# 28E and 28H TRANSMITTER-DISTRIBUTOR UNIT

## REQUIREMENTS AND ADJUSTMENTS

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1. GENERAL

1.01 This section contains the requirements and adjusting procedures for the maintenance of the 28E and 28H transmitter-distributor units.

1.02 This section is reissued to add adjustment information for modification kits which have been approved for use with these transmitter-distributor units and to bring all adjustment information up to date.

1.03 In this section, left or right, front or rear, and top or bottom apply to the apparatus in its normal operating position as viewed from the front.

1.04 When the requirement calls for the clutch to be disengaged, the clutch-shoe lever must be fully latched between its tripler lever and latch lever so that the clutch shoes release their tension on the clutch drum. When engaged, the clutch-shoe lever is unlatched and the clutch shoes are wedged firmly against the clutch drum.

Note: When the main shaft is rotated by hand, the clutch does not fully disengage upon reaching its stop position. In order to relieve the drag on the clutch and permit the main shaft to rotate freely, apply pressure on a lug of the clutch disc with a screwdriver to cause it to engage its latch lever and thus disengage the internal expansion clutch shoes from the clutch drum.
1.05 The covers may be removed for inspection and minor repair of the unit; however, when more extensive maintenance is to be undertaken, it is recommended that the unit be disconnected from its source of power as a safety precaution.

1.06 Requirements and adjustments for the timing mechanism required for the transmitter-distributor unit to operate in conjunction with horizontal or vertical tabulation of the typing unit are given in the section covering 28 typing unit requirements and adjustments.

2. REQUIREMENTS AND ADJUSTMENTS

2.01 The figures in this section show the adjusting tolerances, positions of moving parts, and spring tensions. The illustrations are arranged so that the adjustments are in the sequence that would be followed if a complete readjustment of the apparatus were being made. Where an illustration shows interrelated parts, the sequence that should be followed in checking the requirements and making the adjustments shown is indicated by the letters (A), (B), (C), etc.

A. Transmitter-Distributor Unit

2.02 Cover Assemblies

INSTRUCTIONS FOR

(A) REMOVING FRONT PANEL—-PULL OUTWARD ON LOWER RIGHT AND LEFT REAR CORNER OF FRONT PANEL AND SLIDE PANEL TOWARD THE FRONT. REPLACE IN REVERSE ORDER.

(B) REMOVING COVER PLATE—-LIFT LEFT END OF COVER PLATE TO DISENGAGE DETENTS, THEN SLIDE PLATE TOWARD THE LEFT TO DISENGAGE SPRING PLATE. REPLACE IN REVERSE ORDER.

(C) REMOVING TOP PLATE—-WITH FRONT AND REAR MOUNTING SCREWS LOOSENED (DO NOT DISTURB MOUNTING NUTS) AND TAPE LID RAISED, LIFT PLATE UPWARD. REFER TO TAPE-GUIDE PLATE MOUNTING REQUIREMENT WHEN REPLACING PLATE.

(D) REMOVING TAPE GUIDE PLATE—-WITH FRONT AND REAR MOUNTING SCREWS LOOSENED (DO NOT DISTURB MOUNTING NUTS) AND TAPE LID RAISED, LIFT PLATE UPWARD. REFER TO TAPE-GUIDE PLATE MOUNTING REQUIREMENT WHEN REPLACING THE PLATE.
2.03 Clutch Mechanism

NOTE 1---REQUIREMENTS (A) & (B) ARE ADJUSTED AT THE FACTORY AND SHOULD NOT BE DISTURBED UNLESS ASSOCIATED MECHANISMS HAVE BEEN REMOVED FOR SERVICING OR THERE IS REASON TO BELIEVE THAT THE REQUIREMENTS ARE NOT MET.

NOTE 2---WITH TRANSMITTER-DISTRIBUTOR UNIT REMOVED FROM BASE, INVERT UNIT AND ROTATE MAIN SHAFT UNTIL CLUTCH SHOE LEVER AND STOP LUG ARE UP.

(A) CLUTCH SHOE LEVER SPRING REQUIREMENT---WITH CLUTCH ENGAGED, HOLD CAM DISK TO PREVENT TURNING. MIN. 15 OZS. --- MAX. 20 OZS. TO MOVE SHOE LEVER IN CONTACT WITH STOP LUG.

(B) CLUTCH SHOE SPRING REQUIREMENT---WITH CLUTCH DRUM REMOVED, HOOK SPRING SCALE AS SHOWN. MIN. 3 OZS. --- MAX. 5 OZS. TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE AT POINT OF CONTACT.
2.04 Clutch Trip Mechanism

(C) CLUTCH LATCH LEVER SPRING
REQUIREMENT
CLUTCH ENGAGED AND ROTATED UNTIL LATCH LEVER IS ON LOW PART OF DISC.
MIN. 3 OZS. --- MAX. 5 1/2 OZS.
TO START LATCH MOVING.

(B) CLUTCH SHOE LEVER
REQUIREMENT----CLEARANCE AS SHOWN SHOULD BE 0.055 INCH --- 0.085 INCH GREATER WITH
CLUTCH ENGAGED* THAN WITH CLUTCH DISENGAGED*
(PULL SHOE LEVER WITH FORCE OF 32 OZS., AND RELEASE
SLOWLY TO ENGAGE CLUTCH SHOES.)
TO ADJUST----WITH CLUTCH DISK CLAMPING SCREWS
LOOSENED, PLACE WRENCH OVER STOP LUG AND MOVE
DISK.
CAUTION----MAKE SURE THAT DRUM DOES NOT DRAG ON SHOES WHEN CLUTCH IS
DISENGAGED AND DRUM IS ROTATED IN ITS NORMAL DIRECTION. REFINE ABOVE
ADJUSTMENT TO CORRECT SHOE DRAG.

MAIN BAIL
(FRONT VIEW)

(CLAMP NUT

(A) CLUTCH TRIP LEVER
REQUIREMENTS---(REMOVE COVER PLATE)
WITH CLUTCH DISK STOP LUG OPPOSITE
CLUTCH TRIP LEVER, CLEARANCE BETWEEN
INNER SURFACE OF LUG AND LEVER
(1) PLAY TAKEN UP TO MAKE CLEARANCE MAX.
MIN. 0.012 INCH --- MAX. 0.025 INCH.
TO ADJUST---LOOSEN CLAMP NUT ON CLUTCH
TRIP BAIL ECCENTRIC (FRICITION TIGHT) AND
ROTATE ECCENTRIC POST TO ITS LOWEST POINT.
POSITION ECCENTRIC POST TO MEET REQUIREMENT.
(2) PLAY TAKEN UP TO MAKE CLEARANCE MIN.
SOME CLEARANCE.
TO ADJUST---REFINE REQUIREMENT(1).

(D) CLUTCH TRIP LEVER SPRING
REQUIREMENT --- WITH CLUTCH ENGAGED
MIN. 7 OZS. --- MAX. 10 1/2 OZS.
TO START CLUTCH TRIP LEVER MOVING.
2.05 Tape Guide Plate

(A) TAPE LID (FOR TAPE LID ASSEMBLY WITHOUT TAPE - LID SPRING) REQUIREMENTS---(REMOVE TOP & TAPE GUIDE PLATES, LUBRICATE PRIOR TO ADJUSTMENT.)

1. PRELIMINARY:
   WITH TAPE LID HELD AGAINST NOTCH IN TAPE GUIDE PLATE
   A FEED WHEEL GROOVE IN TAPE LID SHOULD ALIGN WITH SLOT IN PLATE,
   B HOLE IN TAPE LID FOR TAPE-OUT PIN SHOULD ALIGN WITH HOLE IN PLATE. (GAUGE BY EYE)
   C CLEARANCE BETWEEN PIVOT SHOULDER AND TAPE LID SOME TO 0.010 INCH MAX.
   TO ADJUST---WITH TAPE LID BRACKET MOUNTING NUTS (2) FRICTION TIGHT (INSERT TIP OF TP156743 GAUGE THROUGH SLOT AND INTO GROOVE OF LID), POSITION TAPE LID BRACKET --- RETIGHTEN NUTS.

2. TAPE LID FRONT BEARING SURFACE (A) SHOULD TOUCH TAPE GUIDE PLATE. CLEARANCE (B) MEASURED AT FIN OF TAPE LID WHICH IS IN LINE WITH REAR TAPE GUIDE (SEE NOTE 2) MIN. 0.010 INCH --- MAX. 0.018 INCH.

   NOTE 1 --- WHEN BOTH PLATES ARE ASSEMBLED ON UNIT, LEFT EDGE OF LID MAY TOUCH TOP PLATE AND SOME CHANGE IN THIS CLEARANCE MAY BE EXPECTED.

3. TO ADJUST --- WITH TAPE LID BEARING BRACKET MOUNTING SCREWS FRICTION TIGHT AND TAPE LID Pressed AGAINST TAPE GUIDE PLATE, POSITION BEARING BRACKET. RECHECK REQUIREMENT (1).

4. RELEASE PLUNGER SHOULD HAVE SOME END PLAY WHEN LID IS LATCHED AGAINST TAPE GUIDE PLATE.

(B) TAPE GUIDE REQUIREMENTS---WITH TAPE GAUGE POSITIONED AS SHOWN

1. CLEARANCE BETWEEN RIGHT AND LEFT TAPE GUIDE AND GAUGE SOME TO 0.003 INCH.

2. EDGE OF WEAR PLATE SHOULD BE FLUSH WITH EDGE OF TAPE GUIDE PLATE. TO ADJUST---WITH EACH TAPE GUIDE MOUNTING NUT FRIC-TION TIGHT, MOVE WEAR PLATE UPWARD UNTIL IT OVERHANGS EDGE OF TAPE GUIDE PLATE. PLACE GAUGE IN POSITION AND MOVE GAUGE AND WEAR PLATE DOWN-WARD UNTIL BOTH STUDS ENGAGE EDGE OF TAPE GUIDE PLATE TO ALIGN COMMON EDGES. HOLD GAUGE AND WEAR PLATE AND POSITION EACH GUIDE. (GAUGE MAY TOUCH BUT NOT BIND.) THE TAPE SHOULD NOT RIDE ON THE SIDE OF EITHER TAPE GUIDE.
(A) **Tape Lid** (for tape lid assembly with tape-lid spring)

For requirements (1) and (2), see previous paragraph.

(3) Requirement—Release plunger should have some endplay when lid is latched against tape guide plate. Eccentric high part should be toward bracket.

To adjust——With eccentric mounting-post locknut friction tight and tape lid raised, rotate high part of eccentric toward tape-lid bearing bracket. Close tape lid and rotate eccentric in counter-clockwise direction as viewed from slotted end of eccentric until the flat of the tape-lid post is fully engaged by the flat of the latch bail. Rotate eccentric in clockwise direction to take up play in parts so as to firmly seat tape lid against tape guide plate. Tighten nut. Recheck by depressing plunger — with lid held down, tip of latch should clear post as plunger is operated. With the tape lid latched, rounded tip of latch should project just beyond flat of tape-lid post and release plunger should have some endplay. If necessary, refine the adjustment to meet these requirements.
2.07 Tape-lid Assembly (Without Tape-lid Spring)

(A) START-STOP DETENT BAIL SPRING
REQUIREMENT — WITH START-STOP LEVER IN RUN POSITION, PLACE SPRING SCALE AGAINST DETENT STUD.
MIN. 14 OZS. ——— MAX. 22 OZS.
TO START DETENT BAIL MOVING AWAY FROM START-STOP LEVER.

START-STOP DETENT BAIL
DETENT BAIL SPRING
TAPE LID BEARING BRACKET MOUNTING SCREWS
TAPE LID BRACKET MOUNTING NUTS

(6) TAPE-LID RELEASE-PLUNGER SPRING
REQUIREMENT — WITH TAPE GUIDE PLATE HELD HORIZONTALLY AND TAPE LID UNLATCHED
MIN. 3 OZS. ——— MAX. 6 OZS.
TO START TAPE LID BAIL MOVING.

TAPE LID RELEASE PLUNGER
TAPE LID BEARING BRACKET MOUNTING SCREWS
RELEASE PLUNGER SPRING
TAPE LID BRACKET MOUNTING NUTS
2.08 Tape-lid Assembly (With Tape-lid Spring)

(A) FOR REQUIREMENT (A) START-STOP DETENT-BAIL SPRING, SEE PREVIOUS PARAGRAPH.

(B) TAPE-LID RELEASE-PLUNGER SPRING

REQUIREMENT---WITH TAPE GUIDE PLATE POSITIONED IN A HORIZONTAL PLANE AND TAPE LID IN ITS OPEN POSITION
MIN. 28 OZS.---------------------------------MAX. 48 OZS.
TO START TAPE-LID BAIL MOVING.

(C) TAPE-LID SPRING

REQUIREMENT---TAPE GUIDE PLATE POSITIONED IN A HORIZONTAL PLANE AND TAPE LID IN ITS OPEN POSITION. WITH RELEASE PLUNGER HELD FULLY DEPRESSED, APPLY SPRING SCALE AT TOP OF TAPE LID TO THE IMMEDIATE LEFT OF THE TAPE-OUT PIN HOLE AND PUSH VERTICALLY DOWNWARD.
MIN. 3 OZS.---------------------------------MAX. 4-1/2 OZS.
TO MOVE OPEN END OF TAPE LID AGAINST TAPE GUIDE PLATE.
2.09 Tape Guide Plate Mounting

INSTRUCTIONS FOR

REPLACING AND POSITIONING TAPE GUIDE PLATE

REQUIREMENTS——

1. SHOULDER OF FEED WHEEL POST SHOULD NOT INTERFERE WITH TOP PLATE OR TAPE GUIDE PLATE MOUNTING BRACKETS.
   TO ADJUST——SEE NOTE 1. WITH (FEED WHEEL) BEARING POST CLAMP NUT FRICION TIGHT, POSITION THE POST.

2. TAPE GUIDE PLATE SHOULD REST FIRMLY AGAINST AT LEAST THREE PROJECTIONS OF FRONT AND REAR PLATE.
   TO ADJUST——SEE NOTE 1. WITH CLAMP NUT THAT SECURES TAPE GUIDE PLATE MOUNTING BRACKET (FRONT & REAR) FRICION TIGHT, TRIP CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN THEIR UPPERMOST POSITION. WITH TAPE LID RAISED AND START-STOP LEVER IN RUN POSITION, PRESS GUIDE PLATE INTO POSITION WHILE GUIDING MOUNTING SCREWS INTO NOTCH OF FRONT AND REAR PLATE. ENGAGE TIP OF TAPE OUT PIN WITH HOLE IN TAPE GUIDE PLATE.

3. OUTER EDGE OF FRONT AND REAR MOUNTING BRACKET SHOULD BE LOCATED FLUSH WITH SHOULDER OF MOUNTING STUD SO THAT EDGE OF TAPE GUIDE PLATE PROJECTS OVER FRONT AND REAR PLATE BY AN EQUAL AMOUNT. (GAUGE BY EYE.) SEE COVER PLATE REQUIREMENT.
   TO ADJUST——MOVE TAPE PLATE TOWARD THE FRONT OR REAR. TIGHTEN NUTS ONLY AFTER TOP PLATE IS ADJUSTED.

NOTE 1——POSITION TAPE-OUT SENSING PIN STOP ARM (SEE TAPE-OUT SENSING PIN REQUIREMENT.) IN ITS LOWEST POSITION AND HOLD START-STOP BAIL EXTENSION FROM RATCHET WHEEL.
2.10 Top Plate and Cover Plate Mounting

INSTRUCTIONS FOR

REPLACING AND POSITIONING TOP PLATE—LOOSEN NUTS (FRICITION TIGHT) THAT SECURE MOUNTING BRACKETS TO PLATE. PRESS TOP PLATE INTO POSITION WHILE GUIDING TOP PLATE MOUNTING SCREWS INTO NOTCH OF FRONT AND REAR PLATE. POSITION EACH SENSING PIN IN ITS SLOT. MAKE SURE THAT TOP PLATE SEATS FIRMLY AGAINST PROJECTIONS OF FRONT AND REAR PLATE (3 PROJECTIONS SHOULD ENGAGE) AND TIGHT TAPE ARM EXTENSION IS UNDER TOP PLATE.

REQUIREMENTS—
1. MATING EDGE OF TOP PLATE SHOULD BE FLUSH TO 0.003 INCH UNDER FLUSH WITH EDGE OF TAPE GUIDE PLATE (WITHIN AREA OF TAPE LID) WHEN PLATE ENGAGES AT LEAST 3 PROJECTIONS TO ADJUST—POSITION TOP PLATE, TIGHTEN MOUNTING SCREWS AND THEN TIGHTEN NUTS THAT SECURE TAPE GUIDE PLATE MOUNTING BRACKETS.

2. FEEDWHEEL SLOT SHOULD ALIGN WITH SLOT IN TAPE GUIDE PLATE SO THAT FEED WHEEL ROTATES FREELY WITH DETENTS AND FEED PAWL DIENGAGED (FREEWHEELING).
TO ADJUST—POSITION TOP PLATE TOWARD FRONT OR REAR TO ALIGN SLOT.

3. THE CLEARANCE BETWEEN THE TAPE-LID EXTENSION WHICH COVERS THE FEED-WHEEL SLOT AND THE TOP PLATE SHALL BE 0.010-TO-0.020 INCH AT THE CURVED PORTION AND 0.010-TO-0.025 INCH AT THE FLAT PORTION (PLAY TAKEN UP TOWARD TAPE-GUIDE PLATE).
TO ADJUST—IF NECESSARY, LOOSEN TAPE-LID BEARING BRACKET MOUNTING SCREWS AND POSITION TAPE LID. RETIGHTEN SCREWS AND RECHECK REQUIREMENTS.

INSTRUCTIONS FOR

REPLACING AND POSITIONING COVER PLATE

REQUIREMENT—
1. RIGHT EDGE OF COVER PLATE SHOULD BE HELD FLUSH AGAINST LEFT EDGE OF TOP PLATE BY THE COVER PLATE DETENTS.
2. COVER PLATE SHOULD REST AGAINST AT LEAST THREE OF THE FOUR PROJECTIONS (FRONT & REAR PLATE).
3. FRONT EDGE OF COVER PLATE AND TOP PLATE SHOULD ALIGN.
TO ADJUST—WITH DETENTING NUT CLAMP SCREW (FRONT & REAR PLATE) FRICITION TIGHT, MOVE CLAMP SCREWS TO THEIR EXTREME LOWER RIGHT POSITION THEN TIGHTEN SCREWS. LOOSEN DETENT BRACKET AND SPRING PLATE MOUNTING NUTS. PLACE COVER ON UNIT AND POSITION HORIZONTALLY TO MEET THE REQUIREMENTS. RETIGHTEN MOUNTING NUTS.
2.11 Tape-out Contact Assembly

(A) TAPE-OUT CONTACT ASSEMBLY
REQUIREMENT --- (COVER PLATE AND TOP PLATE REMOVED; START-STOP SWITCH IN STOP POSITION; REMOVAL OF TAPE GUIDE PLATE OPTIONAL.) WITH TAPE-OUT SPRING BRACKET FRICTION TIGHT, MOVE BRACKET DOWNWARD UNTIL TAPE-OUT PIN EXTENSION CLEARS INSULATED PORTION OF CONTACT SWINGER.
1. WITH GRAM SCALE APPLIED AS SHOWN
   MIN. 8 GRAMS MAX. 15 GRAMS
   TO SEPARATE NORMALY CLOSED CONTACTS.
   TO ADJUST ------- REMOVEL BAIL SPRING AND CONTACT ASSEMBLY. FORM THE CONTACT SWINGER WITH TPI0445 SPRING BENDER.

2. CLEARANCE BETWEEN NORMALLY OPEN CONTACTS
   MIN. 0.008 INCH MAX. 0.015 INCH.
   TO ADJUST ------- FORM UPPER CONTACT SPRING USING THE TPI0445 SPRING BENDER.
   NOTE ------- REPLACE CONTACT ASSEMBLY WITH SWINGER OVER TAPE-OUT PIN EXTENSION, PLACE SPRING BRACKET SHOULDER BUSHING ON UPPER HOLE AND THE WASHER ON LOWER MOUNTING HOLE.

(B) TAPE-OUT CONTACT BRACKET
REQUIREMENT ------- WITH TAPE-OUT PIN DEPRESSION BY TAPE UNDER TAPE LID, CLEARANCE BETWEEN TAPE-OUT PIN EXTENSION AND INSULATOR ON SWINGER CONTACT
   MIN. 0.006 INCH MAX. 0.020 INCH.
   TO ADJUST ------- POSITION TAPE-OUT CONTACT BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

(C) TAPE-OUT SENSING PIN SPRING
REQUIREMENT ------- WITH START-STOP LEVER IN RUN POSITION
   MIN. 38 GRAMS MAX. 45 GRAMS
   TO MOVE PIN TO A POSITION Flush WITH TAPE GUIDE PLATE.
   TO ADJUST ------- WITH CONTACT BRACKET LOWER MOUNTING SCREW LOOSENED POSITION THE SPRING BRACKET.
2.12 Tape-out Sensing Pin

(A) TAPE-OUT SENSING PIN
REQUIREMENTS
1. WITH START-STOP LEVER IN FREE WHEELING OR STOP POSITION, TIP OF TAPE-OUT PIN SHOULD BE FLUSH TO 0.010 INCH BELOW TOP SURFACE OF TAPE GUIDE PLATE.
   TO ADJUST—PLACE START-STOP LEVER IN STOP POSITION. WITH STOP ARM CLAMP SCREW
   FRICTION TIGHT, POSITION THE STOP ARM.
2. WITH START-STOP LEVER IN RUN POSITION, CLEARANCE AS SHOWN SHOULD BE AT LEAST 0.055 INCH.
   TO ADJUST—PLACE START-STOP LEVER IN RUN POSITION AND LOOSEN TAPE-OUT BAIL CLAMP SCREW,
   POSITION EXTENSION ARM WITH TOMMY WRENCH OR SIMILAR TOOL.
   NOTE—RECHECK REQUIREMENT 1.

(B) DEPRESSOR BAIL TORSION SPRING
REQUIREMENT
TAPE-OUT BAIL SPRING UNHOOKED
START-STOP LEVER IN STOP POSITION,
MIN. 3 OZS., MAX. 5-1/2 OZS.,
TO START INTERMEDIATE TAPE-OUT BAIL MOVING AWAY FROM TAPE-OUT PIN DEPRESSOR BAIL.

(C) INTERMEDIATE TAPE-OUT BAIL SPRING
REQUIREMENT — WITH START-STOP LEVER IN ITS RUN POSITION, HOOK SPRING SCALE IN LOOP.
MIN. 3 OZS. — MAX. 5 OZS.
TO PULL SPRING TO ITS INSTALLED LENGTH.
2.13 Start-Stop Switch Assembly

(A) START-STOP SWITCH BRACKET

REQUIREMENTS:
1. WITH START-STOP LEVER IN RUN POSITION AND CLUTCH IN ITS DISENGAGED POSITION, CLEARANCE BETWEEN START-STOP BOOT EXTENSION AND INSULATOR ON START-STOP SWITCH SWINGER
   MIN. 0.006 INCH MAX. 0.015 INCH
   TO ADJUST --- WITH SWITCH BRACKET MOUNTING SCREWS LOOSENED, POSITION THE BRACKET.
2. START-STOP BOOT EXTENSION SHOULD FULLY ENGAGE INSULATED PORTION OF SWITCH SWINGER.
   TO ADJUST --- LOOSEN CONTACT GIVE-UP MOUNTING SCREWS AND ALIGN CONTACT ASSEMBLY.

(B) TIGHT TAPE;

START-STOP CONTACT SPRING

REQUIREMENT: WITH START-STOP LEVER IN RUN POSITION
   MIN. 3 OZS.
   MAX. 4 OZS.
   TO SEPARATE CONTACTS.
   TO ADJUST --- FORM SWINGER WITH TP10445 SPRING BENDER.

NOTE: RECHECK REQUIREMENTS (A)&(C).

(C) TIGHT TAPE INTERMEDIATE ARM

REQUIREMENT: WITH START-STOP LEVER IN RUN POSITION, TIGHT TAPE, START-STOP CONTACTS SHOULD FUNCTION AS FOLLOWS:
1. REMAIN CLOSED WHEN TIGHT TAPE BAIL IS RAISED 0.045 INCH.
2. OPEN AS BAIL IS RAISED TO HEIGHT OF 0.075 INCH.
   TO ADJUST --- WITH TIGHT TAPE INTERMEDIATE ARM CLAMP SCREW LOOSENED, POSITION THE ARM AT ITS ADJUSTING SLOT.

(D) TIGHT TAPE INTERMEDIATE ARM SPRING

REQUIREMENT: WITH START-STOP LEVER IN RUN POSITION,
   MIN. 20 GRAMS (3/4 OZ.)
   MAX. 40 GRAMS (1-1/2 OZ.)
   TO START INTERMEDIATE ARM MOVING AWAY FROM ITS YIELD ARM.

CONTACT GIVE-UP MOUNTING SCREWS
2.14 Main Bail Assembly

(C) MAIN BAIL
REQUIREMENT——(TOP PLATE REPLACED)
WITH CODE SENSING PINS IN LOWER-MOST POSITION, CLEARANCE BETWEEN TIP OF HIGHEST SENSING PIN AND TOP SURFACE OF TAPE GUIDE PLATE
MIN. 0.010 INCH — MAX. 0.020 INCH.
TO ADJUST——WITH MAIN BAIL ECCENTRIC LOCK NUT FRICITION TIGHT, AND HIGH PART OF ECCENTRIC TOWARD THE RIGHT, POSITION THE ECCENTRIC.

(A) MAIN BAIL SPRING
REQUIREMENT ——(TOP PLATE REMOVED) CLUTCH DISENGAGED, UNIT ON ITS BACK. SPRING UNHOOKED FROM MAIN BAIL.
MIN. 6 OZS. — MAX. 10 OZS.
TO PULL SPRING TO INSTALLED LENGTH.

(B) FEED RATCHET DETENT SPRING
REQUIREMENT —— WITH MAINSHAFT IN STOP POSITION AND FEED PAWL HELD AWAY FROM ITS RATCHET
MIN. 8 OZS. — MAX. 13 OZS.
TO START ROLLER MOVING AWAY FROM RATCHET.
2.15 Code-sensing Fingers

SENSING FINGER SPRING
REQUIREMENT
UNIT IN UPRIGHT POSITION, SENSING FINGERS IN THEIR UPPERMOST POSITION.

<table>
<thead>
<tr>
<th>CHADLESS TAPE</th>
<th>FULLY PERFORATED TAPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIN. 3 OZS.</td>
<td>2 OZS.</td>
</tr>
<tr>
<td>MAX. 5 OZS.</td>
<td>3 OZS.</td>
</tr>
</tbody>
</table>

TO MOVE A SENSING FINGER TO A POSITION FLUSH WITH THE TAPE GUIDE PLATE.

FEED WHEEL DETENT
REQUIREMENT
WITH TAPE LID RAISED, SENSING FINGERS DOWN, HIGH PART OF ECCENTRIC TOWARD THE RIGHT, LETTERS PERFORATED TAPE BETWEEN TAPE GUIDES, AND PLAY IN TAPE TAKEN LIGHTLY TOWARD THE RIGHT, TIP OF EACH SENSING FINGER SHOULD BE CENTRALLY LOCATED IN THE CODE HOLES.

TO ADJUST
HOLD FEED PAWL AWAY AND ROTATE THE FEED WHEEL DETENT ECCENTRIC SCREW.
2.16 Feed Pawl Mechanism

(A) FEED PAWL
REQUIREMENT——TOP PLATE REMOVED — WITH HIGH PART OF ECCENTRIC TOWARDS THE RIGHT AND SENSING FINGERS IN THEIR LOWERMOST POSITION, CLEARANCE BETWEEN FEED PAWL AND RATCHET TOOTH JUST ENGAGED SOME TO 0.003 INCH.
TO ADJUST——WITH ECCENTRIC SCREW LOCK NUT LOOSENED, POSITION THE SCREW. RECHECK REQUIREMENT AT FOUR POSITIONS OF RATCHET APPROXIMATELY 90 DEGREES APART.

(B) FEED PAWL SPRING
REQUIREMENT——WITH UNIT TILTED TOWARDS THE LEFT AND MAINSHAFT IN ITS STOP POSITION MIN. 2 OZS. MAX. 3-1/2 OZS.
TO START PAWL MOVING.

(C) TRANSFER LEVER SPRING
REQUIREMENT——WITH UNIT RESTING ON ITS REAR PLATE AND MAINSHAFT IN ITS STOP POSITION MIN 1/2 OZ. MAX. 1-1/2 OZS.
TO START EACH LEVER MOVING.
2.17 Main Bail Trip Assembly

(A) MAIN BAIL TRIP LEVER
REQUIREMENT — TOP PLATE REPLACED — WITH CLUTCH DISENGAGED AND MAINSHAFT IN ITS STOP POSITION, TIP OF HIGHEST SENSING FINGER SHOULD BE FLUSH TO 0.005 INCH BELOW TOP SURFACE OF TAPE GUIDE PLATE.
TO ADJUST — WITH CLAMP NUTS (FRONT & REAR) THAT SECURE THE TRANSFER LEVER GUIDE POST LOOSENED, ROTATE POST SO THAT ITS ECCENTRIC (REAR END OF POST) POSITIONS THE TRIP LEVER TO MEET REQUIREMENT.

(B) LOCKING BAIL SPRING
REQUIREMENT — WITH UNIT TILTED TOWARD THE LEFT AND THE CLUTCH TRIPPED, ROTATE SHAFT UNTIL SENSING FINGERS START ON THEIR DOWNWARD TRAVEL.
MIN. 6-1/2 OZS. ——— MAX. 10-1/2 OZS. TO START THE BAIL MOVING.
2.18 Transfer Bail Stabilizer

(A) TRANSFER BAIL STABILIZER

REQUIREMENT —— (1) WITH A LTS RS COMBINATION SELECTED, ROTATE MAINSHAFT UNTIL #3 TRANSFER LEVER IS ON HIGH PART OF ITS CAM. CHECK CLEARANCE BETWEEN SIDE OF TRANSFER BAIL EXTENSION AND ITS LATCH. (2) REPEAT ABOVE PROCEDURE WITH A BLANKS COMBINATION SELECTED AND CHECK THE CLEARANCE ON OTHER LATCH. CLEARANCE IN MARKING AND SPACING POSITION SHOULD BE EQUAL WITHIN 0.002 INCH.

TO ADJUST —— WITH STABILIZER ASSEMBLY MOUNTING SCREWS FRICTION TIGHT, POSITION THE ASSEMBLY.

NOTE —— LATCHES SHOULD DROP IN PLACE AS OTHER TRANSFER LEVERS CAM THE TRANSFER BAIL.

(B) STABILIZER SPRING

REQUIREMENT—— WITH UNIT UPRIGHT AND MAINSHAFT IN STOP POSITION MIN. 2-1/2 OZS. ——— MAX. 5 OZS. TO START STABILIZER LATCH MOVING.
2.19 Signal Contact Assembly

(A) SIGNAL CONTACT
REQUIREMENT: (COVER PLATE AND CONTACT BOX COVER REMOVED) CONTACT GAP
IN THE MARKING POSITION AND THE SPACING POSITION SHOULD
BE EQUAL WHEN CLEARANCE BETWEEN RESPECTIVE CONTACTS IS
MAXIMUM. ENGAGE CLUTCH AND ROTATE MAINSHAFT SLOWLY.
TO ADJUST: WITH CONTACT BOX MOUNTING SCREWS FRICITION
TIGHT, POSITION BOX WITH ITS ECCENTRIC.
NOTE: USE IA TELETYPewriter TEST SET OR 28A
STROBOscopic TEST SET WHERE POSSIBLE TO REFINISH
ADJUSTMENT. REFER TO SIGNAL PULSE REFINEMENT.

(B) SIGNAL CONTACT SPRING
REQUIREMENT: WITH MAINSHAFT IN STOP POSITION
AND COVER OF CONTACT BOX REMOVED, UNHOOK TOGGLE LINK SPRING
AND MOVE TRANSFER BAIL TO SPACING POSITION (RIGHT).
MIN. 2 OZS. --- MAX. 3-1/2 OZS.
TO OPEN SPACING CONTACTS (LEFT).

(C) SIGNAL CONTACT LINK SPRING
REQUIREMENT: WITH MAINSHAFT IN STOP
POSITION AND STABILIZER SPRING UN-HOOKED, MOVE LATCHES AWAY FROM
TRANSFER BAIL EXTENSION.
MIN. 6 OZS. --- MAX. 12 OZS.
TO START TRANSFER BAIL EXTENSION MOVING.
2.20 Clutch Trip Magnet Assembly

(A) CLUTCH MAGNET REQUIREMENTS

1. WITH ARMATURE IN ITS ENERGIZED POSITION, THE ARMATURE SHOULD CONTACT THE CORE OF THE MAGNET FARthest AWAY FROM THE ARMATURE HINGE, CLEARANCE BETWEEN ARMATURE AND CORE NEAREST ARMATURE HINGE SOME TO 0.004 INCH AT POINT OF LEAST CLEARANCE.
TO ADJUST---WITH MAGNET ASSEMBLY MOUNTING SCREWS REMOVED, LIFT ASSEMBLY FROM UNIT.
INVERT ASSEMBLY, LOOSEN HINGE BRACKET MOUNTING SCREWS AND POSITION BRACKET.

2. WITH ARMATURE IN ITS ENERGIZED POSITION AND HIGH PART OF BACKSTOP ECCENTRIC UPWARD, CLEARANCE BETWEEN ARMATURE BAIL AND BACKSTOP
MIN. 0.045 INCH — MAX. 0.055 INCH.
TO ADJUST---LOOSEN BACKSTOP CLAMP NUT AND POSITION THE ECCENTRIC.

3. WITH MAGNET ASSEMBLY REPLACED AND CLUTCH DISENGAGED, CLEARANCE BETWEEN END OF ARMATURE BAIL EXTENSION AND MAIN BAIL LATCH
MIN. 0.007 INCH — MAX. 0.015 INCH.
TO ADJUST---WITH BRACKET MOUNTING SCREWS FRICtion TIGHT, MOVE ASSEMBLY TO ITS LOWERMOST POSITION THEN POSITION BRACKET BY ITS ADJUSTING SLOT.
REFINE REQUIREMENTS IF NECESSARY.

(B) ARMATURE BAIL SPRING REQUIREMENT --- WITH ARMATURE IN DE-ENERGIZED POSITION AND MAIN BAIL LATCH LEVER HELD AWAY
MIN. 1 OZ. — MAX. 2 OZS.
TO START BAIL MOVING.

(C) MAIN BAIL LATCH SPRING REQUIREMENT --- WITH UNIT INVERTED AND MAIN BAIL LATCH RELEASED
MIN. 3/4 OZ. — MAX. 2 OZS.
TO START MAIN BAIL LATCH MOVING.
2.21 Cover Plate

COVER PLATE DETENT SPRING
REQUIREMENT --- WITH SPRING
SCALE APPLIED TO CENTER OF
ONE DETENT
MIN. 28 OZS.—MAX. 48 OZS.
TO START PLUNGER MOVING.

NOTE
OUTER EDGE OF EACH
MOUNTING BRACKET SHOULD
BE APPROXIMATELY IN LINE
WITH SHOULDER OF ITS
MOUNTING STUD, SO THAT
PROJECTIONS OF FRONT AND
REAR BRACKETS ARE EQUAL
(GAUGE BY EYE).
2.22 Signal Pulse Refinement

SIGNAL PULSE (FINAL ADJUSTMENT WITH
IA TELETYPETRATES OR 28A STROBOSCOPIC TEST SET)

PROCEDURE --- PLUG TEST SET INTO SIGNAL
LINE TO VIEW PULSE IMAGE GENERATED BY THE MARKING AND
SPACING CONTACTS. SYNCHRONIZE SIGNAL GENERATOR WITH TEST SET
SO THAT END OF STOP PULSE IMAGE ALIGNS WITH THE 142 MARK ON
TEST SET SCALE WHEN BOTH UNITS ARE OPERATED AT SAME SPEED AND
TRANSMISSION IS CONTINUOUS.
NOTE 1 --- END OF STOP PULSE IMAGE SHOULD NOT VARY FROM THE
142 MARK BY MORE THAN 1/2 SCALE DIVISION. IF A GREATER
VARIATION OCCURS, MOVE THE SCALE UNTIL THE VARIATIONS
EXTEND EQUALLY ON EITHER SIDE OF THE 142 MARK.
REQUIREMENTS (SPEEDS UP TO AND INCLUDING 100 W.P.M.)
1. EACH MARKING CODE PULSE SHOULD START NO LATER THAN THE
5TH MARK OF THE PULSE UNDER OBSERVATION AND START NO
EARLIER THAN 95TH MARK OF THE PREVIOUS PULSE.
2. EACH MARKING CODE PULSE SHOULD END NO EARLIER THAN
THE 95TH MARK OF THE PULSE UNDER OBSERVATION AND END
NO LATER THAN THE 5TH MARK OF THE FOLLOWING PULSE.
3. EACH MARKING CODE PULSE MAY HAVE ONE BREAK PROVIDED
THE BREAK IS NOT OVER ONE DIVISION WIDE AND PROVIDED
THE BREAK OCCURS ONLY AT THE END OF CODE PULSE IMAGE
BETWEEN THE 95TH MARK AND THE END OF THE IMAGE.
4. THE STOP PULSE SHOULD START NO EARLIER THAN THE 95TH MARK
OF THE 5TH PULSE AND START NO LATER THAN THE 5TH MARK OF
THE STOP POSITION. (See Note 2)

TO ADJUST --- WITH SIGNAL CONTACT BOX MOUNTING SCREWS
FRICITION TIGHT, ROTATE THE ECCENTRIC (RIGHT OR LEFT). TIGHTEN
MOUNTING SCREWS AND RECHECK ADJUSTMENT.

NOTE 2 ----- THE STOP IMAGE SHOULD NOT CHANGE
IN LENGTH OR POSITION WHEN VIEWED ON TEST SET
WHILE CHANGING FROM "R" TO "Y" SELECTION.
TO ADJUST --- REPOSITION STABILIZER MECHANISM SO
THAT END OF STOP IMAGE COINCIDES WITH THE 142
MARK ON THE SCALE. (DO NOT REMOVE THE SCALE.)

NOTE 3 --- IF ABOVE REQUIREMENTS
CANNOT BE MET REFINE TRANSFER-
BAIL STABILIZER REQUIREMENT WITH
SIGNAL VIEWED ON TEST SET.
B. Auxiliary Features

Multiple Wire Output Facilities

2.23 Code Reading and Timing Contacts

**NOTE 1**
UNLESS SPECIFICALLY STATED OTHERWISE, THE FOLLOWING CODE READING CONTACT ADJUSTMENTS APPLY TO BOTH THE TRANSFER (BREAK BEFORE MAKE) TYPE AND MAKE TYPE CONTACTS. WHEN AN ADJUSTMENT IS APPlicable TO BOTH TYPES, THE TRANSFER TYPE CONTACTS ARE USED IN THE ILLUSTRATIONS. WHEN TESTING THESE CONTACTS ON ASR SETS THE CONTROL KNOB SHOULD BE IN THE K-T POSITION.

**NOTE 2**
THE FOLLOWING ADJUSTMENTS SHALL BE MADE ONLY IF THE CODE READING CONTACT ASSEMBLY IS REMOVED FROM THE UNIT.

![Diagram of Code Reading Contact Assembly]

When using the contact spring bender, start with the contact file-up farthest from the handle of the tool and work toward the handle so as not to disturb adjustments already made.

MARKING CONTACT BACKSTOPS

**REQUIREMENT**
As gauged by eye, five marking contact springs should align with each other and be parallel with mounting plate.

TO ADJUST BEND MARKING CONTACT BACKSTOPS.

MARKING CONTACT BACKSTOP

MARKING CONTACT SPRINGS-PRELIMINARY

**REQUIREMENT**
With swinger contact spring held away:
- MIN. 2 OZS.
- MAX. 6 OZS.

TO MOVE EACH SPRING AWAY FROM BACKSTOP.

TO ADJUST BEND MARKING CONTACT SPRINGS.

**NOTE**
To increase tension of marking contact spring, it may be necessary to bend backstop away from spring, bend spring, and then re-bend backstop to meet requirement of marking contact backstops adjustment (above).
2.24 Code Reading and Timing Contacts

(A) **SWINGER CONTACT SPRINGS-PRELIMINARY**

REQUIREMENT
- MIN. 30 GRAMS
- MAX. 40 GRAMS
TO OPEN MARKING CONTACTS.
TO ADJUST
- BEND SWINGER CONTACT SPRINGS.

NOTE:
SPACING CONTACTS (ON TRANSFER TYPE CONTACT ASSEMBLIES ONLY) ARE NORMALLY OPEN WHEN CONTACT ASSEMBLY IS REMOVED FROM UNIT.

(B) **SPACING CONTACT BACKSTOPS - PRELIMINARY**

(Applies to transfer type contacts only)

REQUIREMENT
- GAP BETWEEN SPACING CONTACTS
  - MIN. 0.025 INCH
  - MAX. 0.030 INCH.
TO ADJUST
- BEND SPACING CONTACT BACKSTOPS.

(C) **SPACING CONTACT SPRINGS-PRELIMINARY**

(Applies to transfer type contacts only)

REQUIREMENT
- MIN. 30 GRAMS
- MAX. 40 GRAMS
TO MOVE EACH CONTACT SPRING AWAY FROM BACKSTOP.
TO ADJUST
- BEND SPACING CONTACT SPRINGS.

NOTE
TO INCREASE TENSION OF SPRING, IT MAY BE NECESSARY TO BEND BACKSTOP AWAY FROM SPRING, BEND SPRING, AND THEN RE-BEND BACKSTOP TO MEET REQUIREMENT OF SPACING CONTACT BACKSTOPS ADJUSTMENT ABOVE.
2.25 Code Reading Contacts

(A) CONTACT SENSING ARM UPSTOP

REQUIREMENT
WITH LETTERS SELECTED, CLUTCH ENGAGED AND MAIN SHAFT ROTATED UNTIL SENSING ARMS ARE AT THEIR UPPERMOST POSITION, CLEARANCE BETWEEN CODE READING CONTACT SPRING AND ITS ASSOCIATED BACKSTOP MIN. SOME MAX. 0.008 INCH.

TO ADJUST
ROTATE ECCENTRIC UPSTOP POST WITH ITS LOCKING NUT LOOSENED. KEEP HIGH PART OF ECCENTRIC TOWARD LEFT.

(C) AUXILIARY CONTACT (FINAL - ASSEMBLY ON UNIT)

(1) REQUIREMENT
WITH CLUTCH DISENGAGED AND LATCHED, CLEARANCE BETWEEN THE INSULATOR ON THE SWINGER AND THE BAIL MIN. 0.040 INCH MAX. 0.050 INCH.

TO ADJUST
POSITION THE CONTACT BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

(2) REQUIREMENT
THE SWINGER INSULATOR SHOULD BE CENTRALLY LOCATED WITH RESPECT TO ITS OPERATING BAIL.

TO ADJUST
LOOSEN THE CONTACT ASSEMBLY SCREWS AND POSITION THE SWINGER AND CONTACT SPRINGS.

(B) AUXILIARY CONTACT (PRELIMINARY)

NOTE - THESE REQUIREMENTS SHOULD BE MET WITH THE CONTACT ASSEMBLY OFF THE UNIT.

(1) REQUIREMENT
MIN. 4 OZS.
MAX. 5 OZS.
TO OPEN THE Normally CLOSED CONTACT.

TO ADJUST
BEND THE SWINGER CONTACT SPRING.

(2) REQUIREMENT
THE Normally OPEN CONTACT GAP MIN. 0.010 INCH MAX. 0.020 INCH.

TO ADJUST
BEND THE Normally OPEN CONTACT STIFFENER.

TO ADJUST
BEND THE Normally OPEN CONTACT.
2.26 Code Reading Contact Sensing Arm

**SENSE ARM SPRING REQUIREMENT**

- WITH CLUTCH DISENGAGED
  - MIN. 2-1/2 OZS.
  - MAX. 3-1/2 OZS.
  - TO START SENSING ARM MOVING.

**NOTE**

- IF THE UNIT IS EQUIPPED WITH HORIZONTAL AND VERTICAL TABULATOR TIMING SET OF PARTS, REMOVE THE TIMING BAIL SPRING BEFORE CHECKING THE SENSING ARM SPRING.

**AUXILIARY CONTACT OPERATING BAIL SPRING REQUIREMENT**

- CLUTCH DISENGAGED
  - MIN. 5 OZS.
  - MAX. 7 OZS.
  - TO MOVE FOLLOWER ROLLER AWAY FROM LOW PART OF ITS CAM.

**NOTE**

- REMOVE TIMING BAIL SPRING BEFORE CHECKING THIS SPRING TENSION, IF THE UNIT IS EQUIPPED WITH HORIZONTAL AND VERTICAL TABULATOR TIMING SET OF PARTS.

**0.040 — 0.050 INCH**

[SEE (C) PRECEDING PAGE]

**SPLIT BAIL ECCENTRIC**

- **1. REQUIREMENT**
  - WITH THE BLANK COMBINATION SELECTED AND CLUTCH TRIPPED, CLEARANCE BETWEEN THE TRANSFER LEVERS AND ASSOCIATED SENSING ARMS
  - MIN. 0.020 INCH
  - MAX. 0.030 INCH.
  - TO ADJUST
  - ROTATE THE SPLIT BAIL ECCENTRIC WITH ITS LOCK NUT LOOSENED.

- **2. REQUIREMENT**
  - BLANK COMBINATION SELECTED, THE UPSTOP POST OUT OF THE WAY, AND SENSING ARMS IN THEIR UPPERMOST POSITION CLEARANCE BETWEEN CONTACT SWINGER AND INSULATOR ON CONTACT SENSING ARM
  - MIN. 0.015 INCH
  - MAX. 0.025 INCH.
  - TO ADJUST
  - POSITION THE CONTACT BRACKET WITH ITS MOUNTING SCREWS LOOSENED.

- **3. REQUIREMENT**
  - THE SWINGER OF EACH CONTACT PILEUP SHOULD ALIGN CENTRALLY ON THE CONTACT SENSING ARM.
  - TO ADJUST
  - POSITION CONTACT ASSEMBLY WITH PILEUP MOUNTING SCREWS LOOSENED.
SECTION 573-127-703

Tabulator Control

2.27 Transmitter-stop Mechanism

START-STOP CONTACT GAP
REQUIREMENT
WITH THE TIMING BAIL ON THE LOW PART OF ITS CAM, THE START-STOP CONTACT GAP SHOULD BE
MIN. 0.008 INCH
MAX. 0.015 INCH.
TO ADJUST
POSITION THE TIMING ARM ON THE YIELD ARM WITH ITS CLAMP SCREW FRICITION TIGHT.

START STOP CONTACT

CLAMP SCREW

YIELD ARM

TIMING ARM

TIMING BAIL SPRING
REQUIREMENT
MIN. 5 1/2 OZS.
MAX. 8 OZS.
TO START THE BAIL MOVING.
Modification Kit to Permit Use of 11/16-inch and 7/8-inch 5-level Tape Interchangeably

2.28 Tape Guide

RIGHT AND LEFT GUIDE ADJUSTMENT

REQUIREMENT

WITH THE TP156743 GUIDE INSERTED BETWEEN THE RIGHT TAPE GUIDE AND THE LEFT TAPE GUIDE, THE GAUGE MAY TOUCH EITHER GUIDE BUT SHOULD NOT BIND. CLEARANCE SHALL NOT EXCEED 0.003 INCH.

TO ADJUST

POSITION EACH TAPE GUIDE WITH THE TAPE-GUIDE MOUNTING NUTS FRICITON TIGHT.

TP156743 GAUGE

TAPE GUIDE PLATE

STEP

TP172764 TAPE GUIDE

11/16 INCH TAPE PATH

7/8 INCH TAPE PATH
Modification Kit to Convert 28H to 28H-1 Transmitter-Distributor

2.29  Tape-lid Sensing Lever

**TAPE LID SENSING LEVER SPRING REQUIREMENT**
- TAPE LID OPEN
  - MIN. 20 GRAMS
  - MAX. 35 GRAMS
  - TO SEPARATE SWITCH LEVER FROM SWINGER.

**SWITCH LEVER 1 REQUIREMENT**
- TAPE LID OPEN, TAPE OUT PIN DEPRESSED,
  - GAP BETWEEN NORMALLY CLOSED CONTACTS
    - MIN. 0.005 INCH
    - MAX. 0.015 INCH.
  - TO ADJUST
    - POSITION THE TAPE LID SENSING LEVER WITH ITS CLAMP SCREW LOOSE.