32 TAPE READER

GENERAL DESCRIPTION AND

PRINCIPLES OF OPERATION

CONTENTS PAGE

1. GENERAL

1.01 This section provides a general description and principles of operation for 32 tape readers. It is reissued to add operating temperature requirements and make a minor correction. Marginal arrows indicate changes and additions.

1.02 The 32 tape reader is a 5-level electromechanical device which senses and transmits coded intelligence perforated in tape (Figure 1).

1.03 References to left, right, front, rear, etc, consider the tape reader as viewed by the operator.

1.04 In the illustrations, fixed pivots are solid black, and floating points — those mounted on parts that move — are crosshatched.

2. DESCRIPTION

TECHNICAL DATA

CAUTION: THIS EQUIPMENT IS INTENDED TO BE OPERATED IN A ROOM ENVIRONMENT WITHIN THE TEMPERATURE RANGE OF 40° F TO 110° F. SERIOUS DAMAGE TO IT COULD RESULT IF THIS RANGE IS EXCEEDED. IN THIS CONNECTION, PARTICULAR CAUTION SHOULD BE EXERCISED IN USING ACOUSTICAL OR OTHER ENCLOSURES.

2.01 Dimensions and Weight (Approximate)

Feeding and Sensing Portion

Width	3-1/2 inches
Depth	4 inches
Height	3-1/2 inches
Weight	2 pounds

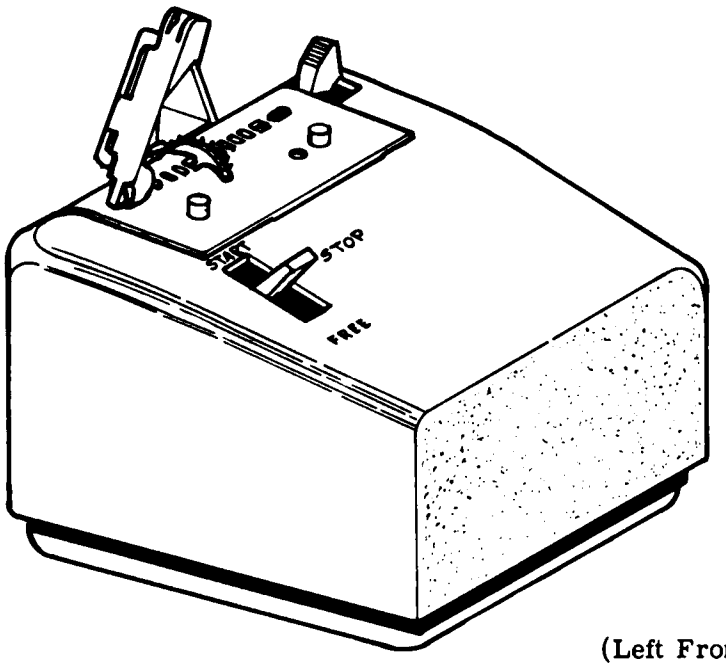
Power Pack Component

Width	6-1/4 inches
Depth	2-1/2 inches
Height	2-3/4 inches
Weight	1 pound

2.02 Electrical — Power Pack

High Voltage

Input	115 volts ac
Output	Min 137 volts dc at 0.160 ampere



(Left Front View)

Figure 1 - 32 Tape Reader

2.03 Feed Magnet

Power dissipation . . . . . 2-1/4 watts
Nominal attraction time. . . . . 8 to 11 milliseconds at a nominal peak transient current of 0.220 ampere
Nominal release time . . 7 to 10 milliseconds

CAUTION: HIGH VOLTAGE IS PRESENT FOR 10 SECONDS AFTER POWER IS REMOVED.

→ 2.04 Speed . . . . . 60, 66, 75, and 100 words per minute

2.05 Tape Specifications

Level 5-level
Width . . . . . 11/16 inch
Code combinations per inch 10
Feed hole diameter . . . . . 0.0465 inch

2.06 Signal Characteristics

Long telegraph loops. . . . . 0.015 to 0.070 ampere at 48 to 240 volts dc inductive
Short telegraph loops . . . . . 0.058 to 0.072 ampere at 16 to 22 volts dc resistive

3. PRINCIPLES OF OPERATION

OUTLINE OF OPERATION

3.01 The tape reader senses coded intelligence perforated in tape and transmits this intelligence as a parallel output.

3.02 The tape reader package consists of three mechanisms: the reader mechanism, the power pack, and the distributor trip mechanism (Figure 2).

3.03 The reader mechanism senses and feeds the tape. Other submechanisms within the reader mechanism transmit the intelligence as a parallel output. The reader mechanism mounts on the left side of the typing unit.

3.04 The power pack provides current rectification for the reader mechanism. It mounts at the rear of the set underneath the typing unit base.

3.05 The distributor trip mechanism receives the reader mechanism output and converts it into serial start-stop signals.

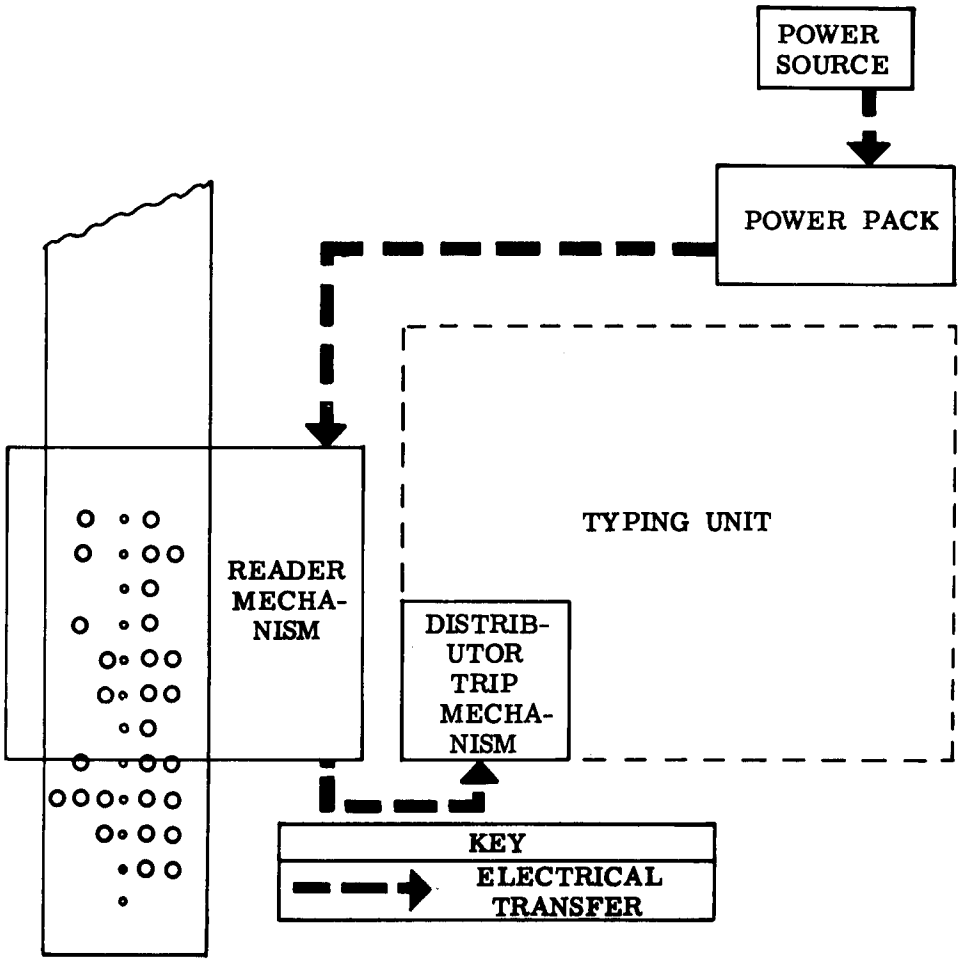


Figure 2 - 32 Tape Reader Package with Major Mechanisms

DETAILED OPERATION

A. Tape Lid Mechanism

3.06 When the tape lid latch handle is moved to the right, the spring biased tape lid swings open. Two locating pins guide the tape as it travels above the top plate (Figure 3).

B. Control Mechanism

3.07 There are three positions for the control lever: START, STOP, and FREE. When the control lever is moved to the START position (Figure 4), the spring biased control contact wires are positioned on the control contact. Since the control contact wires and the control contacts are wired in series with the distributor clutch trip coil in the typing unit, the coil energizes and releases the tape reader trip lever (Figure 5).

C. Distributor Trip Mechanism

3.08 When released, the reader trip lever performs two functions: It closes the tape reader feed magnet contact assembly and trips the distributor clutch. The reader feed magnet contact assembly is closed by an insulator on the back of the tape reader trip lever. In its travel, the tape reader trip lever rotates the distributor clutch stop bail by means of a projection. This motion is carried to the distributor clutch trip lever which moves away from the shoe lever. The distributor clutch engages and the distributor cycle begins (Figure 5).

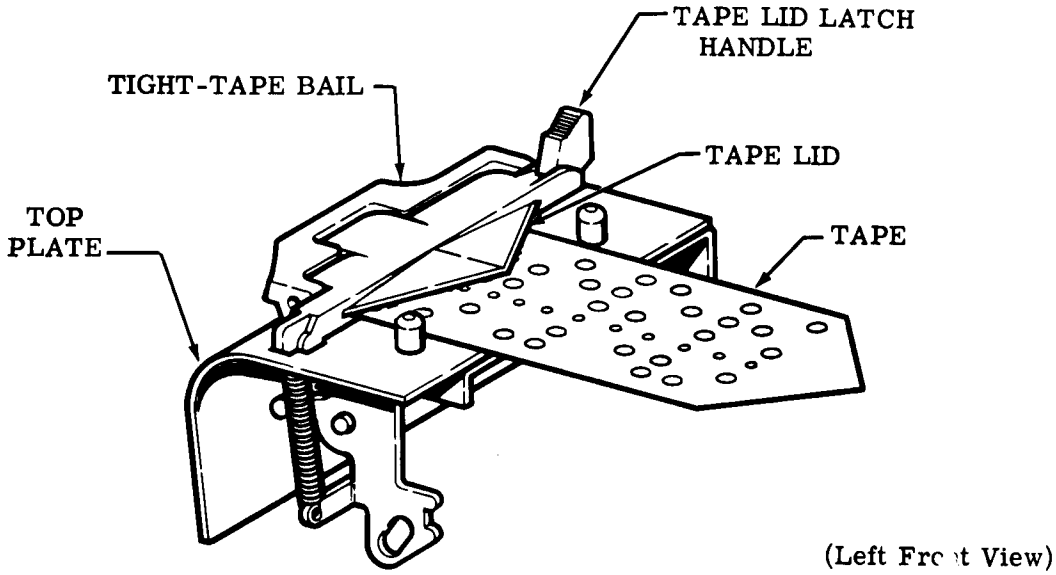


Figure 3 - Tape Lid Mechanism

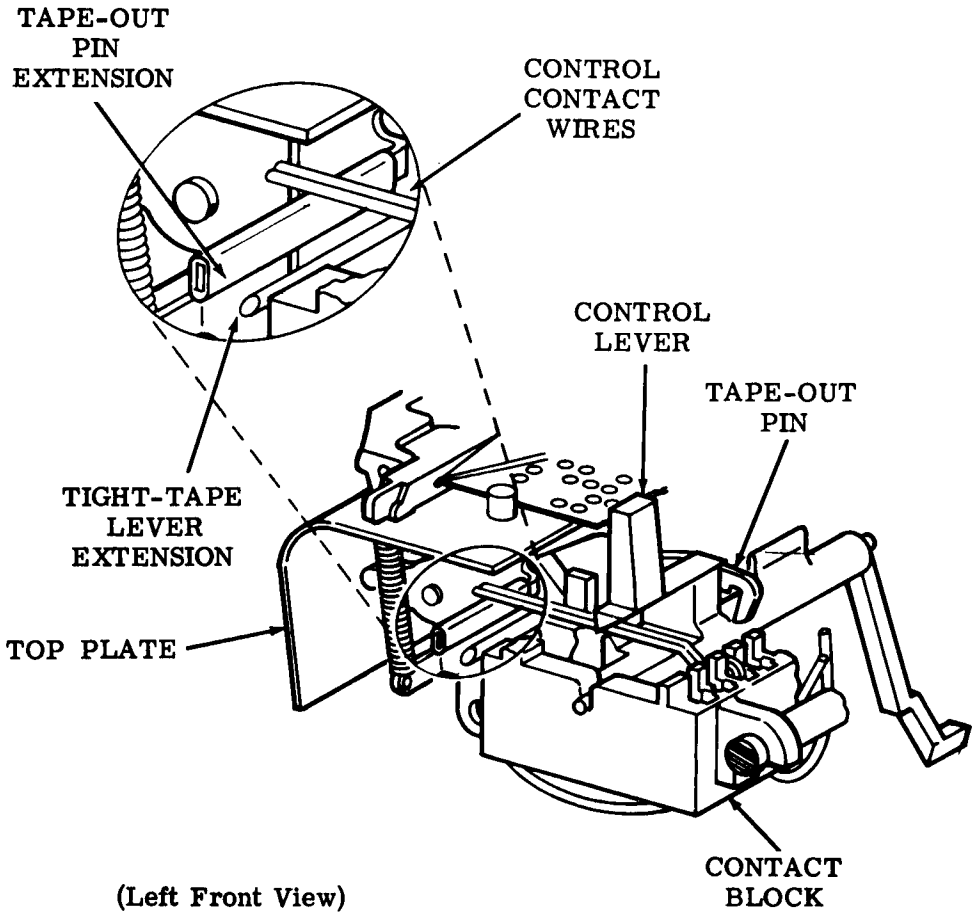


Figure 4 - Control Mechanism

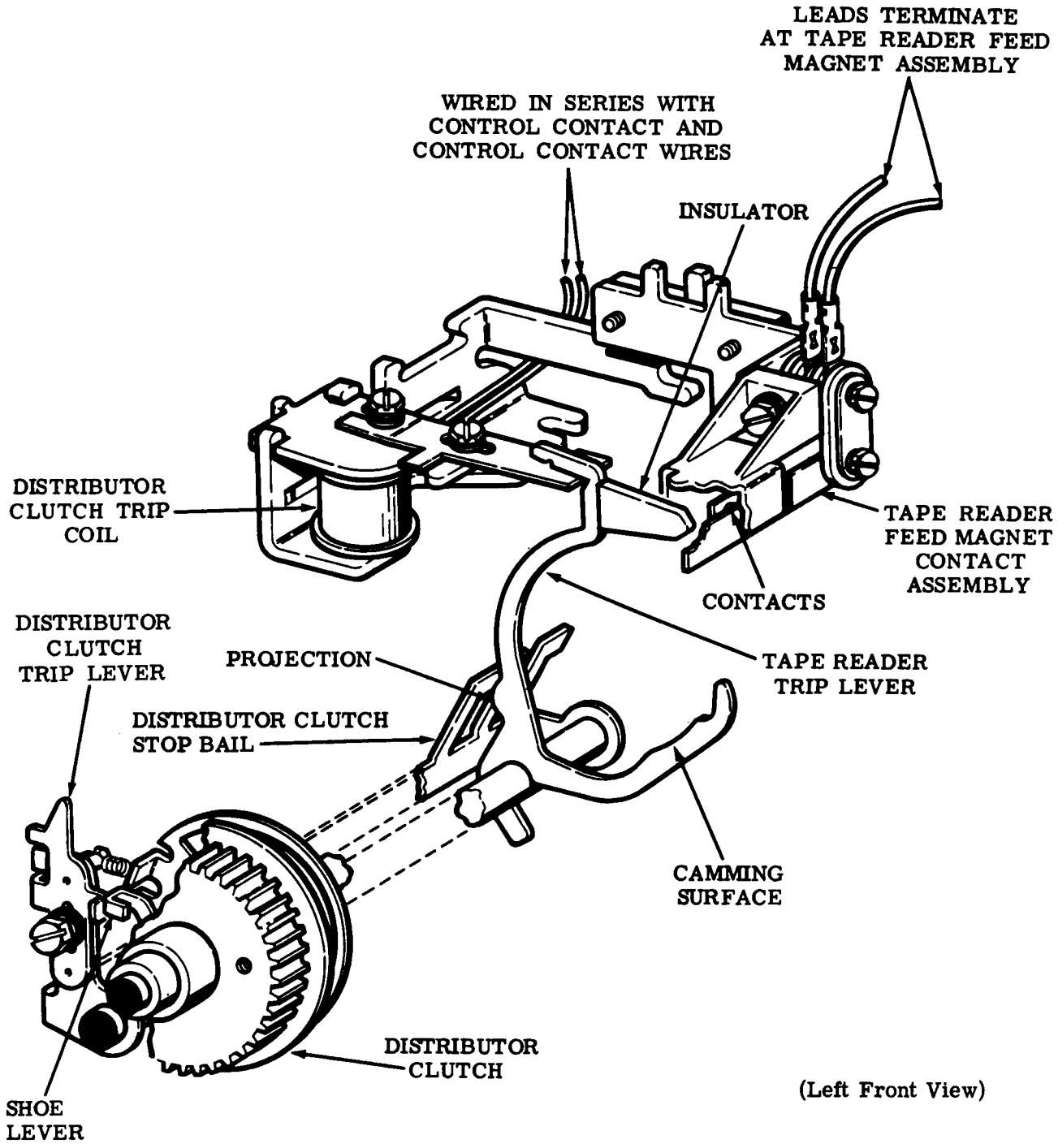


Figure 5 - Distributor Clutch Trip Mechanism

D. Feed Magnet Mechanism

3.09 With the feed magnet contacts closed (Figure 5) the feed magnet in the reader mechanism is activated. The energized feed magnet coil attracts the armature (Figure 6). Rotating about its pivot the armature raises the armature extensions. Fastened to the ends of the armature extensions is a sensing pin guide.

E. Sensing Pin Guide Mechanism

3.10 In its upward travel the sensing pin guide carries with it five spring-biased pins which sense the tape. Where a hole exists in the tape (marking) the sensing pin continues its

upward travel and its associated spring remains unstretched; where no hole exists in the tape (spacing) the sensing pin travel is blocked and its associated spring becomes stretched (Figure 6).

F. Contact Block Mechanism

3.11 There is an insulator attached to each sensing pin. The insulators hold five contact springs in a down position, away from the contact bar (Figure 7). The five contact springs are connected in parallel to corresponding segments on the distributor disc in the typing unit. If a sensing pin finds a hole in the tape (marking) it continues its upward travel. The insulator attached to it also rises, allowing the contact spring to make contact with the contact bar (Figure 7). If a sensing pin does not find a hole in the tape (spacing) it remains in the down position, keeping the insulator down. This prevents the contact spring from making contact with the contact bar. Since all five pins rise up simultaneously the output going from the contact block to the distributor disc will be a parallel output.

G. Tape Feed Mechanism

3.12 The tape feeding cycle begins when the feed magnet attracts the armature as described in 3.09. The right armature extension has a feed pawl attached to it which engages a tooth on the feed ratchet when the armature extensions move upward. But before the feed pawl can be pulled down to advance the feed wheel one character a series of steps take place as follows.

3.13 If the control lever is kept in the START position, the distributor clutch trip coil will remain energized (Figure 9).

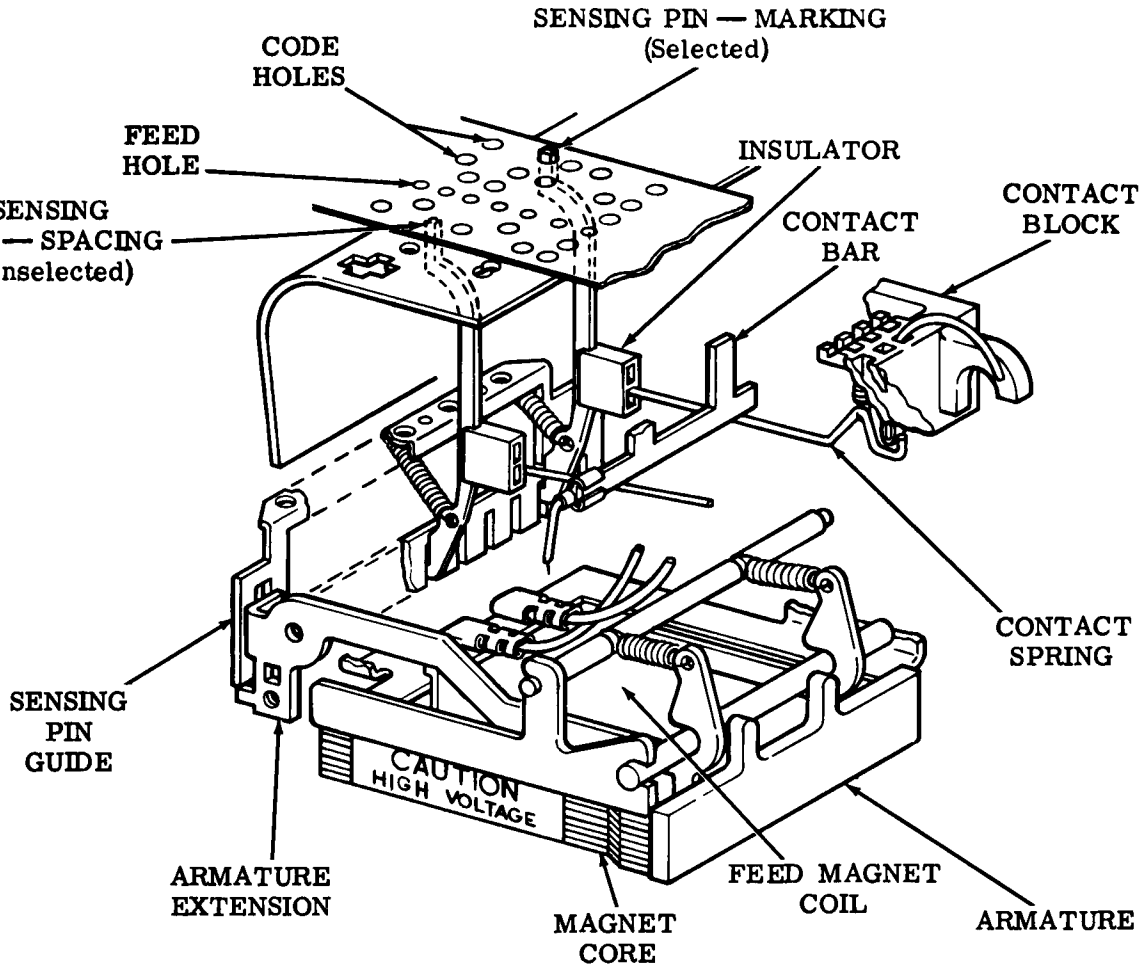


Figure 6 - Feed Magnet and Sensing Pin Guide

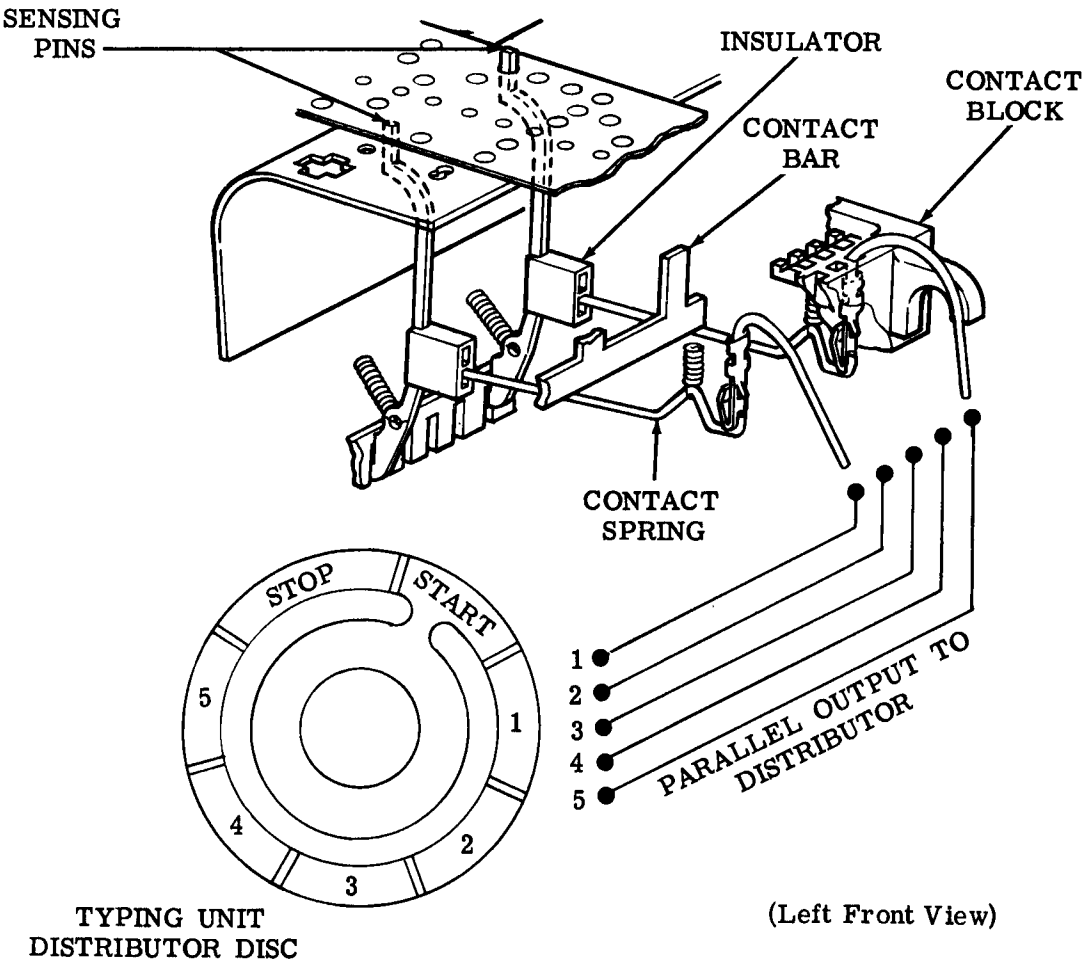


Figure 7 - Contact Block Mechanism

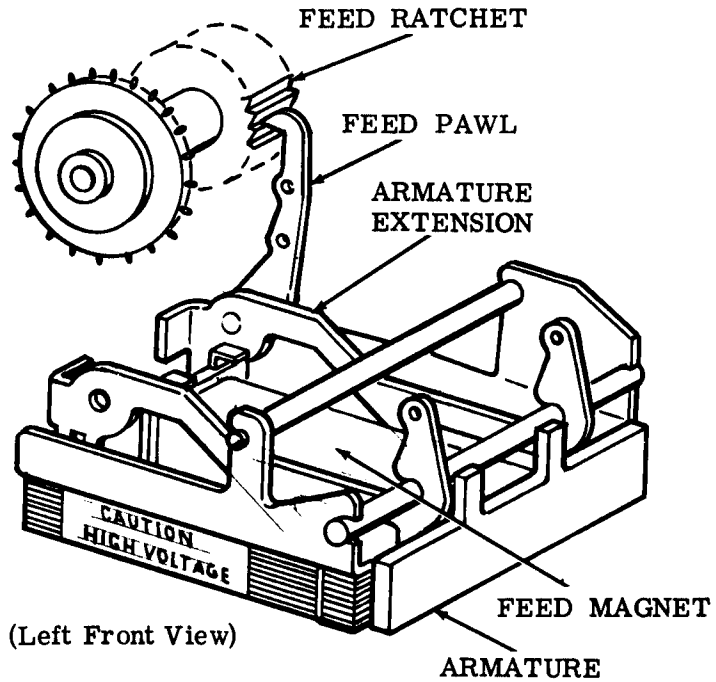


Figure 8 - Feed Pawl Engagement

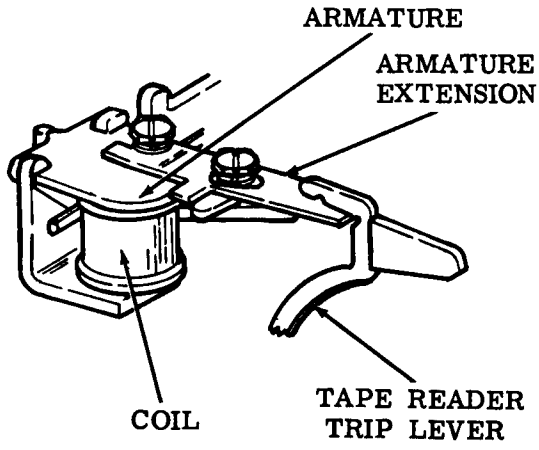


Figure 9 - Distributor Clutch Trip Coil (Energized)

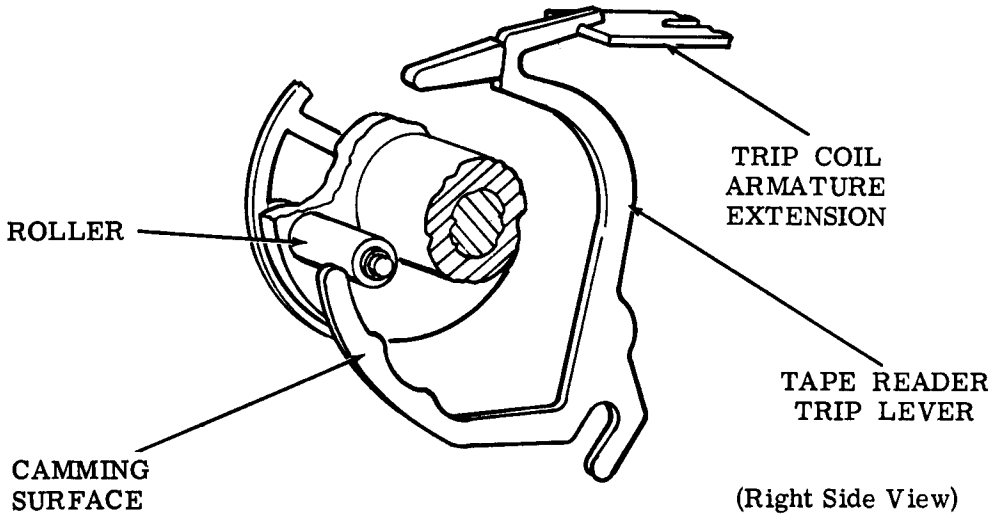


Figure 10 - Tape Reader Trip Lever

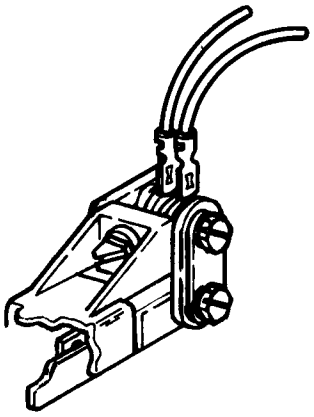


Figure 11 - Feed Magnet Contacts

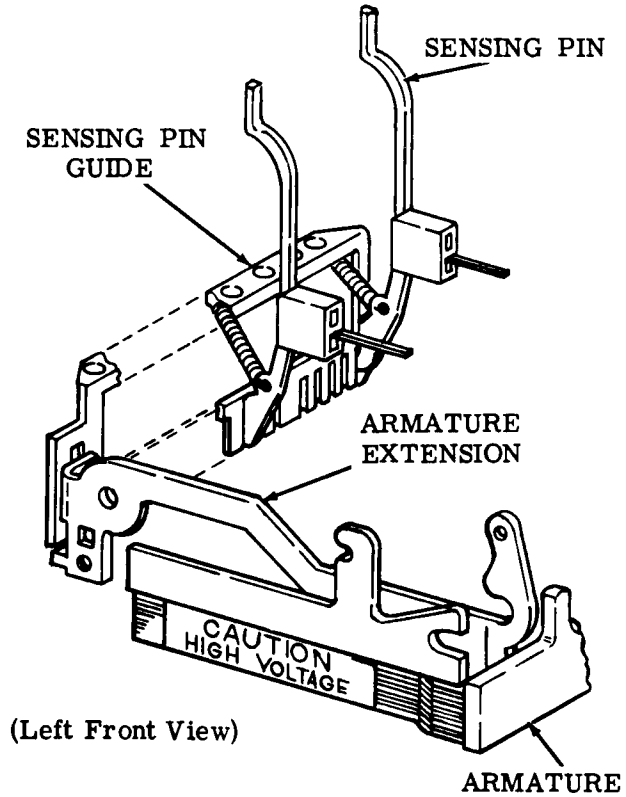


Figure 12 - Sensing Pin Guide

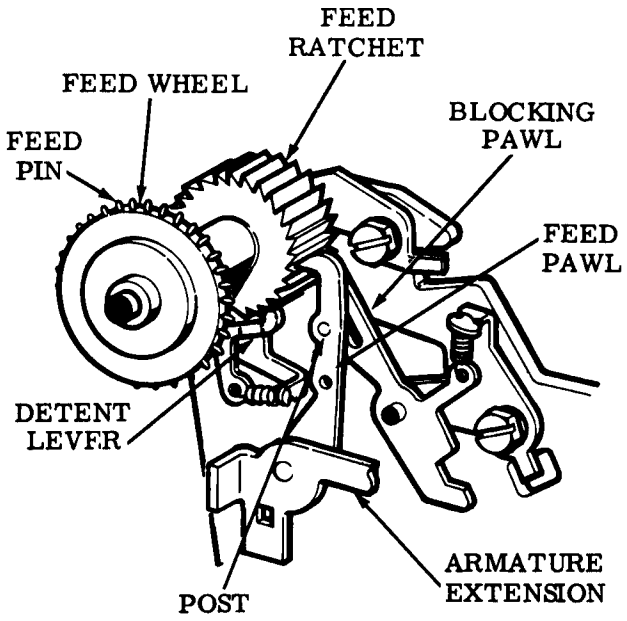
3.14 Near the beginning of the stop pulse the camming surface on the reader trip lever rides the camming roller on the distributor shaft and overtravels the trip coil armature (Figure 10).

3.15 The feed magnet contacts open momentarily, causing the feed magnet in the reader mechanism to be de-energized.

3.16 With the feed magnet de-energized the armature extensions drop, withdrawing the sensing pin guide and the sensing pins (Figure 12).

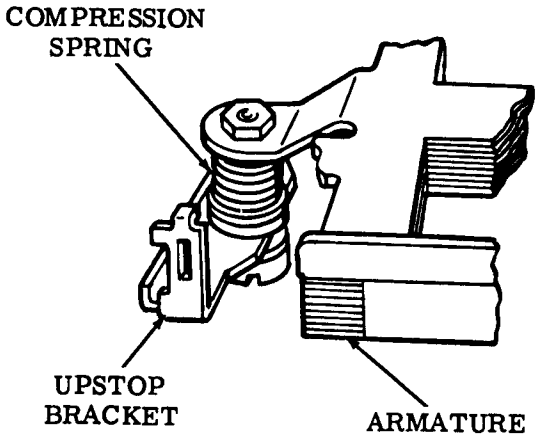
3.17 The tape reader trip lever is reset in sufficient time so that the distributor clutch does not disengage. The tape reader trip lever, once reset, closes the feed magnet contacts by means of the insulator. The projection moves the distributor clutch stop bail which in turn keeps the distributor clutch trip lever away from the shoe lever, allowing the clutch to continue its rotation.

3.18 Tape feeding will occur at the same time that the sensing pins are withdrawn. As the armature extensions drop down the pawl advances the feed ratchet one tooth (Figure 13). Associated with the feed ratchet are a detent lever and blocking pawl.



(Left Front View)

Figure 13 - Tape Feed Mechanism



(Left Front View)

Figure 14 - Upstop Mechanism

3.19 The detent lever, with its circular surface engaging the feed ratchet teeth, holds the feed ratchet and the feed wheel in its correct position during sensing (Figure 13).

3.20 The blocking pawl, which rides a post on the feed pawl, is lowered into engagement with a feed ratchet tooth during the feed stroke. This is to prevent excessive overthrow of the feed wheel during feeding, without use of a heavy detent spring. It also prevents the pulling ahead of the tape, during the sensing, by a tape winder without the use of a heavy detent spring. During the upstroke of the armature extensions, the blocking pawl is rotated out of engagement with the tooth by the post on the feed pawl (Figure 13).

H. Upstop Mechanism

3.21 The armature is provided with a spring loaded upstop which serves two purposes:

(a) A portion of the energy during the end of the stroke is stored in a spring and returned to the armature on the downstroke to give a rapid release and acceleration.

(b) A portion of the energy is dissipated through a resilient buffer to minimize noise and metallic clatter (Figure 14).

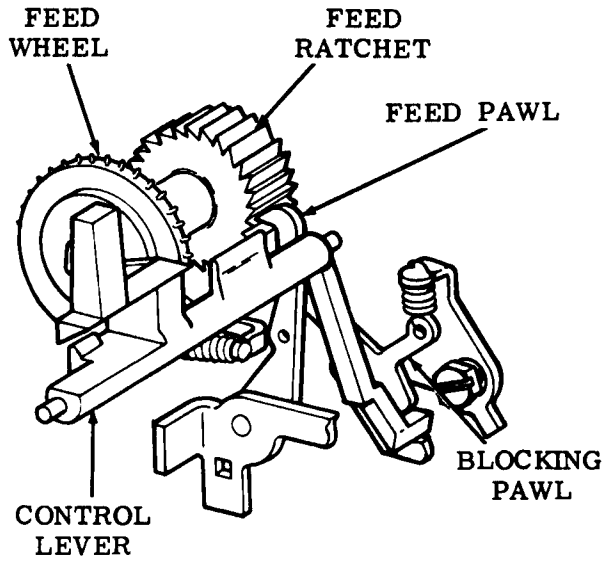


Figure 15 - Freewheeling Mechanism

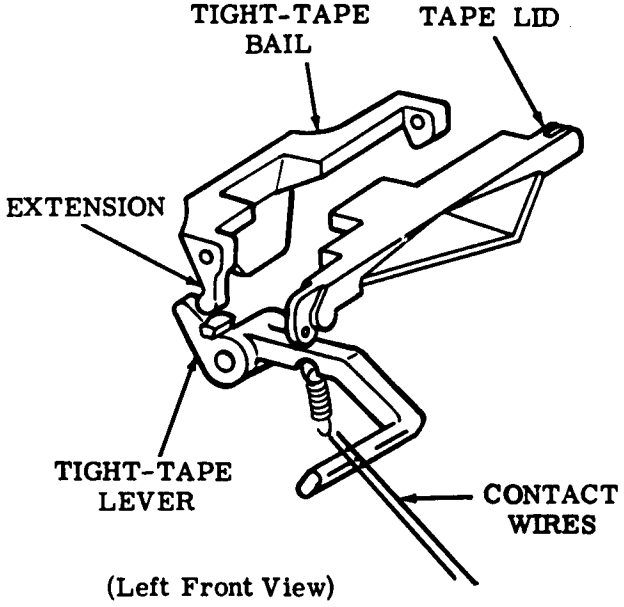


Figure 16 - Tight-Tape Mechanism

4. FEATURES

A. Freewheeling

4.01 The 32 tape reader is provided with a freewheeling feature which allows the feed wheel to rotate freely. When the control lever is moved to the FREE position, the extension on the control lever engages the blocking pawl and pivots it clockwise. Riding in a slot on the underside of the blocking pawl is a stud which connects to the feed pawl. As the blocking pawl is pivoted clockwise by the control lever extension, the blocking pawl moves the feed pawl away from the feed ratchet. With the feed ratchet free, the feed wheel will also rotate freely (Figure 15).

B. Tight-Tape Mechanism

4.02 This feature consists of a plastic tight-tape bail which snaps onto the tape lid. The tight-tape bail serves to place the tape reader in the OFF condition when the moving tapes becomes taut. The tight-tape bail has an extension on it which projects through the top plate. This extension rides on a spring biased tight-tape lever. If the tape in the reader becomes taut, the bail will be raised. The bail extension will rotate, causing the tight-tape lever to rotate also. In its pivoting motion the tight-tape lever will lift the control contact wires away from the control contact, breaking

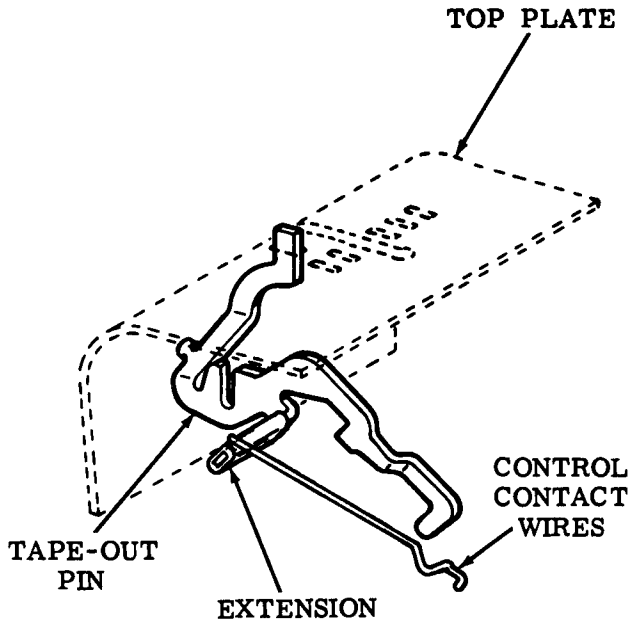


Figure 17 - Tape-Out Mechanism

the current path. With the control contact circuit broken, the tape reader will stop (Figure 16).

C. Tape-Out Mechanism

4.03 The tape reader is equipped with a tape-out feature which will stop the tape reader when the tape runs out. A tape-out pin protrudes above the surface of the top plate. During tape sensing the tape-out pin is kept depressed by the moving tape. When the tape runs out the spring biased tape-out pin moves fully up. An insulated extension on the tape-out pin lifts up the control contact wires away from the control contact. This breaks the current path and the tape reader stops (Figure 17).