 0.000" to 0.005" clearance between the armature and the core with the armature attracted; also, 0.003" to 0.005" between the upper yoke and armature (Figure 4-1).
4. Position the armature knockoff spring assembly so that the armature links 1 and 120 contact the knockoff springs 0.012" to 0.018" before the armature is fully attracted. This should result in spring tension against the armature link of 400 grams ±25 grams (Figure 4-1).

4.2.2 Print Magnet Armature Knockoff Adjustment

1. With the print magnet armature attracted, there should be 0.005" to 0.027" clearance between the print clutch latch and the armature knockoff lever (Figure 4-1).
2. With the print magnet armature released and the print clutch latch resting on the armature knockoff, the overlap of the clutch latch on the knockoff lever should be 0.033" to 0.043" (Figure 4-2).

4.2.3 Print Magnet Armature Link Adjustment

1. Remove print magnet assembly (see 4.2.4).
2. The links should fall freely when the magnet and link assembly is tilted from one end to the other.
3. There should be a clearance of 0.007" to 0.018" between the top guide bar nearest the armature knockoff lever and the armature link (Figure 4-3).

4.2.4 Magnet Unit Removal

1. Remove four holding screws for the print magnet unit. Two socket head screws are

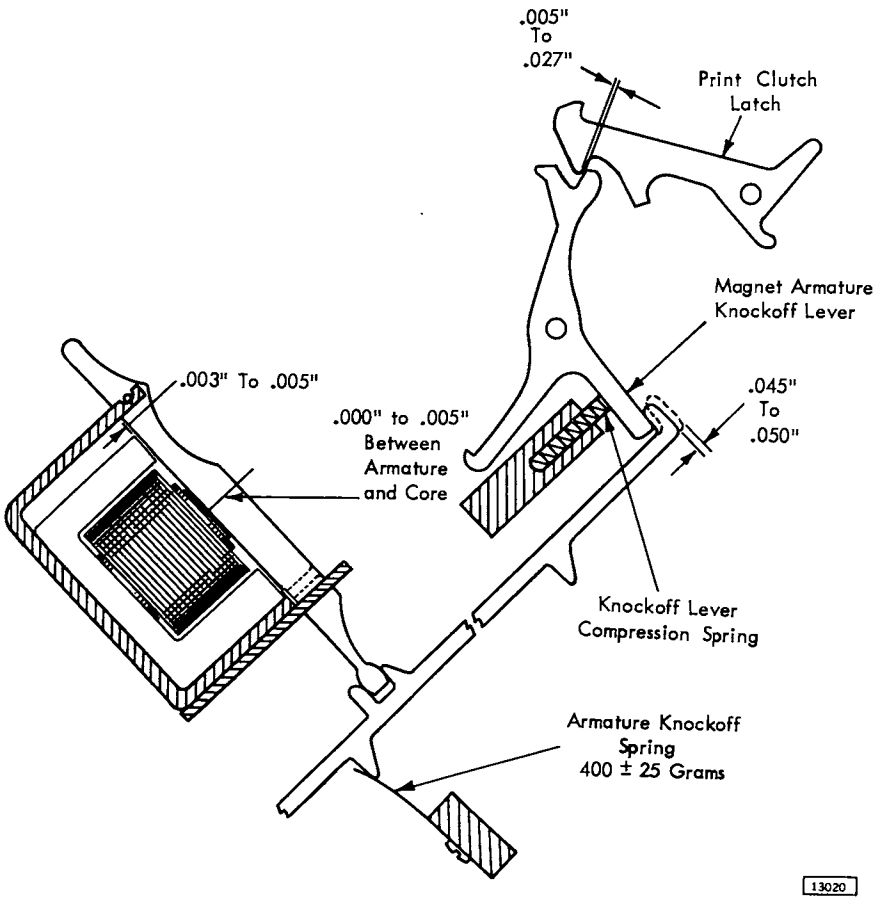


Figure 4-1. Print Magnet Armature and Link

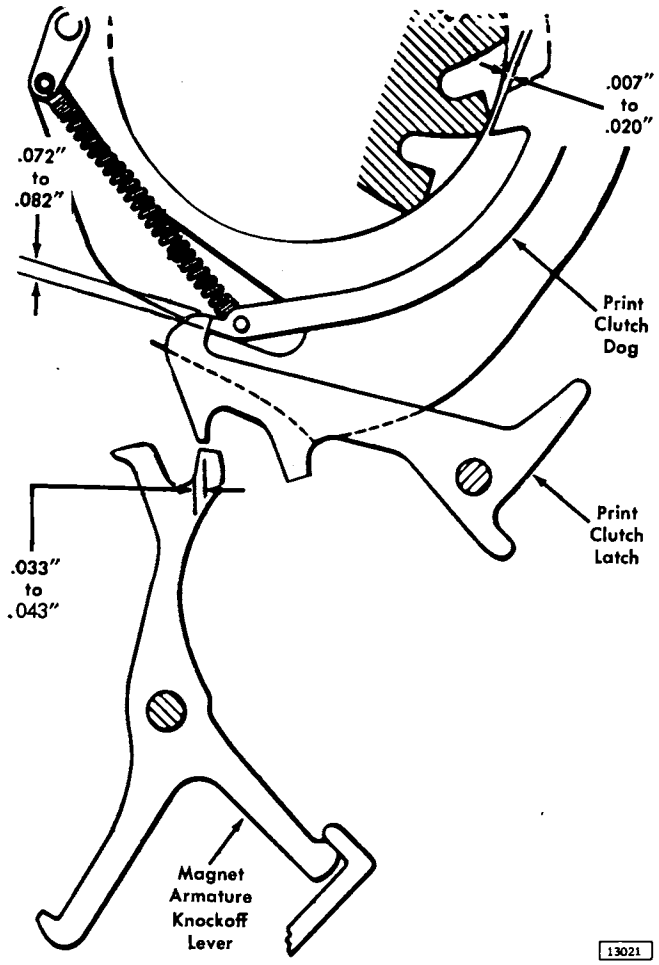


Figure 4-2. Print Clutch Latch

located in the front; two slotted captive screws are in the upper rear.

2. Move the unit to the front without raising the unit until stopped by the stop brackets.
3. Raise the front of the unit and lift the unit out of the machine. Do not raise the rear of the unit, because doing so can result in damage to the armature knockoff levers.

Assemble in reverse order.

NOTE: When the print magnet unit is secured in machine, there must be a clearance of 0.010" to 0.020" between the lower rear support bar and the rails upon which the magnet unit rides as it is being moved in and out of the machine. This is to ensure that the rails are not affecting the final position of the magnet unit.

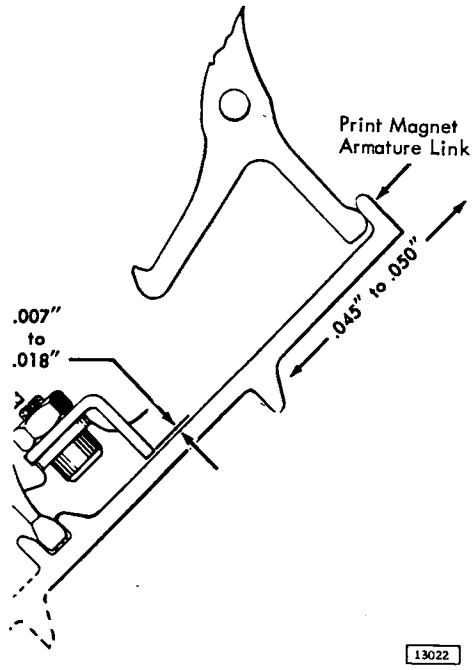


Figure 4-3. Print Magnet Link

4.2.5 Magnet Assembly Removal

1. Remove the magnet unit holding screws and move the magnet unit to the front of the machine.
2. Remove the right-hand handle.
3. Remove the six screws, three on each side, which hold the magnet assembly in place on the magnet unit.
4. Lift the magnet assembly straight out. Locating dowels remain in the magnet unit side frame.
5. The magnet assembly with wires attached may be placed on a flat surface on the posts provided.
6. Replace the right-hand handle before removing the remainder of the magnet unit from the machine.

4.3 PRINT CAM MECHANISM

4.3.1 Print Clutch Dog Adjustment

1. Check for 0.007" to 0.020" clearance between the print clutch dog and the top of a flute of the print clutch shaft when the print cam is detented. To check, release the detent and see that the print cam moves forward under the tip of the detent. There is no means of adjustment.

When making this check, be sure the dog is not moving into a flute of the print clutch shaft.

2. Check for 0.072" to 0.082" overlap of the print clutch dog on the print clutch latch (Figure 4-2).

4.3.2 Restore Lever Adjustment

1. When the restore lever is fully operated by the high lobe of the print cam, the print clutch latch should have 0.032" relatching clearance to the tip of the armature knockoff lever. The tolerances on this clearance are +0.012" and -0.017" (Figure 4-4).
2. At the same time, there must be a minimum 0.002" clearance between the restore lever and the bottom of the slot in the restore lever support bar (Figure 4-4).

Loosen the holding screws and pivot the restore lever support bar on its dowel pins to obtain these clearances. Check several positions across the unit to insure that no restore levers are bottoming on the support bar.

4.3.3 Restore Lever Removal

Remove two dowel pins and four holding screws, two in each print unit side frame. Slide the restore lever support bar out through the front of the machine. To remove an individual restore lever, remove the clip and carefully force out the pivot rod to the desired lever. As the individual lever is removed, take care that the compression spring is not lost.

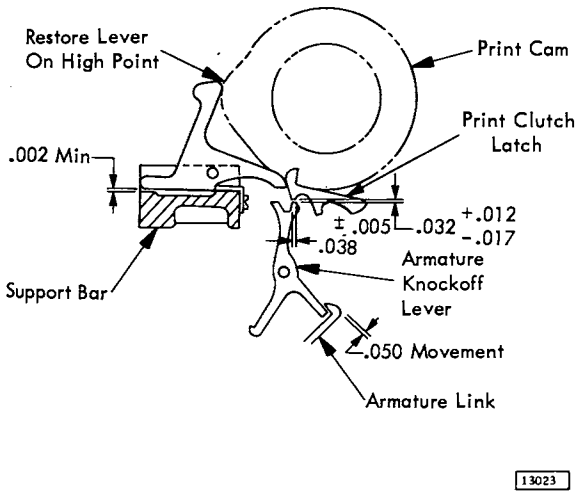


Figure 4-4. Restore Lever

Replace in reverse order, being careful to guide the compression spring into position with no bind.

4.3.4 Print Clutch Dog Removal

1. Rock the print cam detent assembly away from the print cams as follows:
   a. Remove the rear holding screws and dowel pins far enough to clear the detent support bar.
   b. Loosen the front holding screws and rock the detent assembly forward.
2. Remove the print cam guide comb bar rear upper.
3. Rotate the cam until the dog pivot is up.
4. Spread the print cams apart slightly and slide the clutch dog pivot off its stud.
5. Turn the retaining clip and remove the clutch dog spring from its stud. Rotate the print cam while removing the print clutch dog and spring.

   The clutch dog and spring can be replaced by reversing the removal procedure. It may be more convenient to place the clutch dog pivot on its stud before placing the dog spring on its stud. In either case, be sure to turn the retaining clip back into position to hold the spring.

4.3.5 Print Clutch Shaft Removal

1. Remove the carriage (see 4.7.2).
2. Remove the print wheel assembly.
3. Remove the holding screws from the print cam rear upper guide comb bar and tie the guide comb to the print cam clutch shaft to keep the cams evenly spaced and the dogs on their pivots.
4. Remove the left ribbon feed support bracket after disconnecting the operating link.
5. Remove the bearing caps after removing the three screws in each. Exercise caution as these bearing caps are not replaceable.
6. The print clutch shaft and print cams can now be lifted from the machine.
7. The print wheel drive gear can now be lifted from the machine.

4.3.6 Print Clutch Shaft Assembly

1. Before reassembly, loosen the print magnet unit and move it toward the front of the machine. Also, tilt the print cam detent assembly up and toward the front of the machine.
2. Set the removed shaft or shafts in position with the bearings and gears lined up.

3. Replace the bearing caps.
4. Replace the print cam guide comb bar rear upper. Make certain all print clutch dogs are on their respective studs.
5. Return the print magnet unit and the print cam detent assembly to position and secure the holding screws.

4.3.7 Print Clutch Latch Removal

1. Remove the ribbon.
2. Remove the print wheel assembly.
3. Remove the print cam rear lower guide comb bar (with the brush attached).
4. Remove the ribbon operating link which connects the right and left ribbon feed units.
5. Unlatch all the print clutch dogs and turn the cams so that the print clutch dogs are entirely clear of the print clutch latches.
6. Remove the print clutch latch assembly by removing the four holding screws. Assemble in reverse order.

4.4 PRINT WHEEL UNIT

4.4.1 Print Wheel Assembly Adjustment

1. Position the print wheel assembly so that there is 0.010" to 0.023" clearance between the print wheel hanger and the print cam when the print cam is detented (Figure 4-5). Maintain the clearance as near 0.010" as practical.
2. With the locating pins in position and the holding screws loose, lift the unit as much as possible while still maintaining the clearance described in adjustment 1. This will give maximum clearance between the print wheels and the print wheel drive shaft.
3. Tighten the holding screws with print wheel assembly in this position.

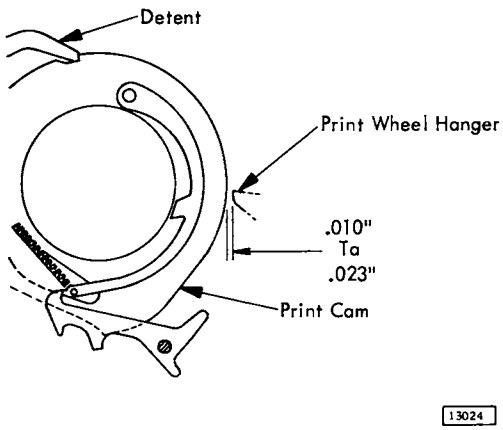


Figure 4-5. Print Wheel Hanger Clearance

Caution

Do not disturb the adjustment of the guides for the print wheel unit, because they are factory-set.

4.4.2 Print Wheel Hanger Adjustment

1. Print wheels must rotate freely on the hubs on their respective print wheel hangers.
2. After the hangers have been cammed toward the platen, they should return freely to their normal position, as print cam motion continues.
3. Adjust the eccentric on the left end of the hanger guide bar to align the number 1 hanger with its print cam.

4.4.3 Service Tool Disengaging Lever Adjustment

1. With the print wheel unit properly positioned, loosen the four setscrews on the top of the unit (Figure 4-6).
2. With the service tool in place, adjust the front setscrews on both ends to obtain 0.067" to 0.094" clearance between the print wheels and the service tool.

Danger

Never place the service tool in position when the printer drive motor is running.

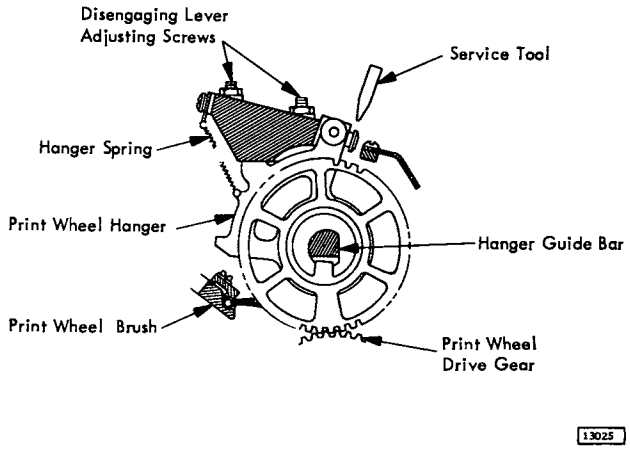


Figure 4-6. Print Wheel Assembly

3. Remove the service tool.
4. Adjust the rear setscrews on both ends of the print wheel unit so that there is no vertical play of the service tool disengaging levers and a minimum play sideways.

4.4.4 Print Wheel Brush Adjustment

1. Position the brush assembly 1/64" to 1/32" closer to the print wheels than is required to just touch the print wheels (Figure 4-6).

4.4.5 Print Wheel Assembly Removal

1. Remove the ribbon.
2. Turn the print wheels to a position such that the service tool can be inserted between the R and E characters on the print wheels.
3. Remove the two holding screws and locating pin on each side of the unit.
4. Place the service tool in position. Lift the unit up and out of the machine using the handles provided.

Replace the unit by reversing the removal procedure with the service tool inserted as previously described. When the assembly is lowered into position, exercise care that the print wheels mesh properly with the print wheel drive gear. If they do not mesh, the type faces may be damaged. Check the print wheel assembly adjustments before tightening the holding screws securely (see 4.4.1).

4.4.6 Individual Print Wheel And Hanger Removal

1. Remove the print wheel assembly (see 4.4.5).
2. Remove the one screw at each end of the print wheel hanger guide rod, noting the position of the eccentric on the left end. Remove the guide rod.
3. Use a follow-up rod and carefully force out the hanger pivot rod to the desired print wheel position.
4. Unhook the return spring and lift out the print wheel and hanger assembly.

To assemble, reverse the removal procedure. Set the eccentric back to the position previously noted.

4.5 PRINT EMITTER UNIT

4.5.1 Solar Cells and Lamp

Service Check

1. Mechanical positioning of the solar cell block assembly, light source or plastic focusing lens.
2. Defective solar cell.
3. Defective light source.
4. Wiring or connector problem.

Adjustment

1. Position the emitter timing disk against the spacer on the print wheel drive gear shaft and clamp securely.
2. Adjust the solar cell block to center the scribed line (on the solar cell assembly) in the fifth row of slots in the timing disk (Figure 4-7).

   NOTE: Count the rows from either end - the fifth row is in the middle.

3. Shift the locating sleeve lengthwise on the shaft for a clearance of 0.15 (±0.10") between the solar cell assembly and the timing disk and clamp the positioning sleeve (Figure 4-7).
4. With the cell assembly against the locating sleeve, rotate the cell assembly on the shaft so that the solar cell assembly openings line up with the centers of the print wheel gear shaft and the solar cell mounting shaft. This adjustment is facilitated by holding a straightedge against the right side of the solar cell housing. The straightedge should line up tangent to the print wheel gear shaft and the solar cell mounting shaft (Figure 4-8).

   NOTE: It may be necessary to shift the positioning sleeve because of locating-pin interference.

5. Clamp the solar cell assembly into position. Loosen the positioning sleeve and position it against the pin on the solar cell assembly. Clamp in place.

   NOTE: After this positioning has been set, no adjustment on subsequent removal of the solar cell assembly should be needed.

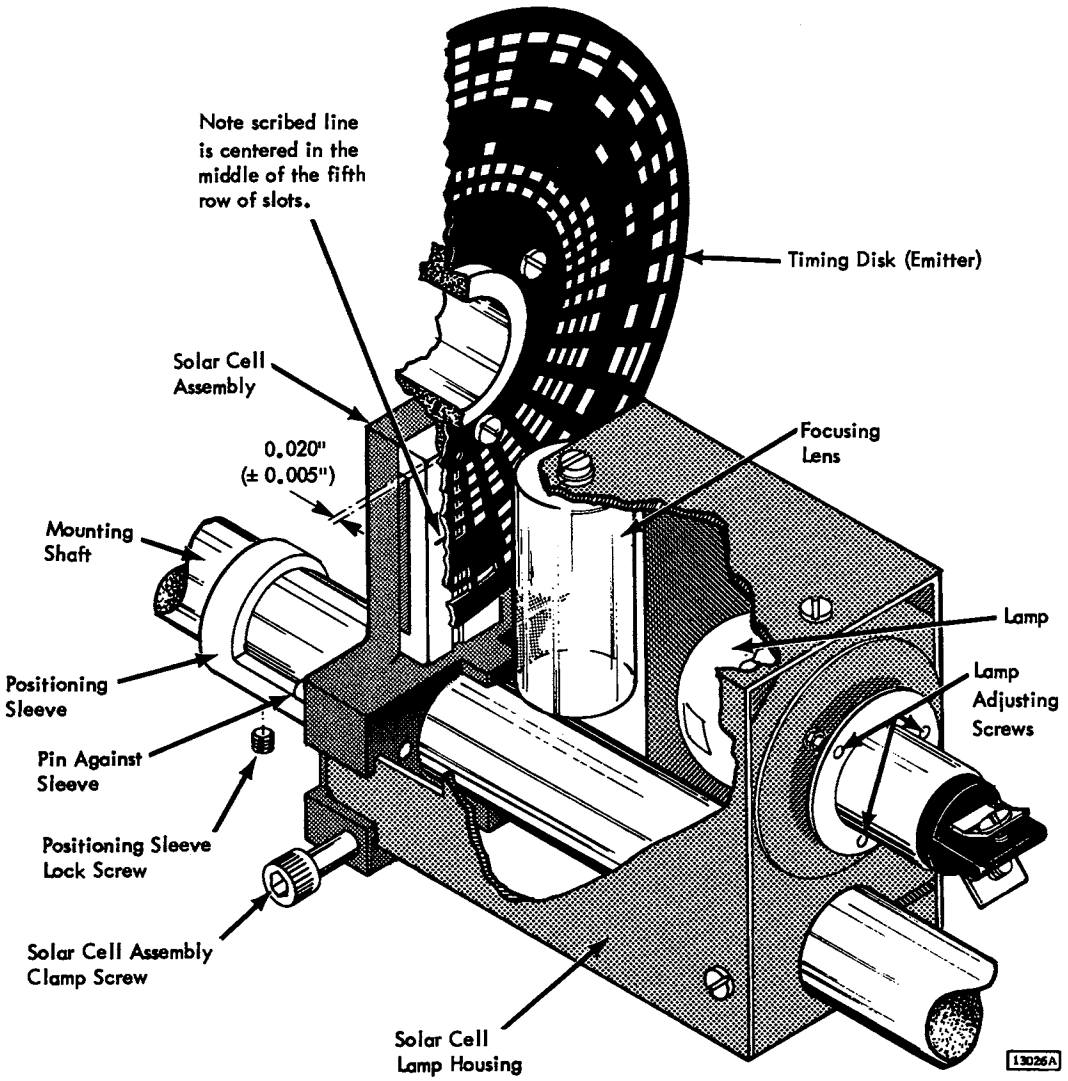


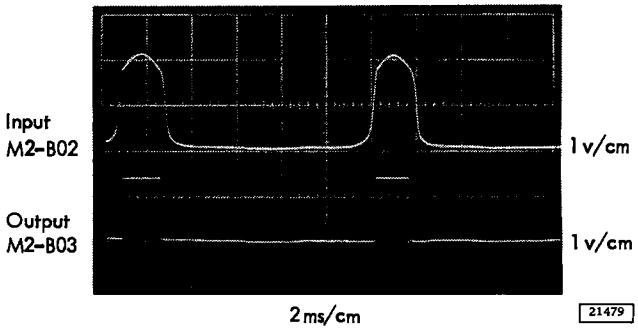
Figure 4-7. Timing Disk and Solar Cell Assembly

6. Remove the lamp assembly and position the plastic focusing lens in the assembly as far forward (away from the lamp) as possible. Center the lens and secure in position. Wipe the plastic lens clean. Replace the lamp assembly and lock in position.
7. Set the solar cell lamp voltage at 11.0 vac measured across the lamp.

NOTE: Adjust at lamp potentiometer (R5) located in the 48 v power supply.

8. Set up an oscilloscope to check the output of the print disk clock solar cell (Figure 4-9).

NOTE: (a) The time shown (Figure 4-9) is nominal and varies with the 1132 Printer speed. (b) Output is located at A-A1 M2-B03 and is shown on PR101 of 1132 logics.



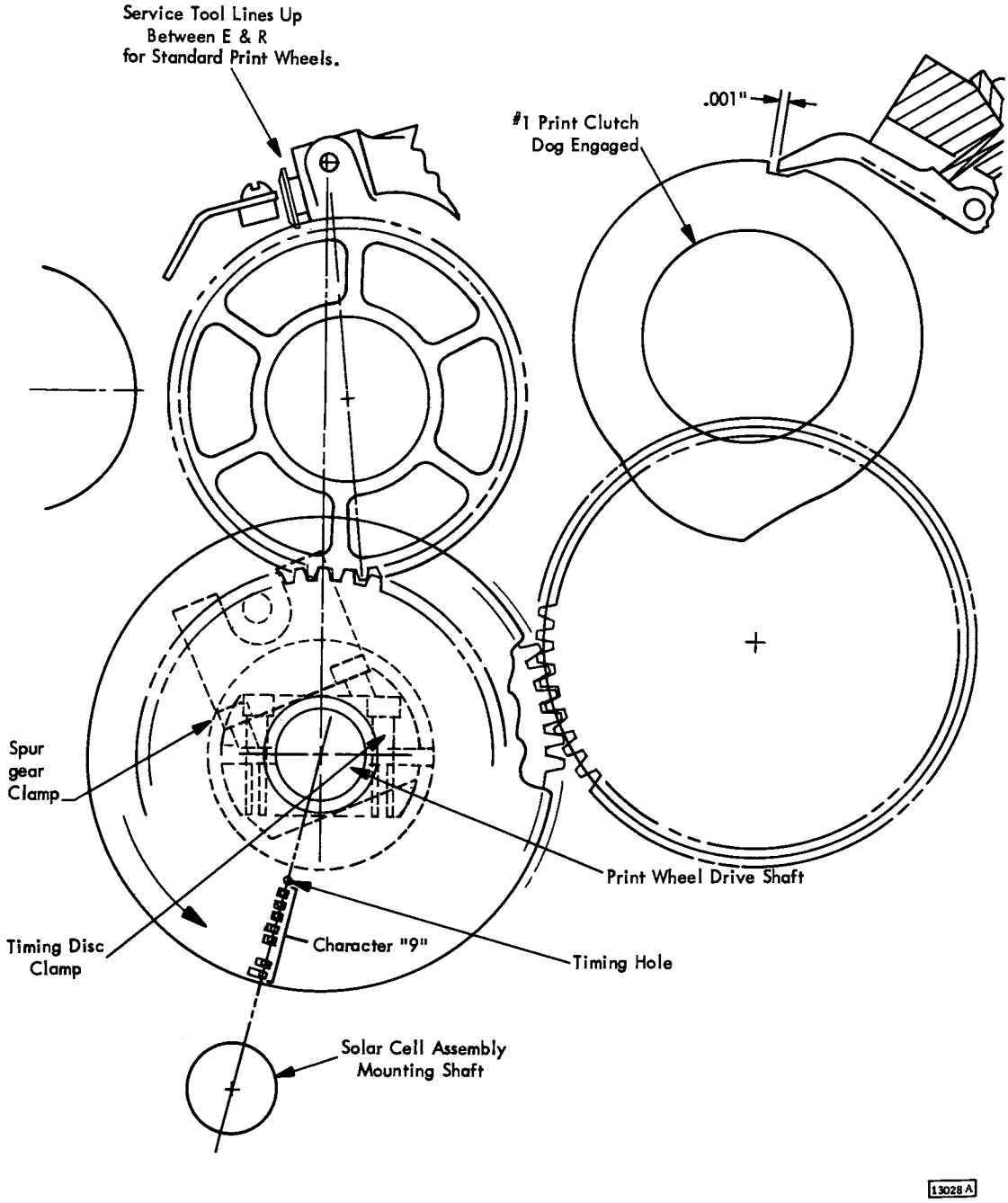
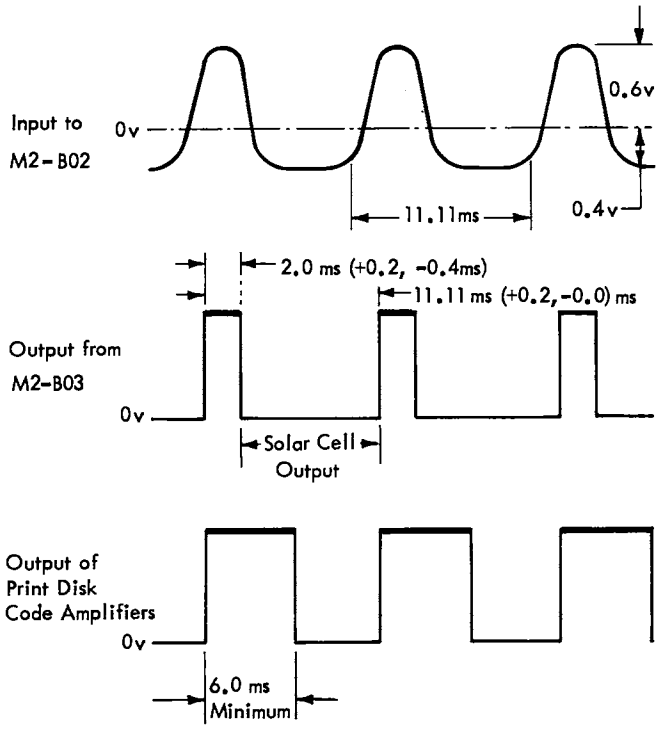


Figure 4-8. Print Wheel and Emitter Disk Timing



Note: Shown with print disk turning at approximately 112.5 rpm which results in a print clutch shoft speed of 300 rpm.

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● Figure 4-9. Solar Cell Output

9. Loosen the three screws holding the lamp to the housing and shift the light to obtain the minimum duration of the positive-going pulse, which is the inactive state of the solar cell. Retighten the lamp in this position.
10. Adjust the solar cell lamp potentiometer to obtain a positive pulse width of 2.0 (+0.2; -0.4) ms. Note that the pulse duration is the time when there is no output from the solar cell.
11. Check the solar cell output (M2-B03) for a pulse interval of 11.11 (+0.2, -0.0) ms. This timing is correct for a print disk speed of 112.5 rpm and a print clutch shaft speed of 300 rpm (+0; -5) rpm (Refer to 4.1.1).
12. Using the X10 probes, set the scope at 2 v/div and 1 ms/div. Sync negative external on the print disk clock amplifier output (output pin A-A1M2-B03, logics PR101). Observe the solar cell amplifier outputs from print disk 0 at A-A1M2 D07 and print disk 7 at A-A1K2 B07. Check that the negative-going slopes coincide. This check ensures correct positioning of the solar cell assembly. If coincidence is not observed, loosen the lamp assembly and solar cell block assembly and rotate both assemblies to obtain coincidence. If it is necessary to rotate the positioning sleeve to obtain this adjustment, loosen the positioning sleeve lock screw and rotate the sleeve. Do not shift the sleeve lengthwise on the shaft or it will affect the clearance adjustment of the solar cell assembly to the timing disk. When coincidence is obtained, reposition the positioning sleeve against the stop pin and tighten the lock screw.

4.5.2 Timing Disk, Print Wheel and Print Shaft Timing

Service Check

1. Print several lines of 120 characters (all the same character).
2. Check that the print impression is even from top to bottom. If not, perform the following adjustments.
3. Check that the print impression is even horizontally. If not, perform carriage position adjustments (4.7.2).

Preliminary Adjustment (Figure 4-8)

NOTE: The purpose of this adjustment is to achieve the relationship shown in Figure 4-8.

1. Rotate the print wheels to a position where the print wheel aligning tool, if inserted, would line up with the lower portion of the R characters.

   NOTE: If print shaft timing mark (EC 415767 has been installed, align timing mark approximately 1/15" before pointer.

   Caution

   Do not install service tool in machine. Turning the type wheels with service tool installed could damage the type wheels.

2. Manually attract the #1 print magnet armature.
3. Lift detent from the #1 print cam and move the print cam backward as far as it can go.
4. Rotate machine, by hand crank, until detent falls into print cam.
5. Check that the service tool lines up between the R and E characters (Figure 4-8)

6. Check that the small hole in the timing disk (opposite the "9" character) is in line with the centers of the print wheel drive shaft and the solar cell mounting shaft. (Figure 4-7).

Adjustment

1. If step 5 (of the preliminary adjustments) is incorrect, loosen the clamping screws in the spur gear, which drives the print wheel shaft, and reposition the print wheels. If step 5 is correct but step 6 is incorrect, proceed to step 4 of adjustments.
2. Retighten clamping screws in spur gear.
3. Recheck print wheel alignment with alignment tool (between the R and the E).
4. With the print wheels lined up between the R and the E, loosen the screws on the photo-emitter disk hub and align the emitter disk so that the small hole in the disk is in line with the centers of the print wheel drive shaft and the solar cell mounting shaft. (Figure 4-7).
5. Tighten the screws in the emitter disk hub.

   NOTE: The print wheel drive shaft timing may need slight variation to obtain optimum print quality of the proper character. If the print wheel drive shaft timing is changed, re-timing the photo emitter timing disk may also be necessary.

6. Repeat service check.

4.5.3 Individual Solar Cell Replacement

1. Loosen the holding screw at the bottom of the lamp housing and remove the housing.
2. Loosen the solar cell assembly clamp screw (Figure 4-7), rotate the assembly 180° clockwise, and remove the assembly from the shaft.
3. Remove the two screws that hold the solar cell housing and cables to the solar cell assembly. Loosen, but do not remove, the cable clamp screw.
4. Remove the two screws holding the phenolic cell mounting block to the housing. Slide the block from the housing.
5. Unsolder the individual cell being replaced and remove the "spaghetti" from the lead.
6. Line the new solar cell up with the other cells on the block. Solder the lead on the red dot side of the cell to the terminal that has the black wire. Replace the "spaghetti" on the other lead and solder lead to the terminal that has the yellow wire. The photo-sensitive side must face the light source.
7. Again check the cells for alignment and then reassemble the unit in the reverse order.
8. Check the solar cell and lamp adjustments (4.5.1).

4.6 RIBBON FEED AND DRIVE

The ribbon feed and drive mechanism must be adjusted in the following sequence because the adjustments are not independent.

1. Adjust the stroke
2. Adjust right-hand ribbon feed
3. Adjust left-hand ribbon feed.

4.6.1 Ribbon Feed Stroke Adjustment

Adjust the length and position of the stroke, using the right-hand ribbon feed mechanism as a reference (Figure 4-10). Loosen the adjusting screw and move the link operating lever with relation to the rocker arm to obtain these two conditions:

1. The ribbon feed pawl moves 3-1/2 teeth of the ribbon feed ratchet.
2. The ribbon feed pawl moves approximately 1/4 tooth before contacting the ribbon feed ratchet. Lock the rocker arm screw in this position.

4.6.2 Right Hand Ribbon Feed Adjustment

1. The feed pawl must not strike the pawl controlling stud when feeding ribbon onto the spool. It should not leave the stud when feeding ribbon off the spool.
2. Adjust the eccentric reverse pawl stud so that the following requirement is met: When the ribbon reverse lever is operated by the reversing rivet in the ribbon, the reverse pawl should be in the path of the pin that is located on the bottom of the ribbon feed operating arm. See Figure 4-11.

4.6.3 Left Hand Ribbon Feed Adjustment

1. Stroke length has already been adjusted. Properly position the stroke by adjusting the length of the operating link (Figure 4-12).
2. Adjust the ribbon feed pawl and the eccentric reverse pawl stud for the same conditions as the right-hand ribbon feed.

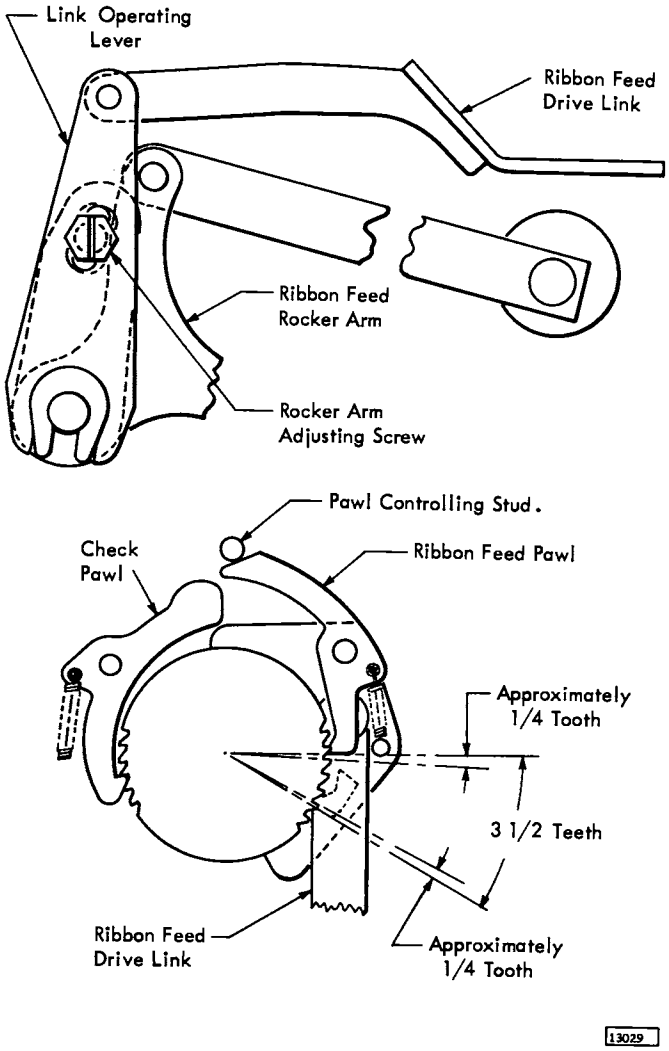


Figure 4-10. Ribbon Feed Stroke

4.6.4 Ribbon Spool and Pulley Pivot Adjustment

Adjust the ribbon so that the ribbon rides in the center of the pulleys when feeding. Use Figure 4-13 as reference in making adjustments. Note that Figure 4-13 shows the old and new style of ribbon feeds.

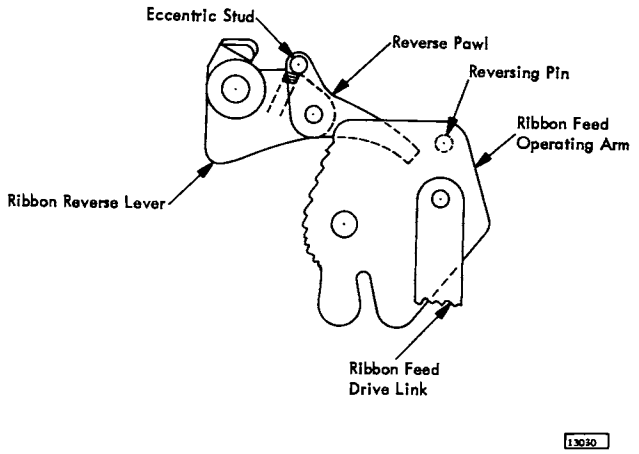


Figure 4-11. Ribbon Feed - Right Hand

Adjustments for both styles are shown in the boxes below the drawings. When one ribbon pulley is adjusted it may be necessary to adjust the pulley on the other end; then recheck the original pulley. Always check the ribbon in both directions and on both ends.

4.7 CARRIAGE

4.7.1 General Information

Worm Drive Gear: The porous bronze worm wheel contains a reservoir which should be filled with IBM 6 oil through a hole in the worm wheel disk at six-month intervals.

Printing Registration: It is imperative that the carriage frame and platen be kept as rigid as possible to prevent uneven printing. Check for looseness in the carriage indicating that the locating blocks and gibs should be adjusted.

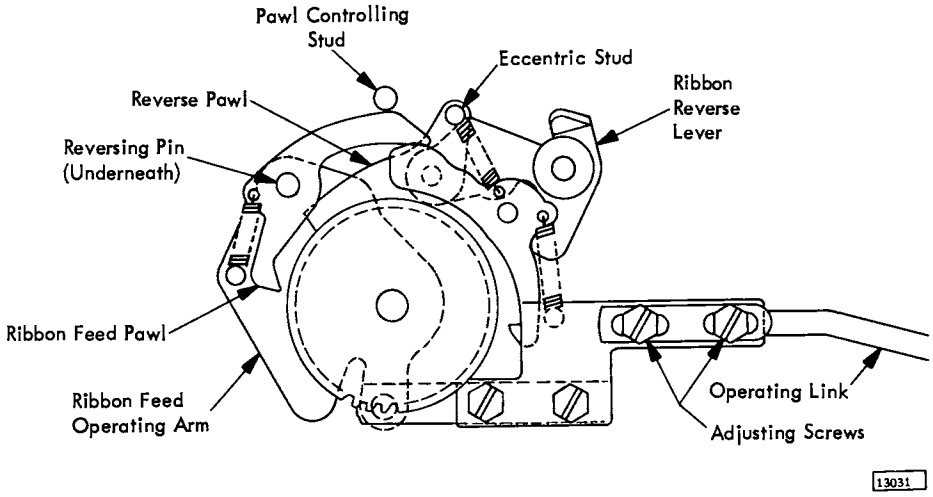


Figure 4-12. Ribbon Feed - Left Hand

Contact Roll and Carriage CB: The timing relationship between the tape brushes and carriage CB should be checked periodically. Incorrect skipping may result if the correct relationship is not maintained.

NOTE: Whenever the contact roll timing is changed, check the circuit breaker timing. The CB cam is mounted on a shoulder of the contact roll.

Carriage Speed: Check the contact roll speed periodically and maintain it at 150 to 155 rpm on high speed or approximately 70 rpm on slow speed.

Adjust the motor control resistor while running the carriage at slow speed so the 70 rpm may be easily counted.

The speed can also be checked using an oscilloscope. At high speed, carriage CB pulses occur at approximate 16.2 ms intervals.

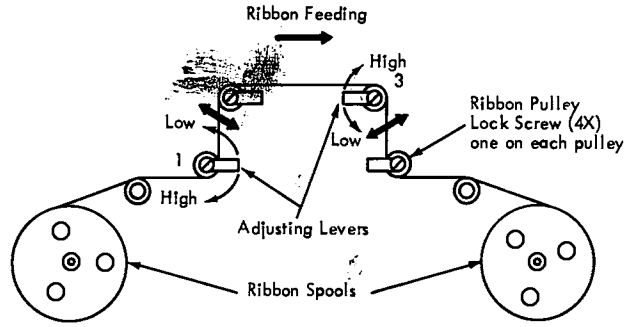
4.7.2 Carriage Position Adjustment

Caution

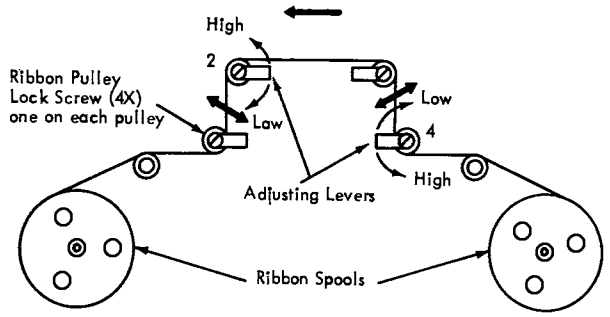
The carriage position adjustments are more critical on the 1132 than on previous machines using the same printing method. The adjustments are shown primarily for reference and they must not be changed unless absolutely necessary. Carriage position adjustments are factory set and can be duplicated in the field, only by trial and error.

NOTE: Print a row of characters (120 - all the same) to be used as reference when the carriage is replaced.

When necessary to remove the carriage, it should be done by removing the two large tip-up shoulder screws, one at each end. (Figure 4-14.) This



NOTES:
1. If new style bracket and pulleys are being installed, start adjustment with adjusting levers in position as shown. This provides the ribbon pulleys a vertical starting position.
2. Ribbon pulleys tip in the direction of rotation of the adjusting levers (new style).



New Style Ribbon Feed
1. Note the direction of ribbon feed.
2. Note the direction of ribbon creep (High or low as shown).
3. Loosen the lock screw on the appropriate pulley.
4. Turn the adjusting pin in the direction of the ribbon creep (As shown).
5. Tighten the lock screw.

Old Style Ribbon Feed			
Ribbon Feeding Left To Right		Ribbon Feeding Right To Left	
High on Left End	High on Right End	High on Left End	High on Right End
Adjust #1 Pulley	Adjust #3 Pulley	Adjust #2 Pulley	Adjust #4 Pulley
NOTE: Form pulley brackets in direction shown by the heavy arrows.			
Caution: Do not attempt to bend the pulley spindle. The spindle will come loose in the bracket.			

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● Figure 4-13. Ribbon Feed Pulley Adjustment

method ensures that the carriage is always returned to its original position without losing factory adjustments.

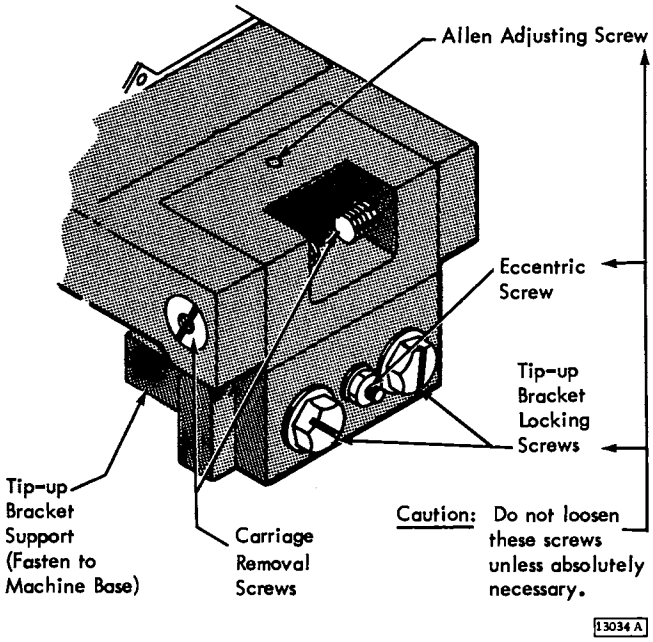


Figure 4-14. Carriage Platen Alignment

If it is absolutely necessary to adjust the carriage, use the following procedure as a guide in returning the carriage to the factory setting:

1. Set the form thickness device in the zero position.
2. Adjust the eccentric screw in the right and/or left tip-up bracket so that the platen will be 0.047" to 0.052" from the type face when the typewheels are held toward the platen by the high dwell of the print cam (Figure 4-15). It will be necessary to loosen the two large locking screws adjacent to the eccentric screws before making this adjustment (Figure 4-14).
3. Position the right and left tip-up brackets so that 120 characters will print with an even impression from top to bottom over the entire length of the printing line. The locking screws in the same hole will have to be removed to gain access to the Allen adjusting screws. When printing from five typewheels at each end, the impression should be heavier at the top of the figure. The reverse will be true when printing from 120 typewheels.

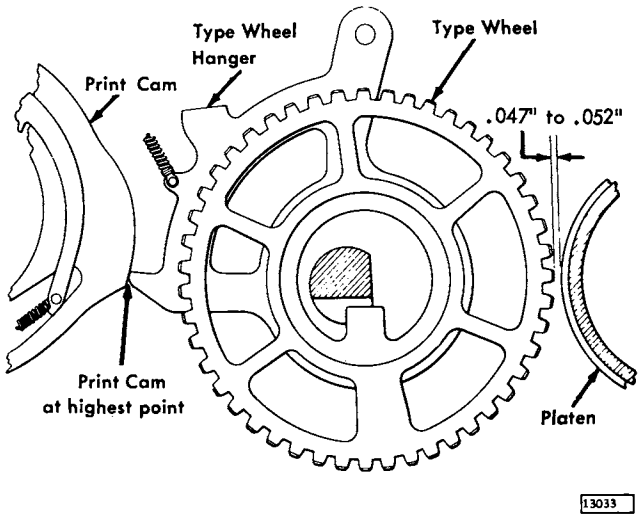


Figure 4-15. Print Wheel to Platen Clearance

Caution

Take care not to introduce any front-to-back tilt when making these adjustments.

4.7.3 Pressure Roll Adjustment

Pressure rolls must exert equal pressure in all positions and turn freely without interference from the paper guide.

4.7.4 Pressure Release Adjustment

When the pressure release lever is operated, there should be 0.060" to 0.070" clearance between the pressure rolls and platen. Loosen the two locking screws and relocate the paper release cam follower to obtain this adjustment (Figure 4-16).

4.7.5 Paper Guide Adjustment

1. The front paper guide is positioned at the factory so that it is parallel to the platen within 0.010" throughout its length.
2. The movable paper guides, right and left, are formed at the factory for a 0.015" maximum clearance to the stationary paper guide (Figure 4-17). The movable paper guides must be free to slide.

4.7.6 Form Stop Adjustment

1. Center the paper lever over the slot in the form guide (Figure 4-18).

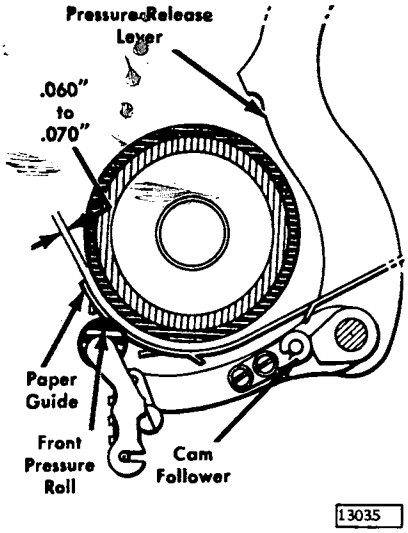


Figure 4-16. Paper Pressure Release

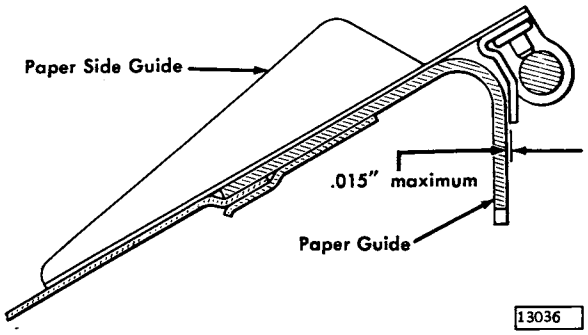


Figure 4-17. Paper Slide Guides

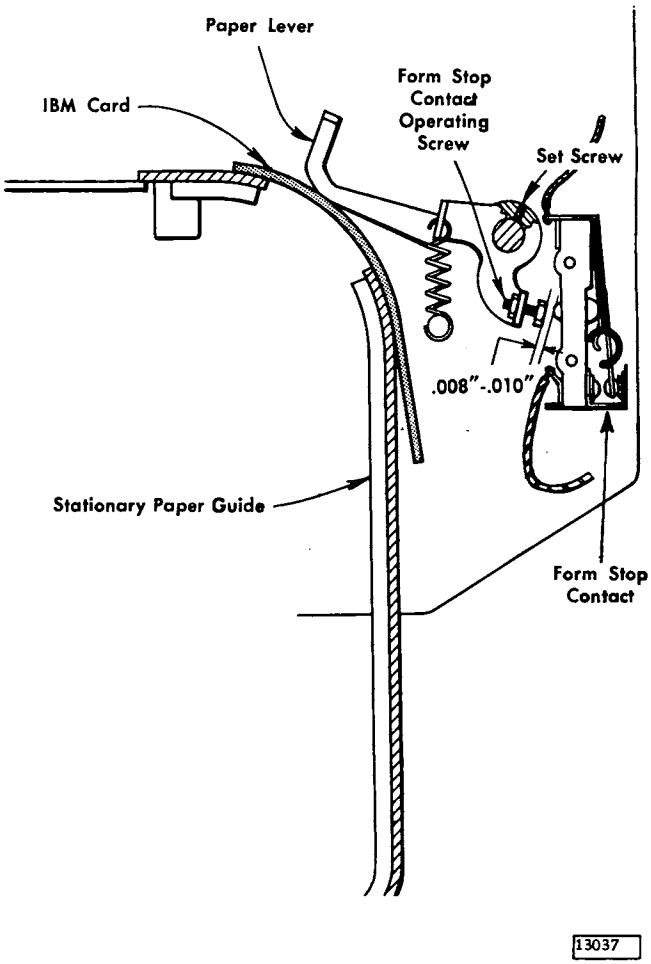


Figure 4-18. Form Stop Contact

2. For a preliminary setting, adjust the contact operating screw so that one thread projects above the ear and one thread projects below the lock nut.
3. With an IBM card between the paper lever and the stationary paper guide, position the contact operating lever on its shaft for 0.008" to 0.010" clearance between the contact operating screw and contact actuating stud. A final adjustment can be made by moving the contact operating screw.

4.7.7 Gib and Support Block Adjustment

1. By means of the adjusting screws, position the adjusting block gibs for a 0.002" maximum clearance with the carriage frame (Figure 4-19).
2. To limit the up and down movement of the carriage, the slide block is positioned with a 0.002" maximum clearance to the carriage frame (Figure 4-19). Shim as required.
3. By means of the adjusting screws, position the adjusting block gib lower for a 0.002" maximum clearance to the eccentric bearing block (Figure 4-19).
4. The adjusting block is also held in position by two retainer strips, which have a 0.002" maximum clearance to the adjusting block (Figure 4-20). Shim as required.
5. The carriage clamp bar front is attached to the lower base by two socket setscrews. Position the clamp bar so that there is 0.002" maximum clearance between the clamp bar and the carriage frame (Figure 4-21).

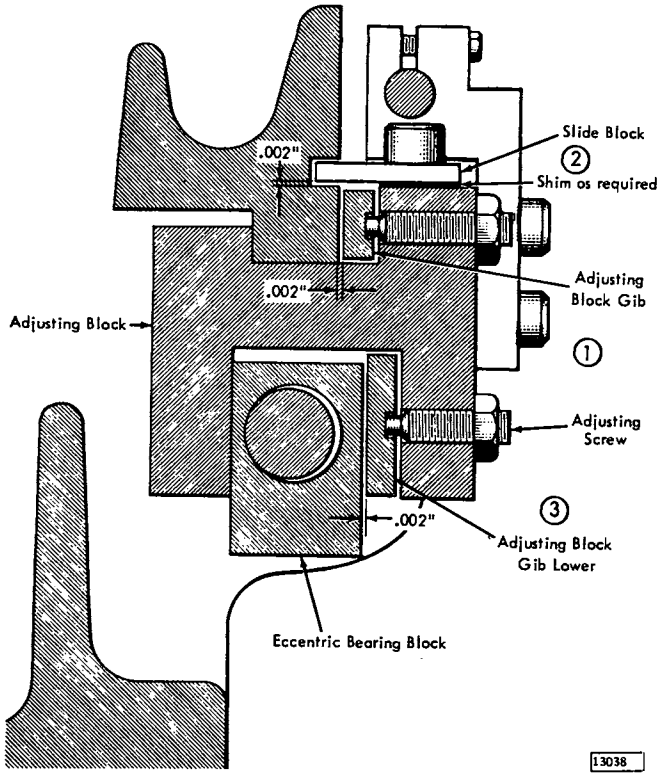


Figure 4-19. Carriage Gibs and Blocks

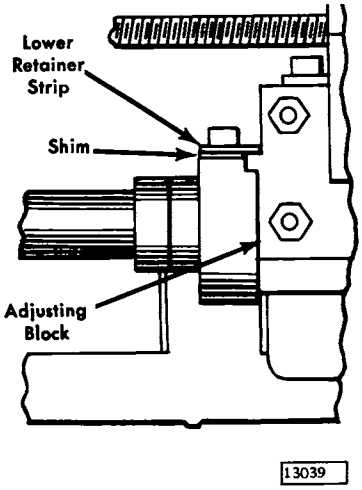


Figure 4-20. Retaining Strip

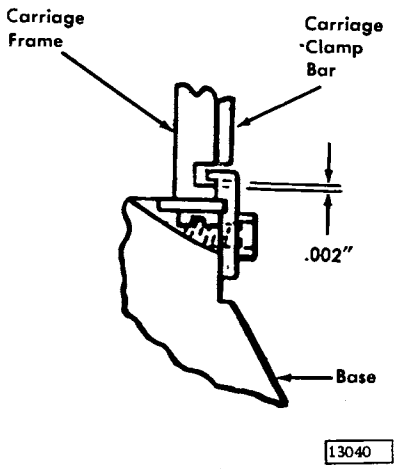


Figure 4-21. Clamp Bar

4.7.8 Clutch Magnet Assembly Adjustment

1. By means of the adjusting screws, position the clutch magnet cores square with the armature. With the detent resting on top of the detent wheel, there should be a clearance of 0.010" between the armature and cores (Figure 4-22).
2. Adjust the armature stop rod for a clearance of 0.005" between the armature and the stop rod with the detent on the top of the detent wheel. (Figure 4-22).

   These adjustments should result in an air gap of 0.060" to 0.065" between the armature and the cores when the magnet is deenergized and the detent is in the detent wheel.
3. With the detent in the detent wheel, adjust the detent spring for a clearance of 0.050 "±0.005" between the detent and the detent spring (Figure 4-23).

4.7.9 Detent Wheel Backstop Adjustment

With the detent wheel in a detented position, adjust the detent wheel backstop for a clearance of 0.005" to 0.012" to the detent tooth (Figure 4-24).

4.7.10 Interposer Magnet Assembly Adjustment

1. Adjust the armature pivot screws so that the right side of the armature is 0.393" (13/32") from the right side of the pivot frame (Figure 4-25).
2. Loosen the clamping screws. Turn the adjusting screw to position the magnet frame in relation to the armature pivot frame to obtain 0.003" to 0.005" clearance between the armature and the

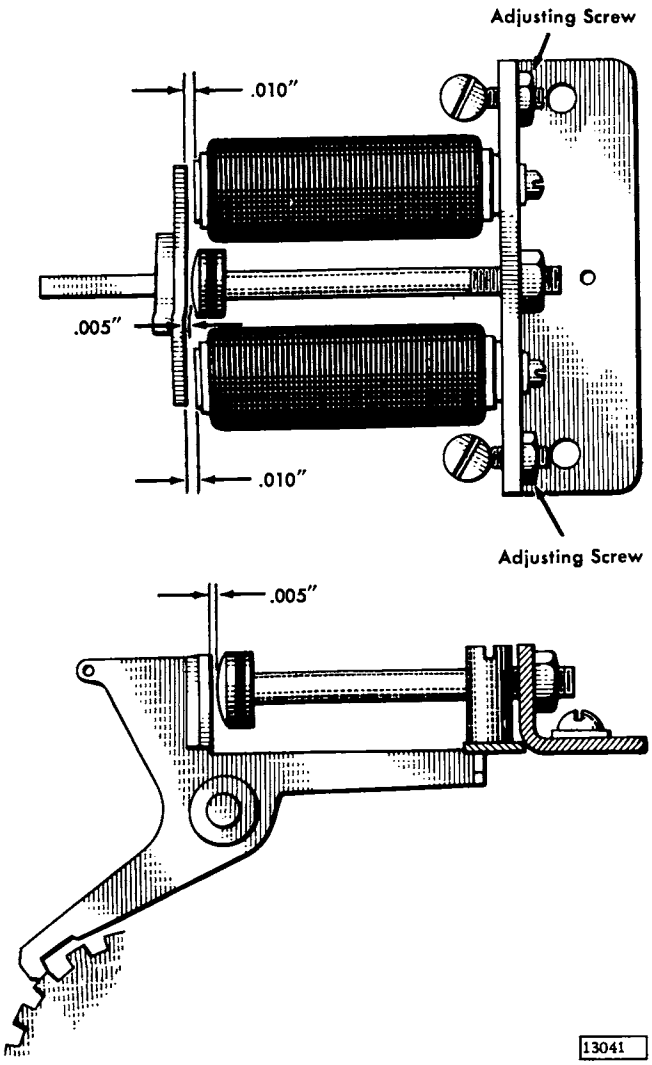


Figure 4-22. Clutch Magnet Armature

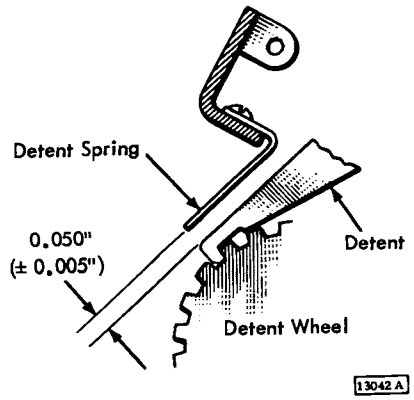


Figure 4-23. Clutch Magnet Detent

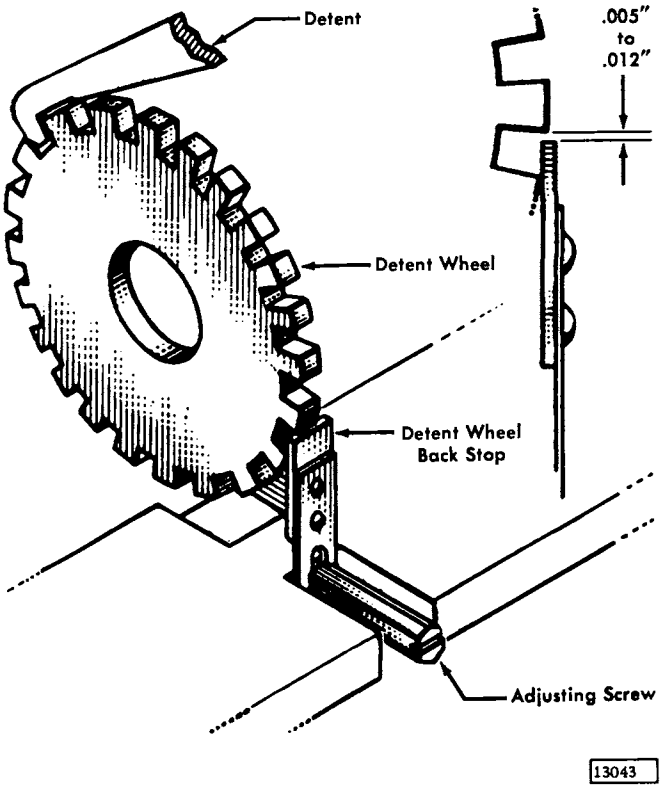


Figure 4-24. Detent Wheel Backstop

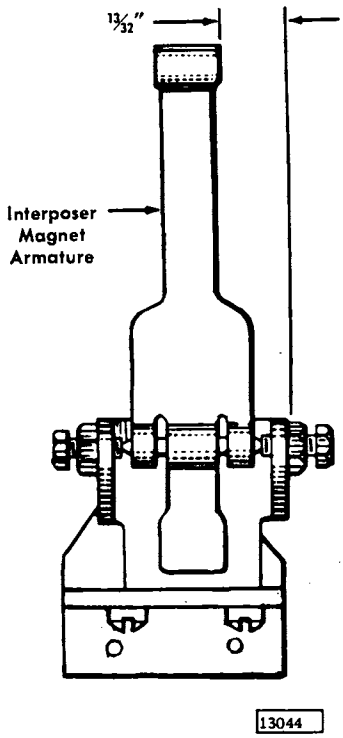


Figure 4-25. Interposer Magnet Armature

core when the armature is against its stop (Figure 4-26). This will position the armature vertically.

3. Adjust the interposer armature backstop screws for 0.070" air gap between the armature and the stop when the magnet is de-energized (Figure 4-26).
4. Loosen the mounting screws and shift the entire interposer armature and contact assembly with the aid of the positioning screw so that the non-operating portion of the high speed interposer is centered under the T-lever (Figure 4-26).
5. Move the backstop bracket at the top of the armature against the armature when it is in the de-energized position.
6. Adjust the stop screw at the top of the armature for 0.015" to 0.020" clearance when the armature is attracted.

4.7.11 Interposer Magnet Contact Adjustment

1. Form the operating strap with sufficient tension to follow the operating rod.
2. Adjust the interposer contact for 0.050" to 0.060" air gap (Figure 4-27).
3. Form the bumper stop to touch the contact blade 1/64" before final movement. Be sure the contact does not make before the interposers are correctly positioned.

4.17.12 Interposers Adjustment

1. With the detent in a latched position, turn the adjusting screw so that the high-speed clutch engaging arm positions the interposer with 0.003" to 0.005" clearance between the top side of the interposer and the T-lever (Figure 4-28). Make the same adjustment for the low-speed interposer. It is recommended that the high side of the eccentric be placed in the up position.
2. Adjust the eccentric stud for 0.002" to 0.003" clearance to the clutch engaging arm (Figure 4-29).

4.7.13 Interlock Plate Adjustment

With the low-speed interposer resting on the clutch engaging arm, set the interlock plate for a clearance of 0.002" to 0.003" between the plate and the lower edge of the interposer (Figure 4-30).

4.7.14 Cam Plate Adjustment

1. With the low-speed clutch engaged and the detent on the top of the detent wheel, apply a drag on the platen and turn the carriage manually. Check to see that the clutch teeth have just disengaged when the face of the detent is 0.010" from the

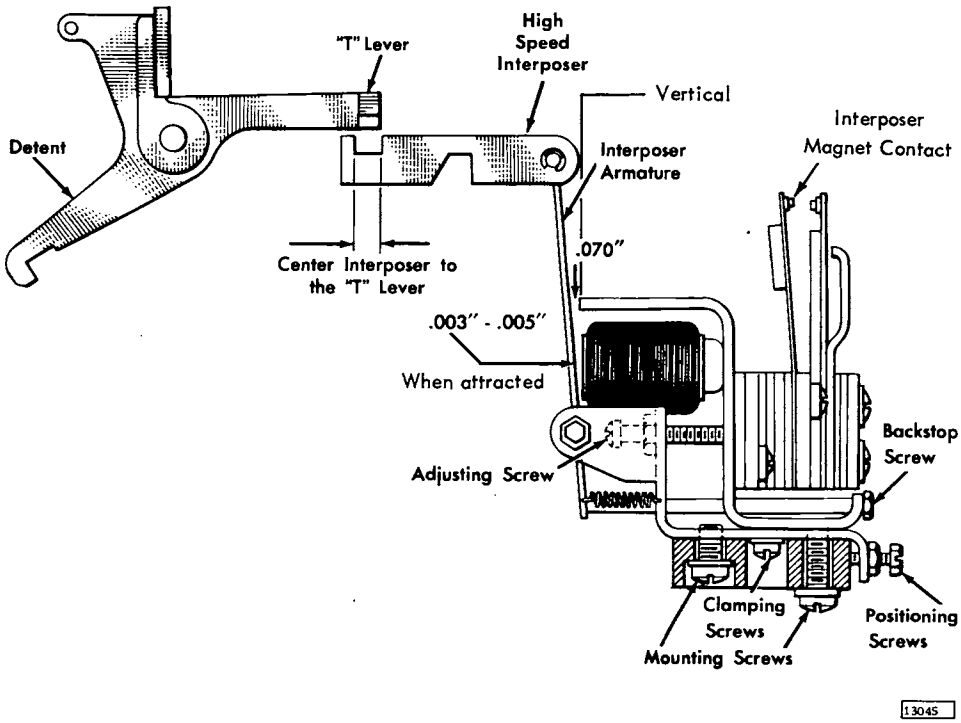


Figure 4-26. Clutch Magnet Armature and T-Lever

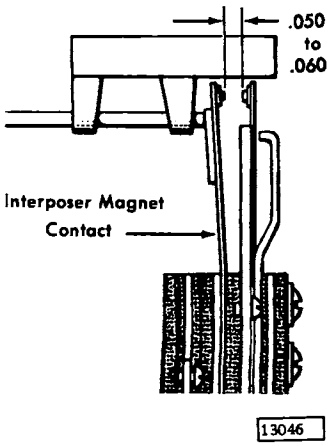


Figure 4-27. Interposer Magnet Contact

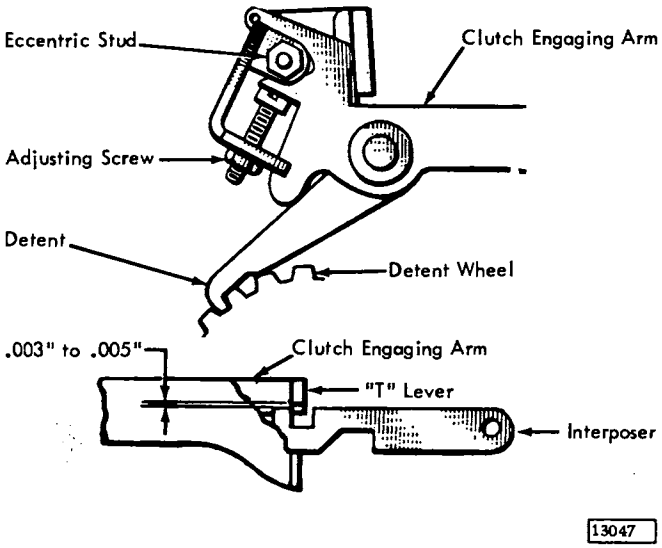


Figure 4-28. Clutch Engaging Arm

next tooth of the detent wheel (Figure 4-29). If this condition does not exist, raise or lower the cam plate as required.

2. Repeat adjustment 1 with the high-speed clutch engaged. The clutch teeth should just disengage when the face of the detent is 0.020" from the next tooth of the detent wheel (Figure 4-29). Adjust the position of the cam plate as required.

4.7.15 Clutch Cam Adjustment

Select the proper thickness cam to allow 0.002" to 0.005" clearance between the clutch teeth when the clutch engaging arm is in its fully operated position (Figure 4-31).

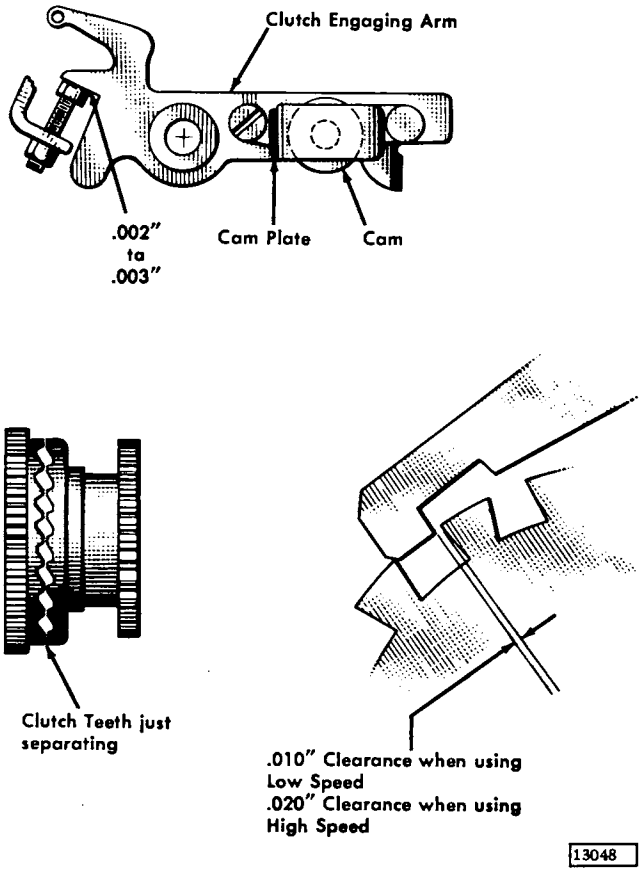


Figure 4-29. Clutch Engaging Arm Cam Plate

Figure 4-31 gives the cam sizes available and the distinguishing groove which is found on the hub of the cam.

4.7.16 Platen Clutch Detent Adjustment

A slotted hole is provided in the right side casting so that the pivot for the platen detent lever assembly may be shifted.

Position the pivot so that the detent pin will hold the platen detent in alignment with the platen drive gear when the platen clutch is operated (Figure 4-32).

4.7.17 High- and Low-Speed Clutch Adjustment

When parts must be replaced, the following procedure should be used:

1. File the long clutch spacers, p/n 197859, to obtain 0.005" to 0.008" clearance between the clutch teeth of both the high- and low-speed clutches (Figure 4-33). Check at several points.

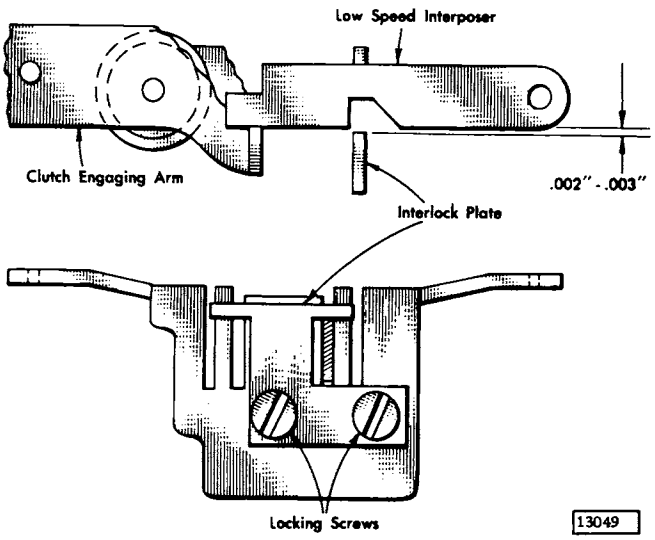
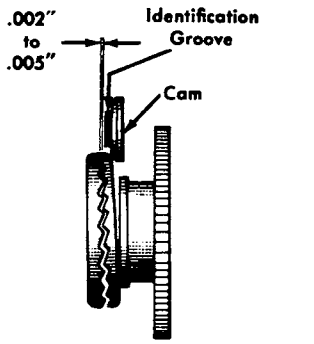


Figure 4-30. Interposer Interlock Plate



Cam Size	Part No.	Groove
.072"	197847	Narrow
.078"	197848	None
.083"	197849	Wide

13050

Figure 4-31. Carriage Drive Clutch Cams

2. Add shims, p/n 216506, to obtain a 0.593" to 0.597" clearance between the left-side frame and the low-speed clutch (Figure 4-33).
3. File the short clutch spacer, p/n 197858, to obtain a 0.593" to 0.597" clearance between the right-side frame and the high-speed clutch (Figure 4-33).

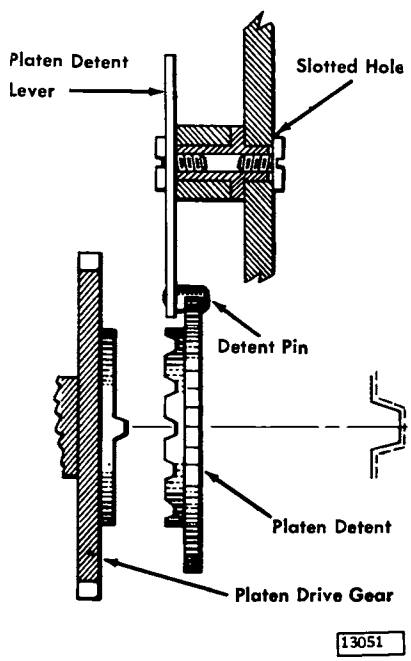


Figure 4-32. Platen Clutch Detent

4.7.18 Tape Channel Brush Adjustment

1. Insert brushes, p/n 2243026, so that the tips of all brushes project 1" from the brush holder (Figure 4-34).
2. Move the entire brush block, if necessary, so that the heels of the brushes line up with the scribed line on the separator.
3. Align the common brush, p/n 197894, by placing the heel of the longer brush group on the scribed line.

4.7.19 Brush Frame Adjustment

1. Position the brush guide for a clearance of 0.052" to 0.062" between the brush guide and the contact roll (Figure 4-35).
2. Position the brush frame spring collar so that the frame is held at a 45° angle when the brush frame latch is released (Figure 4-35).

4.7.20 Contact Roll Timing

Danger

The CB, contact roll, and brushes have logic voltage on them if the CPU is turned on.

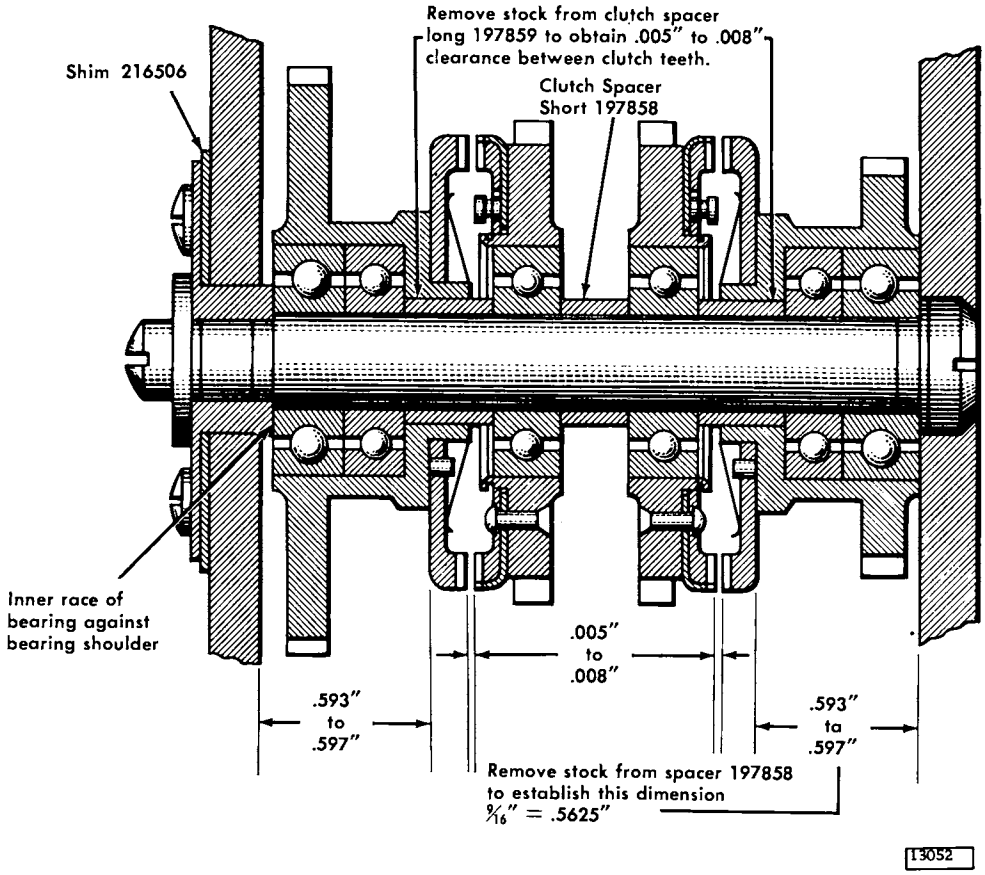


Figure 4-33. Carriage Drive Clutches

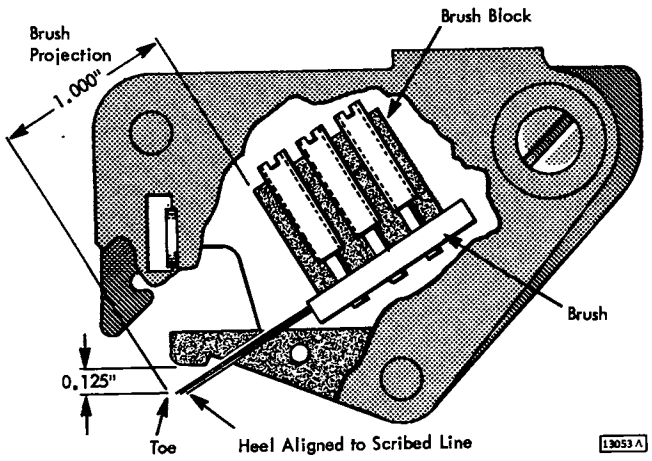


Figure 4-34. Carriage Tape Brush Alignment

NOTE: Heels of brushes must be on scribed line before this adjustment can be made (4.7.18).

1. Punch all twelve holes (in one column) in a carriage tape.
2. Seat detent against detent wheel.
3. With the punched tape on the contact roll and the detent seated in the detent wheel, position the contact roll as follows:

   NOTE: There is a locking screw on top of each contact roll set screw. Remove the top screw and loosen the bottom screw to adjust carriage contact roll (Figure 4-36).

   a. No brush or even a brush strand should make contact with contact roll (Figure 4-36).
   b. Check 3a by connecting one lead of an ohmmeter on the common brush. Run the other lead across the channel brushes while

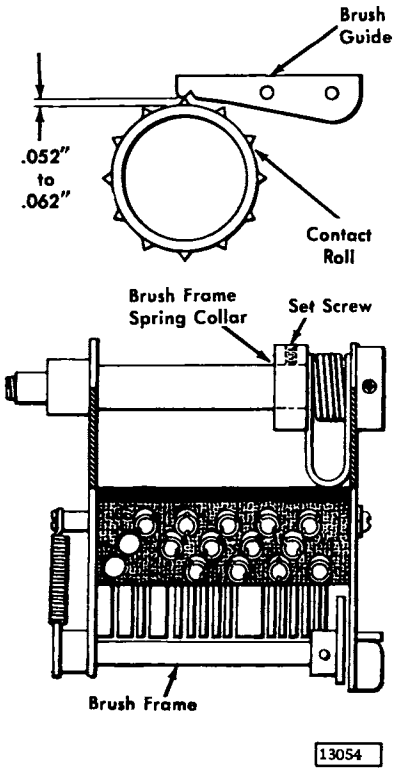


Figure 4-35. Carriage Brush Frame Assembly

manually wiggling the contact roll. If one strand (of any brush) makes contact, move contact roll slightly away from brushes and repeat step 3b. Run carriage under power to ensure step 3b is still correct.

c. Check also that there is 0.005" to 0.010" overlap on detent and detent wheel when the brush makes contact.

4. The carriage CB timing (4.7.21) must be checked if the contact roll has been moved. The carriage CB cam is mounted on the end of the contact roll and moves with the contact roll.

4.7.21 Carriage Circuit Breaker Adjustment

1. Set the carriage circuit breaker points for 0.015" to 0.018" air gap (Figure 4-37).
2. Position the carriage circuit breaker assembly for a clearance of 0.010" to 0.012" between the contact plunger and the low dwell of the cam (Figure 4-37).
3. To position the carriage circuit breaker in relation to the carriage brushes, proceed as follows:
   a. Prepare and install a carriage tape with channels 1, 2, 3, 4, 5, 6, 9 and 12 punched in every other column.

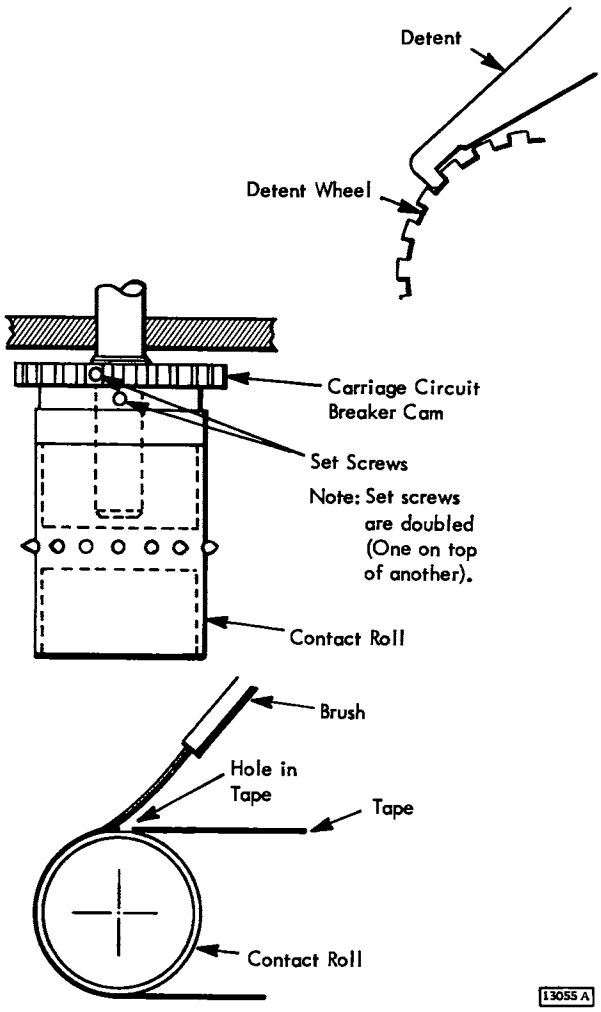


Figure 4-36. Contact Roll

b. Latch carriage brushes down.
c. Ground G3D06 in the 1131 (on board A-A1).
d. Sync scope on internal (plus).
e. Scope output of SCRs, indicated by an asterisk on ALD page 141.
f. Press carriage restore key.

Danger

Use the motor on-off switch to stop the carriage because the ground installed in step 3c makes the stop key inactive.

g. Adjust scope for a stable pattern and check for a pulse width of 2 msec(±0.5 msec).

NOTE: The SCRs are turned on by the carriage brush and turned off by the carriage CB closing.

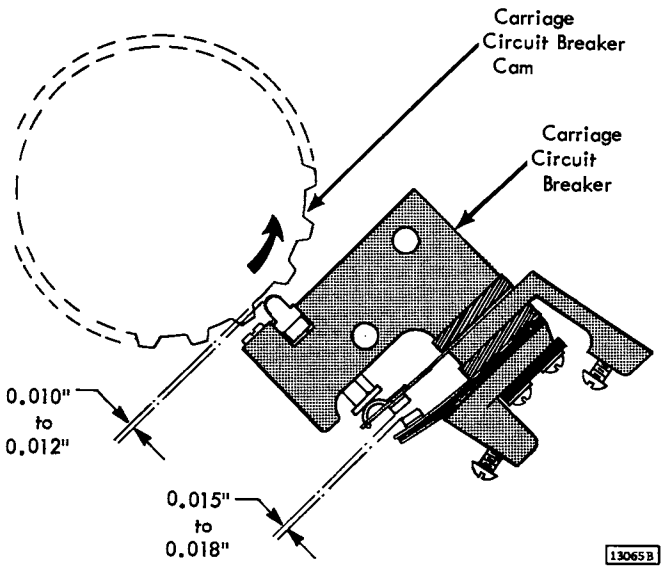


Figure 4-37. Carriage CB and CB Cam

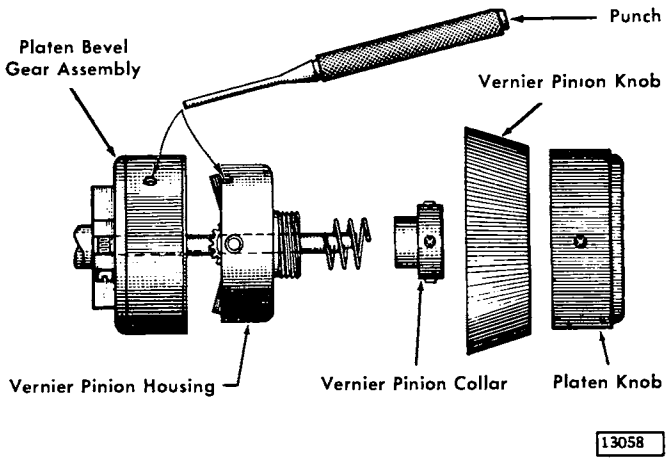


Figure 4-38. Carriage Vernier

h. Adjust the carriage CB cam (if necessary) to obtain the correct pulse width.

4. Check that the CB does not break before the brushes break. This timing should result in a CB duration of approximately 8 ms.
5. Remove ground installed in step 3c.

4.7.22 Vernier Removal

1. Remove the locking screw which covers the setscrew in the platen knob (Figure 4-38).
2. Loosen the setscrew and remove the knob.
3. Revolve the vernier knob until the hole in the platen bevel gear assembly is in line with the hole in the vernier pinion housing. Place the punch through the holes and remove the plastic knob by turning it counterclockwise.
4. Loosen the socket screws in the vernier pinion collar, then slide the vernier pinion housing off the platen shaft.

4.7.23 Vernier Adjustment

Position the vernier collar for maximum spring tension and keep the collar setscrews tight so that the vernier bevel gears are held in full mesh with the platen bevel gear assembly.

4.8 TOP COVER TORSION ROD ADJUSTMENT

Objective: To adjust the two torsion rods so that the top cover will go from a closed (latched) position to 50° (from the horizontal) and remain at 50° without being held.

NOTE: Dash pot must be installed when making these adjustments.

1. Open top cover as far as it will go.
2. Loosen the U-clamps (one set at each side of cover) holding the torsion rod retainers.

Danger

Do not allow cover to fall.

NOTE: The 1/4" square ratchet adapter tool (p/n 451132) fits the retainer for the following adjustment.

3. Insert tool into retainer and apply enough torque (CCW from the right side or CW from the left) to rotate each retainer about 10° to 15°. Tighten U-clamps.

Caution

Do not overtighten cover screws (cover metal strips easily).

4. Close (latch) cover and then unlatch cover, allowing cover to swing upward.
5. Check that cover rises to 50° (+20°; -10°) without being held.
6. Check that cover will remain fully open without being held.
7. Check that the torque on each side is approximately equal.
8. Vary torque applied in step 3 to meet checks, if necessary.

SECTION 2. FEATURES

(Not applicable - none available as of November 1966).

SECTION 1. BASIC UNIT

5.1 POWER REQUIREMENTS

5.1.1 AC Inputs From Using System

Use	Voltage
Drive motor	Line
Power supply input	Line
Use meter power supply	Line
Convenience outlets	115 vac
Gate fan	115 vac
Sequencing	24 vac (Nominal)

5.1.2 DC Inputs From Using System

Use	Voltage
SLT gate	+6 vdc
SLT gate	+3 vdc
SLT gate	-3 vdc
SLT gate	+12 vdc
Use meter relays	+6 vdc

5.2 PRINTER POWER SUPPLY OUTPUT

Use	Voltage
Carriage motor	+48 vdc
Carriage magnets	+48 vdc
Print magnets	+48 vdc
Emitter disk light	20 vac

5.3 DC VOLTAGE CHECKS

Voltage	Test Point	Range
-3 v	GTB-12	-2.88 to -3.12
+3 v	GTB-5	+2.88 to 3.12
+ 6 v	GTB-2	+5.76 to 6.24
+12 v	TB2-10	+11.04 to 12.96
+48 v	GTB-17	+44.16 to 51.84

5.4 POWER SEQUENCING

5.4.1 Power Up

24 vac sequencing voltage is supplied by the using system when the system +6 vdc and -3 vdc are at operating levels. This sequencing voltage picks K1 sequencing contactor and K2 sequencing contactor and K2 sequencing relay in the 1132 Printer if the 1132 motor switch is on. The sequence of bringing up all voltages is under control of the using system power sequencing.

5.4.2 Power Down

Power down sequence is controlled by the using system power sequencing; however, the 1132 Printer sequencing relays can be dropped by turning off the 1132 motor switch. Dropping the sequence relays does the following:

1. Stops the 1132 main drive motor.
2. Stops the use meter.
3. Drops the +48 vdc.
4. Drops the 20 vac.

NOTE: Logic voltages are controlled by the CPU, and they are present in the 1132 with the motor switch off.

SECTION 2. FEATURES

Not applicable - no features available as of this printing.

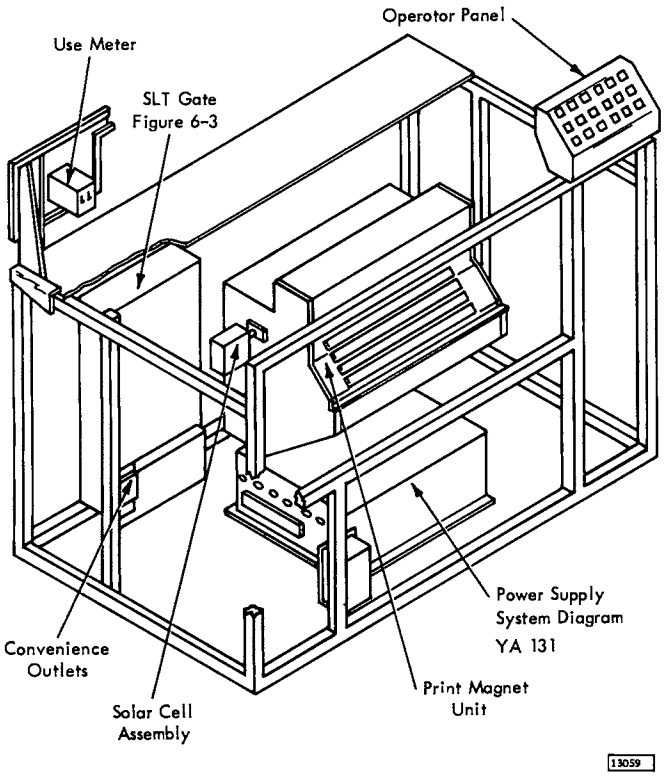


Figure 6-1. 1132 Printer - Front View

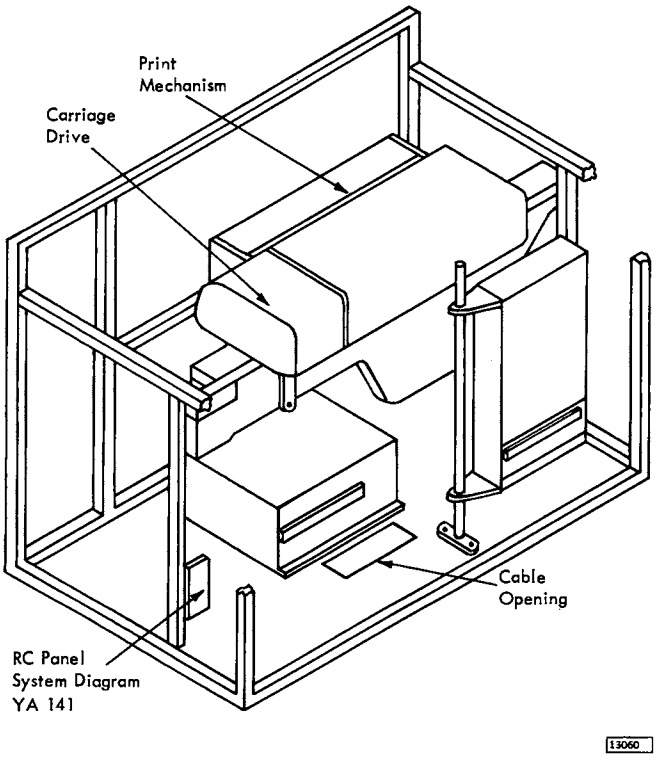


Figure 6-2. 1132 Printer - Rear View

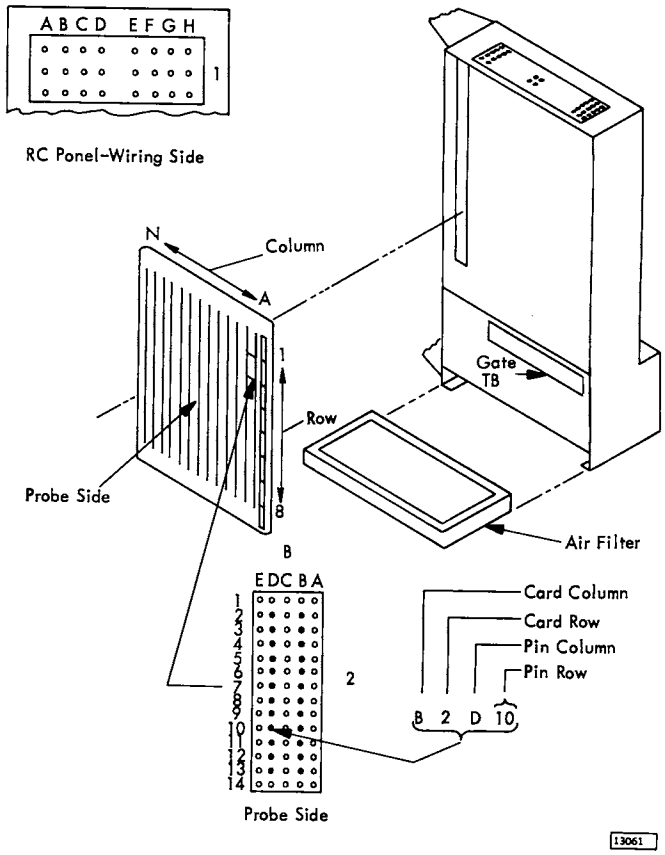


Figure 6-3. SLT Gate and RC Panel

Not applicable - no special circuits are used in the 1132.

Not applicable - the 1132 is not affected by World Trade applications.

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1132 Printer FEMM Y26-3621-2

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