# TELETYPE CORPORATION Skokie, Illinois, U.S.A.

,

PAGE

# 28 KEYBOARD, BASE, COVER, AND MOTOR

# FOR COMPACT KSR AND RO TELETYPEWRITER SETS

# ADJUSTMENTS

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### 1. GENERAL

 This section is issued to provide the mechanical requirements and adjustments for the 28 keyboard, base, cover, and motor units. The units apply to the 28 Compact Keyboard Send-Receive and Receive-Only Teletypewriter Sets. The keyboard unit is associated with the KSR Set and the base unit with the RO Set.

1.02 The adjustments are divided into basic units and variable features. The keyboard, base, cover, and motor units are classified as basic units and are subdivided into major mechanisms which make up the units. Mechanisms of an optional nature, which develop variations of the KSR or RO Set, are given under variable features.

1.03 In general, the adjustments are presented in an order which should be followed if a complete readjustment of the unit is made. However, the keyboard unit is a composite of major mechanisms which may be adjusted or checked as separate entites. Adjustments and spring tensions are included with each mechanism.

1.04 Reference made to left or right, front or

rear, and top or bottom apply to the units in their normal operating position as viewed from the front of the set.

1.05 Location of clearances, positions of parts, and angle of scale applications are illustrated in the drawings. Requirements and procedures are given in the texts that accompany the drawings. A procedure should be read thoroughly before making the adjustment or checking the spring tension. Tools required to make adjustments and check spring tensions are not supplied with the equipment, but are listed in Teletype Bulletin 1124B.

1.06 If parts are removed, all adjustments which removal of these parts might facilitate should be made before the parts are replaced. When a part mounted on shims is removed, the number of shims at each mounting screw should be noted so that identical piles can be made when the part is replaced. After an adjustment has been made, all nuts and screws that were loosened should be tightened unless specifically stated otherwise.

1.07 The spring tensions given in this section are indications, not exact values, and should be checked with appropriate spring scales. Springs which do not meet the requirements and for which there are no adjusting procedures, should be discarded and replaced by new springs.

1.08 All contact points should meet squarely.

Smaller points should fall wholly within the circumference of larger mating points. Points that are the same size should not be out of alignment more than 25 per cent of the point diameter.

## 2. BASIC UNITS

# KEYBOARD

2.01 Keyboard Transmitter Mechanism





# ISS 1, SECTION 573-116-703



### CONTACT BLOCK SPRING

Requirement Min 18 oz--- Max 42 oz-

to start contact block moving.



# REPEAT KEYLEVER SPRING

Requirement

Min 15 grams---Max 30 gramsto start keylever moving.

# BREAK KEYLEVER SPRING

Requirement Min 12 oz---Max 18 oz---to start lever moving.



# CONTACT WIRE SPRING

To Check

Place t-levers in marking (clockwise) positions. Trip contact wire reset bail by depressing universal codebar. (Universal codebar illustrated in UNIVERSAL LINK adjustment.)

### Requirement

— Min 3/4 oz---Max 1-1/4 oz to start contact wire moving away from terminal.



2.04 Keyboard Transmitter Mechanism (Cont'd)



# 2.05 Keyboard Transmitter Mechanism (Cont'd)

# RESET SOLENOID POSITION

## Requirement

Plunger should move freely without binding in solenoid core.

### To Adjust

Position solenoid with mounting screws loosened.



(REAR VIEW)

### RESET ARM

### To Check

Hold plunger in fully operated condition with screwdriver in pry point and against plunger.

### Requirement

With solenoid fully energized, clearance should be:

### To Adjust

Loosen reset arm clampscrew. Hold plunger in fully operated condition with screwdriver. Position reset arm to meet requirement. Tighten clampscrew.

Note: Care should be taken not to bind reset arm against mounting bracket by pushing clamp toward the solenoid when tightening clampscrew.



# 2.06 Keyboard Transmitter Mechanism (Cont'd)

# UNIVERSAL CONTACT



Move contact wire out of fiberboard guide slot.

Requirement

With keyboard transmitter in reset condition, clearance should be:

### To Adjust

Bend wire with TP98055 bending tool. Replace contact wire in guide slot.



### Requirement

End of slots in left and right brackets should be against rear mounting screws.

### To Adjust

Position keyboard transmitter assembly with mounting screws loosened.



METAL CONTACT STRIP

RESET BAIL

CONTACT

WIRE

**TP98055** 

BENDING TOOL



2.08 Distributor Mechanism (Cont'd)

# CLUTCH STOP ARM

# Requirement

With clutch trip lever in latched position, clutch lever should fully engage clutch shoe lever.

# To Adjust

With clutch in stop position, loosen clutch trip clamping screw and adjust clutch stop lever to obtain full bite with clutch shoe lever.

<u>Note</u>: When armature is in attracted position, clutch stop arm should clear stop lever and stop lug by some clearance.





# CLUTCH SHOE LEVER

Requirement

Clearance between clutch shoe lever and stop lug should be:

Min 0.055 inch---Max 0.085 inch greater when clutch is engaged than when disengaged.

## To Adjust

Loosen two clampscrews in clutch disc. Rotate adjusting disc to obtain clearance.

Note: After making adjustment, disengage clutch and rotate drum in normal rotation to make certain it does not drag on shoes. If drum drags, refine adjustment.

Note 1: Remove typing unit from the base before making the following adjustments.

Note 2: Remove fiberboard insulator from distributor terminal block to check and adjust distributor contact assembly. Replace insulator after performing maintenance.

# CAM FOLLOWER GUIDE

### Requirement

Cam follower guide oriented so center cam follower is fully on cam when follower is moved sideways in guide slot. Other followers must have at least 75% bite when moved in either direction, and be free in guide slots.

# To Adjust

Position cam follower guide with its mounting screws loosened. After tightening, check for freeness.



2.09 Interrelated Adjustments

# MOUNTING TYPING UNIT ON BASE

### Requirement

When placing the typing unit on the base, hold it tilted slightly to the right, and lower the right end into engagement with the right locating stud. While easing the left end downward, rotate the motor by hand to properly mesh gears. Secure with four mounting screws. Rotate the motor by hand to insure proper meshing of gears.



2.10 Distributor Mechanism (Cont'd)

Note 1: Remove typing unit from the base before making the following adjustments.

Note 2: Remove fiberboard insulator from distributor terminal block to check and adjust distributor contact assembly. Replace insulator after performing maintenance.

### DISTRIBUTOR BLOCK ASSEMBLY

### Requirement

Distributor block assembly positioned on casting so that rocker levers are fully engaged with bakelite on follower levers.

### To Adjust

Loosen distributor block assembly mounting screws and position block left or right.



### CODE LEVEL CONTACT GAPS

Requirement

With cam follower lever on high part of cam, contact gap should be:

Min 0.020 inch---Max 0.030 inch

To Adjust

Turn contact screw at socket end until desired gap is obtained.

Note 1: Position follower on high part of cam by tripping clutch manually and rotating distributor shaft.

Note 2: Check first six contact gaps from clutch end of shaft.

Note 3: The code level contact gaps may be refined by strobing. See Pars. 2.14 and 2.15.



CONTACT SCREW

(RIGHT SIDE VIEW)

2.11 Distributor Mechanism (Cont'd)

Note 1: Remove typing unit from the base before making the following adjustments.

Note 2: Remove fiberboard insulator from distributor terminal block to check and adjust distributor contact assembly. Replace insulator after performing maintenance.

# CLUTCH TIMING CONTACT GAP

Requirement

Distributor clutch should trip every time a keylever is depressed.

### To Adjust

With the clutch latched, back off contact screw until some gap is visible. Under power depress a keylever and slowly turn contact screw until distributor clutch becomes engaged. Give contact adjustment screw an additional 1/16 to 1/8 turn. Depress another keylever to ensure operation. Refine if necessary.

Note 1: Clutch timing contact is seventh contact from clutch end of shaft.

Note 2: In order to check timing contact gap, it is necessary to remake adjustment.

Note 3: Use an insulated adjustment tool when making adjustment.





CONTACT SCREW

(RIGHT SIDE VIEW)

### SOLENOID CONTACT GAP

Requirement With distributor clutch in latched or stop position, solenoid contact gap should be: ——Min 0.009 inch---Max 0.012 inch

To Adjust

Turn contact screw at socket end until desired gap is obtained.

Note: Solenoid contact is ninth contact position from clutch end.

## CLUTCH SHOE LEVER SPRING

Requirement

Clutch engaged. Clutch disc held to prevent its turning

to pull shoe lever in contact with lug on clutch disc.

2.12 Distributor Mechanism (Cont'd)

Note 1: Remove typing unit from the base before making the following adjustments.

Note 2: Remove fiberboard insulator from distributor terminal block to check and adjust distributor contact assembly. Replace insulator after performing maintenance.



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2.13 Distributor Mechanism (Cont'd)

# CLUTCH LATCHLEVER SPRING





(RIGHT SIDE VIEW)

## CLUTCH TRIP LEVER SPRING

Requirement

Clutch tripped and armature held against magnet core. —\_\_\_\_Min 2 oz---Max 3-1/2 oz to start trip lever moving.

# CLUTCH MAGNET ARMATURE BAIL SPRING

### Requirement

Clutch magnet tripped and shaft rotated manually until trip follower is on high of cam

Min 3 oz---Max 4-1/2 ozto start armature extension lever moving.



(RIGHT SIDE VIEW)

2.14 Distributor Mechanism (Cont'd)

# SIGNAL PULSE (FINAL ADJUSTMENT WITH DXD OR STROBE)

<u>Note 1</u>: Detailed instructions for operating signal distortion test set (DXD) are given in Teletype Bulletin 181B.

<u>Note 2</u>: Use correct unit code test set scale for test set (DXD); i.e., 5 level, 7.42 unit code test set scale for 7.42 unit code transmission, and 5 level, 7.00 unit code test set scale for 7.00 unit code transmission.

Note 3: The test set must operate at the same speed (Baud or WPM) as the distributor. Variations of the 28 Compact Keyboard Send Receive Sets distribute code at the following speeds:

| Unit Code | Baud (Bits per Second) | WPM (Words per Minute) |  |  |  |  |  |  |  |  |
|-----------|------------------------|------------------------|--|--|--|--|--|--|--|--|
| 7.00      | 45.5, 50.0 & 75.0      | 65.0, 71.4 & 107       |  |  |  |  |  |  |  |  |
| 7.42      | 45.5, 50.0 & 75.0      | 61.3, 67.3 & 101       |  |  |  |  |  |  |  |  |
| 7.42      | 45.5, 50.0 & 74.2      | 61.3, 67.3 & 100       |  |  |  |  |  |  |  |  |

### Procedure

Connect strobe or test set across each code level contact (first six contacts from clutch end) in turn to view pulse image generated by that distributor contact. Remove the armature bail spring from the distributor clutch magnet to hold armature down. Set Baud on keyboard to correspond with Baud of test set. Align end of stop pulse image generated by distributor with last mark on test set scale by rotating scale.

Note 4: The distributor contacts, numbered from the clutch end, are identified with their code levels as follows:

| 1. | No.  | 1 | code | level | pulse |
|----|------|---|------|-------|-------|
|    |      |   |      |       | pulse |
|    |      |   |      |       | pulse |
| 4. | No.  | 4 | code | level | pulse |
|    |      |   |      |       | pulse |
|    | Stop |   |      |       | •     |

(See next page for requirements)





Note 5: The auxiliary contacts, i.e., clutch timing contact and reset solenoid contact, do not require strobing.

2.16 Gear Shift Assembly

### TYPING UNIT GEAR BACKLASH

### Requirement

There should be perceptible backlash between the typing unit gear and the associated gear shift pinion at their closest point.

### To Adjust

Remove typing unit from base and terminal block bracket from gear shift casting. Loosen three locknuts on gear shift bracket clampscrews. Replace printer. Slide gear shift casting forward or backward to obtain proper gear tooth engagement.



### Requirement

There should be perceptible backlash between the motor pinion and the associated driven gear at their closest point.

### To Adjust

Loosen the two locknuts on the adjustable bushings. Raise or lower the two adjustable bushings to obtain proper gear tooth engagement.

Note: Check the Typing Unit Gear Backlash as this adjustment may have been disturbed when making the above adjustment. Refine both backlash adjustments, if necessary.



COLLAR

VARIABLE SPEED

SHIFT LINK

SHAFT

STOP PLATE

SPEED SELECTOR -SHAFT

SPEED SELECTOR

- KNOB

MOUNTING SCREWS

#### Gear Shift Assembly (Cont'd) 2.17

## SPEED SELECTOR STOP PLATE

### Requirement

Highest and lowest speed gears should engage variable speed shaft.

### To Check

With unit under power, detent selector knob to engage each of three gear speeds.

### To Adjust

With mounting screws loosened, position stop plate to left or right to obtain full range.



To Check

Disconnect shift link from collar by removing retainer ring. Slide key out from under gears.

CAUTION: PULL KEY TO LEFT SLOWLY. WHEN HEAD OF PIN BEGINS TO EMERGE,

# HOLD IT IN PLACE UNTIL COMPLETELY OUT. OTHERWISE PIN AND SPRING WILL FLY WITH DANGER OF LOSS. Requirement KEY Min 25 oz---Max 40 ozto depress key to lowermost position. SHIFT LINK SPRING RETAINER RING PIN COLLAR

# 2.18 Interrelated Adjustments (Cont'd)



### MARGIN INDICATOR SPRING



# 2.19 Local Function Mechanisms

# LOCAL CARRIAGE RETURN SPRING

# Requirement

With free end unhooked

- Min 5 oz---Max 7 oz-
- to extend spring to installed length.



# LOCAL LINE FEED SPRING



(RIGHT SIDE VIEW)

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## RECEIVE ONLY BASE

Note: The adjustments and spring tensions listed below are pertinent to the Receive Only Base. When making a complete readjustment of the base, they should preceed the adjustments in this part.

### Paragraph

| Typing Unit Gear Backlash     | a, | • |  | ×. |  | 2.16 |
|-------------------------------|----|---|--|----|--|------|
| Motor Pinion Backlash         |    |   |  |    |  | 2.16 |
| Mounting Typing Unit on Base. |    |   |  |    |  | 2.09 |
| Speed Selector Stop Plate     |    |   |  |    |  |      |
| Gear Shift Spring             |    |   |  |    |  |      |
| Local Carriage Return Spring. |    |   |  |    |  |      |
| Local Line Feed Spring        |    |   |  |    |  |      |

2.20 Local Function Mechanisms (Cont'd)

# LINE BREAK KEY

### Requirement

Typing unit should run in open condition when line break key is depressed. Break key extension must fully engage contact actuator.

### To Adjust

Position contact bracket with mounting screws loosened.



# LOCAL LINE FEED

### To Check

With cover in place, depress the local line feed key to advance platen.

### Requirement

Keylever extension must fully engage the local line feed adjusting screw to release the line feed clutch allowing the platen to advance.

### To Adjust

Loosen the locknut and turn the adjusting screw until requirement is met.

Note: Slot in adjusting screw should be left perpendicular to keylever extension.



# 2.21 Local Function Mechanism (Cont'd)

## LOCAL CARRIAGE RETURN

### To Check

Depress local carriage return key with cover in place and type box to the right. Type box should return to the left margin.

### Requirement

Keylever extension must engage the adjusting screw by at least half the width of the keylever extension to release the carriage return clutch, allowing the typebox to return to its left position.

### To Adjust

Loosen the locknut and turn the adjusting screw until requirement is met.

Note: Slot in adjusting screw should be left perpendicular to keylever extension.



### COVER

# 2.22 Latch and Hinge Mechanisms





### COVER LATCH

### Requirement

Latches should hold cover snugly in place by fitting tightly against latching posts.

## To Adjust

With typing unit removed and cover on base, loosen locknuts that hold eccentrics in place. Adjust eccentrics until latches are tight against latching posts without tilting cover. Tighten locknuts. Recheck latch operation and readjust if necessary.

2.23 Latch and Hinge Mechanisms (Cont'd)

# WINDOW DOOR HINGE

# Requirement

Window door should conform with curvature of cover when dome is latched.

# To Adjust

Position hinge brackets with mounting nuts loosened.



### DOME HINGE CLEARANCE

### Requirement

With dome closed, clearance between dome and cover should be:

Min 0.010 inch---Max 0.062 inch-

### To Adjust

Raise or lower hinges with cover mounting nuts loosened.



### DOME CENTERING

(1) Requirement

With dome closed, clearance between dome and rear of cover should be: Min 5/32 inch---Max 1/4 inch \_\_\_\_\_

(2) Requirement

With dome closed, sides of dome should be approximately centered and parallel on cover.

# To Adjust

Position dome with dome mounting nuts loosened.

2.24 Latch and Hinge Mechanisms (Cont'd)



DOME LATCH

 Requirement When dome is closed, latch should engage cover by

- Min 0.031 inch--- Max 0.085 inch

- (2) Requirement With window door and dome closed, latches should be parallel and freely engage underside of cover.
- To Adjust Position mounting brackets with mounting screws loosened.

2.25 Paper Guide and Window

# PAPER GUIDE

#### Requirement

### To Adjust

Loosen paper guide mounting nuts and position paper guide parallel with lower edge of dome.



### WINDOW



Requirement

With window door closed and dome latched, clearance between window edge and paper guide should be: —Min 0.080 inch---Max 0.110 inch

To Adjust

With clampscrews loosened, position window to meet requirement.

Note: Paper guide should clear window when dome is opened. If paper guide hits window, refine PAPER GUIDE adjustment.

2.26 Hood and Line Guide

# KEYBOARD HOOD (KSR SET ONLY)

Requirement

Bottom of keyboard hood should be flush with bottom of cover.

### To Adjust

With cover removed from base, position keyboard hood with mounting nuts loosened.

COVER



## (RIGHT SIDE VIEW)

# BASE HOOD (RO SET ONLY)

Requirement

Bottom of base hood should be flush with cover.

### To Adjust

With cover removed from base, position base hood with mounting nuts loosened.



(RIGHT SIDE VIEW)

## LINE GUIDE

### Requirement

Line guide should be parallel with bottom of window door.

### To Adjust

Position line guide mounting bracket with mounting screws loosened. Gauge by eye.



# 3. VARIABLE FEATURES





3.02 Time Delay Mechanism (Cont'd)





# To Disable

Loosen two mounting screws on the upstop bracket. Lower bracket to its bottom position. Tighten screws.

To Enable

Loosen two mounting screws on the upstop bracket. Raise bracket to its upper position. Tighten screws.



# 3.03 Time Delay Mechanism (Cont'd)



# CAM FOLLOWER LEVER SPRING

# To Check

Place upstop bracket in lowermost position. Unhook upper end of cam follower lever spring.

### Requirement

Min 9 oz---Max 11 ozto extend spring to installed length. Restore upstop bracket to its original condition after checking requirement.

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