

**BELL SYSTEM PRACTICES**  
Teletypewriter Stations

**SECTION P34.101**  
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## **28 TELETYPEWRITER**

### **LIST OF UNITS**

### **AND**

### **AUXILIARY FEATURES**

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#### **1. GENERAL**

1.01 This section lists by code designations, together with brief descriptive information, the 28 teletypewriter apparatus units and the auxiliary features associated with these units.

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1.02 This section is reissued to:

- (a) Add to the listings and describe new or improved units and associated auxiliaries, in particular such as are arranged to provide for sprocket-feed, horizontal-tabulating, and selective-calling features.
- (b) Add to the listings a number of new conversion and maintenance kits.
- (c) Improve the text by tabular presentation, where possible.

Because of the extensive changes made, marginal arrows are not feasible.

1.03 A 28-type teletypewriter station consists in general of the coded components below which must be provided:

- (a) typing unit
- (b) typebox
- (c) teletypewriter base
- (d) set of gears
- (e) motor unit
- (f) electrical service unit
- (g) cabinet

1.04 Each of the coded components may be obtained in various designs to suit the functions it is required to perform.

1.05 In addition to the coded units there are numerous auxiliary features. An auxiliary feature is provided by an apparatus assembly which is not regularly part of coded units, but is ordered separately to be installed by the factory before delivery or by others after delivery. In some instances, coded machines include parts listed as auxiliary features, but this is the exception. The tariff usually provides for an additional charge for auxiliary features.

1.06 Various sets of parts are provided to convert a coded unit from one model to another, or to convert auxiliary features to a later design. For example, a friction-feed typing unit can be converted to sprocket feed.

1.07 Finally, the various maintenance parts kits for servicing units are tabulated.

## 2. TYPING UNITS

2.01 Typing units are arranged to provide for friction-feed, sprocket-feed, horizontal-tabulating, and selective-calling features. Older 28A units and interim 28A1 and 28A2 units are of the type in which the function-pawl stripper bail is operated from the typebox clutch. The 28B, C, D, E, F, and G units are of the improved type in which the function-pawl stripper bail is operated by the function clutch and thereby the

typing operation is separated from the operation of the function mechanism, as is necessary for selective-calling uses.

2.02 The following table gives the codes assigned to 28 typing units and indicates the essential features provided under each of these codes:

	<b>Nonselective Calling</b>	<b>Non-selective Calling</b>	<b>Selective Calling</b>
		(Function-pawl stripper bail operated from function clutch.)	
Friction Feed	28A (to be superseded by 28D)	28D	28E
Sprocket Feed	28A1 (to be superseded by 28B)	28B	28F
Sprocket Feed with Horizontal Tabulator	28A2 (to be superseded by 28C)	28C	28G

2.03 Features common to all the typing units are as follows:

- (a) Signal-bell contacts on upper-case S.
- (b) Motor-stop contacts (except on selective-calling units).
- (c) Unshift on space (activated but can be disabled).
- (d) Keyboard Lock (Break Signal Mechanism) normally on double blank (can be disabled).

2.04 Features provided on the stuntbox of selective-calling typing units are as follows:

- (a) One shift slide to shift the unit from nonprint to the print condition, equipped with one function-lever mechanism which responds to U as a group call. For other CDCs, function bars and associated parts must be ordered and installed separately.
- (b) Function-lever mechanisms operating on the disconnect code (FIGS H LTRS) shift the unit to the select-nonprint condition.
- (c) Shift slide responding to CAR RET LINE FEED LTRS (end-of-address code) to shift the unit to the nonselect condition.
- (d) Function-lever mechanism to lock the keyboard of unselected machines on the end-of-address signal.
- (e) A contact block with four contacts for copylight control, busy lamp, busy lamp flashing, and bell.

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2.05 All sprocket-feed typing units include the TP153926 cabinet parts to modify a 28-type teletypewriter cabinet for use with sprocket-feed paper. See Paragraph 9.03.

2.06 Sprocket-feed typing units are equipped with parts for handling superfold sprocket-feed stationery 8-1/2" wide. Paper widths other than 8-1/2" can be accommodated by installing on the typing unit the paper-handling parts and associated paper tray required for the width of paper desired. See Paragraph 9.06.

### 3. TYPEBOXES

<u>Code</u>	<u>Bell System Type Arrangement</u>
28A	A
28B	B
28C	C
28D	D

### 4. TELETYPEWRITER BASES

4.01 **28A Teletypewriter Base**—A send-receive base usable only with the 28A electrical service unit, and equipped with keytop arrangement C. Behind the character keyboard are six red keys which furnish the following operating features: local line feed, keyboard lock, keyboard unlock, break (opening contacts of signal generator), repeat character operation, and local carriage return. The base is provided with radio-frequency filter for signal generator (sending contacts).

4.02 **28B Teletypewriter Base**—A receiving-only base usable with the 28B electrical service unit. Two keys provide for local line feed and local carriage return. Space is provided for a break key, available as the TP152344 set of parts. See Paragraph 9.21.

4.03 **28C Teletypewriter Base**—A send-receive base, the same as the 28A teletypewriter base, except that it has a separate break contact and uses a W.E.Co. 185A network instead of a radio-frequency filter. The base is arranged for operation with a 28B electrical service unit.

### 5. SETS OF GEARS

5.01 The following sets of gears consist of a motor pinion and a countershaft gear, usable with either synchronous or governed motors:

<u>Code</u>	<u>Speed (words per minute)</u>
28A	60
28B	75
28C	100

## 6. MOTOR UNITS

- 6.01 **28A Motor Unit**—A synchronous motor unit equipped with a starting relay.
- 6.02 **28B Motor Unit**—A series motor unit equipped with a centrifugal-type governor and the necessary components for governing and spark protection circuits. It is designed for operation on 115-volt ac or on 115-volt dc with a capacitor-resistor assembly mounted in the electrical service unit as discussed in Paragraph 9.01. Requires tuning fork TP104986 for setting speed.

## 7. ELECTRICAL SERVICE UNITS

- 7.01 **28A Electrical Service Unit**—A service assembly to be mounted in the 28A teletypewriter cabinet. It is equipped with a line-shunt relay, fuses, switches, wiring and cables with plug receptacles. It is not equipped with, but has provision for, other auxiliary features listed hereafter.
- 7.02 **28B Electrical Service Unit**—A service assembly to be mounted in the 28B and 28C teletypewriter cabinet. It differs from the 28A electrical service unit in that it is equipped with four connecting blocks instead of three. It is likewise not equipped with, but has provision for, auxiliary features listed hereafter.

## 8. 28 TELETYPEWRITER CABINETS

- 8.01 **28A Teletypewriter Cabinet**—A console-type cabinet for 28-type, either send-receive or receiving-only teletypewriters, and designed for use with the 28A electrical service unit. It is equipped with a copylight, an end-of-line indicator lamp, signal bell, and the necessary cabling and three 10-terminal terminal blocks for external connections. The upper section has a hinged cradle for the teletypewriter; a copyholder is mounted on the front of the cover. The lower section has a shelf for a rectifier and a door that can be used as a maintenance tray.
- 8.02 **28B Teletypewriter Cabinet**—Similar to the 28A teletypewriter cabinet except that it is equipped with two 20-terminal terminal blocks and with incandescent lighting instead of fluorescent lighting. It is designed for use with the 28B electrical service unit.
- 8.03 **28C Teletypewriter Cabinet**—A cabinet for table mounting. It is similar to the upper portion of the 28B teletypewriter cabinet and is designed for use with the 28B electrical service unit.

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## 9. AUXILIARY FEATURES AND CONVERSION PARTS

### A. Auxiliaries Associated with the Electrical Service Units

9.01 The following table lists and describes the auxiliary features associated with the electrical service units:

	<u>Set of Parts For</u>		
	<u>28A Electrical Service Unit</u>	<u>28B Electrical Service Unit</u>	<u>Description</u>
Line Test Key Assembly	TP152744	TP152625	Provides for switching from signal line operation to local operation for test or maintenance purposes.
Line Relay Mounting Assembly	TP151822	TP152623	Provides a mounting for the 255A line relay.
Line Pad Resistor Assembly		TP152330	Provides the necessary current limiting resistance in series with the signal line circuit when the signal line current is to be supplied at the station.
Rectifier and Cable Assembly	TP151999	TP152950	Provides direct current for the selector magnet and the line-relay biasing winding. It is not designed to supply the signal line current.
Capacitor-Resistor	TP152021	TP152624	Adapts a 28 teletypewriter set equipped with a series motor to operate from a 115-volt dc supply.
Electrical Motor Control Assembly	TP151400	TP153251	This assembly of start and stop magnets and contacts works together with the motor-stop contacts on the typing unit or the time-delay motor-stop mechanism on the base to start and stop the teletypewriter motor.

9.02 The following are sets of parts for converting the 28A electrical service unit to a 28B unit, and for converting the auxiliary parts of the 28A electrical service unit to the corresponding parts on the 28B electrical service unit.

Conversion Set of Parts

Conversion

TP152324	28A to 28B Electrical Service Unit
TP152325	TP152744 to TP152625 Line Test Key Assembly
TP152326	TP151822 to TP152623 Line Relay Mounting Assembly
TP152327	TP151999 to TP152950 Rectifier and Cable Assembly
TP152328	TP152021 to TP152624 Capacitor-Resistor Assembly
TP152329	TP151400 to TP153251 Motor Control Assembly

## B. Auxiliaries Associated with Cabinets

9.03 The following is a list of the auxiliary features associated with the cabinets:

Conversion Unit (TP152321)	To convert the 28A cabinet to the electrical equivalent of the 28B cabinet.
Copyright (TP153309) End-of-Line Indicator Lamp (TP152310)	Provided as part of TP152321 conversion unit.
28A Copyholder	Offset copyholder, to be mounted on right side of the 28A and 28B cabinet.
28B Copyholder	Offset copyholder, similar to 28A copyholder, to be mounted on right side of the 28C cabinet.
Auxiliary Apparatus Mounting Rack (TP152909)	Set of mounting racks to permit mounting 19-inch relay rack mounting plates in the lower compartment of the 28A and 28B cabinet.
Directory Holder (TP152910)	To be mounted on left side of the 28A and 28B cabinet.
Directory Holder (TP152300)	To be mounted on left side of the 28C cabinet.
28A Paper Box	Floor-mounted stand to be attached at the rear of the 28A and 28B cabinet for containing a supply of form stationery in alignment with the typing unit. A form-accumulating shelf for typed forms is provided as part of the paper box. A TP153842 paper-holder clip is also provided to facilitate the insertion of paper into the typing unit.
Modification Kit (TP153926) (Cabinet Paper Guide Set of Parts)	To be installed on the 28A and 28B cabinet to permit handling sprocket-feed paper. (This kit is an accessory to the sprocket-feed typing unit and is supplied with the typing unit.)

### C. Conversion Parts and Auxiliary Features for Sprocket-Feed Operation

9.04 Conversion Parts required on the typing unit and cabinet to convert a friction-feed teletypewriter set to a sprocket-feed set are tabulated below:

<u>Set of Parts</u>	<u>Installation On</u>	<u>Reference Paragraph</u>
Conversion Set (TP152316)	Typing Unit	9.05
Modification Kits (TP153701 through TP153717) } Paper Trays (TP153726 through TP153729) }	Typing Unit	9.06
Spacing Drum Parts (TP153905 or TP153914)	Typing Unit	9.07
Modification Kit (TP153926)	Cabinet	9.03
28A Paper Box	Cabinet	9.03

**9.05 Conversion Set of Parts (TP152316)**—To convert a 28-type friction-feed typing unit into a sprocket-feed typing unit. This conversion set includes all conversion parts required for the typing unit except the variable parts covered by Paragraphs 9.06, 9.07 and 9.08.

Note: The TP153673 shaft tool and TP153797 retaining tool are required for the assembly of the sprockets in the TP152316 set of parts.

**9.06 Modification Kits (TP153701 through TP153717)**—To adapt a sprocket-feed typing unit to a desired width of continuous superfold form stationery. Each kit is used in association with a particular paper tray which is ordered separately. Tabulated below are the various widths of stationery together with the corresponding modification kits and paper trays:

<u>Paper Width in Inches</u>	<u>Modification Kit</u>	<u>Paper Tray</u>
9	TP153701	TP153727
8-1/2	TP153702	TP153726
8	TP153703	TP153727
7-1/2	TP153704	TP153726
7	TP153705	TP153727
6-1/2	TP153706	TP153726
6-3/8	TP153707	TP153728
6-1/4	TP153708	TP153729
6	TP153709	TP153727
5-3/4	TP153710	TP153728
5-1/2	TP153711	TP153726
5	TP153712	TP153727
4-1/2	TP153713	TP153726
4-5/16	TP153714	TP153729
4-1/4	TP153715	TP153728
4	TP153716	TP153727
3-5/8	TP153717	TP153726

**9.07 TP153905** (for units not equipped with the automatic carriage-return and line-feed feature) or **TP153914** (for units equipped with the automatic carriage-return and line-feed feature) **set of parts:** To provide a universal spacing drum on the typing unit for handling narrow-page friction-feed paper centrally located or narrow-page sprocket-feed paper located at the left-hand side. Whenever friction feed is converted to sprocket feed, these parts should be installed.

**9.08 Page Feed-Out Mechanism (TP152302 or TP153907)—**

To be installed on the typing unit to provide automatic advancing of a sprocket-feed form from any point on the form to the first printing line on the succeeding form. Only the TP153907 set of parts includes contacts for controlling an associated transmitter distributor.

(a) The following table indicates the gear and disc assembly set to be used in addition to the TP152302 or TP153907 set of parts for a given length of form :

<u>Gear and Disc Set</u>	<u>Form Length in Inches</u>
TP153927	15, 7-1/2
TP153928	14, 7, 3-1/2
TP153929	13, 6-1/2
TP153930	12, 6, 3
TP153931	11, 5-1/2
TP153932	10, 5
TP153933	9-1/2
TP153934	9, 4-1/2
TP153935	8-1/2, 4-1/4
TP153936	8, 4, 2

**D. Associated with Selective-Calling Typing Units**

**9.09 Conversion Set of Parts (TP153941)—**To convert a 28D, 28B or 28C typing unit into a 28E, 28F, or 28G typing unit respectively. These are the basic selective-calling parts furnished in the 28E, 28F, and 28G units. Additional function-bar and function-lever parts are required as described in Paragraphs 9.10 and 9.11.

9.10 Cut-on parts, as tabulated below, are required for selective-calling typing units. In addition, function bars listed in Paragraph 9.11 are also required.

(a) **On 1-Letter Codes**

	<u>Stuntbody Parts Required</u>		
	<u>Features to be Provided</u>	<u>Function-Lever Parts</u>	<u>Contact Assembly*</u>
1.	To call in machine	TP153918	— **
2.	To momentarily close contact	TP153916	TP152737
3.	To momentarily open contact	TP153916	TP153324
4.	To latch contact closed on CDC and release on FIGS H LTRS	TP153918	TP152737
5.	To latch contact open on CDC and release on FIGS H LTRS	TP153918	TP153324

\* Contact assembly TP152737 consists of a contact block mounting a single make-contact mechanism. Contact assembly TP153324 is the same except that it has only a single break-contact mechanism. However, the contact blocks are each capable of holding three additional contact mechanisms which may be selected from the following:

Make-contact mechanism—TP154751 set of parts

Break-contact mechanism—TP154752 set of parts

\*\* In this case a shift slide is provided in the stuntbox.

(b) **On 2-Letter Codes**

For each feature listed under (a), TP153915 function-lever parts are required (to operate on the first letter of the CDC) in addition to the respective function-lever parts and contact assemblies which then operate on the second letter.

In addition, the TP157164 shift slidebar is needed for 2-letter code operation instead of the shift slidebar used in 1-letter code operation.

(c) If an additional shift slide is desired, shift slide TP154750 should be added for 2-letter code operation. The part number for 1-letter code operation is not presently available; latest information should be secured at the time needed.

9.11 Additional cut-on character function bars are required with each of the above sets of function-lever parts for selective-calling typing units. Function-bar mechanisms should be ordered for 1-letter codes, or for the first and second letter on 2-letter code sequences, from the list below, according to characters desired.

**List for Cut-on Character Function Bars**  
(Both Upper and Lower Case)

<u>Character</u>	<u>Bar</u>	<u>Character</u>	<u>Bar</u>
A	TP155100	N	TP155113
B	TP155101	O	TP155114
C	TP155102	P	TP155115
D	TP155103	Q	TP155116
E	TP155104	R	TP155117
F	TP155105	S	TP155118
G	TP155106	T	TP155119
H	TP155107	U	TP155120
I	TP155108	V	TP155121
J	TP155109	W	TP155122
K	TP155110	X	TP155123
L	TP155111	Y	TP155124
M	TP155112	Z	TP155125

**Note:** All of the above function bars are coded to operate in the select condition only.

**E. Parts to Provide Remote Motor Control**

9.12 If it is desired to turn the teletypewriter motor on and off from a remote point, two sets of parts are required, with a third set needed if the automatic shut-down of the motor is desired after a fixed time delay.

(a) Upper-case BLANK H contacts on the stuntbox of the typing unit (furnished on all typing units except selective-calling units 28E, F, and G).

(b) Electrical motor-control assembly on the electrical service unit. See Paragraph 9.01.

(c) Optionally, the time-delay motor stop mechanism on the base.

9.13 **Motor-Stop Contact Parts (TP153924)**—To provide for motor stop on upper-case BLANK H on selective-calling typing units when the units are in the select nonprint condition. These mount on the stuntbox.

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9.14 **Time-Delay Motor-Stop Mechanism (TP152338)**—To be installed on send-receive or receiving-only bases, to measure a predetermined time interval during which the teletypewriter receives no telegraph signals, and thereafter to energize the associated electrical motor control assembly to stop the teletypewriter motor.

#### F. Miscellaneous Features Associated with Typing Units

9.15 **Horizontal Tabulator Mechanism (TP153908)**—To convert a 28A1, 28B, or 28F typing unit into a 28A2, 28C, or 28G typing unit, respectively, and to provide tabulating features on friction-feed typing units where this may be desired. This mechanism includes a contact to control an associated transmitter distributor start magnet. (If parts without this transmitter control are desired, the TP152304 set of tabulator parts should be ordered.)

9.16 **Multicopy Roll Paper Handling Mechanism (TP152340)**—To control multiple carbon friction-feed paper (original and two carbons).

9.17 **Latching Control Parts Mechanism (TP152307)**—A reperforator-control mechanism to close and latch a contact on upper-case H and unlatch the contact on upper-case F.

9.18 **Automatic Carriage Return—Line Feed Parts TP152322**—Typing-unit parts (except for stuntbox) to provide automatic carriage return and line feed.

**TP152335**—Stuntbox parts to provide automatic carriage return and line feed.

**Note:** These parts cannot be used with selective-calling typing units.

9.19 **Space on Upper-Case BLANK Mechanism (TP152900)**—To provide spacing on upper-case BLANK (along with the printing of a dash) on 28 typing units for weather service.

#### G. Miscellaneous Features Associated with Bases

9.20 **Break Key Mechanism (TP152333)**—To be installed on 28A bases to provide a separate BREAK key.

9.21 **Break Key Mechanism (TP152344)**—To be installed on receiving-only bases to provide a BREAK key.

9.22 **Paper Feed-Out Motor Start Mechanism (TP152334)**—To be installed on send-receive or receiving-only bases in sets equipped with a 28B electrical service unit, to permit starting the teletypewriter motor, simultaneously feeding out copy paper by depressing the local line-feed keylever without operating the line shunt relay.

9.23 **Keylever Conversion Sets**—The following sets of key-levers convert keytop arrangement C to the other arrangements indicated:

<u>Set of Parts No.</u>	<u>Convert Arrangement C to Arrangement</u>
TP152904	D
TP152905	B
TP152906	A

**Note:** The entire keylever is changed. Do not remove the keytops proper from the levers.

## 10. MAINTENANCE PARTS KITS

10.01 Maintenance Kits for servicing 28-teletypewriter units are tabulated below.

<u>Equipment to be Serviced</u>	<u>For Maintenance of Single Unit</u>	<u>For Maintenance of 2 to 5 Units</u>
28 Teletypewriter Set	TP152861	TP152862
28B Cabinet and 28B Electric Service Unit } 28D Typing Unit	TP154712	TP154714
Selective-Calling Typing Unit	TP154715	TP154713
Sprocket-Feed Typing Unit	TP154716	TP154719
Horizontal-Tabulate Typing Unit	TP154717	TP154720
Unit	TP154718	TP154721

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