

HIGH SPEED TAPE PUNCH UNIT

(DRPE TYPE)

ADJUSTMENTS

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Drive spring	14	1.01 This section is reissued to make it a standard publication and to incorporate engineering changes, new 2400 wpm models, a photoelectric reader, and a universal punch block. Since this is a general revision, marginal arrows are omitted.	
Feed mechanism - vertical position	16	1.02 The following requirements and adjusting procedures for the high speed tape punch (DRPE type) are arranged in a sequence that would be followed if a complete readjustment of the unit were undertaken. In following such a procedure, parts or assemblies that are removed to facilitate adjustments should not be replaced until all other adjustments which would be facilitated by the removal of these parts are made. If any adjustment is changed, related adjustments should be checked.	
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SECTION 592-803-700

1.03 The spring tension values indicated in this specification are scale readings which would be obtained when proper scales are used as specified. Springs that do not meet the requirements specified, and for which no adjusting procedure is given, should be replaced by new springs.

1.04 Before proceeding with any adjustment, read the applicable portion of the adjusting text carefully. After the adjustment is complete, be sure to tighten any screws or nuts which may have been loosened.

1.05 Check all moving parts to make sure they are free from binds before operating the unit under power.

1.06 Ordering information for parts and tools can be obtained from the appropriate parts and tool publications.

Note: Early units may be equipped with solid reeds marked with an "X" on the end. Inspect the reeds, and if they have the "X" do not use the punch at speeds over 850 words per minute (wpm). If higher speeds are required, replace the solid reeds with the laminated type (not marked with an "X").

2. BASIC UNIT

2.01 Punch Mechanism

Note 1: If universal punch block is used, refer to Paragraph 3 for additional adjustments.

PUNCH PIN RETAINING PLATE

Requirement

With punch block installed on casting

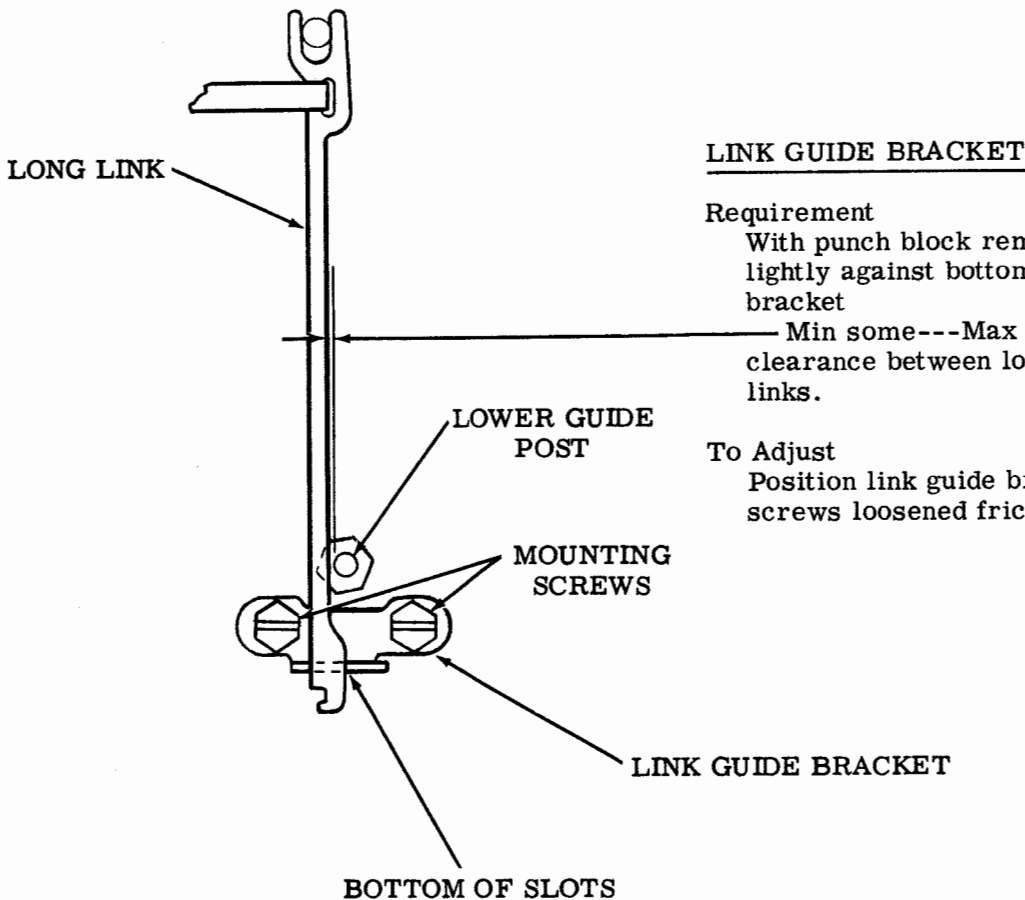
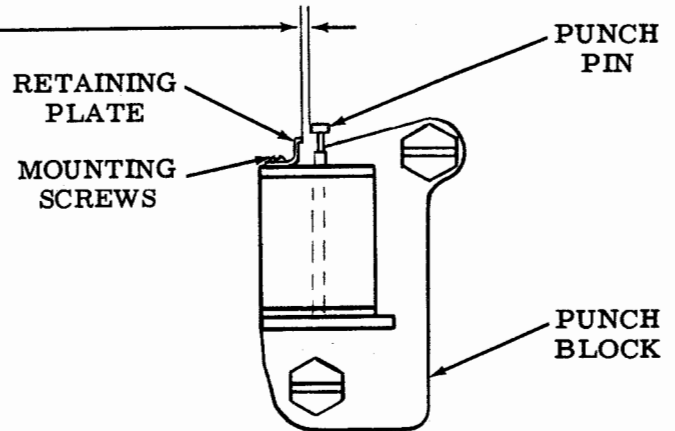
Min some, as gauged by eye, clearance between heads of punch pins and retaining plate. Punch pins shall move freely.

Note 2: Adjustment should be made prior to assembly of punch block to main casting.

To Adjust

Position retaining plate to left with its mounting screws loosened.

Note 3: If punch block is to be removed, adjust plate to retain punch pins.



LINK GUIDE BRACKET

Requirement

With punch block removed and links pressed lightly against bottom of slots in link guide bracket

Min some---Max 0.005 inch clearance between lower guide post and long links.

To Adjust

Position link guide bracket with its mounting screws loosened friction tight.

2.02 Punch Mechanism (Contd)

PUNCH BLOCK

Requirement

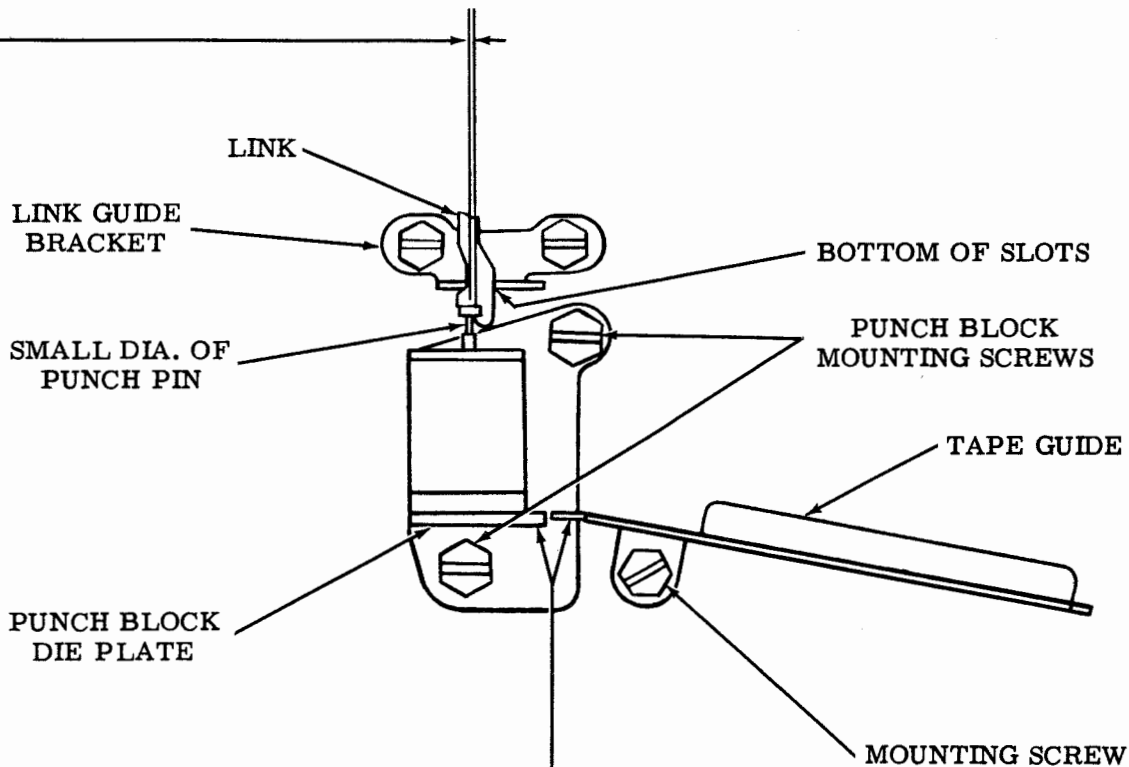
With punch block mounted on unit and links held against bottom of slots in link guide bracket

Min some---Max 0.003 inch

clearance between small diameter of punch pins and links.
(Some clearance at link with least clearance.)

To Adjust

Pivot block about lower mounting screw with mounting screw loosened friction tight.



TAPE GUIDE (RIGHT)

Requirement

Aligned with punch block die plate extension, as gauged by eye.

To Adjust

Position tape guide with lower mounting screw loosened.

2.03 Punch Mechanism (Contd)

BUMPER (If so equipped)

Note 1: This adjustment should be made before the magnet bracket assembly is installed on the unit.

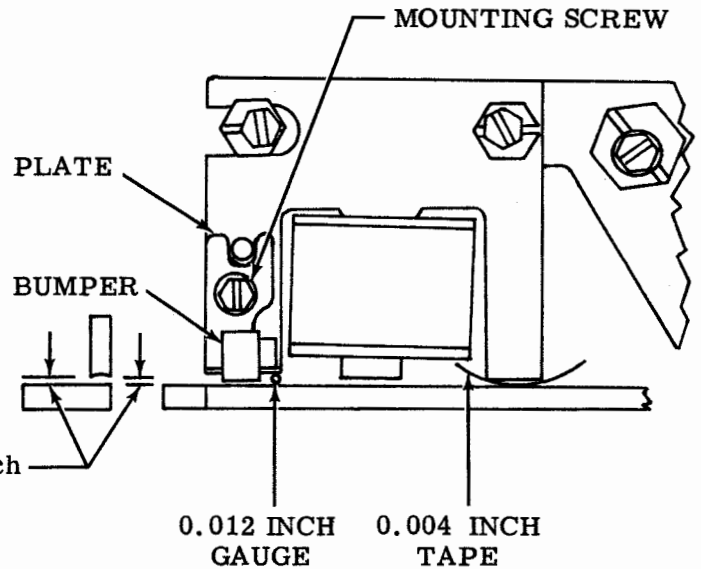
Requirement

Seat bumper fully on its plate with reed mounting screws tight. Place a piece of standard unpunched tape under core face nearest reed anchor and a 0.012 inch gauge under core face away from anchor at point of least clearance. Position core against tape and gauge and tighten core eccentric mounting screws.

Min some, as gauged by eye---Max 0.003 inch between reed and edge of bumper with least clearance.

To Adjust

Position each bumper plate with its mounting screw loosened to meet requirement. Tighten screw and recheck requirement.

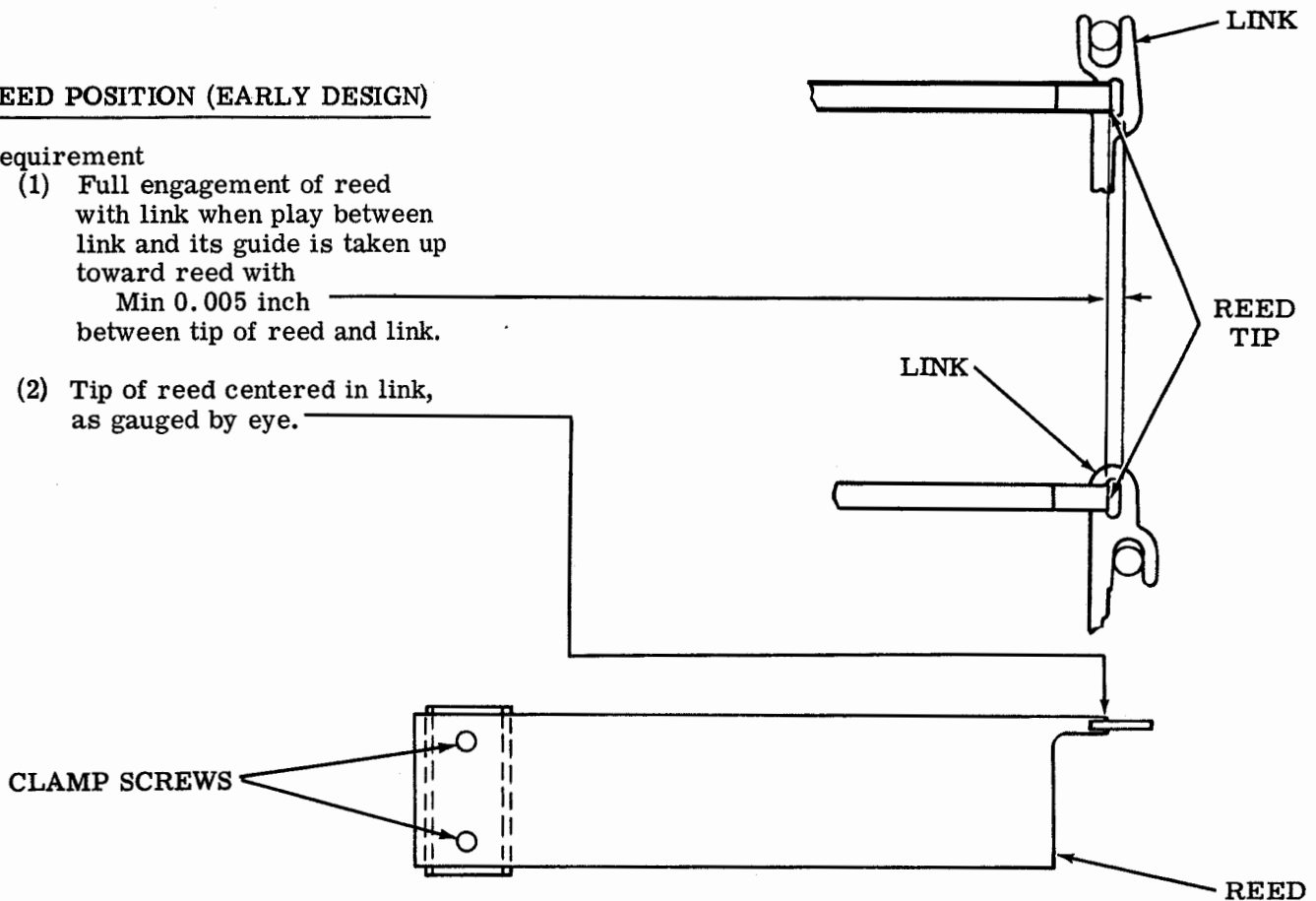


Note 2: If magnet bracket is removed for this adjustment, all related adjustments through PUNCH PIN PENETRATION must be rechecked.

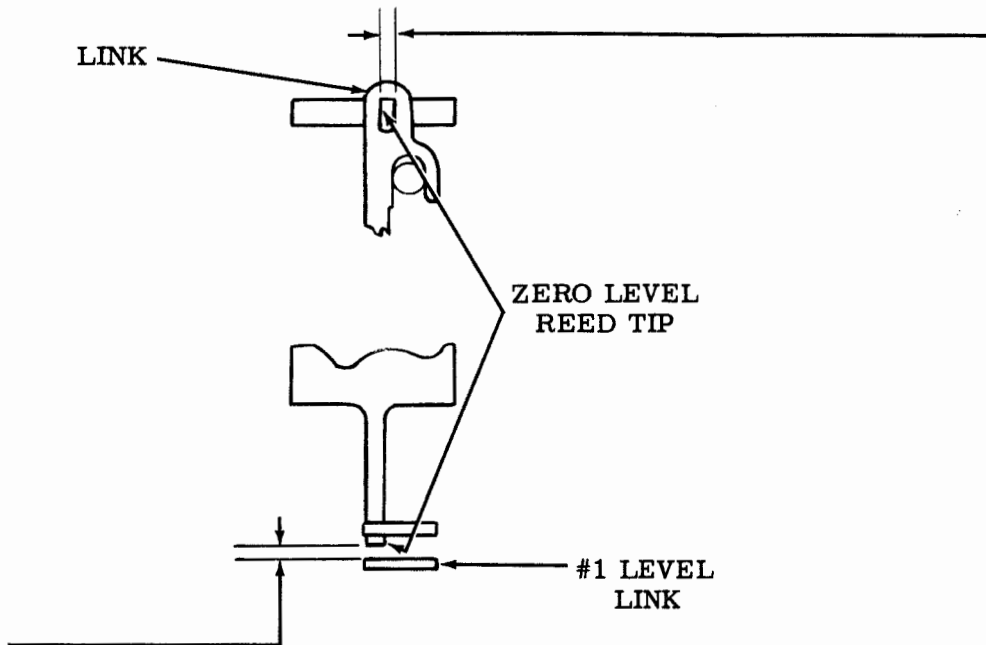
REED POSITION (EARLY DESIGN)

Requirement

- (1) Full engagement of reed with link when play between link and its guide is taken up toward reed with
Min 0.005 inch between tip of reed and link.
- (2) Tip of reed centered in link, as gauged by eye.



2.04 Punch Mechanism (Contd)



NO. 1 LEVEL REED POSITION (EARLY DESIGN) (Except 5-Level)

Requirement

- (1) With play between link and its guide taken up towards reed
Min 0.012 inch---Max 0.028 inch
clearance between side of no. 1 level reed tip and its link,
and reed tip in full engagement with link.

- (2) Clearance between tip of no. 1 level reed and no. 2 level
link shall be
Min 0.005 inch---Max 0.015 inch.

To Adjust

Position reed with its clamp screws loosened.

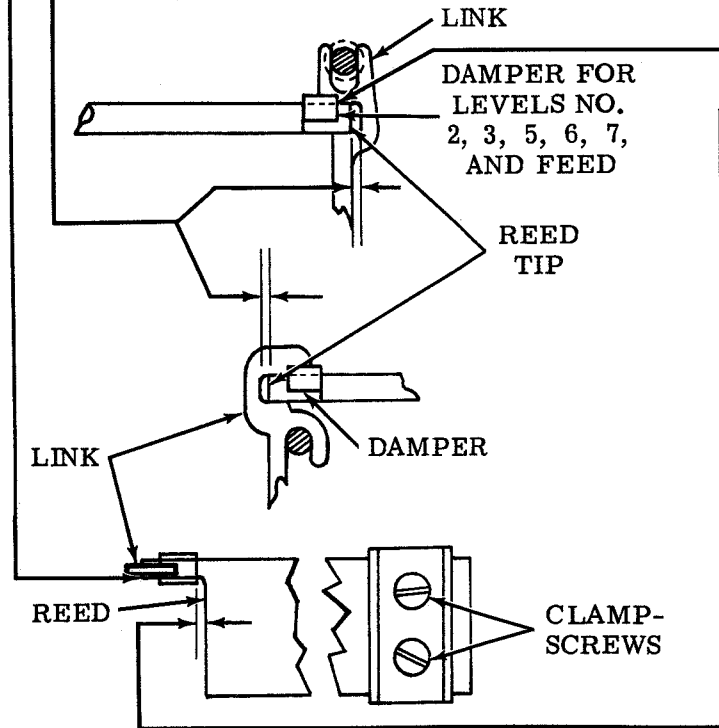
2.05 Punch Mechanism (Contd)

REED POSITION (LATE DESIGN)

Requirement

- (1) Tip of reed should be centered in link, as gauged by eye.
- (2) With play between link and its guide taken up toward the reed
Min 0.030 inch---Max 0.037 inch between tip of reed and link.

To Adjust
Position reed with its clampscrews loosened.



Note 1: Make REED POSITION (LATE DESIGN) and DAMPER POSITION (LATE DESIGN) adjustments together. After both adjustments are completed, make certain that the reed mounting screws are securely tightened.

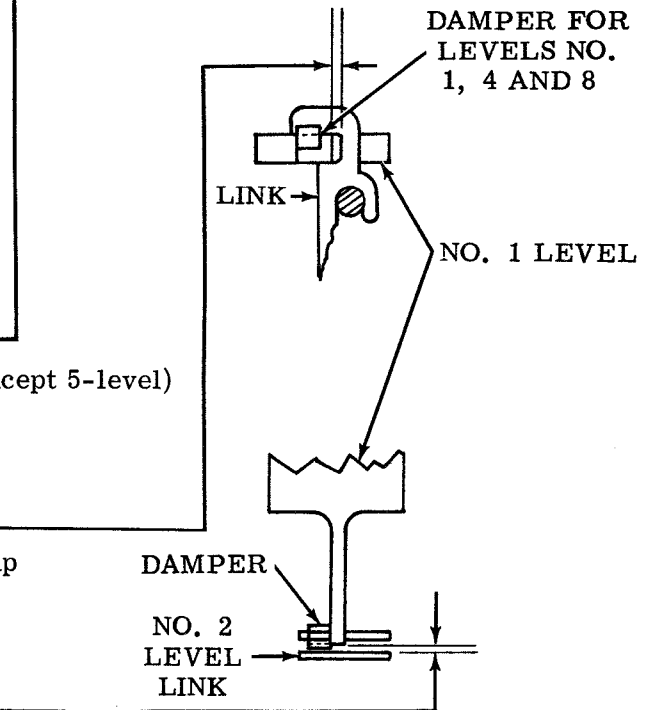
Note 2: DAMPER POSITION (LATE DESIGN) adjustment applies only to No. 2, 3, 5, 6, 7 and feed levels. On No. 1, 4 and 8 levels, the damper is kept in place by its link.

DAMPER POSITION (LATE DESIGN)

Requirement

- Damper on reed tip must be flush to link, with
Min 0.006 inch clearance between damper and edge of reed.

To Adjust
Position reed with its clampscrews loosened.



NO. 1 LEVEL REED POSITION (LATE DESIGN) (Except 5-level)

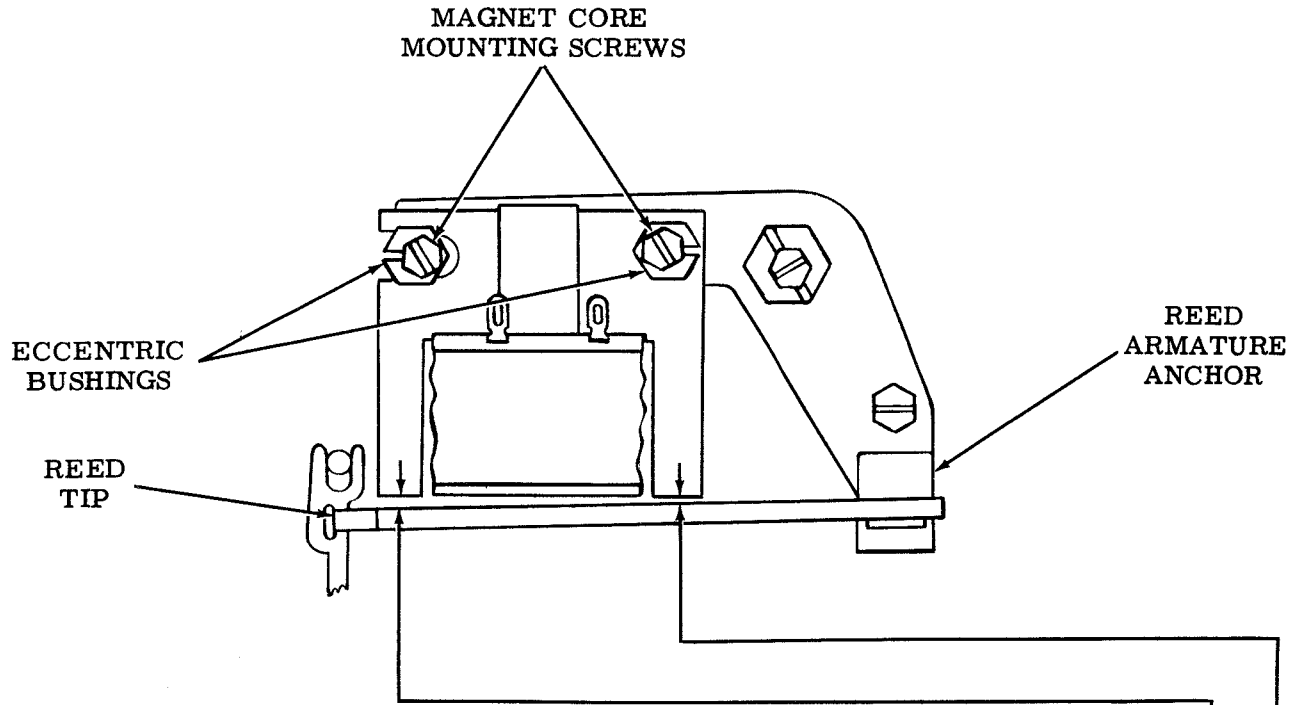
Requirement

- (1) With play between link and its guide taken up towards reed
Min 0.030 inch---Max 0.037 inch clearance between side of no. 1 level reed tip and its link.
- (2) Clearance between tip of no. 1 level reed and no. 2 level link should be
Min 0.035 inch---Max 0.045 inch

To Adjust
Position reed with its clampscrews loosened.

2.06 Punch Mechanism (Contd)

Note 1: The following adjustment may be made with the magnet assemblies on or off the unit.



ARMATURE (REED) AIR GAP

Requirement

- (1) Measured between reed and pole faces at reed tip ends with reed in its neutral, unenergized position
Max 0.027 inch gap between reed and pole face closest to reed tip;
Max 0.008 inch gap between reed and pole face closest to reed anchor. Gauges should not enter at points of least clearance near anchor ends.

Note 2: The 0.008 inch adjustment is preliminary and may be refined to meet Requirement (2) below.

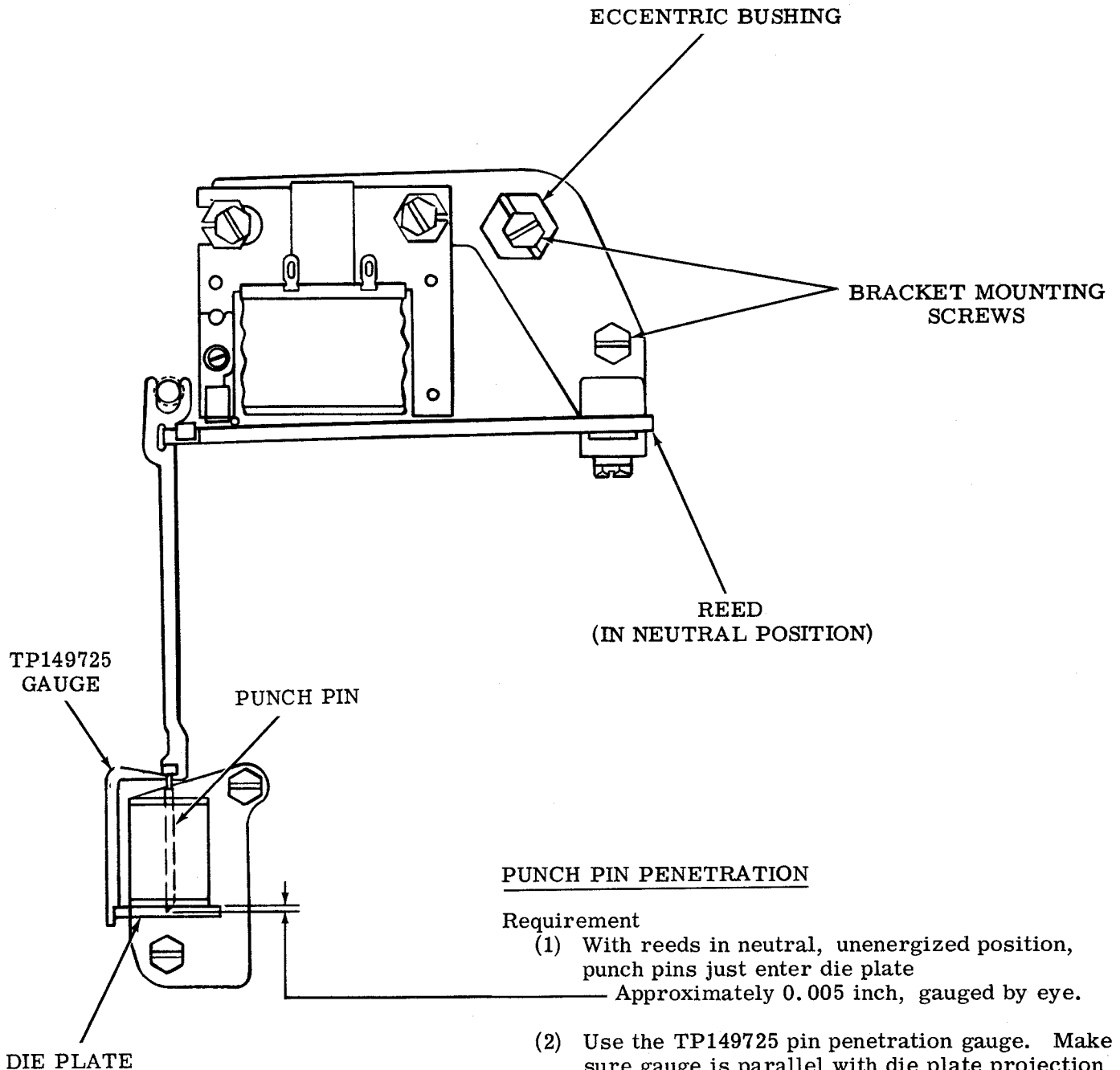
- (2) With magnet energized
Max less than 0.002 inch
clearance between core and armature at any point as checked by 0.002 inch feeler gauge.

To Adjust

Rotate eccentric bushings with core mounting screws loosened friction tight. Note that eccentric highs should be toward outer edges of core. It is recommended that the two larger air gaps be adjusted together.

If Requirement (2) is not met, refine Requirement (1) at pole nearest anchor. This may be done with magnet energized.

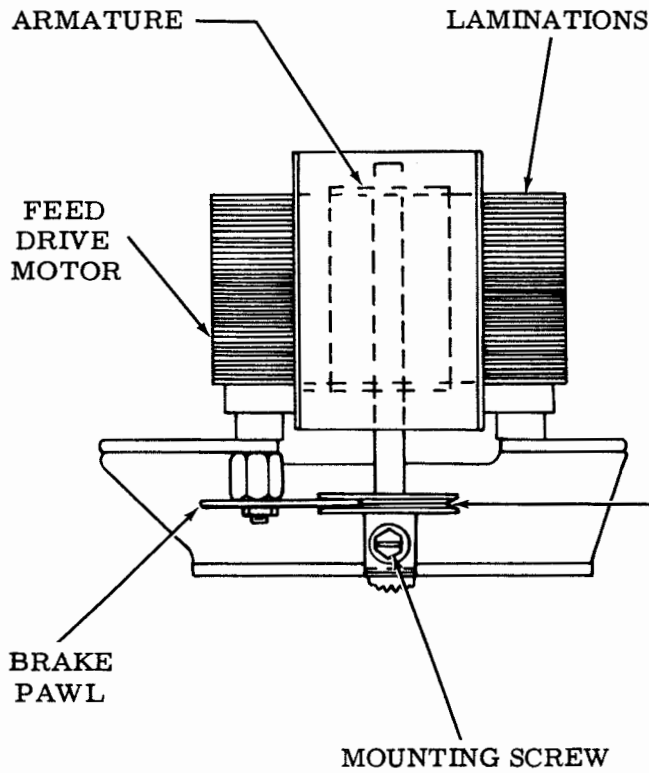
2.07 Punch Mechanism (Contd)

**To Adjust**

Rotate eccentric bushing with two bracket mounting screws loosened friction tight. Note that eccentric high should be pointed away from lower mounting screw.

2.08 Tape Feed Mechanism

Note: The following five adjustments may be made on the feed drive assembly while it is removed from the unit.

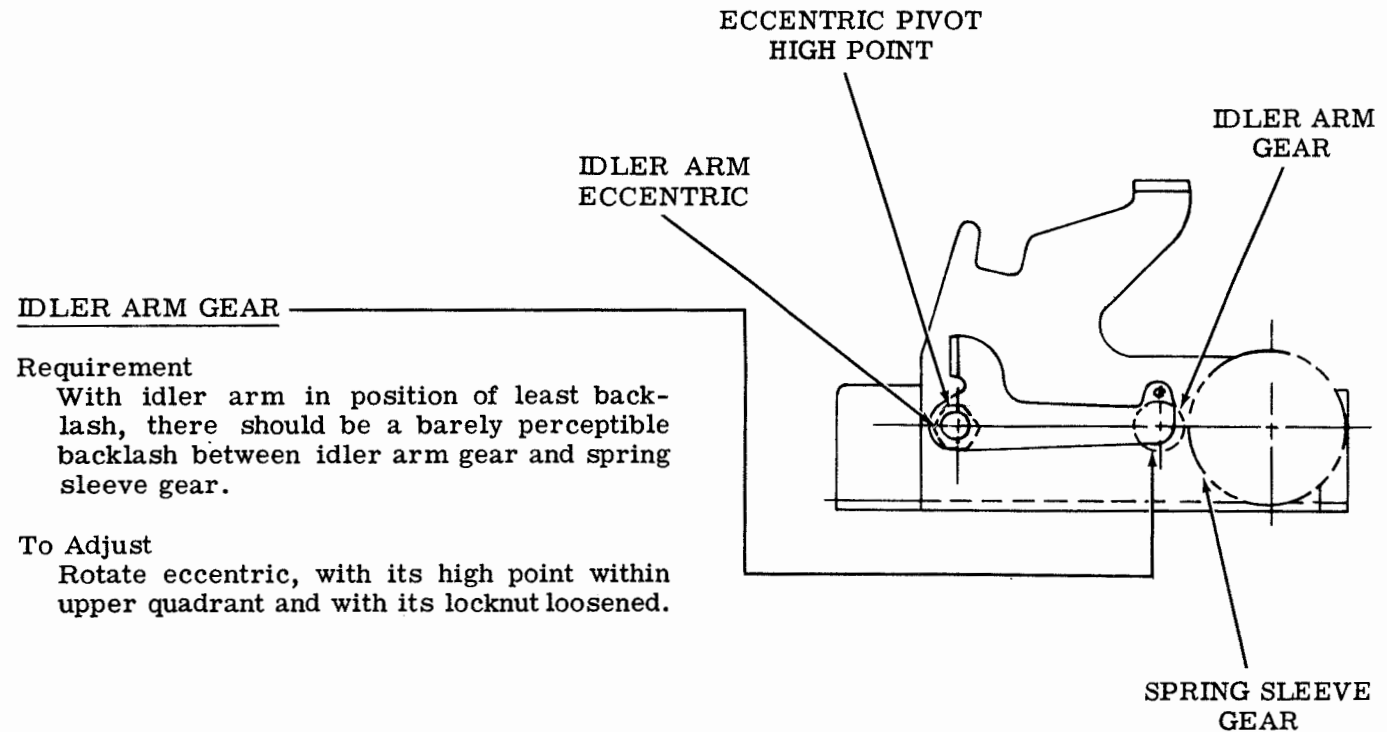


ANTIREVERSAL DISC

Requirement
 With the motor armature centered in its laminations, the brake pawl is centered in the disc slot as gauged by eye.

To Adjust
 Position the disc with its mounting screw loosened.

ANTIREVERSAL DISC SLOT



IDLER ARM GEAR

Requirement
 With idler arm in position of least backlash, there should be a barely perceptible backlash between idler arm gear and spring sleeve gear.

To Adjust
 Rotate eccentric, with its high point within upper quadrant, and with its locknut loosened.

2.09 Tape Feed Mechanism (Contd)

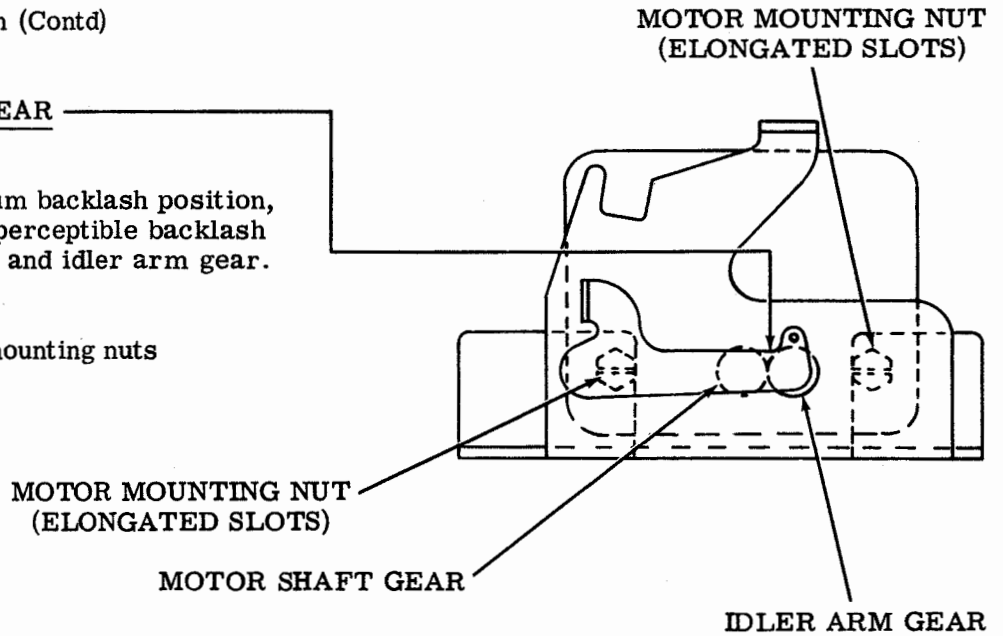
SPRING WINDER MOTOR GEAR

Requirement

With idler arm in minimum backlash position, there should be a barely perceptible backlash between motor shaft gear and idler arm gear.

To Adjust

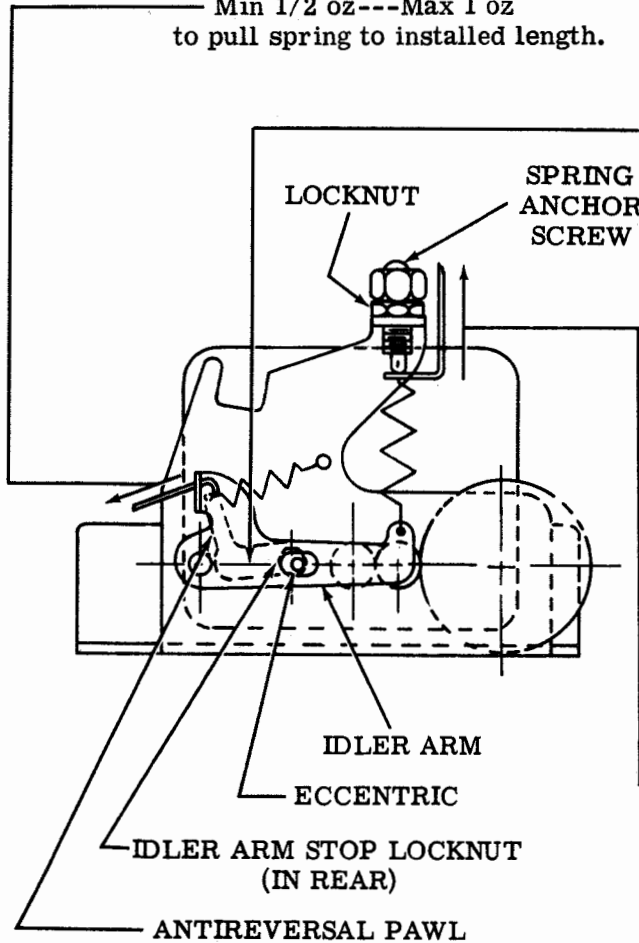
Position motor with its mounting nuts loosened friction tight.



ANTIREVERSAL PAWL SPRING

Requirement

Min 1/2 oz---Max 1 oz
to pull spring to installed length.



IDLER ARM STOP

Requirement

Idler arm stop shall stop idler arm an equal distance above and below center line of gears, gears, as gauged by eye.

To Adjust

With its locknut loosened, rotate stop, keeping eccentric high point toward gears.

SPRING WINDER TENSION

Requirement

Min 6 ozs---Max 9 ozs
to start tension spring moving.

To Adjust

Rotate spring anchor screw with its locknut loosened.

2.10 Tape Feed Mechanism (Contd)

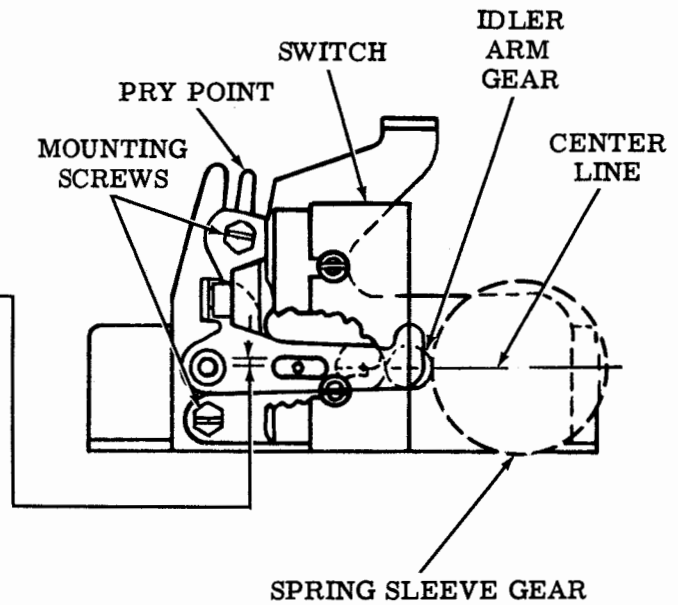
SPRING WINDER SWITCH

Requirement (Remove Power)

- (1) With all three gears in line as gauged by eye and when switch has just opened

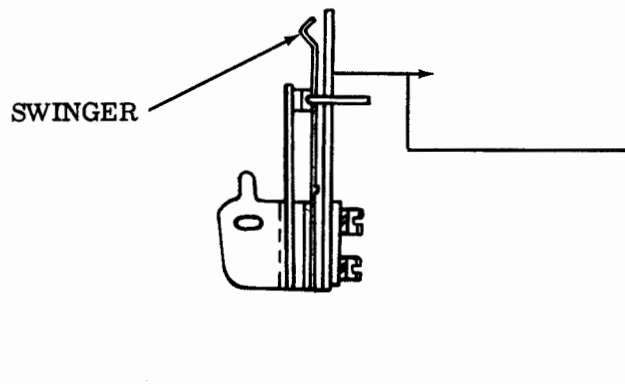
Min 0.015 inch---Max 0.020 inch between top of eccentric idler arm stop and its slot in idler arm. There must be some overtravel after switch closes.

- (2) To measure: Move large gear by hand to operate switch. Do not press idler arm near switch actuator. Operate points of switch may be determined by audible click or by continuity checking device.



To Adjust

With mounting screws loosened friction tight, position switch bracket by pry point.



TAPE PULLER CONTACT PILE-UP

Requirements

- (1) Min 4 ozs---Max 5 ozs to open contact.
- (2) Min 0.010 inch--Max 0.015 inch gap with swinger on high point of puller cam.

To Adjust

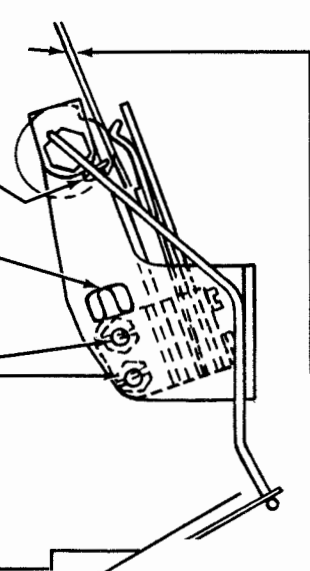
- (1) Bend contact swinger.
- (2) With its mounting screws loosened friction tight, position contact bracket by pry point.

TAPE SENSING ARM SPRING

PRY POINT

MOUNTING SCREWS

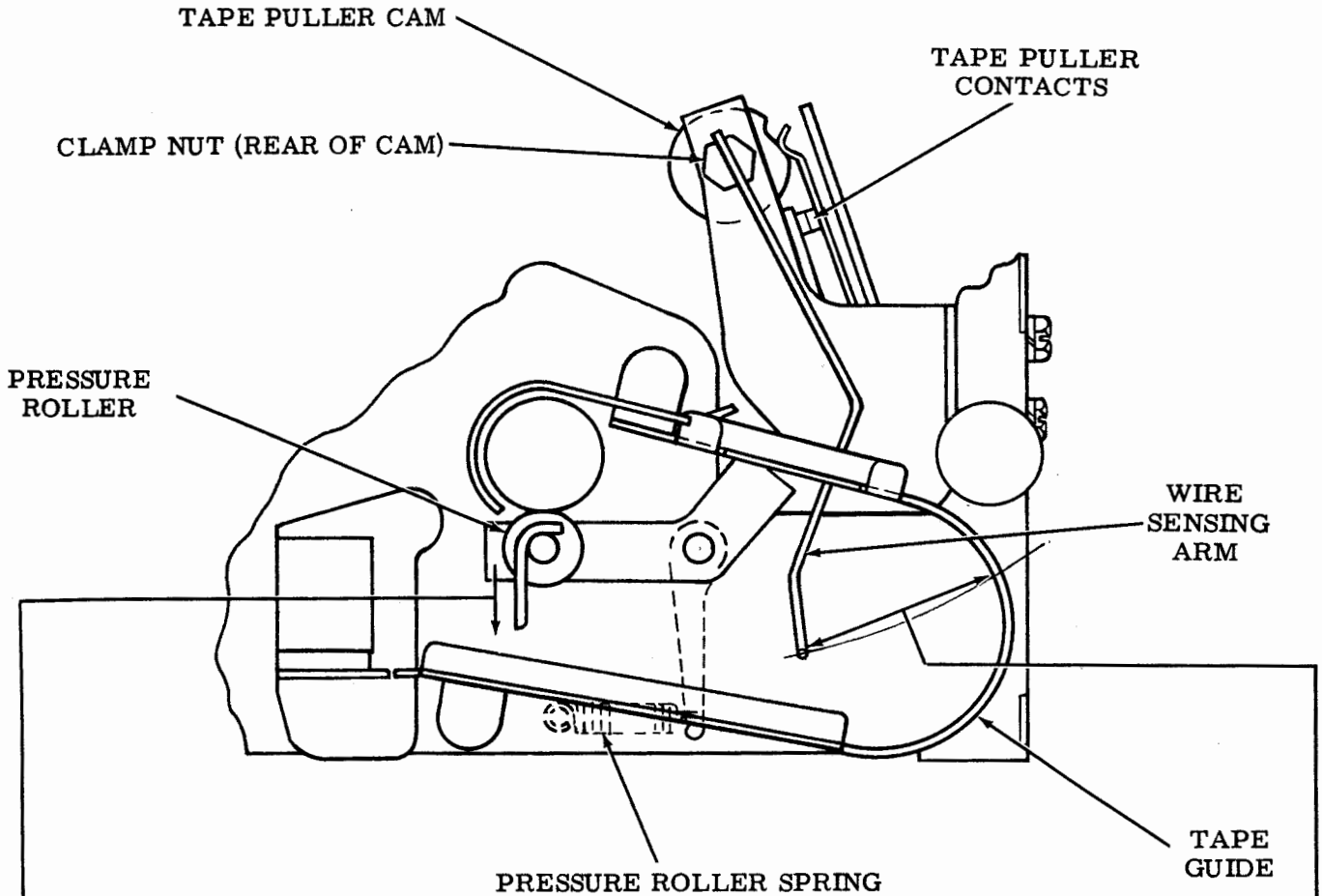
TAPE SENSING ARM SPRING



Requirement

Min 1/4 oz---Max 3/4 oz. to start arm moving away from tape guide.

2.11 Tape Feed Mechanism (Contd)



PRESSURE ROLLER SPRING

Requirement

Min 3 ozs---Max 4 ozs
to start pressure roller moving
away from tape puller roller.

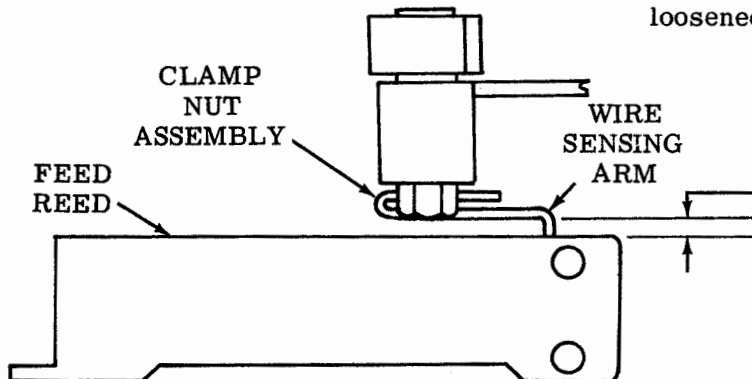
TAPE PULLER CAM

Requirement

Tape puller contacts close when sensing arm is
Approximately 1-5/16 inches
from tape guide and open when arm is moved
to extreme left.

To Adjust

Rotate tape puller cam with its clamp screw
loosened.



WIRE SENSING ARM

Requirement

Min 1/16 inch
clearance between reed feed magnet
and wire sensing arm, when cam is
in off and in on position.

To Adjust

Bend wire sensing arm.

2.12 Tape Feed Mechanism (Contd)

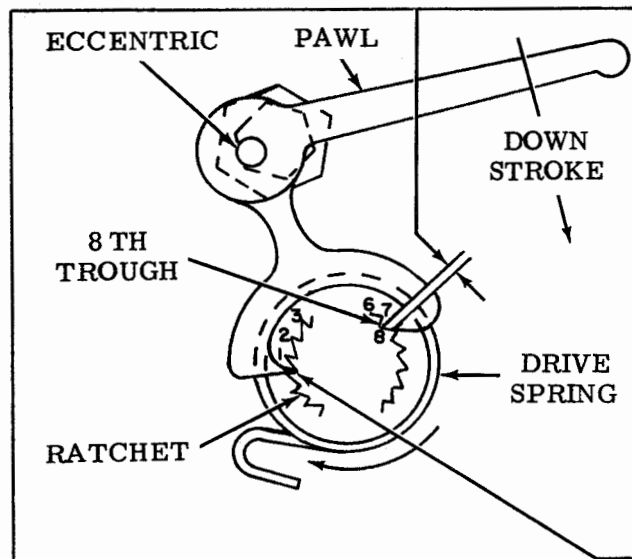
Note: The following adjustment should be made with the feed mechanism assembly removed from the unit.

CAUTION: IF TORQUE IS SUDDENLY RELEASED FROM A FULLY WOUND DRIVE SPRING, PERMANENT DAMAGE TO THE SPRING WILL RESULT.

RATCHET AND PAWL ENGAGEMENT

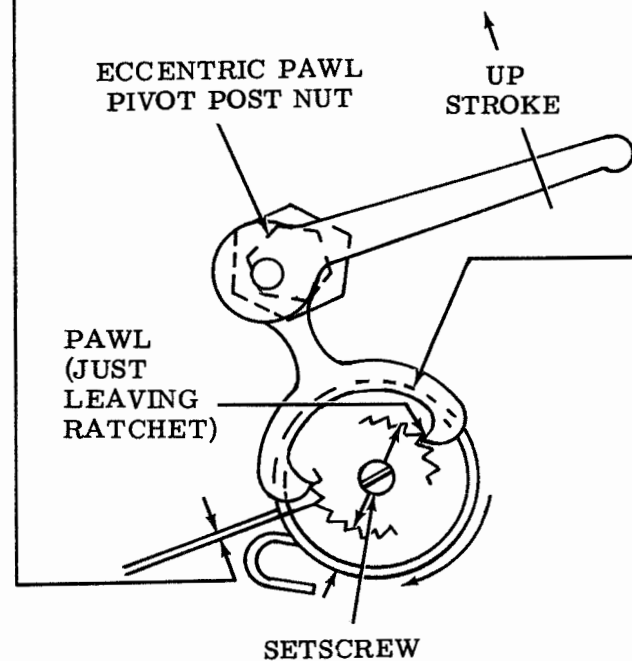
Requirement

- (1) With ratchet under drive spring tension and pawl operated by hand, ratchet shall operate freely through complete revolution. Feed wheel should reverse through one revolution with no more than 1 oz applied to wheel periphery.
- (2) With ratchet under drive spring tension and pawl operated by hand, ratchet shall make equal steps on up stroke and on down stroke of the pawl, as gauged by eye.
- (3) It shall not be possible for ratchet to move more than one step with pawl in any position.
- (4) With pawl raised, right pawl tooth should be opposite 8th trough in upper half of ratchet.



To Adjust

With the nut on the eccentric pawl pivot post loosened, use an Allen wrench to rotate the eccentric, keeping eccentric high to the left.



DRIVE SPRING

Requirement

Spring should be concentric with ratchet wheel, as gauged by eye.

To Adjust

Hold feed wheel and position spring with its setscrew loosened.

2.13 Tape Feed Mechanism (Contd)

TAPE GUIDE CLEARANCE

Requirement

At the closest point, as gauged by eye, between feed wheel and conforming tape guide

Min 0.006 inch---Max 0.010 inch (early design)

Min 0.004 inch---Max 0.006 inch (late design)

clearance between tape guide and feed wheel.

To Check

- (1) (Preliminary - late design) pass a 0.006 inch round gauge between two feed pins and tape guide. Gauge should just touch the high point on feed wheel. Check at least three points.
- (2) With feed mechanism installed on unit, insert perforated tape (letters, or feed only) between feed wheel and tape guide. Pull tape to right, and at same time push tape guide handle towards eccentric stop. Release tape, and it should move freely.

To Adjust

With tape guide mounting bracket screws and eccentric stop bushing screw loosened friction tight, position bracket right or left at pry point and rotate eccentric stop bushing.

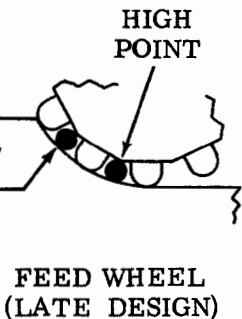
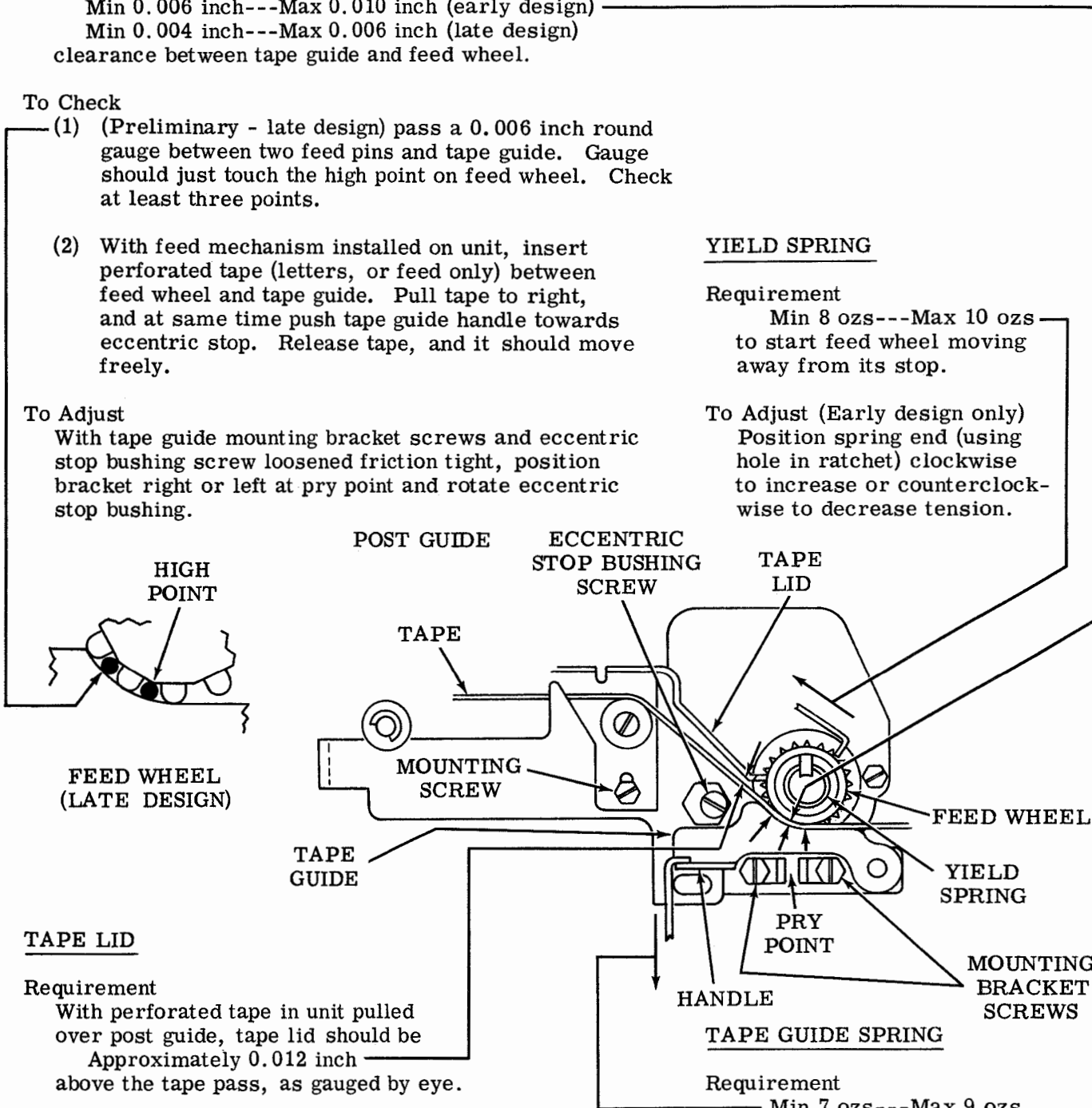
YIELD SPRING

Requirement

Min 8 ozs---Max 10 ozs to start feed wheel moving away from its stop.

To Adjust (Early design only)

Position spring end (using hole in ratchet) clockwise to increase or counterclockwise to decrease tension.



TAPE LID

Requirement

With perforated tape in unit pulled over post guide, tape lid should be approximately 0.012 inch above the tape pass, as gauged by eye.

To Adjust

Position tape lid with mounting screws loosened friction tight.

TAPE GUIDE SPRING

Requirement

Min 7 ozs---Max 9 ozs to start tape guide moving away from its stop.

2.14 Tape Feed Mechanism (Contd)

Note: Feed mechanism should be assembled on unit

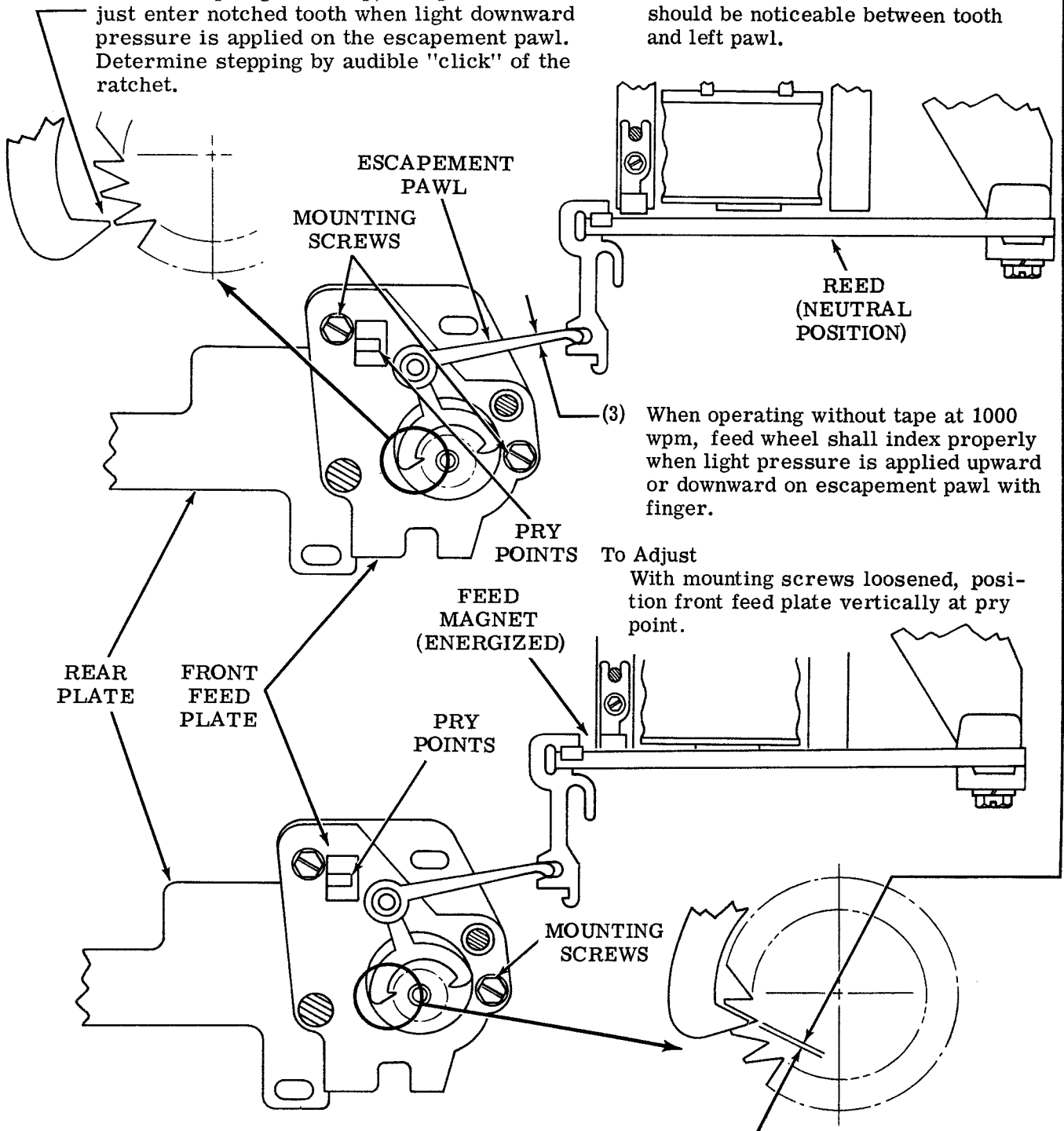
FEED MECHANISM - VERTICAL POSITION

Requirement

- (1) With reed in neutral (unenergized) position and drive spring wound up, left pawl should just enter notched tooth when light downward pressure is applied on the escapement pawl. Determine stepping by audible "click" of the ratchet.

- (2) With magnet energized and ratchet turned counterclockwise
Some clearance should be noticeable between tooth and left pawl.

- (3) When operating without tape at 1000 wpm, feed wheel shall index properly when light pressure is applied upward or downward on escapement pawl with finger.



2.15 Tape Feed Mechanism (Contd)

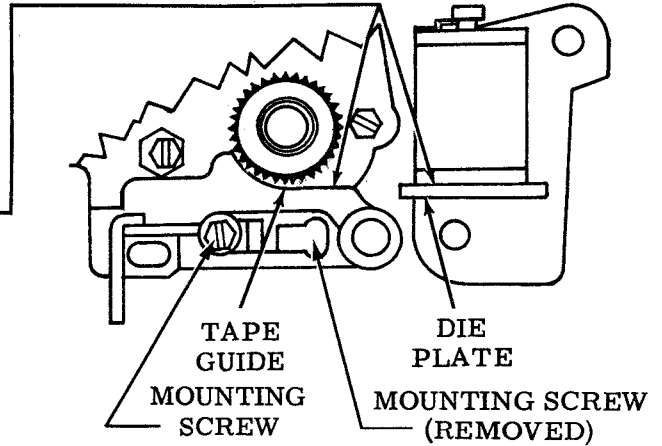
TAPE GUIDE - PUNCH BLOCK

Requirement

The tape guide shall line up with the die plate, as gauged by eye.

To Adjust

With right mounting screw removed, pivot tape guide around loosened friction tight left mounting screw.



Note 1: If above requirement is not met, recheck TAPE GUIDE CLEARANCE adjustment and refine if necessary.

Note 2: Tape will not feed if ten holes to inch adjustment is not approximately correct. To make a rough adjustment, remove one of three feed mechanism mounting screws and center the tapped hole in the elongated slot by eye.

CODE PUNCH PIN PENETRATION

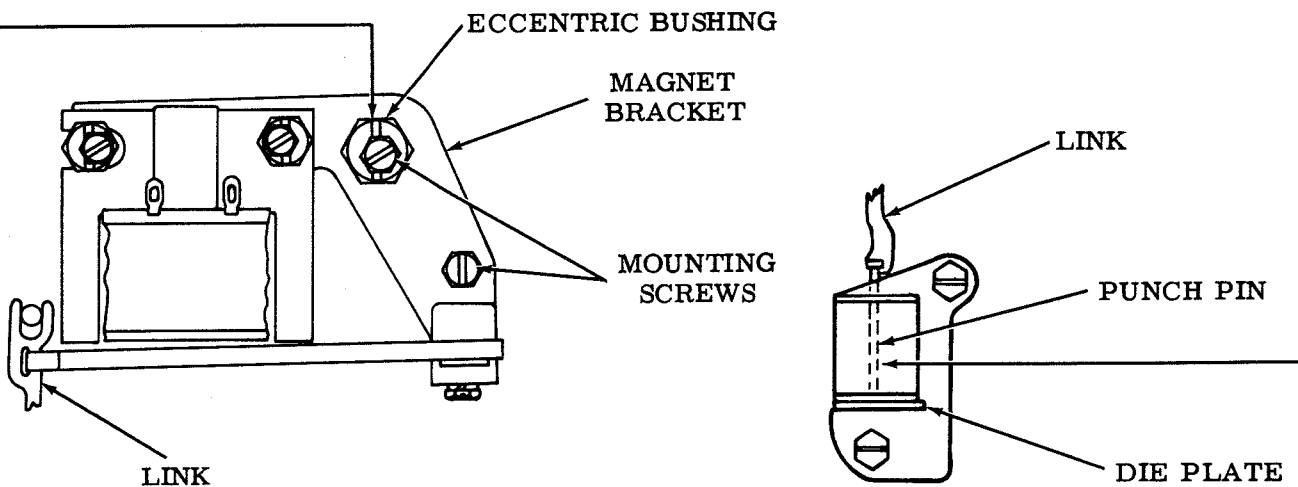
Requirement

(See Note 2 if tape does not feed.)

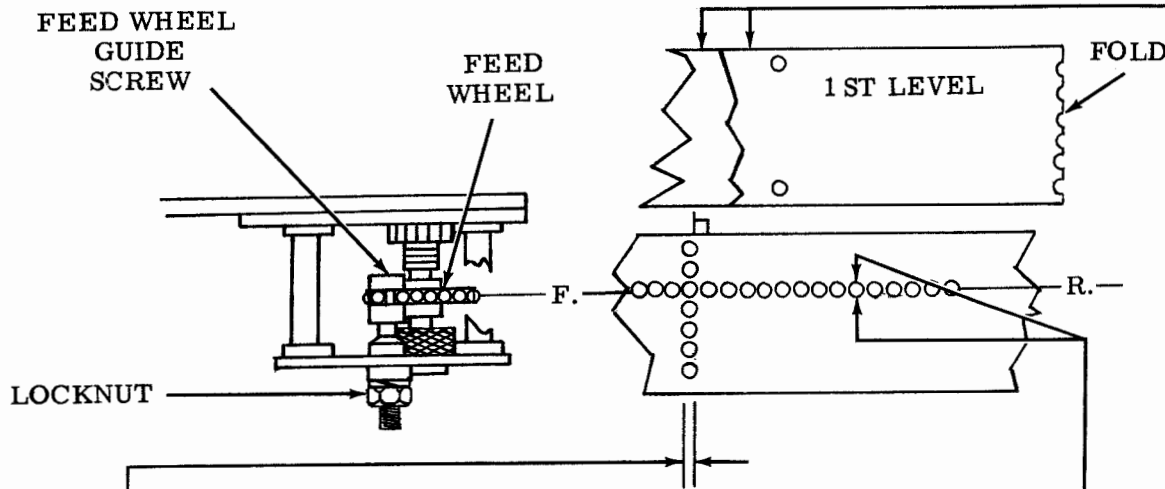
At operating speed, with no levels marking, add one level at a time. The edges of holes of each level shall be clean cut with no impression or punch pin marks on spaces between holes.

To Adjust

With magnet bracket mounting screws loosened friction tight, rotate eccentric bushing, keeping eccentric high pointed away from lower mounting screw.



2.16 Tape Feed Mechanism (Contd)



FEED WHEEL LINE UP

Requirement

With tape re-perforated at operating speed, there should be no burr on front or rear edge of feed hole, and code hole centers must lie square to the tape edge within ± 0.003 inch.

To Measure

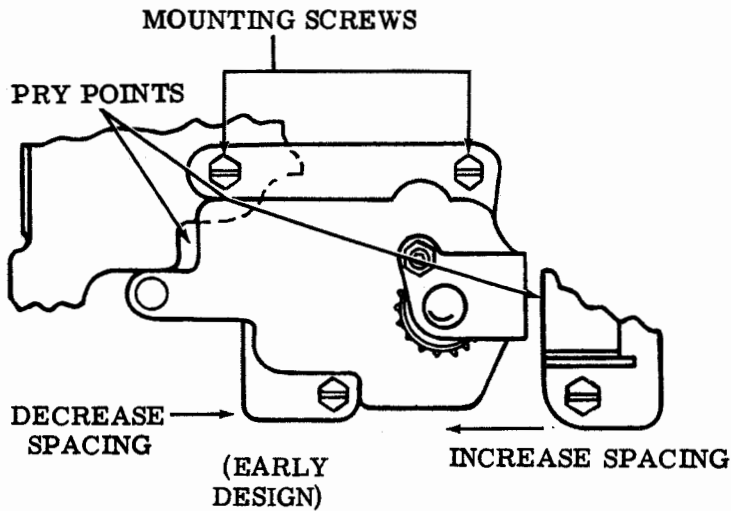
Re-perforate tape at operating speed and examine for burrs. Fold tape with edges and 1st level holes in line. The 5th, 6th, 7th or 8th level holes (highest level, depending on unit) shall overlap, as gauged by eye.

To Adjust

With an Allen wrench, rotate the feed wheel guide screw with its locknut loosened.

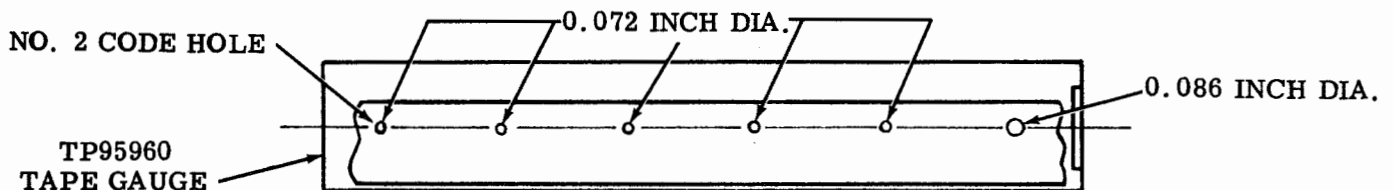
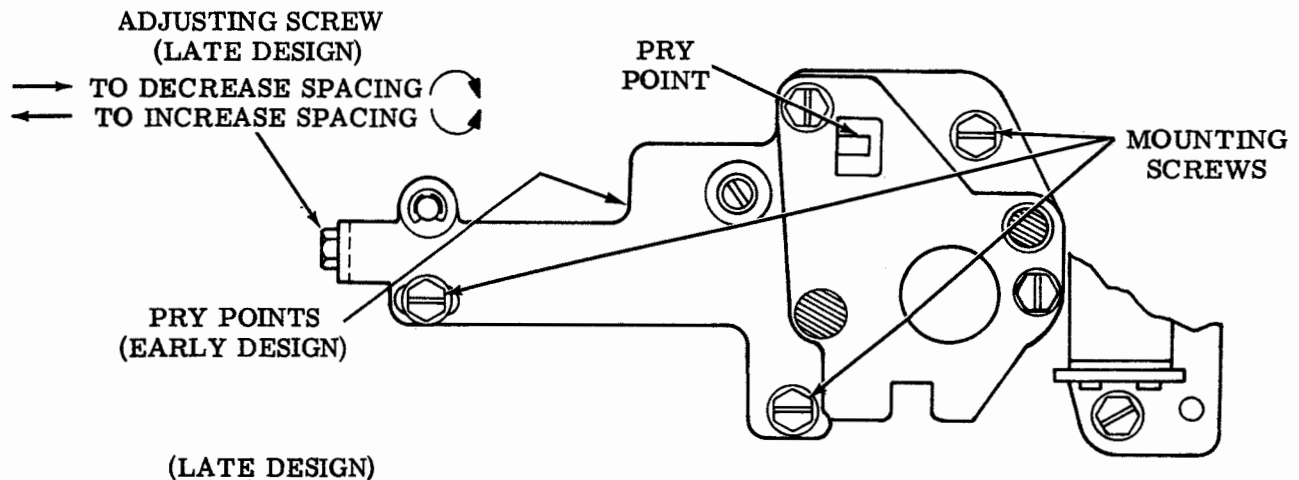
2.17 Tape Feed Mechanism (Contd)

Note: First five holes in gauge TP95960 are same size as code holes in tape (0.072 inch diameter). Sixth hole in gauge is larger (0.086 inch diameter). This arrangement allows + or - 0.007 inch variation in ten to the inch spacing over a five inch length of tape.



To Adjust (Early Design)

With a screwdriver, pry feed mechanism with its mounting screws friction tight to the right to decrease spacing and to the left to increase spacing.



**TEN TO THE INCH ADJUSTMENT
(TAPE FEED HOLE SPACING)**
(Early Design and Late Design)

Requirement

The punch shall produce tape that conforms to TP95960 tape gauge.

To Measure

With all code levels perforating, perforate at least 5 inches of tape. Place tape over smooth side of gauge, so that first No. 2 code hole in tape is concentric with first (0.072 inch) hole of gauge. (See Note.) The next four (0.072 inch) holes in gauge shall be visible through the No. 2 code holes in the tape, and the sixth No. 2 code hole in the tape should be entirely within the 0.086 inch diameter hole in gauge.

To Adjust (Late Design)

With three mounting screws loosened friction tight, rotate the adjusting screw clockwise to move feed mechanism to right (decrease spacing) and counterclockwise to move to left (increase spacing).

2.18 Tape Feed Mechanism (Contd)

TAPE BIAS SPRING

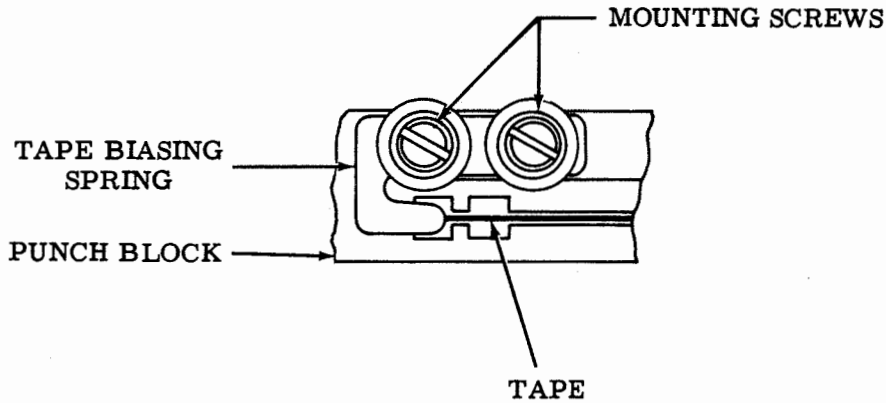
Requirement

- (1) Spring shall bias tape towards rear of punch block without crimping, curling or damaging front edge of tape.
- (2) Perforate 3 or 4 foot sample of tape with all code levels marking. With one end of tape held at eye level, sight down tape. There should be no wavering in alignment of perforations with respect to edge of tape.

To Adjust

Position bias spring with its mounting screws loosened.

Note: Spring must not bind against lower guide plate or die plate.



RIGHT SIDE VIEW

3. VARIABLE FEATURES

3.01 Photoelectric Reader

Note 1: TP302448 gauge is required for photoelectric reader adjustments.

Note 2: PUNCH PIN PENETRATION adjustment must be made prior to installing sensor. The feed mechanism must be removed in order to install sensor assembly.

SENSING ELEMENT POSITION

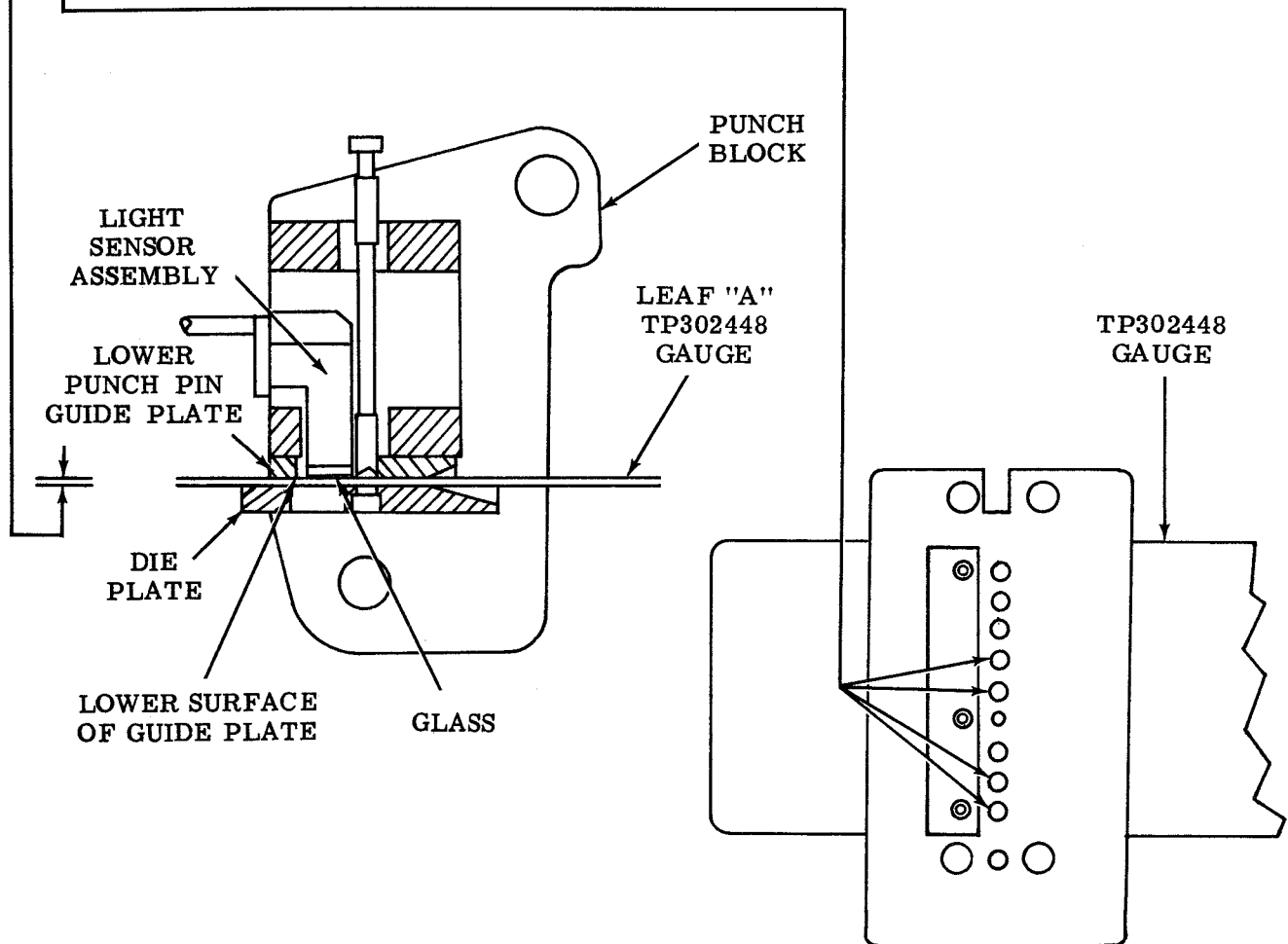
Requirement

- (1) Glass surface of sensor assembly
Flush to 0.001 inch above
surface of lower guide plate.
- (2) Sensor holes aligned with perforator
pins, as gauged by eye, using
holes in TP302448 gauge.

To Adjust

With mounting screws loosened, insert leaf "A" of TP302448 gauge in slot in punch block. Press down lightly on sensor assembly, and position it from side to side to align holes in sensor with perforator pins, noting that holes in gauge align sensor holes with perforator pins. Tighten screws and remove gauge. Recheck the adjustment.

Note 3: Magnet coils must be energized in order to fully insert gauge.



3.02 Photoelectric Reader (Contd)

CAUTION: CARE MUST BE EXERCISED IN HANDLING GLASS PRISM TO AVOID CHIPPING OR OTHER DAMAGE.

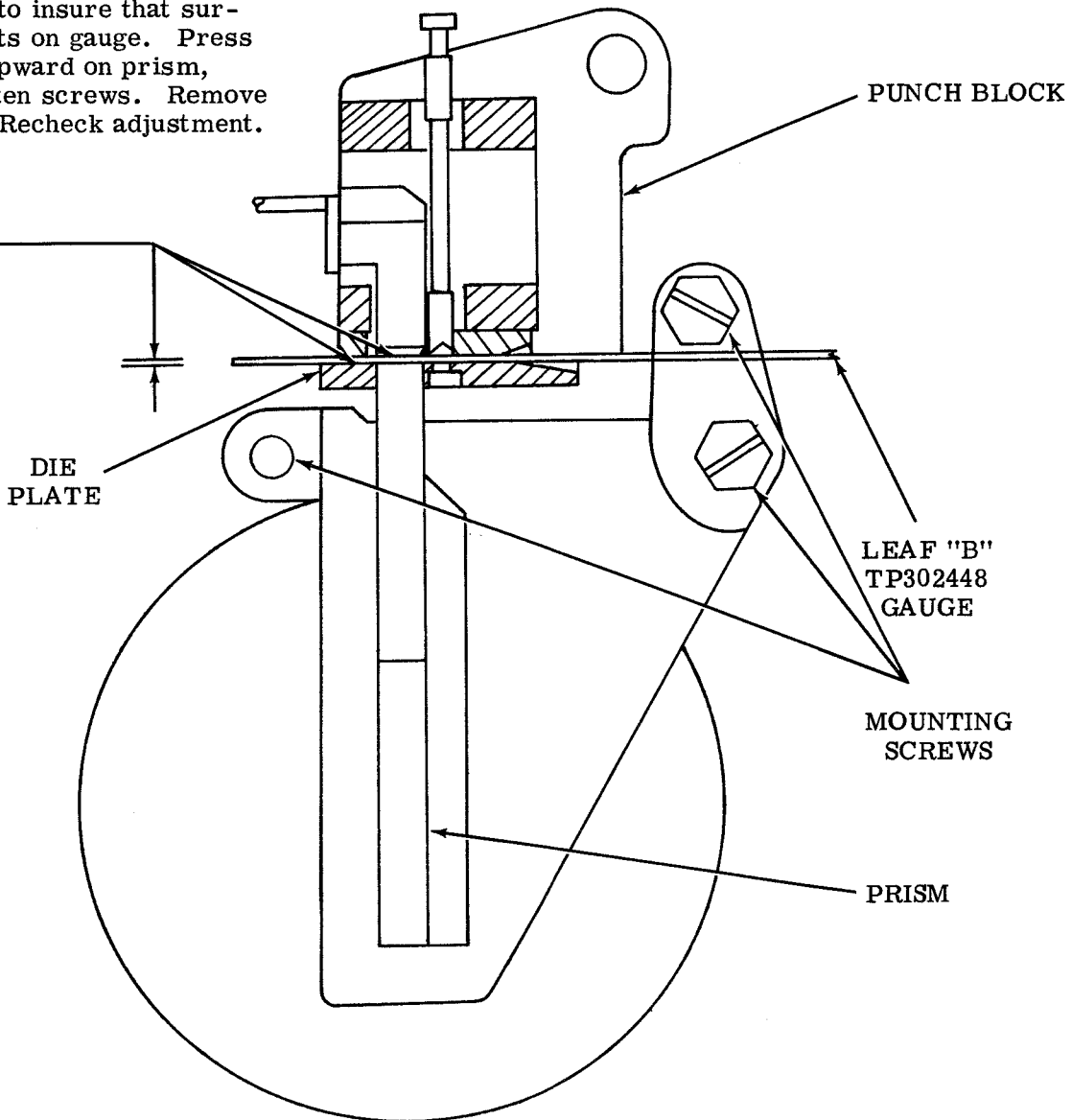
PRISM POSITION

Requirement

Upper surface of prism should be
Flush to 0.001 inch above
upper surface of punch block die plate.

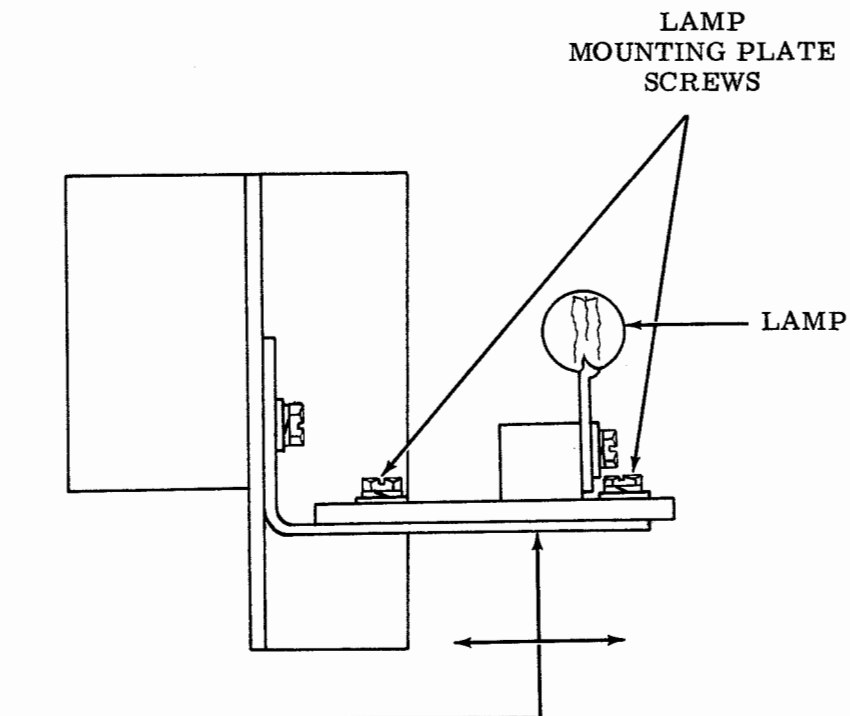
To Adjust

With three mounting screws loosened, insert leaf "B" of TP302448 gauge into slot in punch block. Rock prism slightly to insure that surface rests on gauge. Press lightly upward on prism, and tighten screws. Remove gauge. Recheck adjustment.



3.03 Photoelectric Reader (Contd)

CAUTION: DO NOT HANDLE THE QUARTZ GLASS ENVELOPE OF THE LAMP. REMOVE GREASE OR FINGER PRINTS FROM LAMP BY CLEANING WITH A GREASE FREE SOLVENT SUCH AS ACETONE.



LAMP FOCUS

Requirement

Lamp filament shall be at the focal point of the lens.

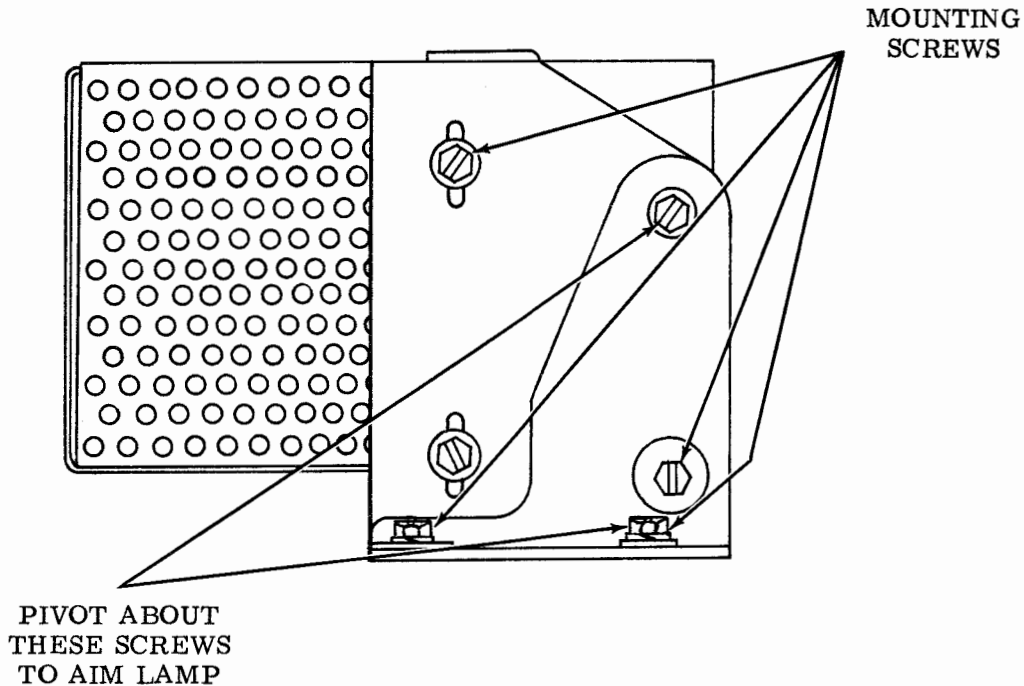
To Measure

With lamp assembly removed from cabinet, apply 9.5 volts (ac or dc) and point lens at a light colored wall a minimum of 20 feet away. A sharp image of the lamp filament should be observed on the wall.

To Adjust

Position lamp relative to lens with lamp housing cover removed and lamp mounting plate screws loosened.

3.04 Photoelectric Reader (Contd)



LAMP POSITION

Requirement

- (1) In normal operating position, lamp housing shall be in line with prism support vertically, as gauged by eye.

To Adjust

Position assembly with two lamp housing mounting screws loosened so that lens is in line with prism holder.

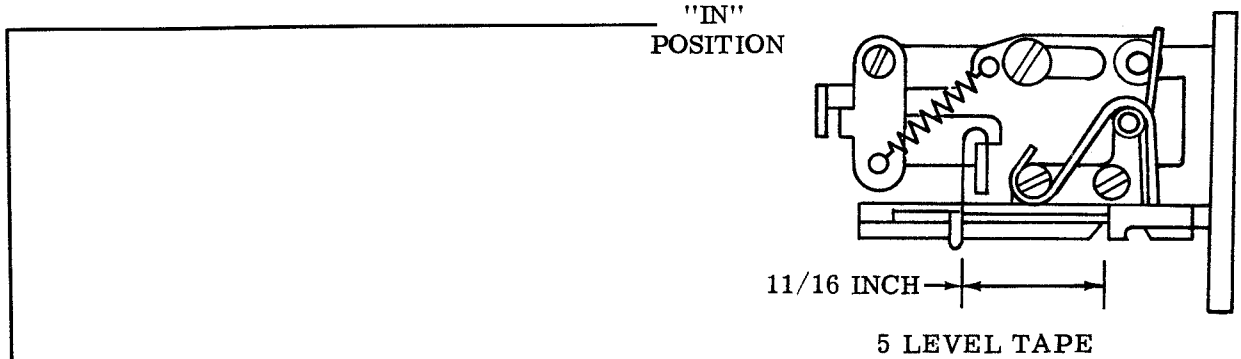
- (2) Connect appropriate collector (see 7131WD) to ground through a 10K ohm, 1/2 watt resistor. Apply 12 volts dc to photo transistor emitters (white lead in cable). Using a 20,000 ohm per volt meter, measure voltage across 10K ohm resistor at
Min 11.5 volts
when lamp housing is aimed so that level 1, 8 and feed photo transistors are saturated.

To Adjust

Loosen four screws securing vertical mounting bracket to lamp assembly and to cabinet. Aim lamp housing vertically and horizontally to meet the requirements. Tighten screws and recheck the adjustments.

3.05 Universal Punch Block

Note: The standard "Punch Mechanism" adjustments of Paragraph 2 also apply to this punch block. The following are additional adjustments that apply only to the universal punch block.



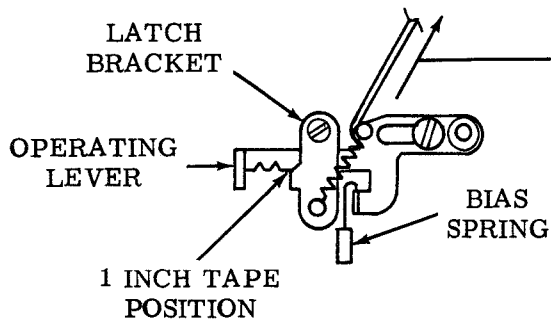
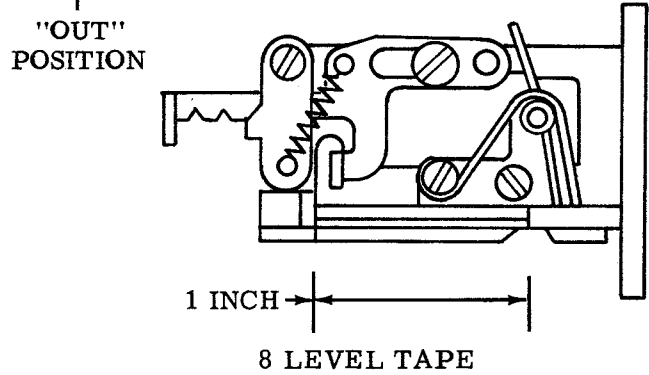
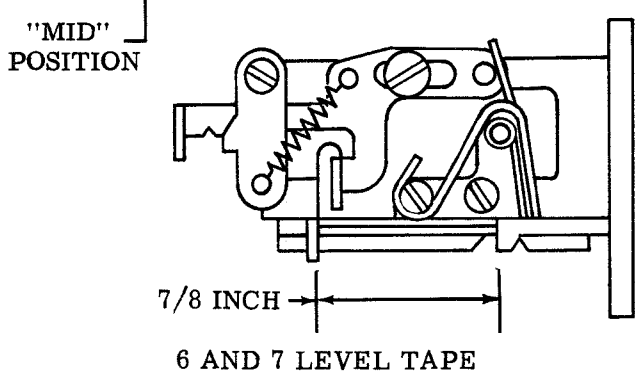
TAPE GUIDE WIDTH

Requirement

Operating lever should be positioned for width of tape used.

- (1) 11/16 inch tape. extreme "in" position
- (2) 7/8 inch tape. "mid" position
- (3) 1 inch tape. extreme "out" position

To Adjust
Position tape guide operating lever by hand.

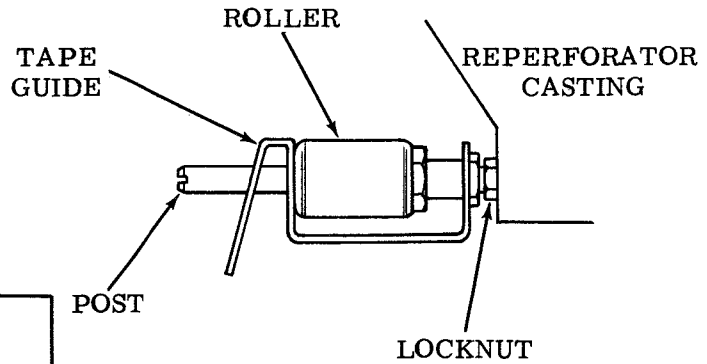


OPERATING LEVER SPRING TENSION

Requirement

With operating lever in the 1 inch tape position, it should require
— Min 3 ozs---Max 7 ozs
to start moving operating lever.

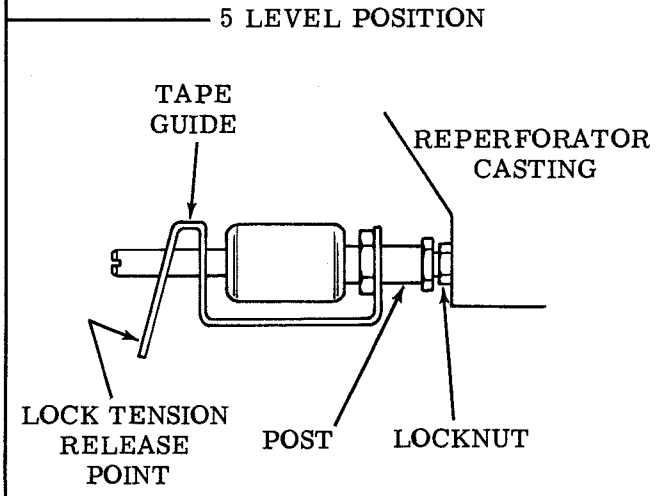
3.06 Universal Punch Block (Contd)



TAPE ROLLER - GUIDE POSITION

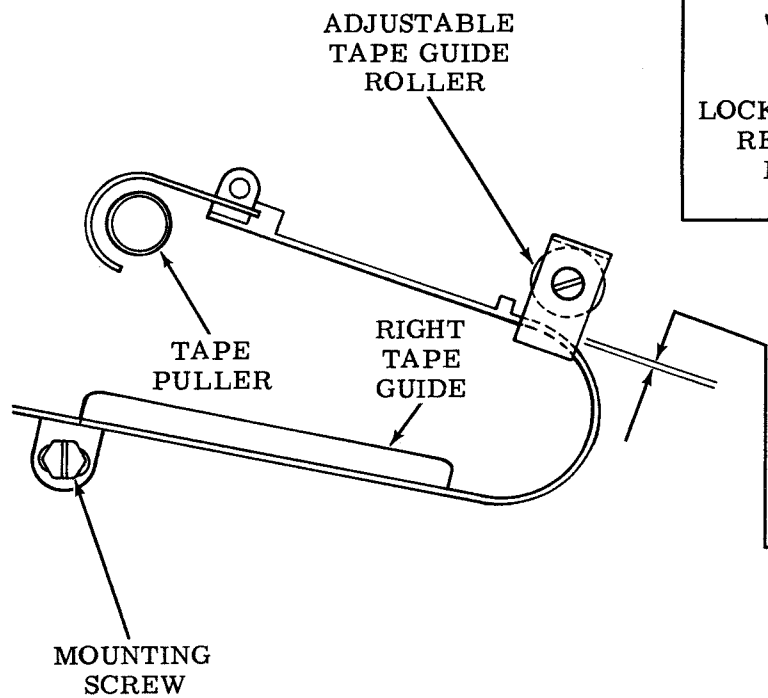
Requirement
Tape guide should be positioned for width of tape in use.

To Adjust
Press in lower outside end of tape guide at lock tension release point and position guide.



5 LEVEL POSITION

6, 7 AND 8 LEVEL POSITIONS

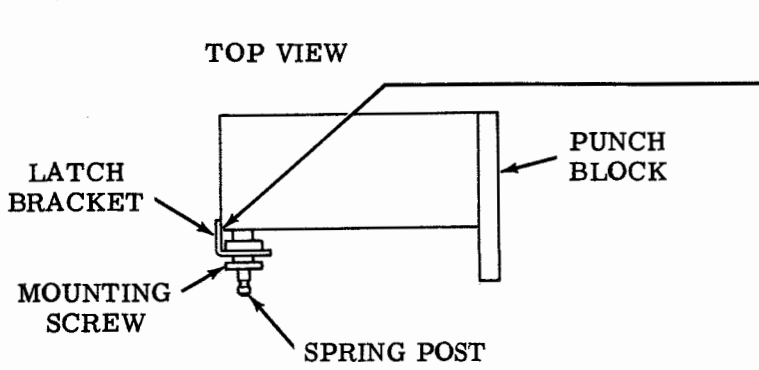


ADJUSTABLE TAPE GUIDE

Requirement
Adjustable tape guide parallel with right tape guide, as gauged by eye.

To Adjust
Position guide with its locknut loosened.

3.07 Universal Punch Block (Contd)



LATCH BRACKET

Requirement

No clearance between latch bracket and punch block.

To Adjust

With spring post and mounting screw loosened, position bracket against face of punch block.

TAPE BIAS SPRING

Requirement

No curling or crimping of front edge of tape when tape is held toward rear of punch block by tape bias spring.

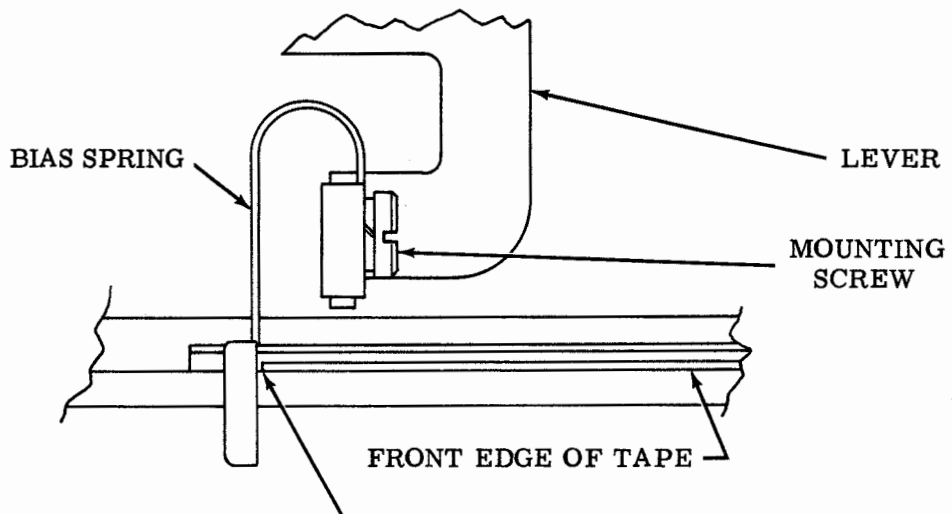
To Check

Perforate a three or four foot sample tape with all marking code levels. Sight along length of tape, with one end held at eye level. There should be no wavering in alignment of perforations with respect to edge of tape.

To Adjust

Position bias spring with mounting screws loosened.

Note: Tape bias spring must not bind against lower guide plate or die plate.



3.08 Universal Punch Block (Contd)

TAPE GUIDE PLATE

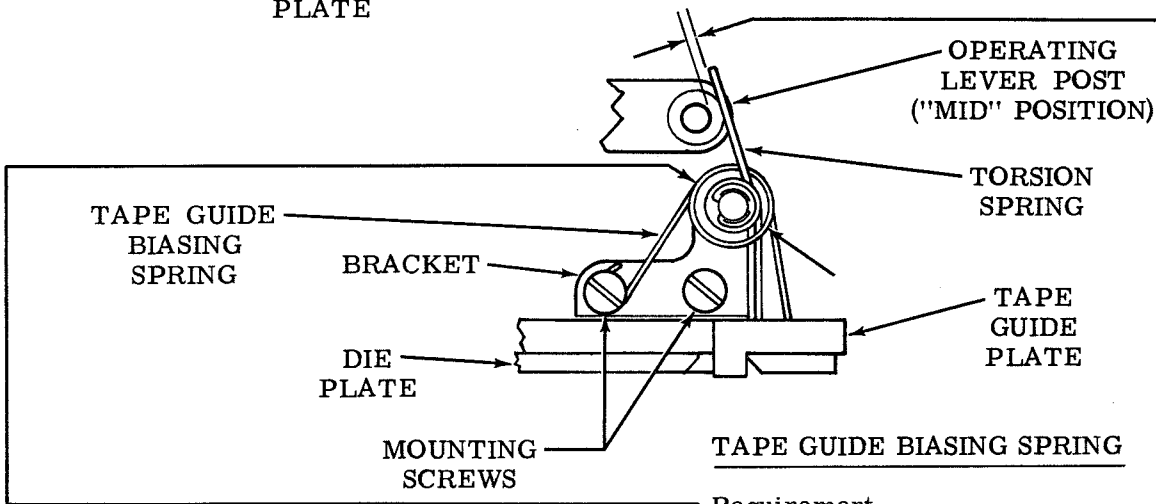
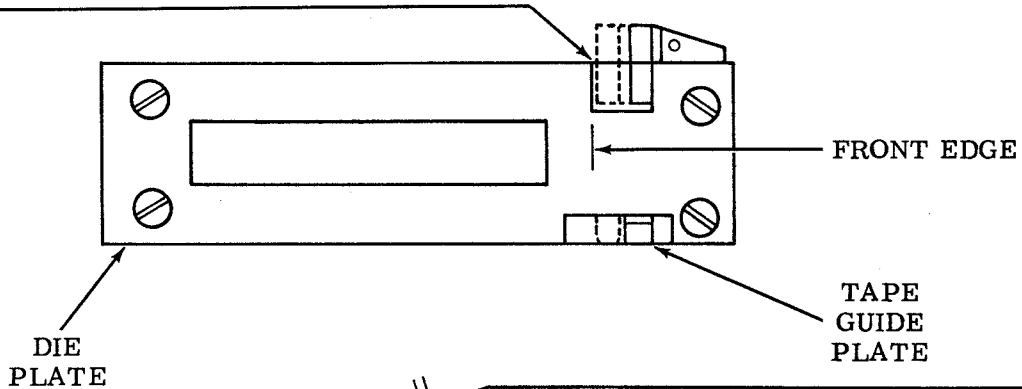
Requirement

- (1) When play is held to the rear, with tape guide in the "mid" position
 Min some---Max 0.005 inch
 clearance between operating lever post and torsion spring.

- (2) With tape guide in the "in" position, the tape guide plate should rest against front edge of slot in die plate.

To Adjust

Position bracket with mounting screws loosened friction tight.



Requirement

Tape guide biasing spring concentric with post, as gauged by eye.

To Adjust

Position spring with mounting screw loosened. Hold spring while tightening mounting screw.