28 REPERFORATOR-TRANSmitter
UNIT AND SET
REQUIREMENTS AND ADJUSTMENTS

CONTENTS

1. GENERAL .......................................................... 1.01-1.06

2. REQUIREMENTS AND ADJUSTMENTS OF
   28 REPERFORATOR-TRANSmitter UNIT .......... 2.01-2.14
       Code Hole and Sensing Pin Alignment .... 2.14
       Gear Mechanisms ............................. 2.07-2.10
       Fixed Speed Gear Alignment (Receiving
       End) ........................................... 2.08
       Idler—Cross Shaft Driven Gear Mesh ... 2.08
       Idler Gear—Motor Pinion Mesh .......... 2.09
       Shaft Gear Alignment (Transmitting and
       Receiving Ends) .................. 2.07
       Shift Gear Key Alignment .................. 2.07
       Transmitter Driving and Distributor Shaft
       Driven Gear Mesh ...................... 2.10
       Horizontal Alignment of Pivoted Sensing Head
       and Punch .................................. 2.11
       Last Character Contact Switch .......... 2.12(C)
       Motor of Unit .............................. 2.05
       Oil Shield .................................. 2.13
       Rear Tape Guide Bracket ............... 2.12(A)
       Rear Tape Guide Roller ................. 2.12(B)
       Single-magnet Nontyping Reperforator of Unit
       So Equipped ............................... 2.03
       Tape Depressor ............................. 2.11
       Transmitter-Distributor of Unit .......... 2.04
       Typing Reperforator of Unit So Equipped ... 2.02
1. GENERAL

1.01 This section contains the specific requirements and adjustments for the 28 reperforator-transmitter unit and set. The material herein, together with the section containing the general requirements on teletypewriter apparatus, provides the complete adjusting information necessary for maintenance.

1.02 This section is reissued to revise various requirements adjustments so as to bring the section generally up to date. Since this is a general revision, the marginal arrows ordinarily used to indicate changes have been omitted.

1.03 The 28 reperforator-transmitter set consists of a reperforator-transmitter unit and a reperforator-transmitter stand. The reperforator-transmitter unit is made up of a typing or a single-magnet nontyping reperforator, a pivoted-head multicontact transmitter-distributor, a motor, and drive gears assembled on a casting. The reperforator-transmitter stand provides the tape-handling facilities and the framework to hold the unit. A detailed description is given in the section containing the list of units and auxiliary features for the 28 reperforator-transmitter set.

1.04 Where a requirement calls for the clutch to be disengaged, the clutch-shoe lever must be fully latched between its trip 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 rotating either the sensing shaft or distributor shaft 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 shaft to rotate freely, apply pressure on the lug of the clutch disc with a screwdriver to cause it to engage its latch lever, and thus dis-
engage the internal-expansion clutch shoes from the clutch drum.

1.05 When rotating the drive-shaft gear by hand, rotate in a counterclockwise direction as viewed from the exposed side of the drive-shaft gear.

1.06 In this practice, all references to direction apply to the unit in its normal operating position with the viewer facing the tape-storage bin.

2. REQUIREMENTS AND ADJUSTMENTS OF 28 REPERFORATOR-TRANSMITTER UNIT

2.01 The following figures 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. In some cases where an illustration shows interrelated parts, the sequence that should be followed in checking the requirements and making the adjustments is indicated by the letters (A), (B), (C), etc.

2.02 Typing Reperforator of Unit So Equipped: Refer to the requirements specified herein and those in the section containing the requirements and adjustments for the 28 typing reperforator.

2.03 Single-magnet Nontyping Reperforator of Unit So Equipped:
Refer to the requirements specified herein and those in the section containing the requirements and adjustments for the 28 nontyping reperforator.

2.04 Transmitter-Distributor of Unit: Refer to the requirements specified herein and those in the section containing the requirements and adjustments for the 28C transmitter-distributor unit.

2.05 Motor of Unit: Refer to the section containing the requirements and adjustments for the 28 motor units.

2.06 Variable Features of Unit: Requirements and adjustments for the variable features are as specified in the sections containing the requirements and adjustments for the previously mentioned components of the 28 reperforator-transmitter unit.
2.07 Shift Gear Mechanism

SHIFT GEAR KEY ALIGNMENT REQUIREMENT—SHIFT GEAR ASSEMBLY SHOULD SLIDE FREELY ON ITS SHAFT.

TO ADJUST—POSITION KEY BAR WITH MOUNTING SCREWS LOOSENED WHILE SLIDING GEAR ASSEMBLY ALONG SHAFT.

SHIFT GEAR ASSEMBLY SHAFT

SHIFT ARM ASSEMBLY

LOCATING PLATE MOUNTING SCREWS

LOCATING PLATE

SHIFT GEAR ALIGNMENT (TRANSMITTING AND RECEIVING ENDS) REQUIREMENT—DRIVEN SHIFT GEAR ASSEMBLY GEARS SHOULD ALIGN APPROXIMATELY CENTERED ON THEIR RESPECTIVE DRIVING GEARS ON CROSS SHAFT ASSEMBLY.

TO ADJUST—POSITION LOCATING PLATE WITH MOUNTING SCREWS LOOSENED, CHECK THREE SHIFT POSITIONS.

NOTE
MAKE CERTAIN THAT THE TWO PORTIONS OF THE SHIFT GEARS ON THE CROSS SHAFT ASSEMBLYARE MOUNTED WITH NO CLEARANCE BETWEEN THEM. IF THERE IS CLEARANCE, LOOSEN DUAL GEAR MOUNTING SCREW AND ELIMINATE CLEARANCE BEFORE MAKING ABOVE ADJUSTMENT.
2.08 Fixed Speed, Idler, and Cross Shaft Driven Gear Mechanisms

Fixed Speed Driven Gear

Fixed Speed Gear Alignment (Receiving End)

Requirement — Fixed Speed Driven Gear should be approximately centered on Fixed Speed Driving Gear.

To Adjust — Position Fixed Speed Driven Gear with Hub Mounting Screw loosened.

Cross Shaft Driven Gear

Bracket Mounting Screws

Tape Winder Drive Bracket

Idler-Cross Shaft Driven Gear Mesh Requirement — Some Backlash

Max. 0.003 Inch

Between Idler Gear and Cross Shaft Driven Gear Throughout One Revolution of Idler Gear.

To Adjust — Add or Remove Shims Between Base and Tape Winder Drive Bracket. Keep Equal Number of Shims on Each Side.
2.09 Idler Gear—Motor Pinion Mesh

Idler Gear—Motor Pinion Mesh

Requirement — Some backlash
Max. 0.003 inch
Between Idler Gear and Motor Pinion throughout one revolution of idler gear.
To adjust — Position tape winder drive bracket with mounting screws loosened.
2.10 Vertical Alignment of Pivoted Sensing Head and Punch and Transmitter Driving and Distributor Shaft Driven Gear Mesh

VERTICAL ALIGNMENT OF PIVOTED SENSING HEAD AND PUNCH
REQUIREMENT
WITH PIVOTED SENSING HEAD AGAINST PUNCH BLOCK, TOP PLATE OF SENSING HEAD SHOULD BE
MIN. FLUSH
MAX. 0.010 INCH BELOW BOTTOM SURFACE OF TAPE SLOT IN PUNCH BLOCK.

TO ADJUST
POSITION HEIGHT ADJUSTING SCREW, ON SENSING END OF UNIT, WITH LOCK NUT AND MOUNTING SCREW LOOSENED.

TRANSMITTER DRIVING AND DISTRIBUTOR SHAFT DRIVEN GEAR MESH
REQUIREMENT
SOME BACKLASH
MAX. 0.003 INCH
BETWEEN DISTRIBUTOR SHAFT DRIVEN GEAR ON TRANSMITTER AND TRANSMITTER DRIVING GEAR ON BASE. CHECK THROUGHOUT ONE COMPLETE REVO LUTION OF LARGER GEAR.

TO ADJUST
POSITION TWO HEIGHT ADJUSTING SCREWS, ON DISTRIBUTOR END OF UNIT, WITH LOCK NUTS AND MOUNTING SCREWS LOOSENED. TURN SCREWS EVENLY TO MAINTAIN PARALLELISM BETWEEN UNITS. RECHECK VERTICAL ALIGNMENT OF PIVOTED SENSING HEAD AND PUNCH.
2.11 Horizontal Alignment of Pivoted Sensing Head and Punch and Tape Depressor

**HORIZONTAL ALIGNMENT OF PIVOTED SENSING HEAD AND PUNCH**

**REQUIREMENT**
When one tape lid extension is centered on respective area between punch pin slots, remaining extensions should be fully within their respective areas.

**TO ADJUST**
- Loosen transmitter-distributor and horizontal positioning eccentric mounting screws. Shift unit to meet requirement. Tighten unit mounting screws, position eccentric against rear plate of transmitter-distributor and tighten its mounting screw.
- **NOTE**
  It may be necessary to position the perforator unit if the requirement cannot be met by the adjustment of the transmitter-distributor. If necessary, position the perforator in the same manner as the transmitter-distributor.

**TAPE DEPRESSOR**

1. **REQUIREMENT**
   Tip of depressor extension should be centered between $f_2$ and $f_3$ punch pin slots in punch block.
   - To adjust:
     - Position depressor extension with its two adjusting screws loosened.

2. **REQUIREMENT**
   Depressor extension should be positioned
   - **MIN.** flush
   - **MAX.** 0.060 below top surface of punch block.

3. **REQUIREMENT**
   Clearance between tape depressor extension and punch block
   - **MIN.** 0.040 inch
   - **MAX.** 0.080 inch
   - To adjust:
     - Position by moving tape depressor extension anguially and/or horizontally with lock nut on depressor loosened.

**NOTE**
If requirement (2) is still not met, rotate bar at top of transmitter-distributor (to which depressor bracket is secured) with four mounting screws of bar assembly loosened. Make sure clearance between punch block and depressor extension (at mounting stud) is maximum possible while still meeting requirement.

4. **REQUIREMENT**
   With tape following normal path, and pivoted head approximately 15 characters from punch block, tape edge should not touch depressor.
   - To adjust:
     - Refine tape depressor adjustment as specified in the section containing the requirements and adjustments for the 2BC transmitter-distributor unit.
2.12 Last Character Contact Switch, Rear Tape Guide Bracket and Roller

**Requirement**

With pivoted sensing head against punch block, there should be a gap between the contacts. Min. 0.005 inch to adjust position contact bracket with mounting screws loosened.

**Last Character Contact Switch**

(A) **Rear Tape Guide Bracket**

Requirement

With perforator operating under power and drawing tape from supply reel, tape should squarely enter center of tape chute (tape twisted a quarter turn clockwise as it enters chute).

To adjust position rear tape guide bracket with its mounting screws loosened.

(B) **Rear Tape Guide Roller**

Requirement

Tape should ride approximately centered on tape rollers when perforator is operating under power as in (A).

To adjust loosen roller bracket lock nut and position bracket while tape is in motion.

Note: Recheck rear tape guide bracket adjustment.

---

28 REPERFORATOR-TRANSMITTER UNIT AND SET

P34.635 Page 9
2.13 **Oil Shield**

OIL SHIELD

OIL SHIELD SHOULD BE APPROXIMATELY CENTERED BETWEEN MOTOR SHAFT AND TAPE WINDER DRIVE BELT.

TO ADJUST POSITION OIL SHIELD WITH ITS MOUNTING SCREWS LOOSENED.

MOUNTING NUTS

OIL SHIELD

DRIVE BELT

MOTOR SHAFT
CODE HOLE-SENSING PIN ALIGNMENT

NOTE
ALL PRECEDING ADJUSTMENTS BETWEEN TRANSMITTER-DISTRIBUTOR AND TYPING OR NONTYPING REPERFORATOR SHOULD BE COMPLETED AND REQUIREMENTS MET BEFORE PROCEEDING WITH FOLLOWING FINAL ADJUSTMENTS.

TO CHECK
WITH A LOOP OF LYT'S TAPE (PERFORATED UNDER POWER BY THE REPERFORATOR) BETWEEN REPERFORATOR AND TRANSMITTER-DISTRIBUTOR, AND PIVOTTED SENSING HEAD RESTING AGAINST ITS BACKSTOP, MANUALLY TRIP SENSING SHAFT CLUTCH AND ROTATE SHAFT UNTIL SENSING PINS ARE IN THEIR UPPERMOST POSITION.

(1) REQUIREMENT
THE SENSING PINS SHOULD BE APPROXIMATELY CENTERED LATERALLY ON CODE HOLES.
TO ADJUST
REFINE PUNCH FEED HOLES LATERAL ALIGNMENT AS SPECIFIED IN SECTION CONTAINING THE REQUIREMENTS AND ADJUSTMENTS FOR THE 28 TYPING REPERFORATOR.

(2) REQUIREMENT
SENSING PINS SHOULD BE POSITIONED TOWARD REAR EDGE OF CODE HOLE MIN. 0.008 INCH CLEARANCE BETWEEN PIN AND REAR EDGE.
CHECK FIVE PLACES.
TO ADJUST
CHECK TAPE QUALITY FOR COMPLIANCE WITH TP156011 TAPE GAUGE AND, IF NECESSARY, REFINE DETENT ADJUSTMENT AS SPECIFIED IN THE SECTION CONTAINING THE REQUIREMENTS AND ADJUSTMENTS FOR THE 28 TYPING REPERFORATOR.

NOTE
IF REQUIREMENT STILL IS NOT MET, POSITION PIVOTTED SENSING HEAD TOP PLATE IN REQUIRED DIRECTION WITH ITS MOUNTING SCREWS LOOSENED. RECHECK LAST CHARACTER CONTACT SWITCH ADJUSTMENT.

(3) REQUIREMENT
AS CODE HOLES ARE OPENED BY SENSING PINS, THERE SHOULD BE SOME CLEARANCE BETWEEN SIDES OF CHAD AND TAPE LID EXTENSIONS. CHECK TEN PLACES.
TO ADJUST
POSITION PIVOTTED SENSING HEAD TOP PLATE LATERALLY WITH ITS MOUNTING SCREWS LOOSENED. RECHECK (2).
3. REQUIREMENTS AND ADJUSTMENTS OF 28 REPERFORATOR-TRANSMITTER SET

A. Reperforator-Transmitter Unit

3.01 Refer to Part 2 of this section for the requirements and adjustments for 28 reperforator-transmitter unit.

B. Reperforator-Transmitter Stand

3.02 Refer to the section containing the requirements and adjustments for 28A reperforator-transmitter stand.

4. ASSOCIATED BELL SYSTEM PRACTICE

4.01 The following Bell System Practice provides additional information that may be required in connection with this section.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alphabetical Index of 28-type Equipment, Bell System Practices, and Associated 28 ASR Station Drawings</td>
<td>P34.001</td>
</tr>
</tbody>
</table>