HIGH SPEED TAPE PUNCH UNIT
(DRPE TYPE)

ADJUSTMENTS

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1. GENERAL

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.

1.02 The following requirements and adjust-
ing procedures for the high speed tape
punch (DRPE type) are arranged in a sequence
that would be followed if a complete readjust-
ment 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.
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.

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.

Note 2: If magnet bracket is removed for this adjustment, all related adjustments through PUNCH PIN PENETRATION must be rechecked.
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.
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 FOR LEVELS NO. 2, 3, 5, 6, 7, AND FEED

DAMPER FOR LEVELS NO. 1, 4 AND 8

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.
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 (Cont'd)

**PUNCH PIN PENETRATION**

Requirement

1. With reeds in neutral, unenergized position, punch pins just enter die plate
   Approximately 0.005 inch, gauged by eye.

2. Use the TP149725 pin penetration gauge. Make sure gauge is parallel with die plate projection and that the gauge slides freely under all punch pin heads. Begin with checking no. 1 through no. 8 pins.

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.

Requirement

1. 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.

Requirement

2. 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.

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2.11  Tape Feed Mechanism (Contd)

**TAPE PULLER CAM**

- **CLAMP NUT (REAR OF CAM)**
- **PRESSURE ROLLER SPRING**
- **TAPE PULLER CONTACTS**
- **WIRE SENSING ARM**

**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 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.
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.

To Adjust

With mounting screws loosened, position front feed plate vertically at pry point.
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.

**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 reperforated 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**
Reperforate 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.

**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.
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**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>To Adjust</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Glass surface of sensor assembly Flush to 0.001 inch above surface of lower guide plate.</td>
<td>With mounting screws loosened, insert leaf &quot;A&quot; 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.</td>
</tr>
<tr>
<td>(2) Sensor holes aligned with perforator pins, as gauged by eye, using holes in TP302448 gauge.</td>
<td>Note 3: Magnet coils must be energized in order to fully insert gauge.</td>
</tr>
</tbody>
</table>

![Diagram showing the relationships between different components of the sensor assembly.](image-url)
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.
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 MOUNTING PLATE SCREWS

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)

PIVOT ABOUT THESE SCREWS TO AIM LAMP

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.

"IN" POSITION

11/16 INCH

5 LEVEL TAPE

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.

"MID" POSITION

7/8 INCH

6 AND 7 LEVEL TAPE

"OUT" POSITION

1 INCH

8 LEVEL TAPE

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.

**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)

**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.
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.

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.