33 TAPE READER

ADJUSTMENTS

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1. GENERAL

1.01 This section provides adjustment and maintenance information for the 33 tape reader. It is reissued to provide exclusive coverage of the 33 tape reader and to update the section. Since this is a general revision, marginal arrows ordinarily used to indicate changes and additions are omitted.

1.02 In the adjustments covered in this section, location of clearances, position of parts, and point and angle of scale applications are illustrated by line drawings. Tools required to perform adjustments are contained in TP185830 Tool Kit and are listed in Maintenance Tool Section 570-005-800.

Note: An adjustment must be performed even if the accompanying illustration is not an exact duplication of the adjustment area.

1.03 The sequence in which the adjustments appear should be followed when a complete readjustment of the tape reader is undertaken. No adjustment should be undertaken without completely understanding the procedure and the requirements. Read a procedure all the way through before making an adjustment or checking a spring tension.

Note 1: Be sure to check all related adjustments (Paragraph 1.07).

Note 2: Remove all electric power before checking or performing adjustments.

1.04 References to left, right, front, rear, etc consider the tape reader to be viewed from a position where the feed wheel faces up and the lid latch is located to the viewer's right. Orientation references to the clutch trip area consider the armature extension to be facing up with the contact bracket pry points located to the viewer's right.

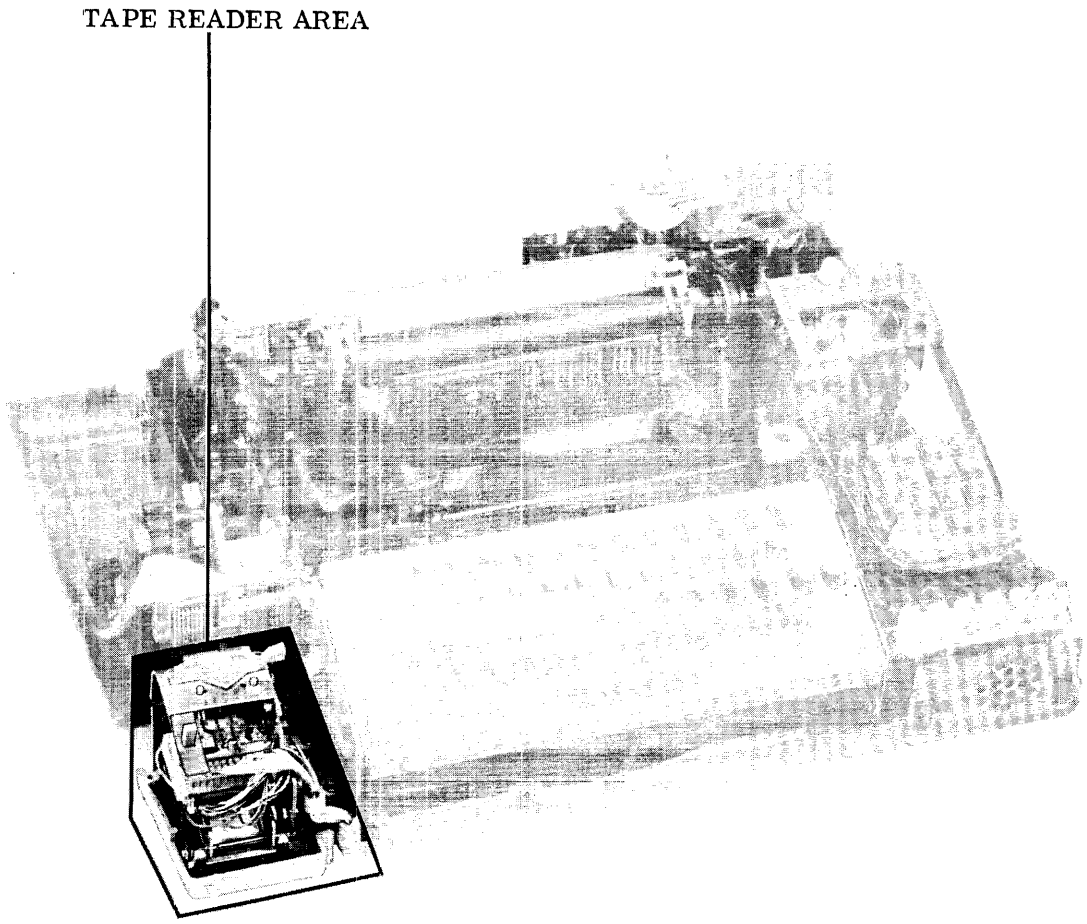


Figure 1 - Tape Reader Area

1.05 When a procedure calls for using pry points or slots to make an adjustment, place a screwdriver between the points or in the slots and pry parts in the proper direction.

1.06 If parts are removed from the tape reader to facilitate making an adjustment, be sure that they are replaced.

Note: Recheck any adjustment that may have been affected by the removal of parts.

1.07 Related adjustments are listed with some of the adjustment text and are primarily intended to aid in troubleshooting the equipment. As an example, suppose that in searching for a trouble it is discovered that the BLOCKING PAWL (Tape Reader Area) adjustment does not meet its requirement. Under "Related Adjustment," it is indicated that this adjustment is affected by the DETENT LEVER (Tape Reader Area) and FEED PAWL (Tape Reader Area) adjustments. Check these to see if either is the cause of the trouble. Also, note that certain adjustments affect other adjustments. For example, see the DETENT LEVER (Tape Reader Area) adjustment. Note that this adjustment affects the FEED PAWL (Tape Reader Area) and BLOCK PAWL (Tape Reader Area) adjustments. If the former adjustment is changed, check the latter adjustments.

1.08 The spring tensions specified in this section are indications, not exact values. Therefore, to obtain reliable readings, it is important that spring tensions be measured by spring scales placed in the positions shown on pertinent line drawings. Springs that do not meet their requirements should be replaced by new ones. Only those springs that directly affect the operation of the tape reader are measured, however, others may be measured indirectly in the

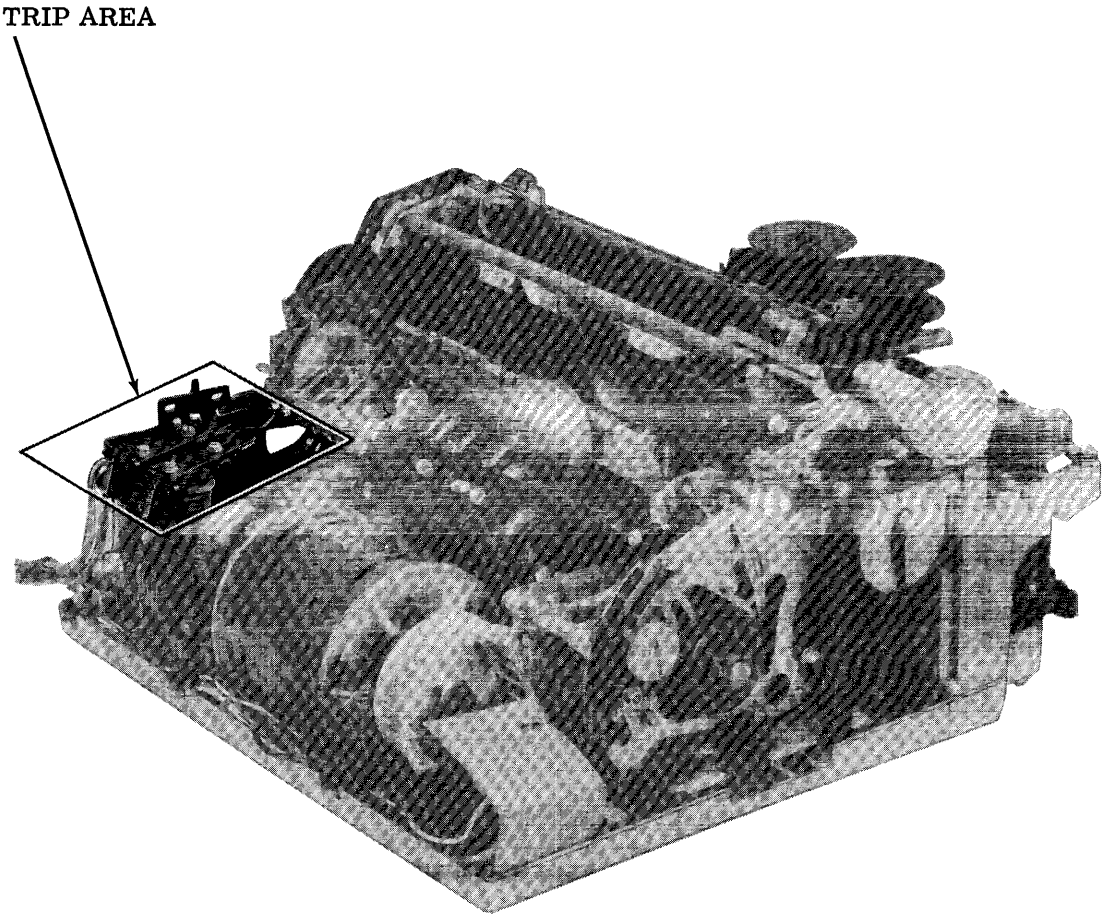


Figure 2 - Clutch Trip Area (Without Reader Feed Magnet Contact Assembly)

process. If this is the case and the requirement is not met, replace the springs one at a time, starting with the indicated spring, until the requirement is satisfied.

Note 1: Use spring scales which are listed in the Maintenance Tool Section 570-005-800.

Note 2: Spring tensions may be checked in any sequence.

1.09 Certain adjustments specify that an armature is to be in its attracted position prior to checking a requirement. This refers to an armature's position when it is magnetically attracted to its magnet core.

CAUTION: THE TAPE READER FEED MAGNET OPERATES UNDER HIGH VOLTAGE. PRECAUTIONARY MEASURES SHOULD BE TAKEN WHENEVER POWER TO THE TAPE READER IS TURNED ON. HIGH VOLTAGE WILL CONTINUE UNTIL APPROXIMATELY 10 SECONDS AFTER THE POWER PACK HAS BEEN DISCONNECTED.

1.10 When inserting a tape that has originated from the tape punch, into a tape reader, allow some slack in the tape between the punch and the reader. This is done to close the reader tape lid.

Note: Do not place the control lever directly into the FREE position while the tape reader is operating under power. Place the control lever into the STOP position and wait until after the tape reader has stopped before moving it beyond the STOP position and into the FREE position. The FREE position of the control lever is used to facilitate the insertion and/or removal of paper tape from the tape reader.

1.11 All adjustments in the "Clutch Trip Area" should be started with the typing unit in the stop condition. It is in the stop condition when the selector armature is in its attracted (frontward) position and all clutches are disengaged.

1.12 To place the typing unit in the stop condition, hold the selector armature in its attracted (frontward) position. Rotate the main shaft clockwise (as viewed from the left) until all clutches are fully disengaged as instructed in 1.13 below.

1.13 When disengaged, a clutch is latched so that a shoe lever is held in its stop position by a trip lever while a corresponding latchlever is seated in a notch of the clutch disc. This allows the clutch shoes to release their tensions on the clutch drum. With all clutches disengaged, the main shaft will turn freely without any clutch shoes dragging.

Note 1: The clutch stop position is that position where a shoe lever contacts a trip lever.

Note 2: If the shaft is turned by hand, a clutch will not fully disengage upon reaching a stop position. Where an adjustment procedure requires disengagement, rotate the clutch to a stop position, apply a screwdriver to the associated stop-lug, and push the clutch disc in the normal direction of main shaft rotation until the corresponding latchlever seats in its clutch disc notch.

Note 3: The distributor clutch will not disengage unless the answer-back drum is in its home position, which is the position where the control lever is fully detented into the indent on the answer-back drum.

1.14 There are two areas in which tape reader adjustments and spring tensions are found. As aids in locating the areas, Figures 1 and 2 are provided. They indicate the areas as follows:

Area	Figure
Clutch trip	2
Tape reader	1

1.15 General Maintenance Principles:

(a) Lubrication instructions and intervals are given in the appropriate lubrication sections.

(b) To maintain the operational effectiveness of the equipment, it is recommended that certain parts be replaced at uniform intervals. Below is the recommended overhaul interval as recorded in typing unit operating hours.

Operating Speed (words per minute)	Overhaul Interval	Estimated Service Life
100	1500 hrs*	4500 hrs*

*Typing unit operating hours

Replacement parts are available in overhaul maintenance kits.

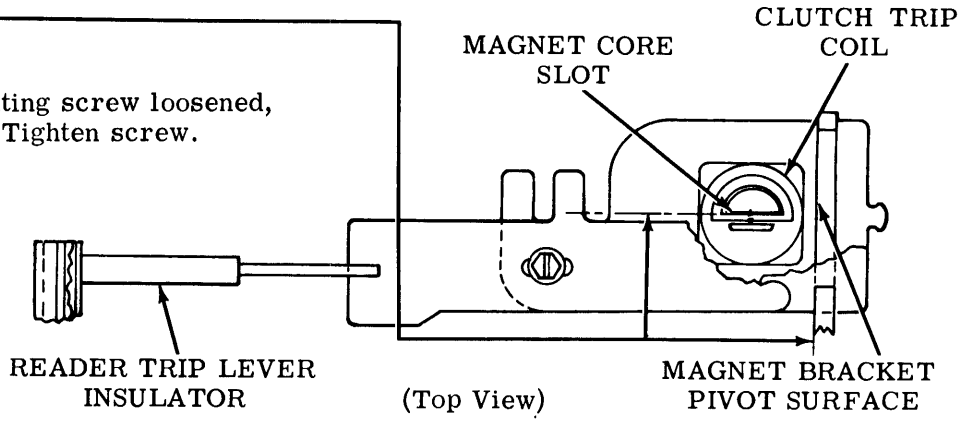
2. BASIC UNIT

2.01 Clutch Trip Area

MAGNET CORE

Requirement
Magnet core slot to be perpendicular to magnet bracket pivot surface as gauged by eye.

To Adjust
With clutch trip coil mounting screw loosened, position clutch trip coil. Tighten screw.



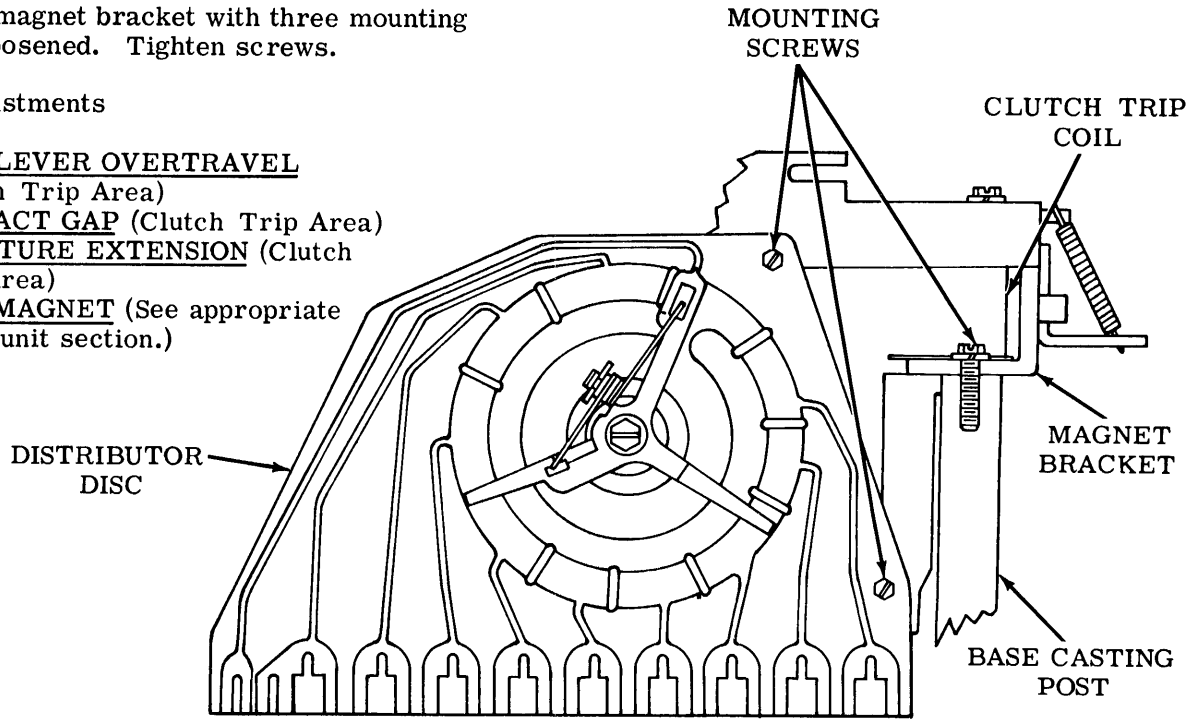
(Top View)

TRIP MAGNET

Requirement
Magnet bracket to be positioned on base casting post as far forward and to the left as possible.

To Adjust
Position magnet bracket with three mounting screws loosened. Tighten screws.

Related Adjustments
Affects
TRIP LEVER OVERTRAVEL (Clutch Trip Area)
CONTACT GAP (Clutch Trip Area)
ARMATURE EXTENSION (Clutch Trip Area)
TRIP MAGNET (See appropriate typing unit section.)



(Right Side View)

2.02 Clutch Trip Area (continued)

TRIP LEVER OVERTRAVEL

To Check
Trip distributor clutch by momentarily holding armature in its attracted position. Rotate main shaft until cam roller is on high part of reader trip lever cam. Take up play in the armature toward the rear and release. Position the reader trip lever to the center of the armature extension.

Requirement
Min 0.010 inch --- Max 0.030 inch between the end of armature extension and latching surface of reader trip lever.

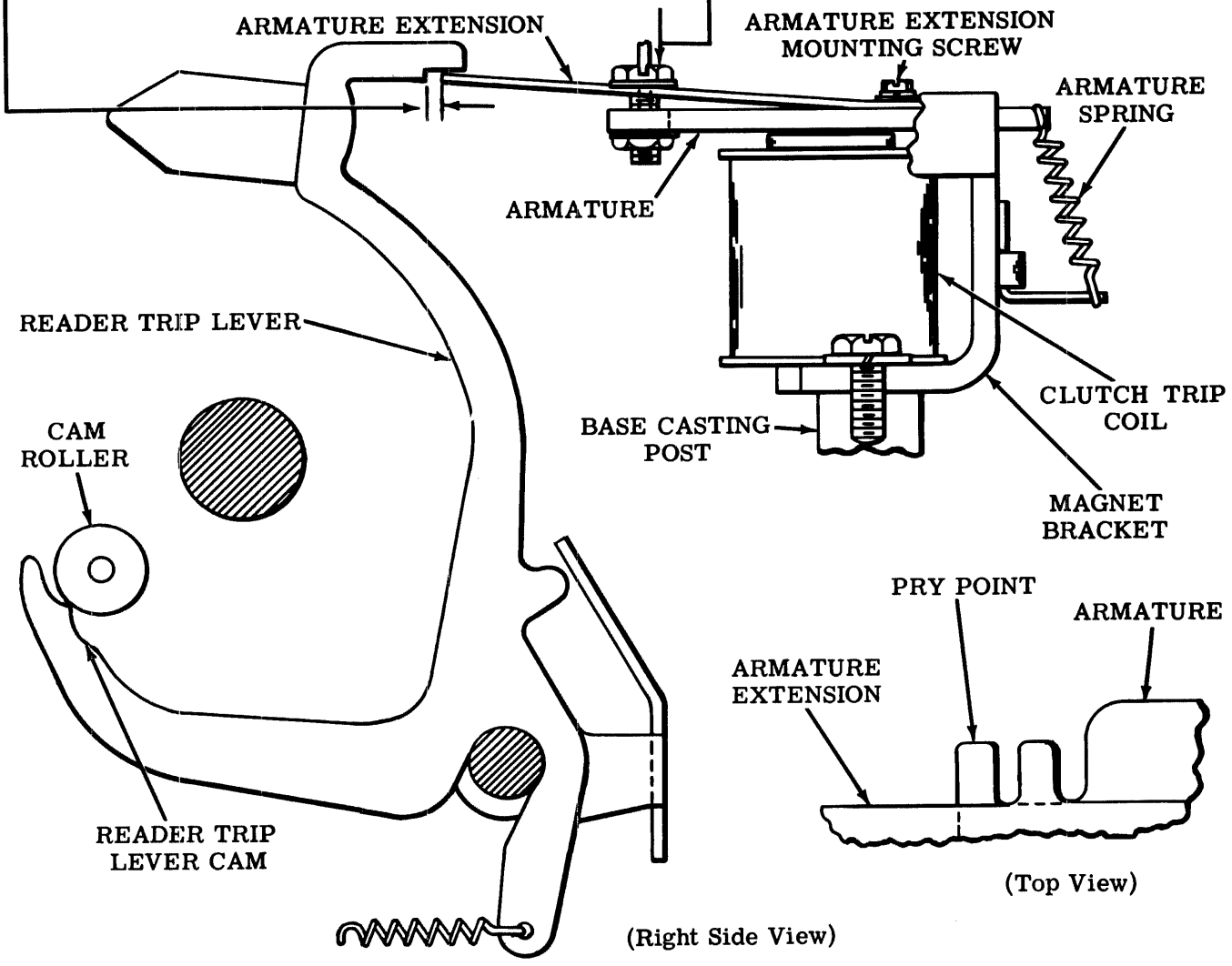
To Adjust
With armature extension mounting screw loostened friction tight, position armature extension using pry point. Tighten screw.

Related Adjustment
Affects
CONTACT GAP (Clutch Trip Area)

TRIP MAGNET ARMATURE SPRING

Requirement
With armature in its unattracted position and cam roller on high part of reader trip lever cam
Min 2 oz --- Max 4 oz
to start armature moving.

Note: The requirement for readers containing busy and reset switches is
Min 2 oz --- Max 3 oz



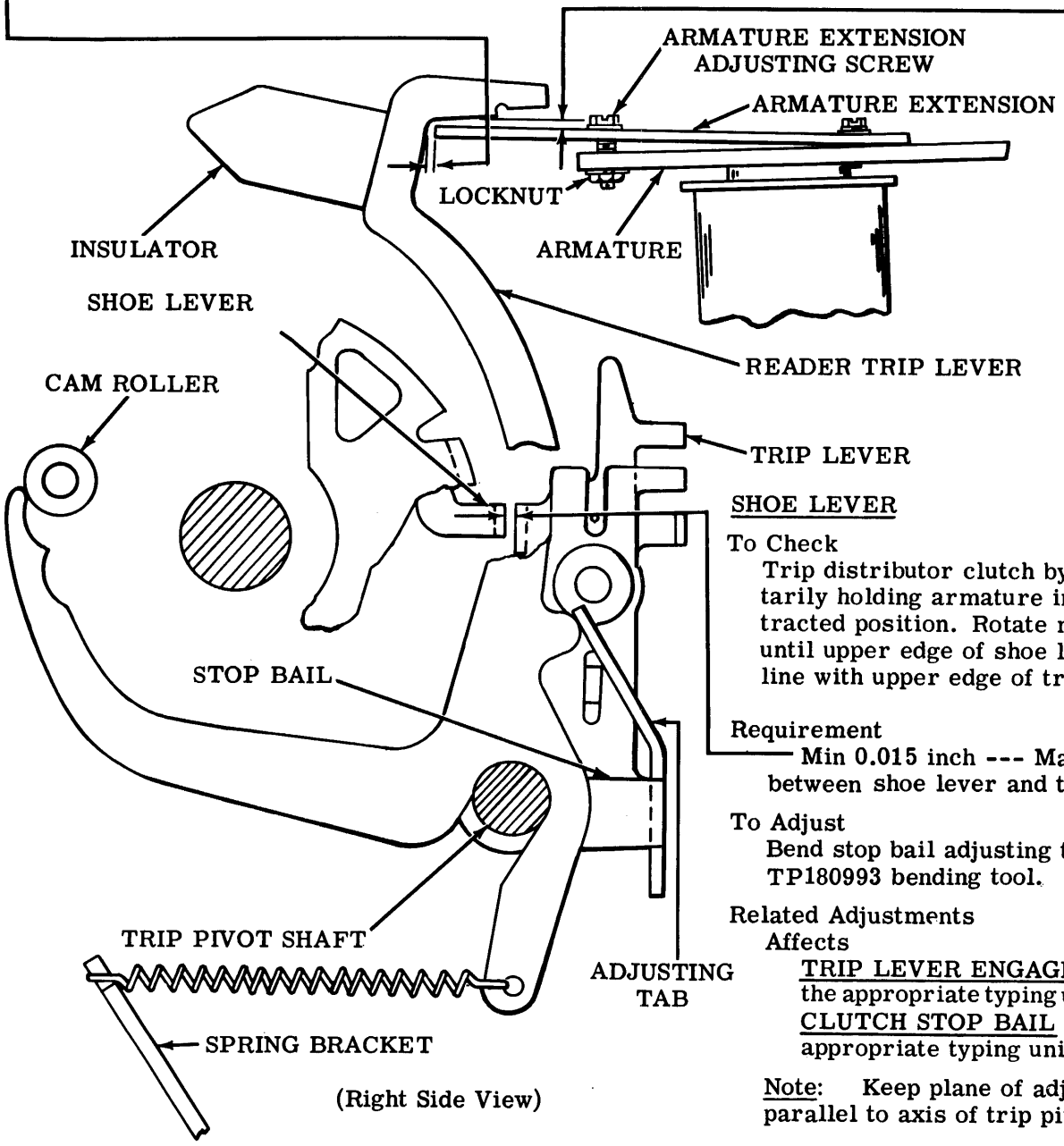
2.03 Clutch Trip Area (continued)

ARMATURE EXTENSION

To Check
Place typing unit in stop condition. Hold armature in attracted position and rotate main shaft until a clearance of
Min Some --- Max 0.040 inch
exists between end of armature extension and reader trip lever.

Requirement
Min Some --- Max 0.030 inch
between the armature extension and reader trip lever at its closest point.

To Adjust
Loosen and use armature extension adjusting screw and locknut to position armature extension. Tighten adjusting screw and locknut.



(Right Side View)

SHOE LEVER

To Check
Trip distributor clutch by momentarily holding armature in its attracted position. Rotate main shaft until upper edge of shoe lever is in line with upper edge of trip lever.

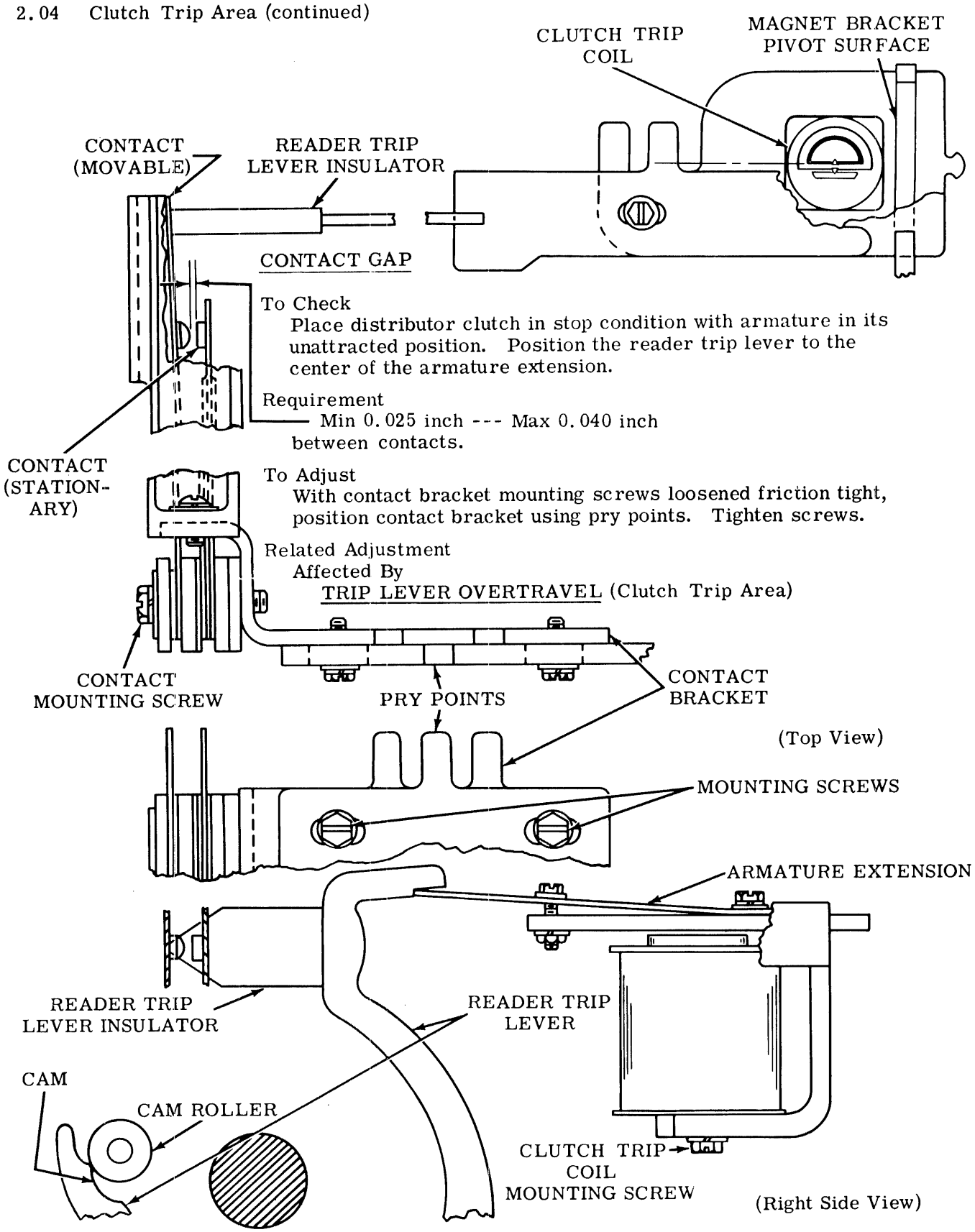
Requirement
Min 0.015 inch --- Max 0.035 inch
between shoe lever and trip lever.

To Adjust
Bend stop bail adjusting tab with TP180993 bending tool.

Related Adjustments
Affects
TRIP LEVER ENGAGEMENT (See the appropriate typing unit section.)
CLUTCH STOP BAIL (See the appropriate typing unit section.)

Note: Keep plane of adjusting tab parallel to axis of trip pivot shaft.

2.04 Clutch Trip Area (continued)

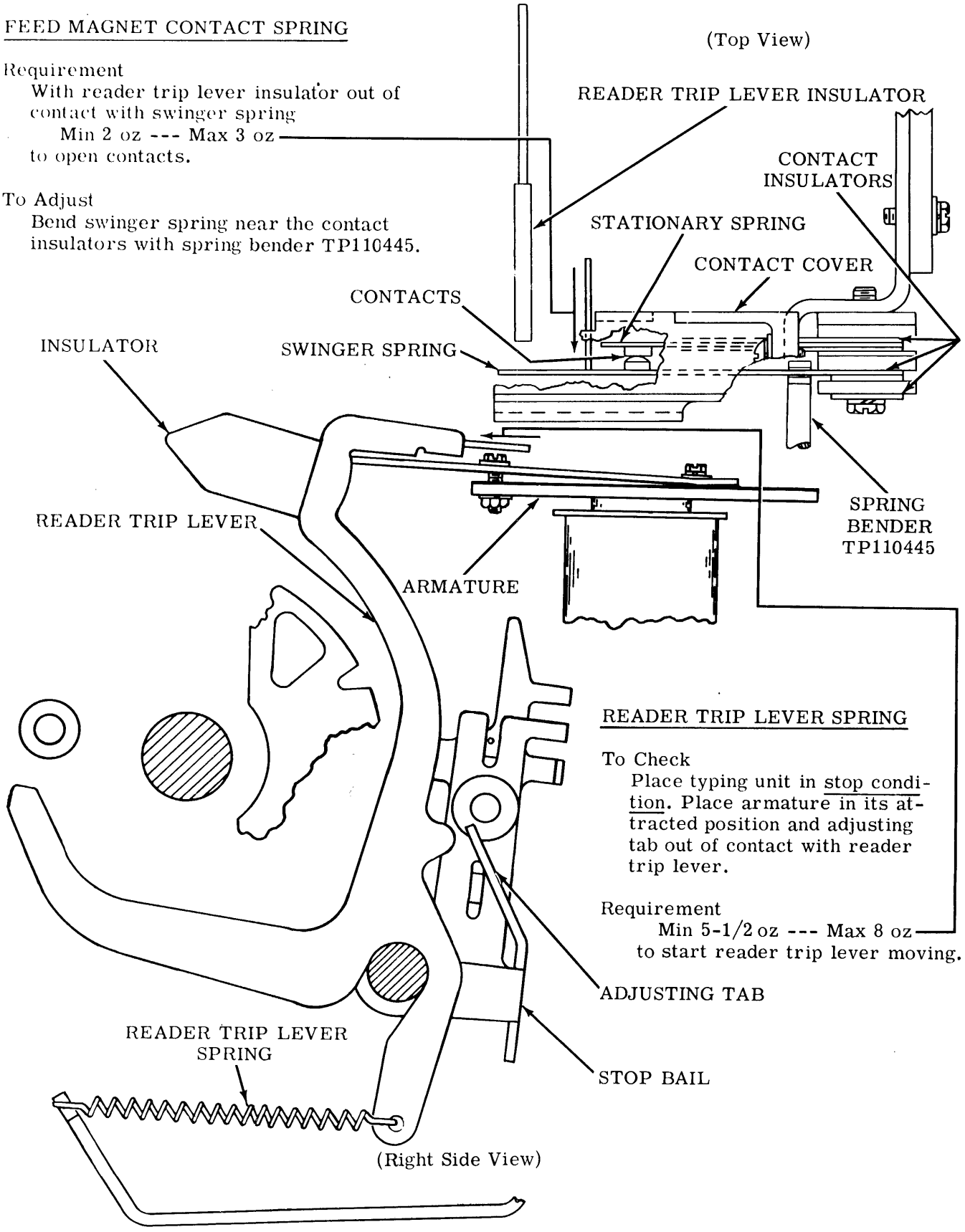


2.05 Clutch Trip Area (continued)

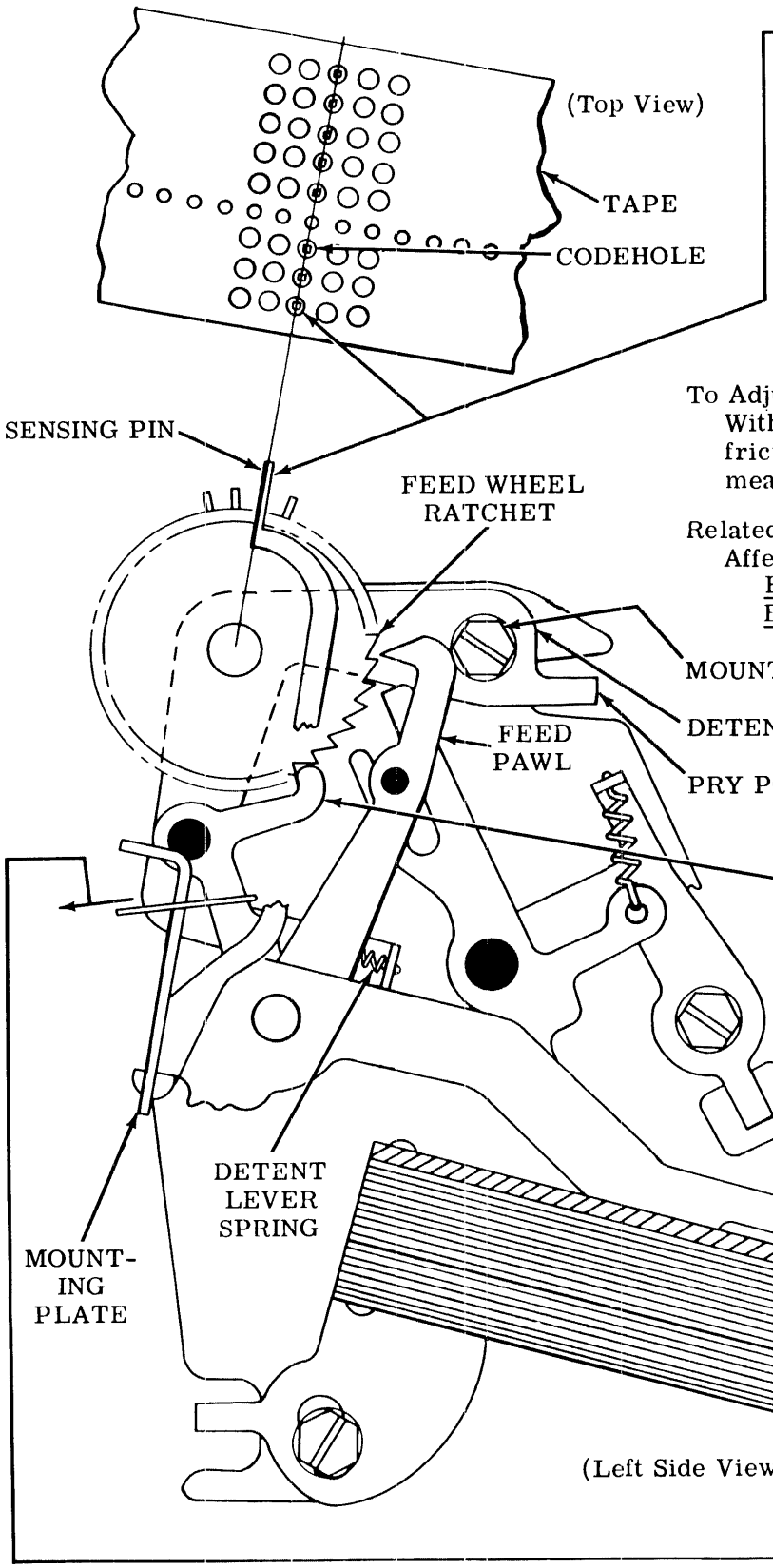
FEED MAGNET CONTACT SPRING

Requirement
With reader trip lever insulator out of contact with swinger spring
Min 2 oz --- Max 3 oz
to open contacts.

To Adjust
Bend swinger spring near the contact insulators with spring bender TP110445.



2.06 Tape Reader Area



DETENT LEVER

Requirement

With the control lever in FREE position, tips of sensing pins must be centrally located in the code holes of tape which has an all-marking code combination punched in it.

Note: If the tape reader is operating under power, do not push the control lever beyond the STOP position until the tape reader has stopped.

To Adjust

With detent bracket mounting screw friction tight, position detent bracket by means of pry points. Tighten screw.

Related Adjustments

Affects

FEED PAWL (Tape Reader Area)
BLOCKING PAWL (Tape Reader Area)

DETENT LEVER SPRING

Requirement

Min 3-1/2 oz
Max 5-1/2 oz

to start detent lever moving.

2.07 Tape Reader Area (continued)

FEED PAWL (Adjustment with Gauge TP183103)

To Check
Place armature in unattracted position. Visually check to see if there is some clearance between the blocking pawl and ratchet tooth. If not, provide clearance. See BLOCK PAWL (Tape Reader Area) adjustment.

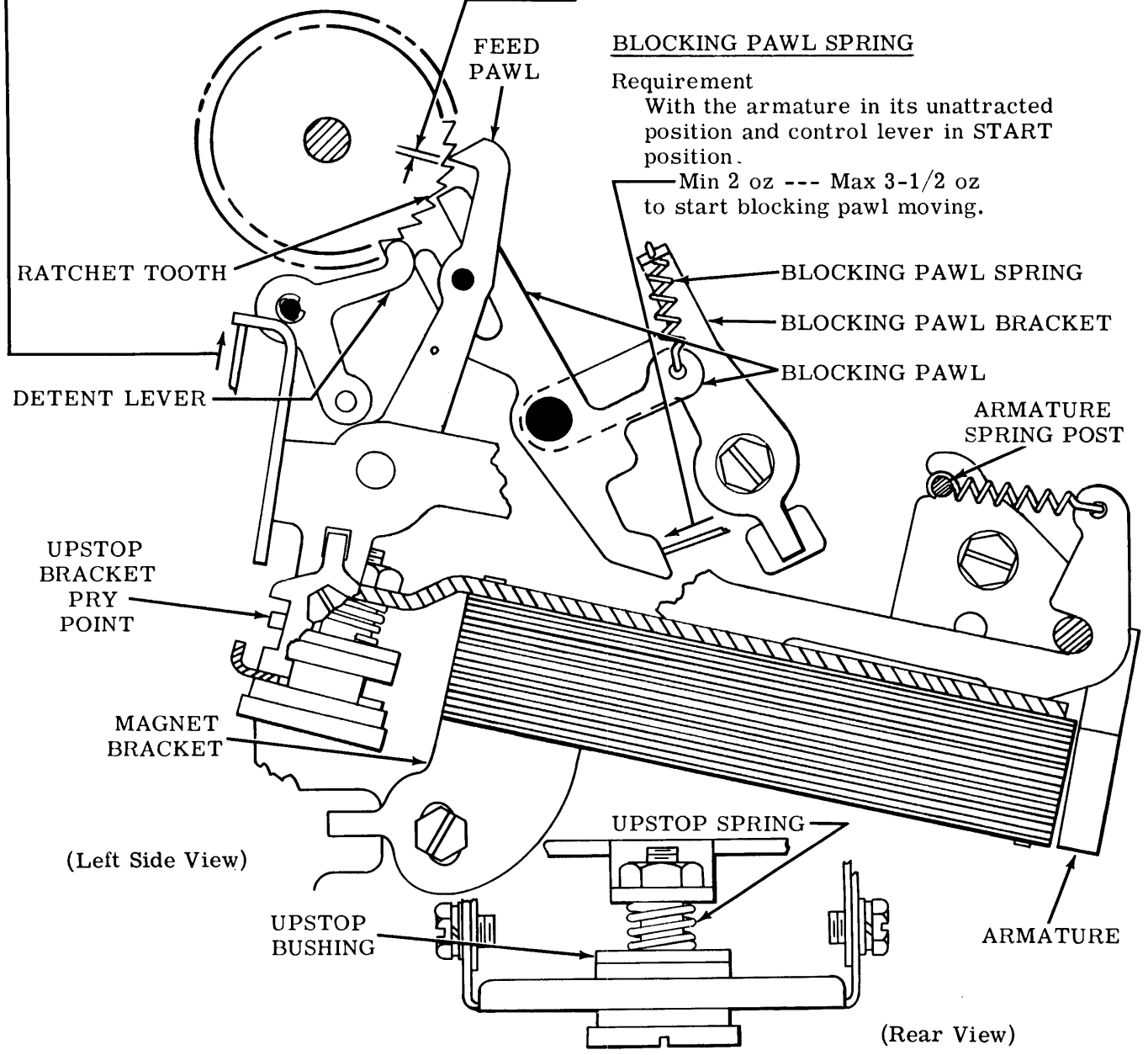
Requirement
Min Some --- Max 0.008 inch between the feed pawl and ratchet tooth with a total of five ratchet teeth between the feed pawl and detent lever. (Continued on following page.)

UPSTOP SPRING

Requirement
With armature spring post removed from its slot in magnet bracket
Min 14 oz --- Max 20 oz
to start upstop bushing moving.

BLOCKING PAWL SPRING

Requirement
With the armature in its unattracted position and control lever in START position.
Min 2 oz --- Max 3-1/2 oz
to start blocking pawl moving.



2.08 Tape Reader Area (continued)

FEED PAWL (Continued from preceding page.)

To Adjust

With armature in attracted position and two upstop bracket mounting screws friction tight, insert gauge TP183103 between upstop bracket and shoulder of upstop shoulder screw. Position upstop bracket so that it lies flat on gauge. Tighten upstop bracket mounting screws. With armature in unattracted position and three magnet bracket mounting screws friction tight, position magnet bracket by means of pry point. Tighten magnet bracket mounting screws.

Note: For tape readers with vibration damper plate TP183136, tighten magnet bracket mounting screws A and B first. Then, rotate the vibration dampener plate until the upper finger presses firmly on contact block extension. Finally, tighten magnet bracket mounting screw C.

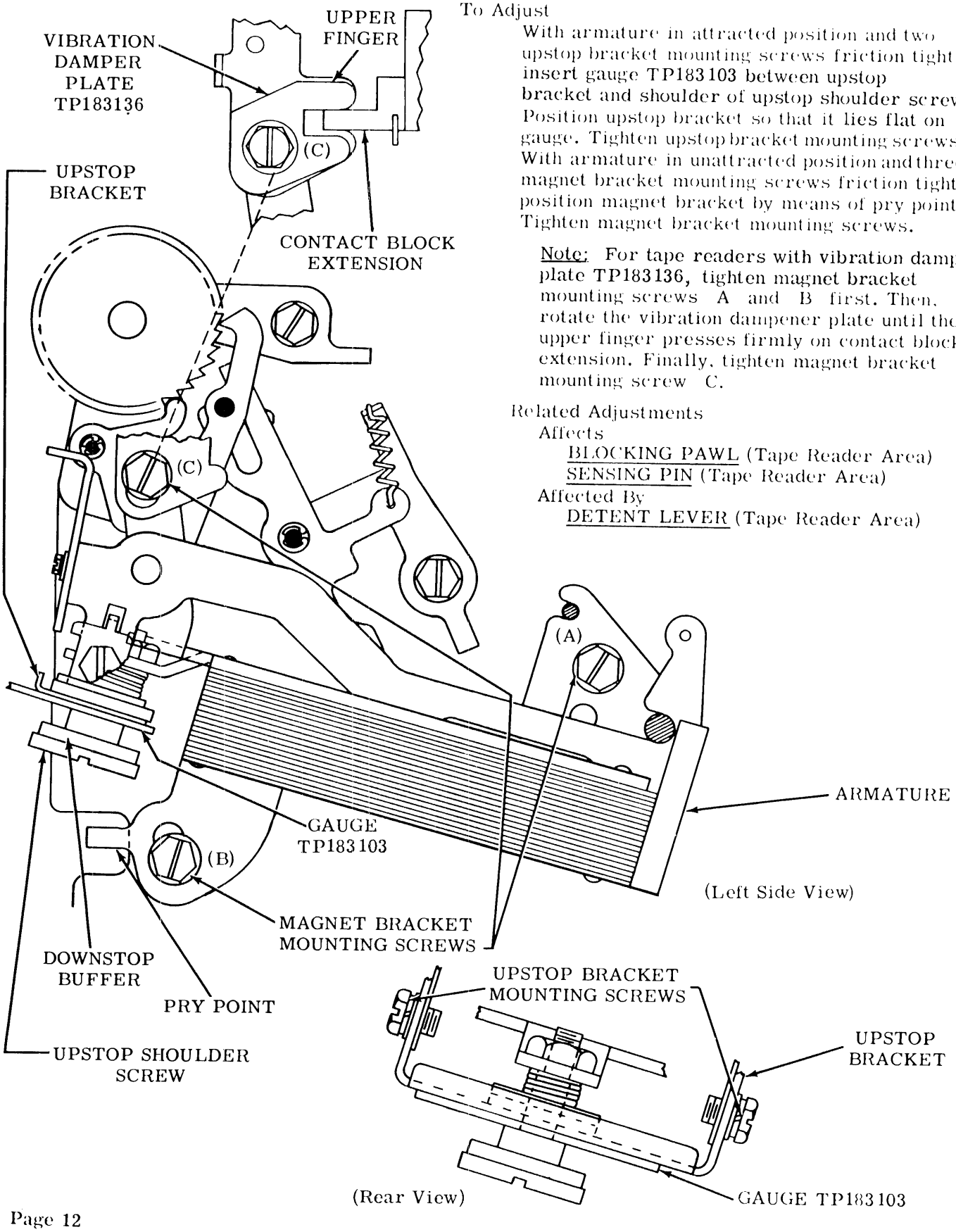
Related Adjustments

Affects

BLOCKING PAWL (Tape Reader Area)
SENSING PIN (Tape Reader Area)

Affected By

DETENT LEVER (Tape Reader Area)



2.09 The Tape Reader Area (continued)

FEED PAWL (Adjustment without Gauge TP183103)

(1) To Check
Place armature in attracted position and loosen two upstop bracket mounting screws so that the upstop bracket does not limit the feed pawl motion.

Requirement
Min 0.020 inch --- Max 0.045 inch between feed pawl and ratchet tooth and a total of six ratchet teeth between feed pawl and detent lever.

To Adjust
With three magnet bracket mounting screws friction tight, position magnet bracket using pry point.

(2) To Check
Place armature in unattracted position. Visually check to see if there is some clearance between the blocking pawl and ratchet tooth. If not, provide clearance. See BLOCKING PAWL (Tape Reader Area) adjustment. Place upstop bracket flat against downstop buffer.

Requirement
Min Some --- Max 0.008 inch between feed pawl and ratchet tooth at point of least clearance.

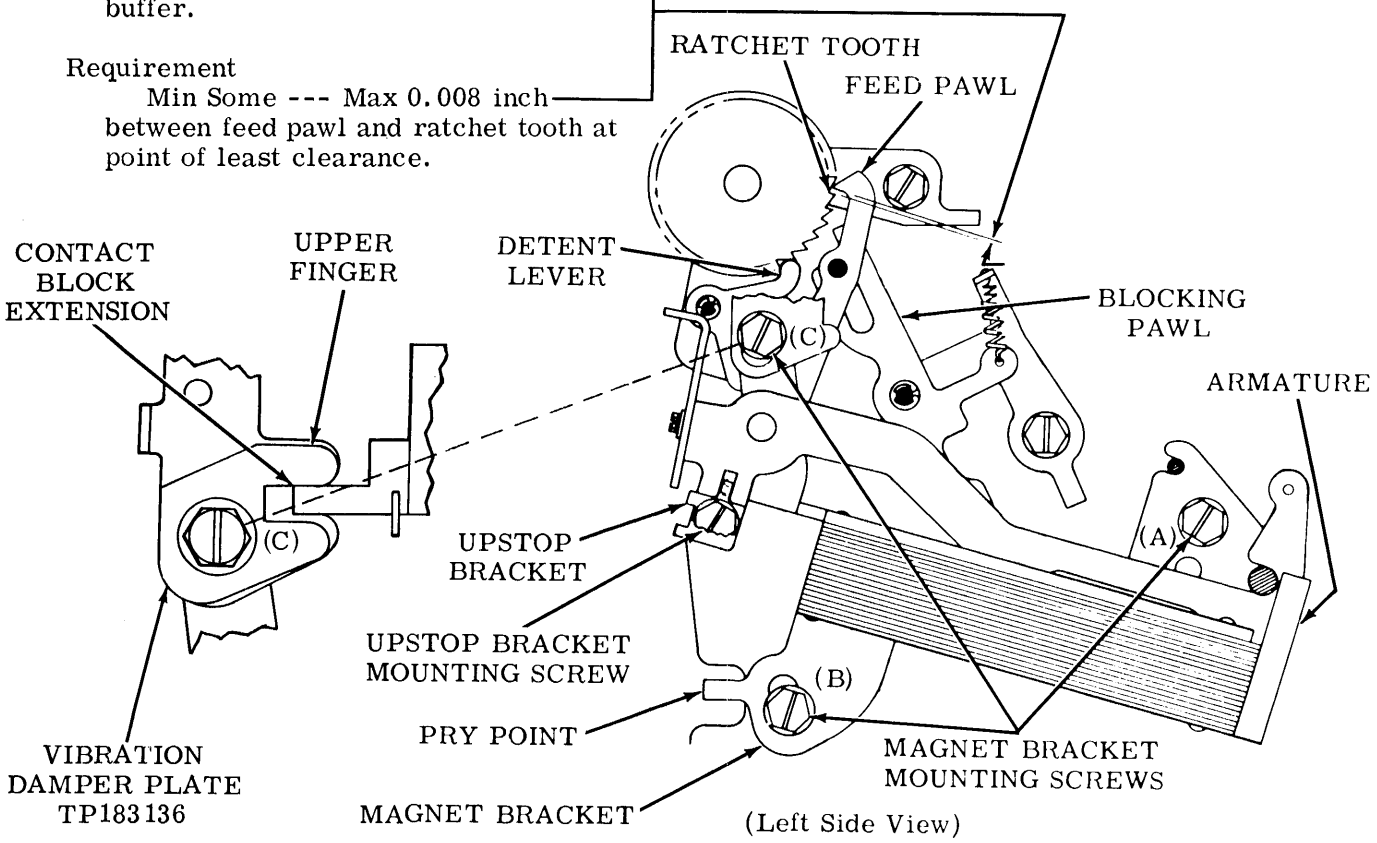
To Adjust
With two upstop bracket mounting screws friction tight, position upstop bracket using upstop bracket pry point. Tighten screws.

Note 1: If the some of 0.008 inch requirement cannot be met, refine requirement (1) until it is met.

Note 2: For tape readers with vibration damper plate TP183131, tighten magnet bracket mounting screws A and B first. Then, rotate the vibration damper plate until the upper finger presses firmly on contact block extension. Finally tighten magnet bracket mounting screw C.

Recheck Requirements (1) and (2) and refine, if necessary.

Related Adjustments
Affects
BLOCKING PAWL (Tape Reader Area)
SENSING PIN (Tape Reader Area)
Affected By
TRIP LEVER OVERTRAVEL (Tape Reader Area)



2.10 Tape Reader Area (continued)

BLOCKING PAWL

To Check

Place armature in unattracted position. Check to see that there is some clearance between feed pawl and ratchet tooth. If not, provide clearance. See FEED PAWL (Tape Reader Area) adjustment.

Requirement

Min Some --- Max 0.010 inch at point of least clearance between blocking pawl and ratchet tooth.

Note: When a tape winder is used

Min Some --- Max 0.003 inch at point of least clearance between blocking pawl and ratchet.

To Adjust

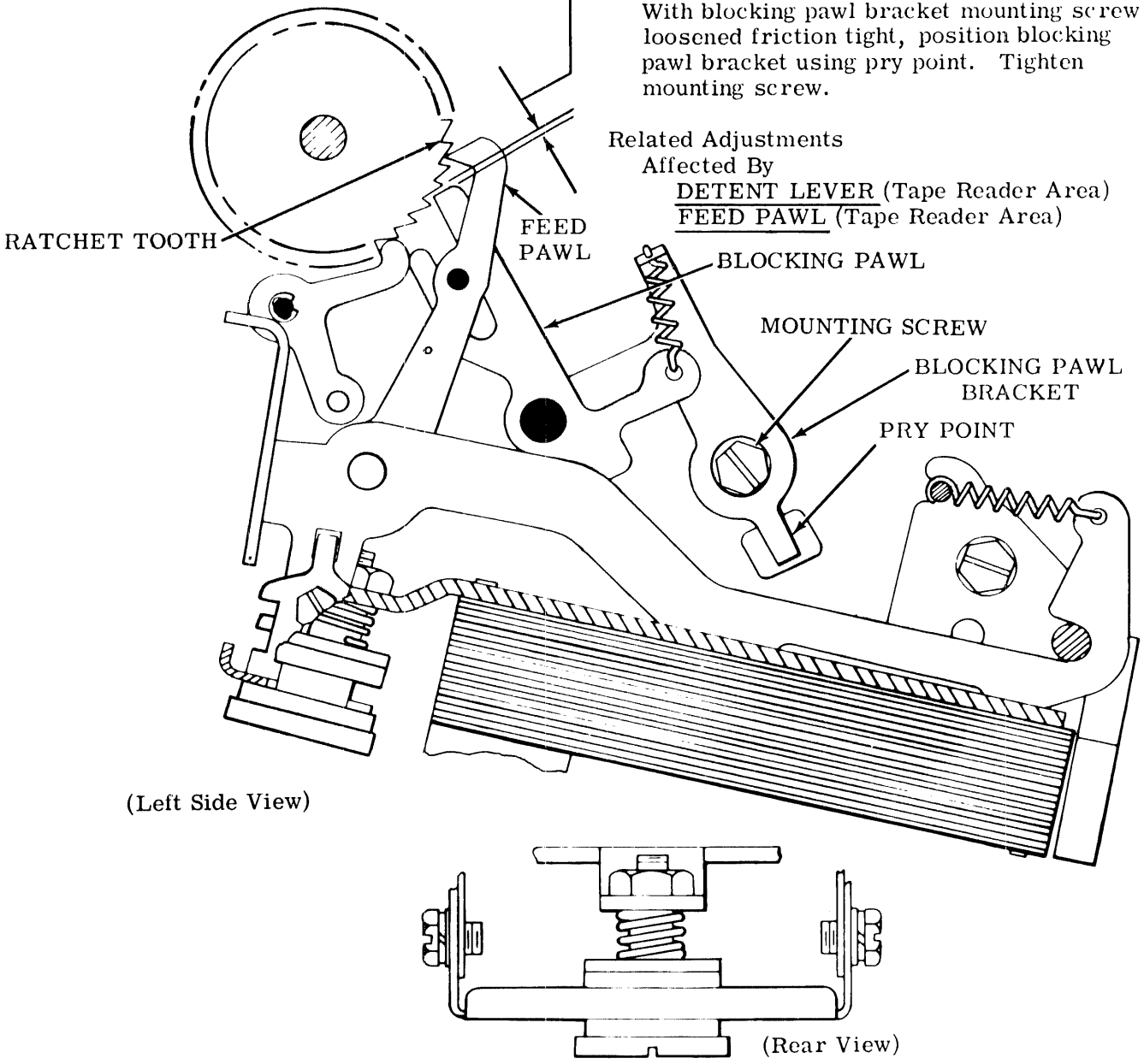
With blocking pawl bracket mounting screw loosened friction tight, position blocking pawl bracket using pry point. Tighten mounting screw.

Related Adjustments

Affected By

DETENT LEVER (Tape Reader Area)

FEED PAWL (Tape Reader Area)



(Left Side View)

(Rear View)

2.11 Tape Reader Area (continued)

SENSING PIN SPRING

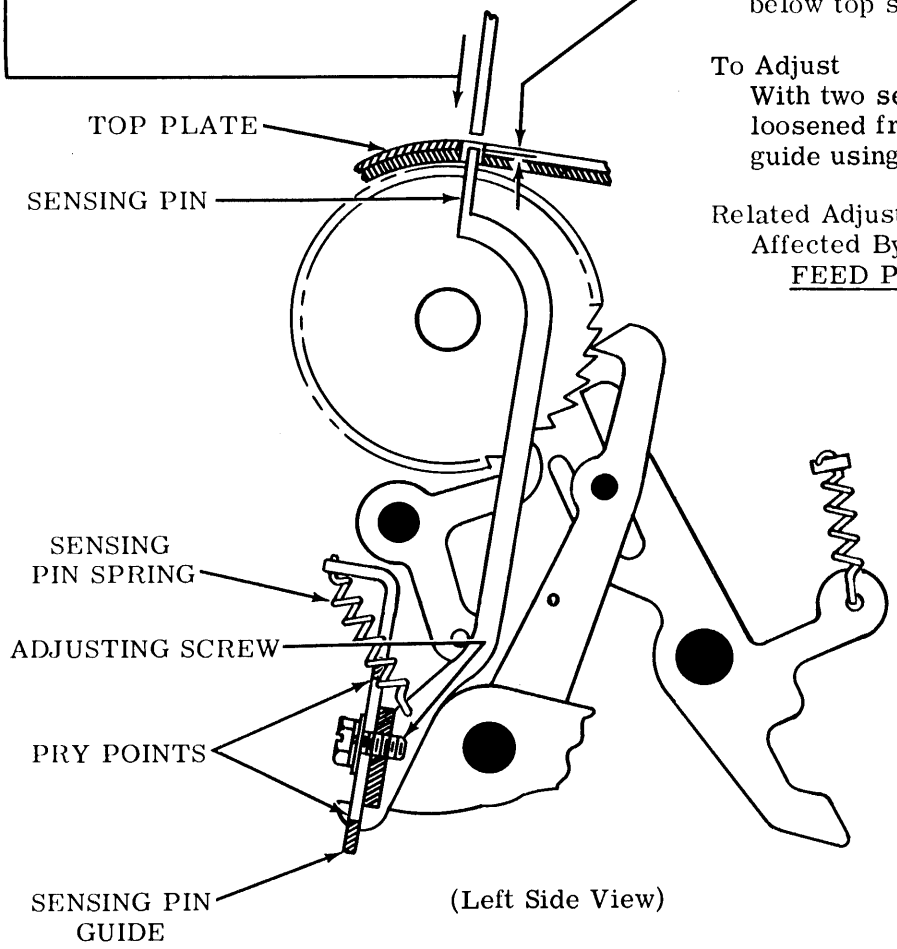
Requirement
With armature in its attracted position
Min 1-1/2 oz --- Max 2-3/4 oz
to position sensing pin flush with top plate.

SENSING PIN

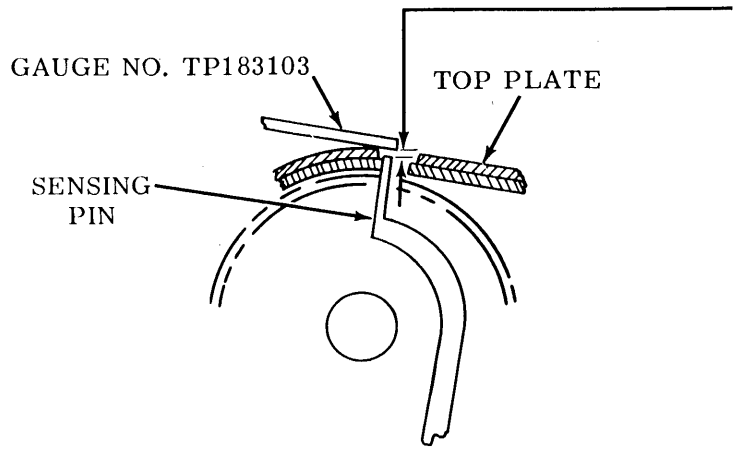
Requirement
With armature in unattracted position. the tip of all sensing pins shall be
Min Flush --- Max 0.015 inch
below top surface of top plate.

To Adjust
With two sensing pin guide adjusting screws loosened friction tight, position sensing pin guide using pry points. Tighten screws.

Related Adjustment
Affected By
FEED PAWL (Tape Reader Area)



(Left Side View)



(Left Side View)

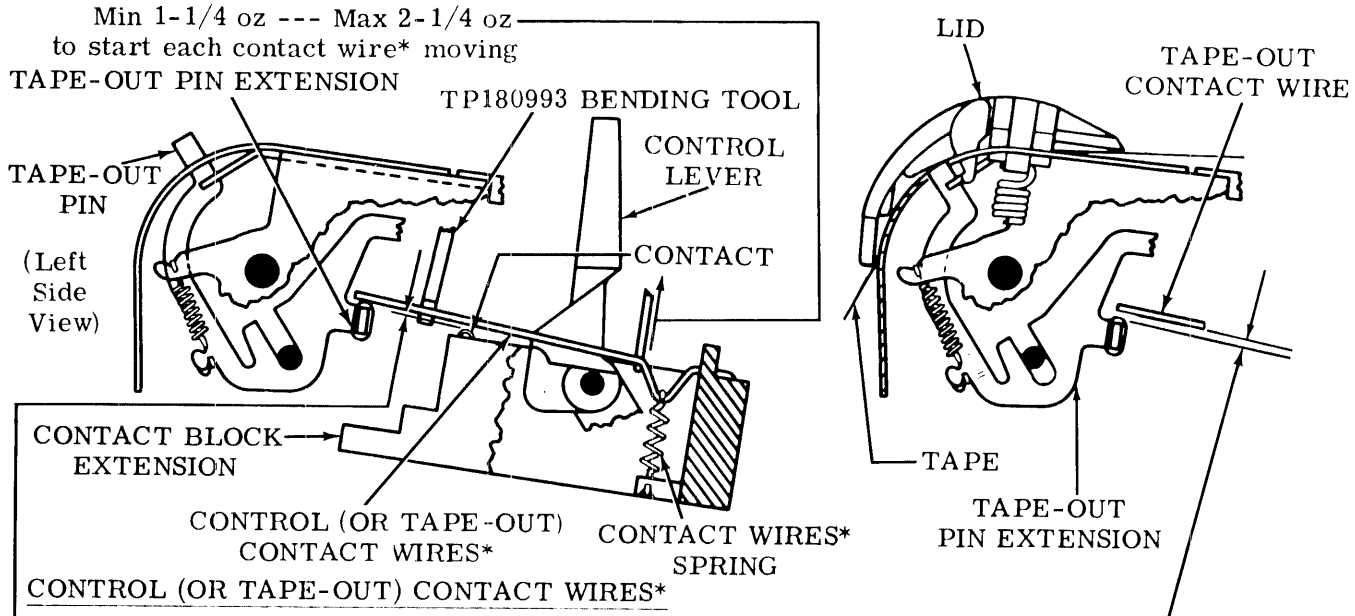
Note: This adjustment may be made by using the thin-slotted end of gauge TP183103. To check the above minimum requirement (Flush), hold the gauge flat against the top plate in back of the sensing pins and move it forward against sensing pins. If any sensing pin is deflected by the gauge, then the above minimum requirement is not met. The sensing pin pin guide must be lowered. To check the above maximum requirement (0.015 inch), hold the gauge directly above the sensing pins and measure the clearance. Adjust, if necessary, as indicated above.

2.12 Tape Reader Area (continued)

CONTACT WIRES* SPRING

To Check
Place control lever in START position and fully depress tape-out pin.

Requirement
Min 1-1/4 oz --- Max 2-1/4 oz
to start each contact wire* moving



CONTROL (OR TAPE-OUT) CONTACT WIRES*

Note 1: Tape readers without automatic reader control: Place the control lever in START position.

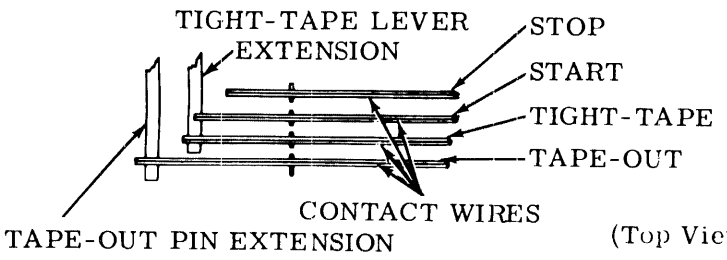
(1) Requirement
With tape-out pin in its fully up position,
Min 0.015 inch --- Max 0.025 inch
between control (or tape-out) contact wires* and contact.

(2) Requirement
With tape in reader and reader lid closed,
Min 0.005 inch
clearance between the tape-out pin extension and tape-out contact wire.

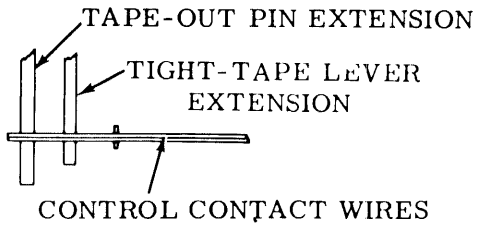
To Adjust
Bend control (or tape-out) contact wires* between the contact and the tape-out pin extension with bending tool TP180993.

*Note 2: The location of the contact wires is shown below:

TAPE READERS WITH AUTOMATIC READER CONTROL



TAPE READERS WITHOUT AUTOMATIC READER CONTROL



2.13 Tape Reader Area (continued)

Note: The following adjustment applies only to tape readers with automatic reader control.

START CONTACT WIRES

Requirement

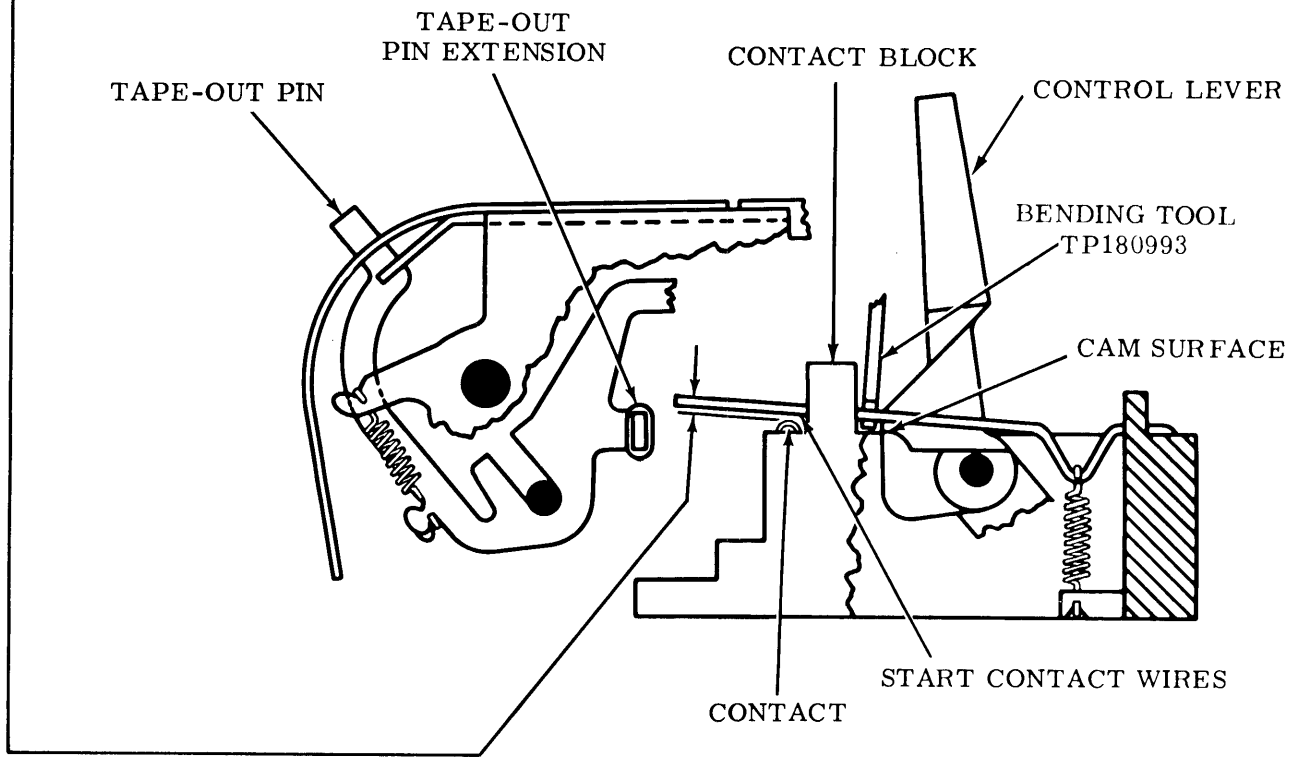
With the control lever in the neutral position (resting in a position midway between START and STOP positions)

Min 0.035 inch --- Max 0.055 inch

between the start contact wires and their contact.

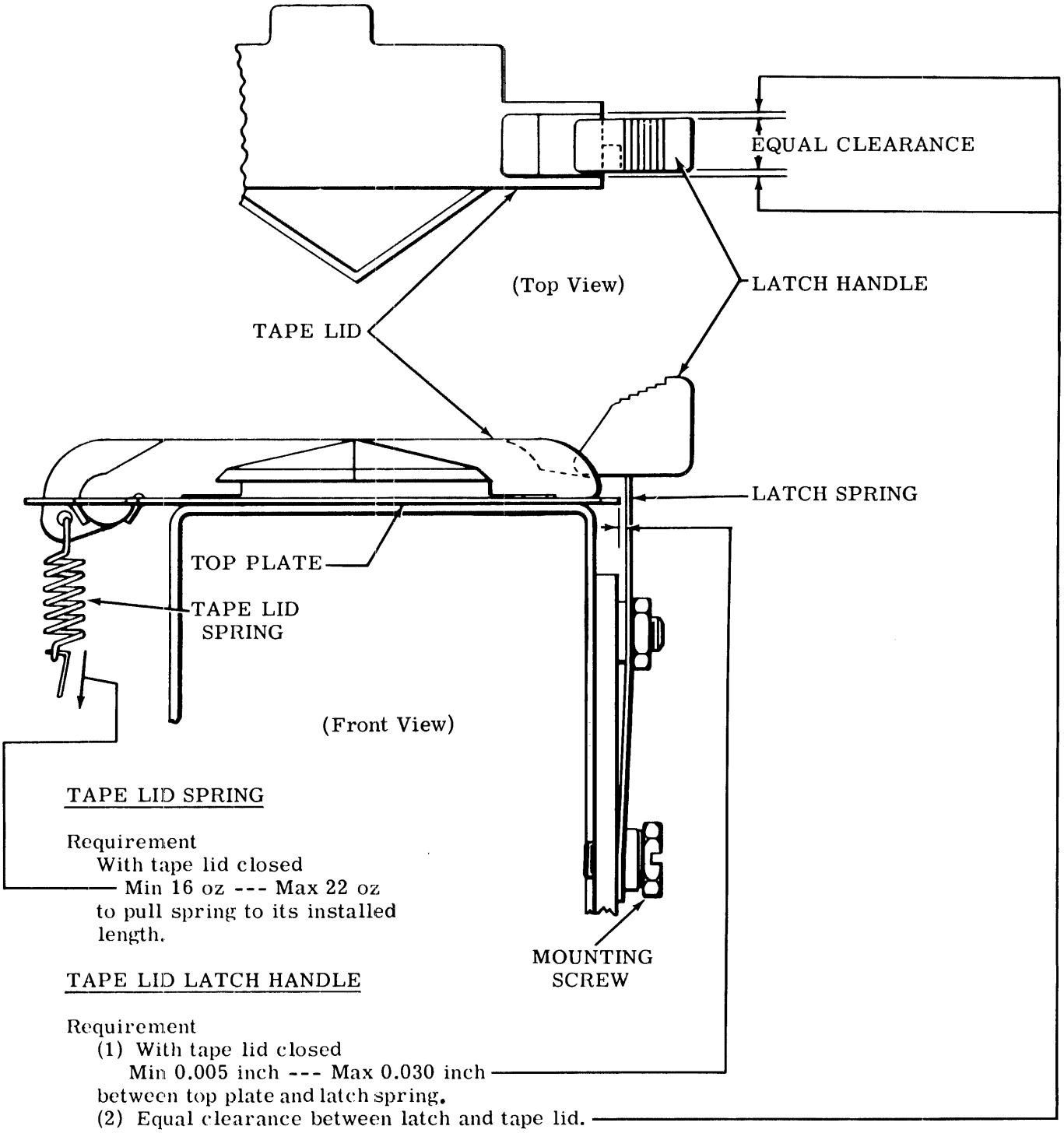
To Adjust

With the control lever in the FREE position, bend start contact wires between contact block and control lever cam surface with bending tool TP180993.



(Left Side View)

2.14 Tape Reader Area (continued)



TAPE LID SPRING

Requirement
With tape lid closed
Min 16 oz --- Max 22 oz
to pull spring to its installed length.

TAPE LID LATCH HANDLE

Requirement
(1) With tape lid closed
Min 0.005 inch --- Max 0.030 inch
between top plate and latch spring.
(2) Equal clearance between latch and tape lid.

To Adjust
With mounting screw friction tight, position latch handle vertically. Tighten screw.

2.15 Tape Reader Area (continued)

TIGHT-TAPE LEVER SPRING

Requirement
With the tape lid closed
Min 1 oz --- Max 2-1/4 oz
to start tight-tape lever moving.

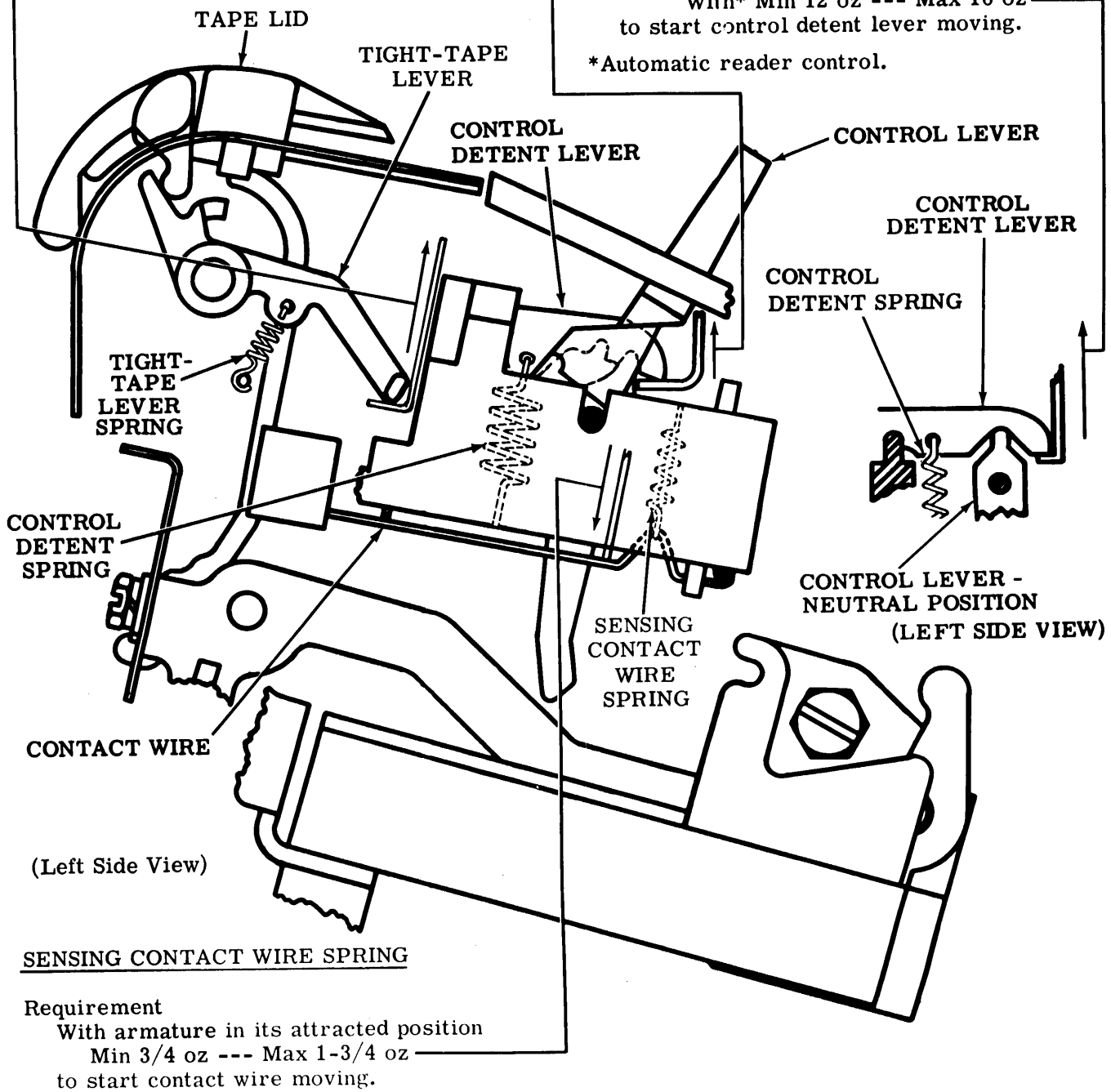
CONTROL DETENT SPRING

Requirement
Place control lever in STOP position,

Note: For tape readers with automatic reader control, place the control lever in the neutral position.

Without* Min 5 oz --- Max 9 oz
With* Min 12 oz --- Max 16 oz
to start control detent lever moving.

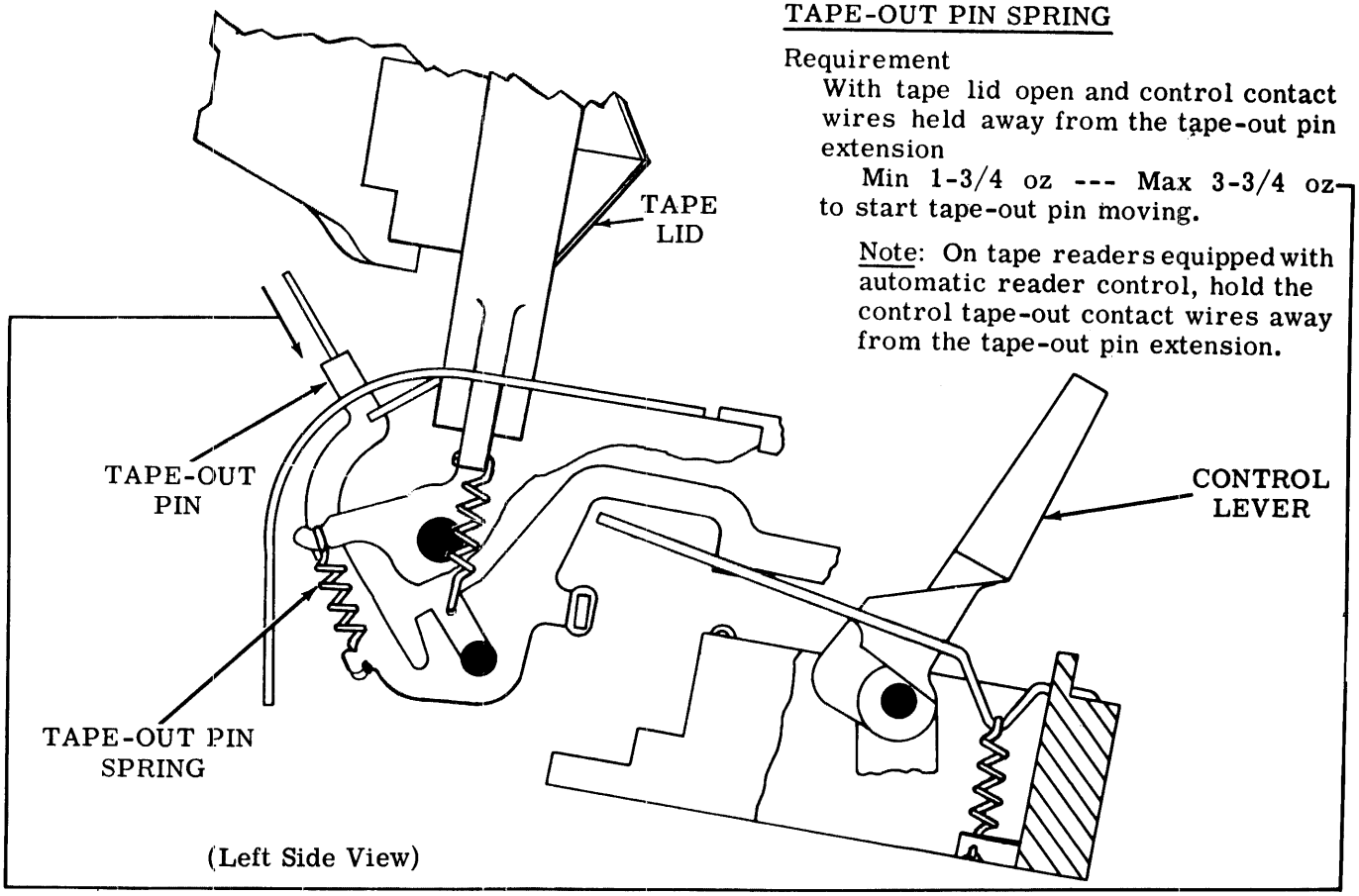
*Automatic reader control.



SENSING CONTACT WIRE SPRING

Requirement
With armature in its attracted position
Min 3/4 oz --- Max 1-3/4 oz
to start contact wire moving.

2.16 Tape Reader Area (continued)



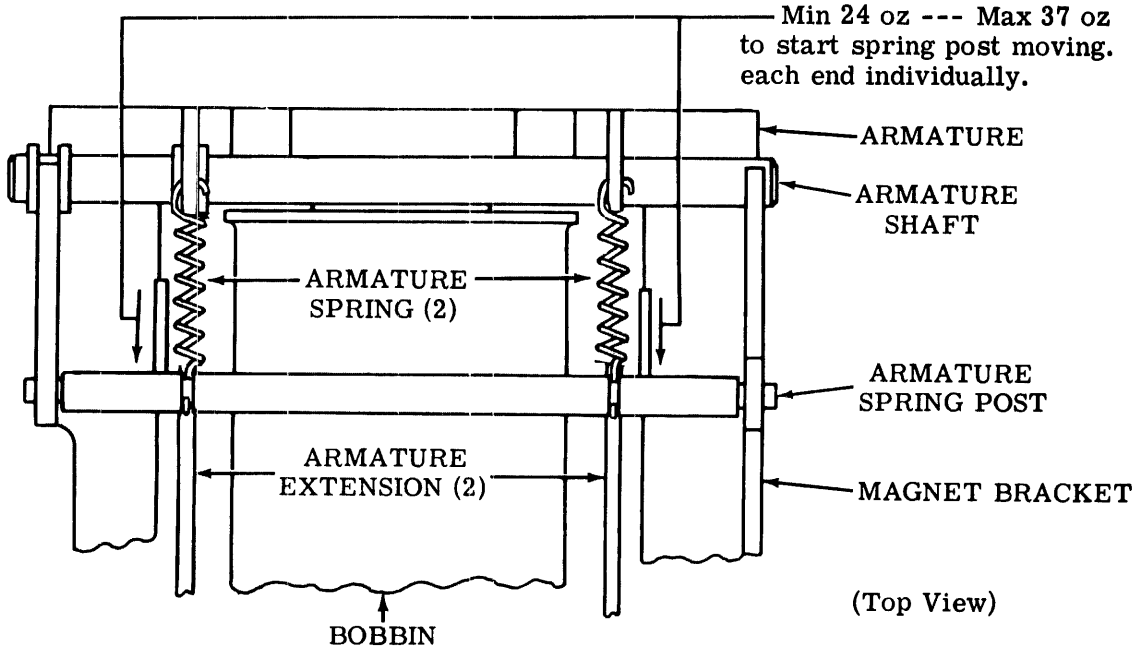
TAPE-OUT PIN SPRING

Requirement

With tape lid open and control contact wires held away from the tape-out pin extension

Min 1-3/4 oz --- Max 3-3/4 oz to start tape-out pin moving.

Note: On tape readers equipped with automatic reader control, hold the control tape-out contact wires away from the tape-out pin extension.



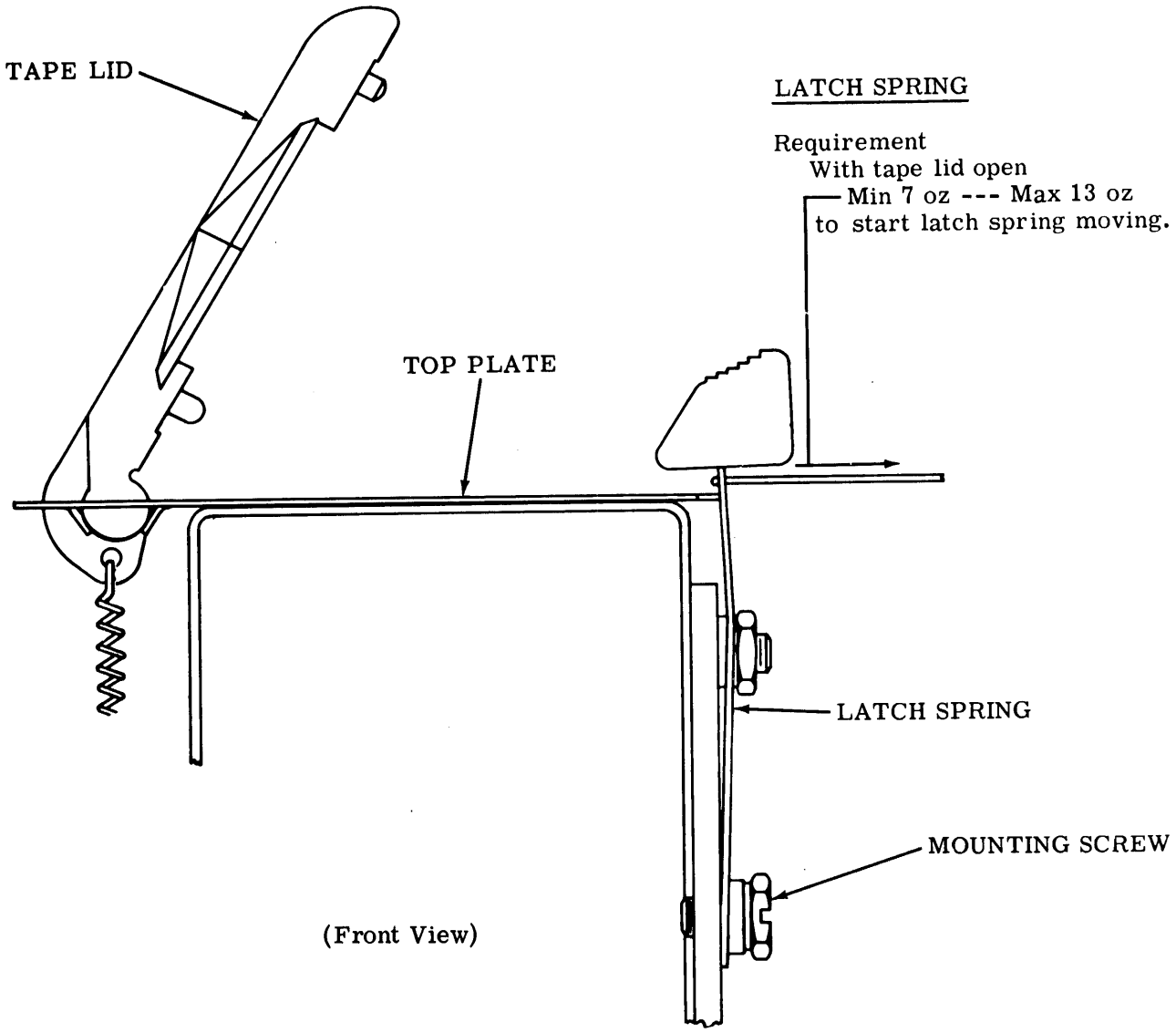
ARMATURE SPRING

Requirement

With armature in its unattracted position

Min 24 oz --- Max 37 oz to start spring post moving. Measure each end individually.

2.17 Tape Reader Area (continued)



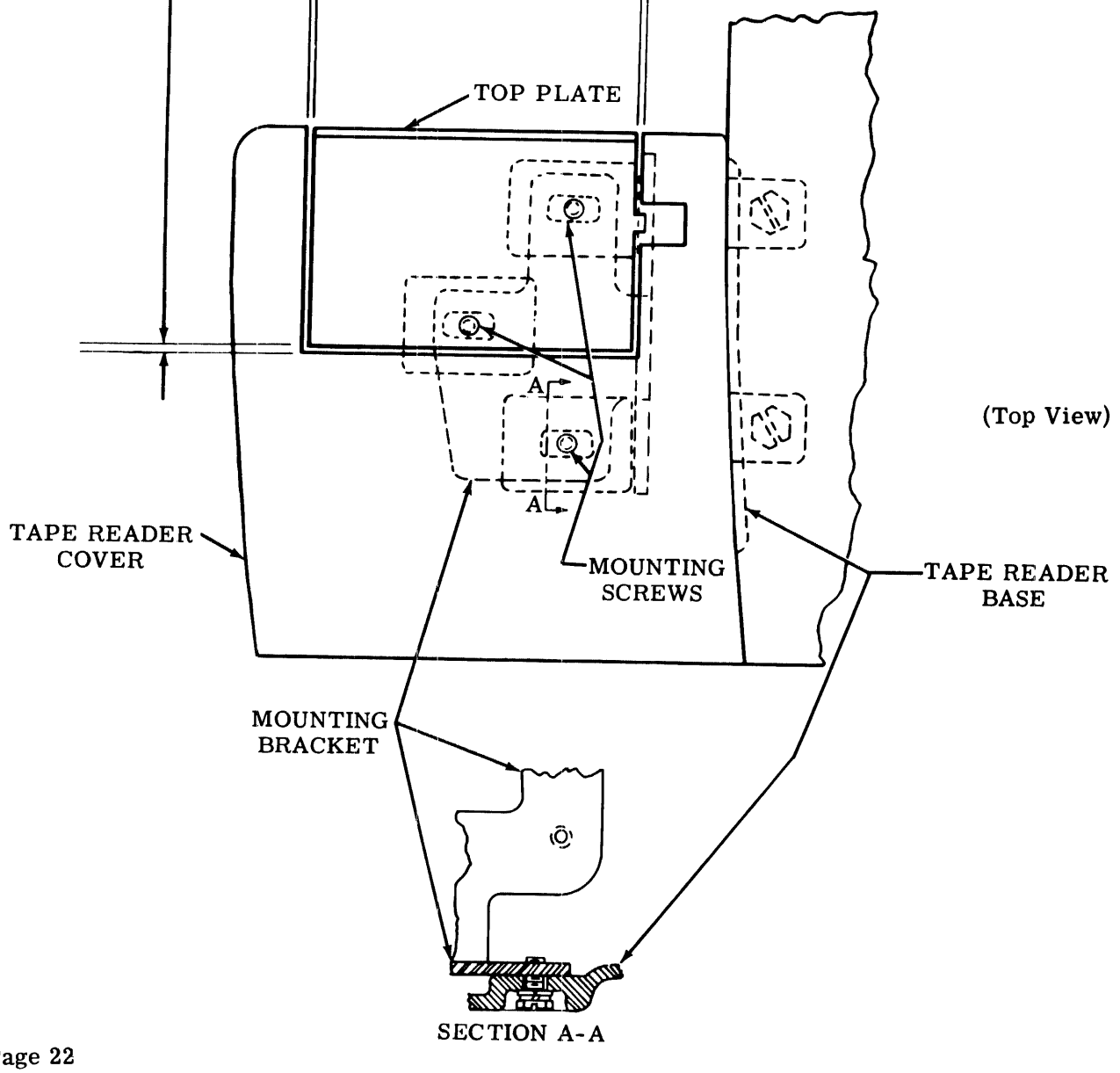
2.18 Tape Reader Area (continued)

Note: The following adjustment applies to tape readers with early design bases.

READER MOUNTING BRACKET (Early Design)

Requirement
There shall be equal clearance on three sides between top plate and tape reader cover.

To Adjust
With three mounting screws friction tight, position tape reader base. Tighten screws.



2.19 Tape Reader Area (continued)

Note: The following adjustment applies to tape readers with late design bases.

READER MOUNTING BRACKET (Late Design)

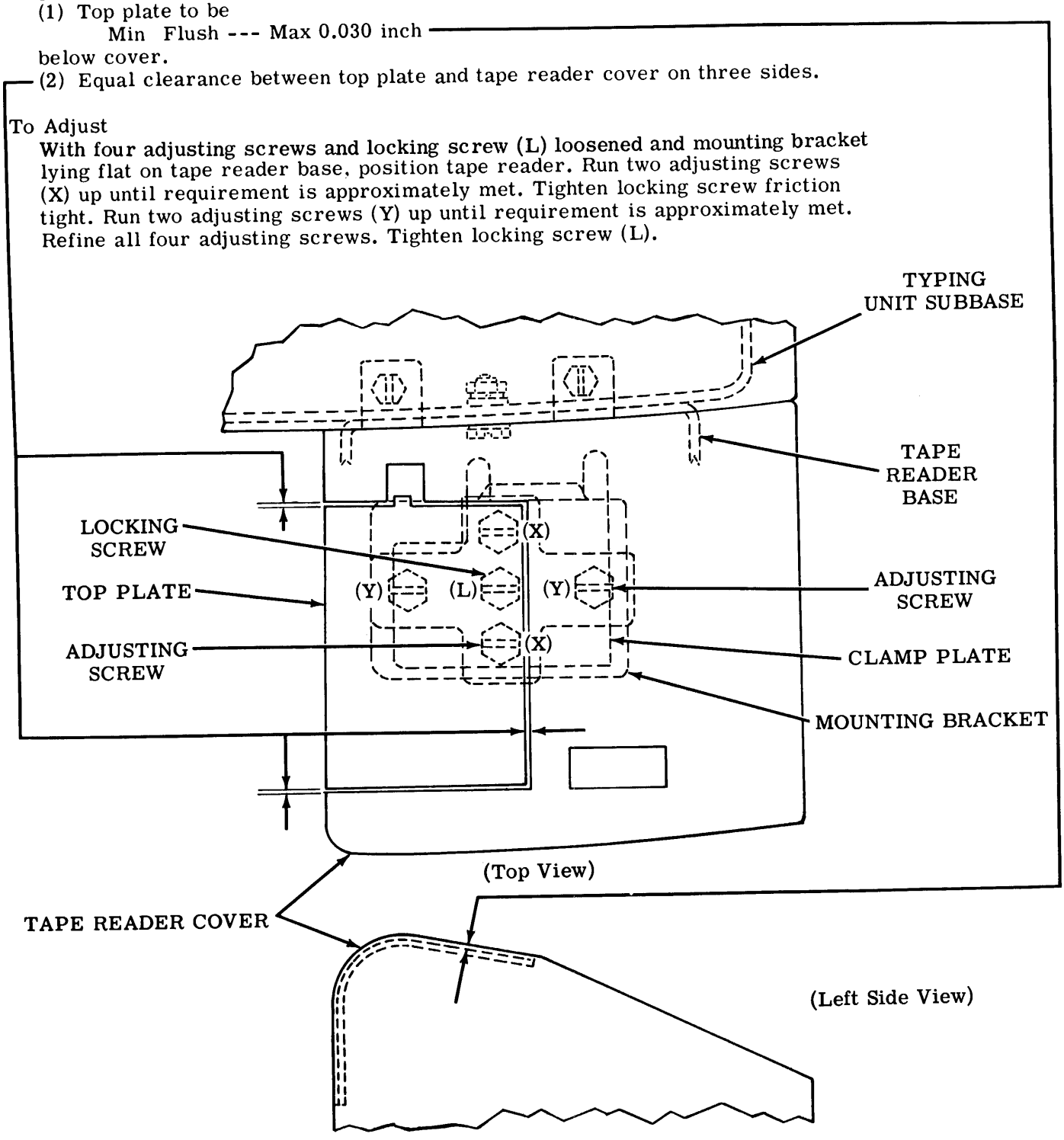
Requirement

(1) Top plate to be
Min Flush --- Max 0.030 inch
below cover.

(2) Equal clearance between top plate and tape reader cover on three sides.

To Adjust

With four adjusting screws and locking screw (L) loosened and mounting bracket lying flat on tape reader base, position tape reader. Run two adjusting screws (X) up until requirement is approximately met. Tighten locking screw friction tight. Run two adjusting screws (Y) up until requirement is approximately met. Refine all four adjusting screws. Tighten locking screw (L).



3. VARIATIONS TO THE BASIC UNIT

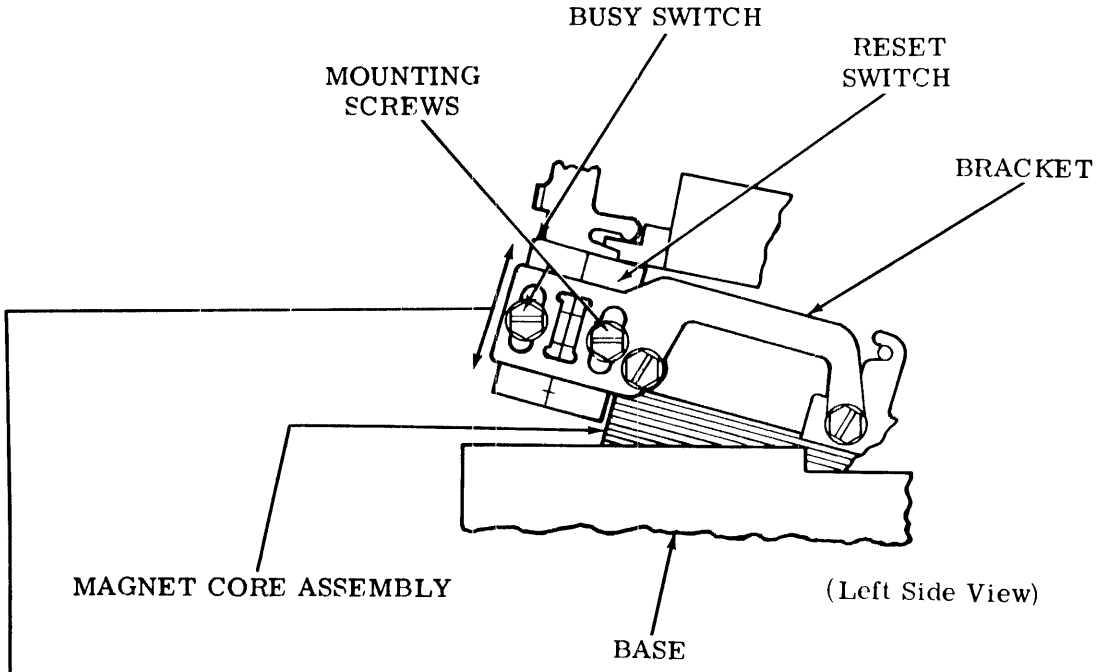
3.01 Tape Reader Area

Note: The following adjustment applies to readers equipped with timing contacts.

RESET AND BUSY SWITCH TIMING

(1) Requirement (Preliminary)
The busy and reset switches should be centered in their bracket slots.

(2) Requirement (Final)
With the sensing pins fully down, the reset switch should be closed and the busy switch should be open. With the sensing pins fully up (energized position), the reset switch should be open and the busy switch should be closed.



To Adjust
—With switch mounting screws friction tight, position switches up or down. Tighten screws.