# 28 Transmitter-Distributor Base

## Answer-Back Mechanism

### Requirements and Adjustments

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### 1. General

1.01 This section contains the requirements and adjustments for a 28 transmitter-distributor base equipped with the answer-back mechanism. This section and the general typewriter requirements and adjustments section provide the complete adjusting information for this unit. This section also describes how to code the message drum.

1.02 This section is reissued to make changes in the coding of the answer-back assembly and to include the latest adjusting requirements.

1.03 Where a requirement calls for the clutch to be disengaged, the clutch shoe lever must be fully latched between its triplever 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 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 dragging on the clutch drum.
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2. REQUIREMENTS AND ADJUSTMENTS

2.01 Clutch Triplever and Armature Mechanism

**CLUTCH TRIP ARMATURE AIR GAP (PRELIMINARY)**

**REQUIREMENT**

AIR GAP BETWEEN ARMATURE AND MAGNET ASSEMBLY BRACKET:
MIN. 0.004 INCH --- MAX. 0.008 INCH
WHEN ARMATURE IS HELD FLUSH AGAINST MAGNET CORE.

TO ADJUST

REMOVE ARMATURE EXTENSION SPRING, LOOSEN SPRING POST
AND HINGE MOUNTING SCREW AND POSITION HINGE.

**NOTE:** ONE SIDE OF THE ARMATURE CONTAINS A HEAVY CHROME PLATING
STAMPED "C." THE "C" SIDE SHOULD FACE THE MAGNET CORE. (DC OPERATION)

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**CLUTCH TRIPLEVER**

**REQUIREMENT**

CLEARANCE BETWEEN ARMATURE EXTENSION LEVER
AND LATCHING SURFACES OF CLUTCH TRIPLEVER
MIN. 0.020 INCH --- MAX. 0.030 INCH
WHEN CLUTCH TRIPLEVER ON HIGH PART OF CAM.

TO ADJUST

LOOSEN PLATE ADJUSTING SCREW AND PLATE MOUNTING SCREW, INSERT SCREWDRIVER IN SLOT
ADJACENT TO ADJUSTING SCREW AND POSITION PLATE FOR REQUIRED CLEARANCE.

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**ARMATURE EXTENSION**

**REQUIREMENT**

CLEARANCE BETWEEN ARMATURE EXTENSION LEVER AND CLUTCH TRIPLEVER
MIN. 0.030 INCH --- MAX. 0.040 INCH
WHEN CLUTCH TRIPLEVER IS ON HIGH PART OF CAM AND ARMATURE IS FLUSH AGAINST CORE (PLAY TAKEN UP WITH SPRING).

TO ADJUST

LOOSEN BRACKET MOUNTING SCREW AND BRACKET ADJUSTING SCREW AND INSERT SCREWDRIVER INTO SLOT BELOW ADJUSTING SCREW, AND ADJUST BRACKET.
2.02 Clutch Stop Arm, Clutch Shoe Lever, and Cam Follower Guide

**Clutch Stop Arm**

**Requirement**

With Clutch Trip Lever in latched position, Clutch Lever shall 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.

**Note:** When armature is in attracted position, Clutch Stop Arm should clear Stop Lever and Stop Lug by at least some clearance.

**Clutch Shoe Lever**

**Requirement**

Clearance between Clutch Shoe Lever and extension

- Min. 0.055 inch
- Max. 0.085 inch
Greater when Clutch is engaged than when disengaged.

**To Adjust**

Loosen two clamp screws in Clutch Disk. Rotate adjusting disk to obtain proper clearance.

**Note:** After above adjustment is made, disengage Clutch and rotate drum in normal rotation to make certain it does not drag on shoes. If drum drags, refine adjustment.

**Cam Follower Guide**

**Requirement**

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

**To Adjust**

Position Cam Follower Guide with its mounting screws loosened. After tightening, check for freeness.
2.03 Distributor Block Assembly, Distributor Contact Gap, and Clutch Shoe Lever Spring

**Distributor Block Assembly**

**Requirement**

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

**To Adjust**

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

**Follower Lever Bakelite**

**Follower Levers**

**Distributor Contact Gap**

**Requirement**

Contact gap

Min. 0.020 inch --- Max. 0.030 inch with cam follower lever on high part of cam.

**To Adjust**

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

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

**Contact Screw**

**Clutch Shoe Lever**

**Lug**

**Clutch Shoe Lever Spring**

**Requirement**

Clutch engaged, clutch disk held to prevent its turning:

Min. 15 ozs. --- Max. 20 ozs.

To pull shoe lever in contact with lug on clutch disk.

**Clutch Disk**
2.04 Clutch Shoe and Distributor Cam Follower Springs

NOTE
AS IT REQUIRES REMOVAL OF CLUTCH FROM SHAFT, THIS SPRING TENSION SHOULD NOT BE CHECKED UNLESS THERE IS GOOD REASON TO SUSPECT THAT IT WILL NOT MEET ITS REQUIREMENT.

CLUTCH SHOE SPRING
REQUIREMENT
CLUTCH DRUM REMOVED
MIN. 3 OZS. --- MAX. 5 OZS.
TO START PRIMARY SHOE MOVING AWAY FROM SECONDARY SHOE.

DISTRIBUTOR CAM FOLLOWER SPRING
REQUIREMENT
DISTRIBUTOR BLOCK REMOVED.
MIN. 1/2 OZ. --- MAX. 1-1/2 OZS.
TO START CAM FOLLOWER LEVER MOVING WHEN LEVER IS ON HIGH PART OF CAM.
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2.05 Distributor Rocker and Compression Springs

DISTRIBUTOR ROCKER SPRING

REQUIREMENT
WITH COMPRESSION SPRINGS REMOVED AND CONTACTS INITIALLY ADJUSTED SO CONTACT SURFACE IS APPROXIMATELY 1/32 INCH BELOW OUTER SURFACE OF CONTACT BLOCK:
MIN. 3 OZS. --- MAX. 4 OZS.
TO SEPARATE CONTACTS.

DISTRIBUTOR ROCKER COMPRESSION SPRING

REQUIREMENT
WITH COMPRESSION SPRINGS INSTALLED
MIN. 6-1/2 OZS. --- MAX. 9-1/2 OZS.
TO JUST SEPARATE CONTACTS.
2.06 Clutch Latch Lever, Trip Lever, and Magnet Armature Bail Springs

**Clutch Latch Lever Spring**

**Requirement**
- Clutch latch lever on low of clutch disk (but not latched)
- Min. 2-1/2 ozs. --- Max. 4-1/2 ozs.
- To start latch lever moving.

**Clutch Trip Lever Spring**

**Requirement**
- Clutch tripped and armature held against magnet core
- Min. 2 ozs. --- Max. 3-1/2 ozs.
- To start trip lever moving.

**Clutch Magnet Armature Bail Spring**

**Requirement**
- Clutch magnet tripped and shaft rotated manually until trip follower is on high part of cam, auxiliary contact swinger held away from extension lever
- Min. 2-1/2 ozs. --- Max. 4 ozs.
- To start armature extension moving.
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2.07 Auxiliary Contact (TWX)

(A) REQUIREMENT

WITH ARMATURE EXTENSION IN RELEASED POSITION

THIS CONTACT MUST BE CLOSED.

MOUNTING PLATE

INSULATOR

ARMATURE EXTENSION
(RELEASED POSITION)

CONTACT ASSEMBLY

(MOUNTING SCREWS)

(B) REQUIREMENT

1. WITH ARMATURE EXTENSION IN RELEASED POSITION

MIN. 8 GRAMS -- MAX. 15 GRAMS

TO JUST SEPARATE CLOSED CONTACTS.

2. WITH ARMATURE EXTENSION HELD AGAINST MAGNET CORE

MIN. SOME -- MAX. 0.012 INCH

BETWEEN INSULATOR AND ARMATURE EXTENSION.

3. WITH ARMATURE EXTENSION HELD AGAINST MAGNET CORE

MIN. 0.008 INCH -- MAX. 0.015 INCH

BETWEEN UPPER CONTACTS.

TO ADJUST

POSITION CONTACT ASSEMBLY UP OR DOWN WITH CONTACT ASSEMBLY BRACKET MOUNTING SCREWS LOOSENED.
NOTE: TO CHECK TENSIONS (A) AND (B), REMOVE ENTIRE ANSWER-BACK MECHANISM FROM ITS BRACKET.

REMOVE MESSAGE DRUM AND TAKE OFF THE CONTACT BLOCK.

(A) CLUTCH LATCH CONTACT SPRING

REQUIREMENT
MIN. 1/2 OUNCE
MAX. 1-1/2 OUNCES
TO START CLUTCH LATCH CODE BLADE LEVER MOVING WHEN THE LEVER IS RESTING AGAINST CAM SLEEVE.

(B) CAM AND CODE BLADE LEVER SPRING

REQUIREMENT
MIN. 1-1/2 OUNCES
MAX. 2-1/2 OUNCES
TO START CAM AND CODE BLADE LEVERS MOVING WHEN THE LEVERS ARE ON HIGH PART OF RESPECTIVE CAMS.

REASSEMBLE ANSWER-BACK MECHANISM.
2.09 Answer-back Assembly

**D) Clutch Latching Contact Gap**

- **Requirement**
  - Gap between clutch latching contacts
  - MIN: 0.030 inch
  - MAX: 0.035 inch

- **To Check**
  - Rotate message drum until clutch latch code blade lever is resting on stop projection of stop blade.
  - To adjust
    - Position contact screw.

**C) Cam Follower Code Blade Clearance**

- **Requirement**
  - Clearance between cam follower code blade and associated tine on code blade of message drum
  - MIN: 0.007 inch
  - MAX: 0.030 inch

- **To Check**
  - Disengage clutch. Tines of code blades should be opposite projections of cam follower code blades.

- **To Adjust**
  - Position bracket with mounting screws loosened.

**B) Message Drum End Play**

- **Requirement**
  - End play between message drum and bracket or drive plate
  - MIN: SOME
  - MAX: 0.012 inch

- **To Adjust**
  - Position rear message drum bracket with the two mounting screws loosened.
  - Keep bracket square with drum drive plate.

*Continued on following page*
NOTE: WHERE NECESSARY, REMOVE SHOULDERScrew AND TAKE OFF ANSWER-BACK DRIVEN GEAR.

(E) FEED PAWL CLEARANCE (PRELIMINARY)
REQUIREMENT
CLEARANCE BETWEEN LATCHING SURFACE OF FEED PAWL AND FEED PROJECTION OF CODE BLADE ON MESSAGE DRUM
MIN. 0.010 INCH
MAX. 0.025 INCH
TO CHECK: DISENGAGE CLUTCH.
TO ADJUST
LOOSEN PLATE MOUNTING SCREW AND ECCENTRIC RETAINING NUT TO FRICION TIGHT
POSITION ECCENTRIC WITH SCREWDRIVER THROUGH HOLE PROVIDED IN BRACKET. DO NOT TIGHTEN NUT OR SCREW (OR REPLACE DRIVEN GEAR) UNTIL REFINING ADJUSTMENT (I) IS MADE.

(F) FEED PAWL SPRING
REQUIREMENT
MIN. 1 1/2 OZS.
MAX. 2 1/2 OZS.
TO START FEED PAWL MOVING WHEN THE CLUTCH IS DISENGAGED AND FEED PAWL IN STOP POSITION.

(G) DETENT ROLLER POSITION
1. REQUIREMENT
ROLLER ON DETENT LEVER SHALL BE FIRMLY SEATED BETWEEN TWO DETENT PROJECTIONS OF CODE BLADES IN MESSAGE DRUM.
TO CHECK: DISENGAGE CLUTCH.
2. REQUIREMENT
CODE BLADE PROJECTIONS (TINES) ON MESSAGE DRUM SHALL BE CENTRALLY LOCATED WITH RESPECT TO CAM FOLLOWER CODE BLADE (GAUGE BY EYE).
TO CHECK
TRIP CLUTCH, ROTATE MAIN SHAFT TO INDEX MESSAGE DRUM FOR NEXT CHARACTER.
TO ADJUST
POSITION DETENT ROLLER ASSEMBLY BY MEANS OF ECCENTRIC SCREW LOOSENED TO FRICION TIGHTNESS.

(H) DETENT LEVER SPRING
REQUIREMENT
MIN. 4 OZS.
MAX. 6 OZS.
TO MAKE DETENT LEVER MOVE WHEN ITS ROLLER IS RESTING BETWEEN TWO DETENT PROJECTIONS ON MESSAGE DRUM AND THE CLUTCH DISENGAGED.

(I) FEED PAWL CLEARANCE (FINAL)
RECHECK PRELIMINARY FEED PAWL CLEARANCE ADJUSTMENT (E) AND REFINE IF REQUIRED.
TIGHTEN NUT AND SCREW. REPLACE THE DRIVEN GEAR AND SHOULDERScrew IF PREVIOUSLY REMOVED

CONTINUED ON FOLLOWING PAGE
2.09 Answer-back Assembly (Cont)

(J) FEED PAWL BACKSTOP

REQUIREMENT
CLEARANCE BETWEEN LATCHING SURFACE
OF FEED PAWL AND ADJACENT FEED PROJECTION ON MESSAGE DRUM
MIN. 0.010 INCH
MAX. 0.025 INCH

TO CHECK TRIP CLUTCH, ROTATE MAIN SHAFT SLOWLY
UNTIL FEED PAWL REACHES MAXIMUM REARWARD TRAVEL,
TO ADJUST LOOSEN LOCK NUT AND POSITION BACK-STOP SCREW.

(K) DRIVE PLATE SPRING

REQUIREMENT
MIN. 18 OZS.
MAX. 24 OZS.
TO MOVE FEED PAWL FROM STOP POSITION
(CLUTCH DISENGAGED).

CONTINUED ON THE FOLLOWING PAGE
3. CODING THE ANSWER-BACK ASSEMBLY

1. THE MESSAGE DRUM HAS A CAPACITY OF 21 CHARACTERS. CHARACTERS ARE DETERMINED BY DETACHABLE CODE BLADES SET IN THE MESSAGE DRUM. SINCE PROJECTIONS ON THE CODE BLADES ARE USED TO ROTATE THE DRUM, ALL OF ITS 21 SLOTS MUST BE OCCUPIED BY A BLADE.

2. THE LAST CHARACTER TRANSMITTED IS DETERMINED BY A SPECIAL STOP CODE BLADE. THIS CHARACTER MUST ALWAYS BE A LTRS COMBINATION AND ITS POSITION DETERMINES THE LOCATION OF SLOT 21.

3. CODE A BLADE BY BREAKING OFF THE UNWANTED TINES AT THE SCORED LINE AT THE BASE OF THE TINE. TINES WHICH ARE TO BE REMOVED FOR A PARTICULAR CHARACTER ARE SHOWN ON THE FOLLOWING PAGE. TO PREVENT DISTORTION OF A CODE BLADE, EACH BLADE SHOULD BE HELD SECURELY NEAR THE SCORE MARK OF THE TINE TO BE REMOVED.

4. PLACE AN "O" RING IN THE GROOVE ON THE RIM OF THE MESSAGE DRUM WHICH IS FURTHEST FROM THE SLOT IN THE CENTER PORTION OF THE DRUM. INSTALL A STOP BLADE IN SLOT 21 BY FIRST INSERTING THE BLADE UNDER THE "O" RING AND THEN ROTATING THE BLADE TOWARD THE CENTER OF THE DRUM UNTIL IT IS FULLY SEATED.

CONTINUED ON THE FOLLOWING PAGE
3. CODING THE ANSWER-BACK ASSEMBLY (Cont)

5. CODE THE DRUM IN A COUNTERCLOCKWISE DIRECTION BEGINNING WITH THE NO. 1 BLADE ADJACENT TO THE STOP BLADE AS FOLLOWS:

1 LTRS
2 CARRIAGE RETURN
3 LINE FEED
4 LTRS
5-16 CUSTOMER IDENTIFICATION
17 LTRS
18 CARRIAGE RETURN
19 LINE FEED
20 BLANK
21 LTRS (USING THE SPECIAL STOP BLADE)

WHENEVER THE CUSTOMER IDENTIFICATION IS LESS THAN 12 CHARACTERS, USE LTRS CHARACTERS UP TO AND INCLUDING SLOT 16.

- LEAVE TINE
- REMOVE TINE

6. AFTER FILLING THE DRUM, ENCIRCLE THE BLADES BY PLACING ANOTHER "0" RING IN THE GROOVE ON THE OPPOSITE RIM OF THE DRUM.


LUBRICATE THE MECHANISM ACCORDING TO THE BELL SYSTEM PRACTICE FOR THE 28 TRANSMITTER-DISTRIBUTOR BASE, ANSWER-BACK MECHANISM, LUBRICATION.

NOTE:
1. STOP BLADE HAS SAME PROVISIONS FOR INDIVIDUAL CODING AS STANDARD CODE BLADE.

2. WHEN CODING THE BLADES REMOVE THE "0" POSITION TINE ON ALL STOP AND CODE BLADES.