

**DEPARTMENT OF THE ARMY TECHNICAL MANUAL  
DEPARTMENT OF THE AIR FORCE TECHNICAL ORDER**

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**FIELD AND DEPOT MAINTENANCE**

**HANDSETS H-33D/PT, H-33E/PT, AND H-33F/PT**

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**Departments of the Army and the Air Force, Washington 25, D. C.**

**8 May 1959**

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**\*This manual supersedes DA Supply Manual TB SIG 265, 16 May 1958.**

# SECTION I

## INTRODUCTION

### 1. Scope

*a.* This manual covers field and depot maintenance for Handsets H-33D/PT (fig. 1), H-33E/PT, and H-33F/PT (fig. 2). It includes instructions appropriate to third, fourth, and fifth echelons for troubleshooting, testing, and repairing the equipment. It also lists tools and test equipment for third, fourth, and fifth echelon maintenance.

*Note.* Operation and organizational maintenance of these handsets are covered in the technical manuals for the equipments with which the handsets are used.

*b.* The complete technical manual for this equipment includes—

- (1) TM 11-5965-202-12P, Operator's and Organizational Maintenance Repair Parts and Special Tools List and Maintenance Allocation Chart for

Handsets H-33/PT, H-33B/PT, H-33C/PT, H-33D/PT, H-33E/PT, and H-33F/PT.

- (2) TM 11-5965-202-35P, Field and Depot Maintenance Repair Parts and Special Tools List for Handsets H-33/PT, H-33B/PT, H-33C/PT, H-33D/PT, H-33E/PT, and H-33F/PT.

*c.* Official nomenclature including (\*) is used to indicate all models of the equipment covered in this manual. Thus, Handset H-33(\*)PT represents Handsets H-33D/PT, H-33E/PT, and H-33F/PT.

*d.* Forward comments concerning this manual to the Commanding Officer, United States Army Signal Publications Agency, Fort Monmouth, N. J.

### 2. Differences in Models

Item	H-33D/PT and H-33E/PT	H-33F/PT
Cable assembly	Electrical Special Purpose Cable Assembly CX-1574A/U (fig. 1) used.	Retractable (coiled) cable assembly (Federal stock No. 5995-542-6453) (fig. 2) used.
Plug connector	Plug Connector U-77/U (fig. 1) used.	Electrical Plug Connector U-161/U (fig. 2) used.
Push-to-talk switch assembly	Has solder-lug terminals; has no breather bar.	Has taper-pin terminals; includes breather bar.

### 3. Circuit Analysis

(fig. 3)

The circuitry of Handset H-33(\*)/PT can be divided into three parts: a transmitting circuit for microphone element E2, a receiving circuit for earphone element E1, and a two-part switching circuit for push-to-talk switch S1.

*a.* The transmitting circuit of the handset is wired permanently as shown in figure 3. It can be used in two different ways:

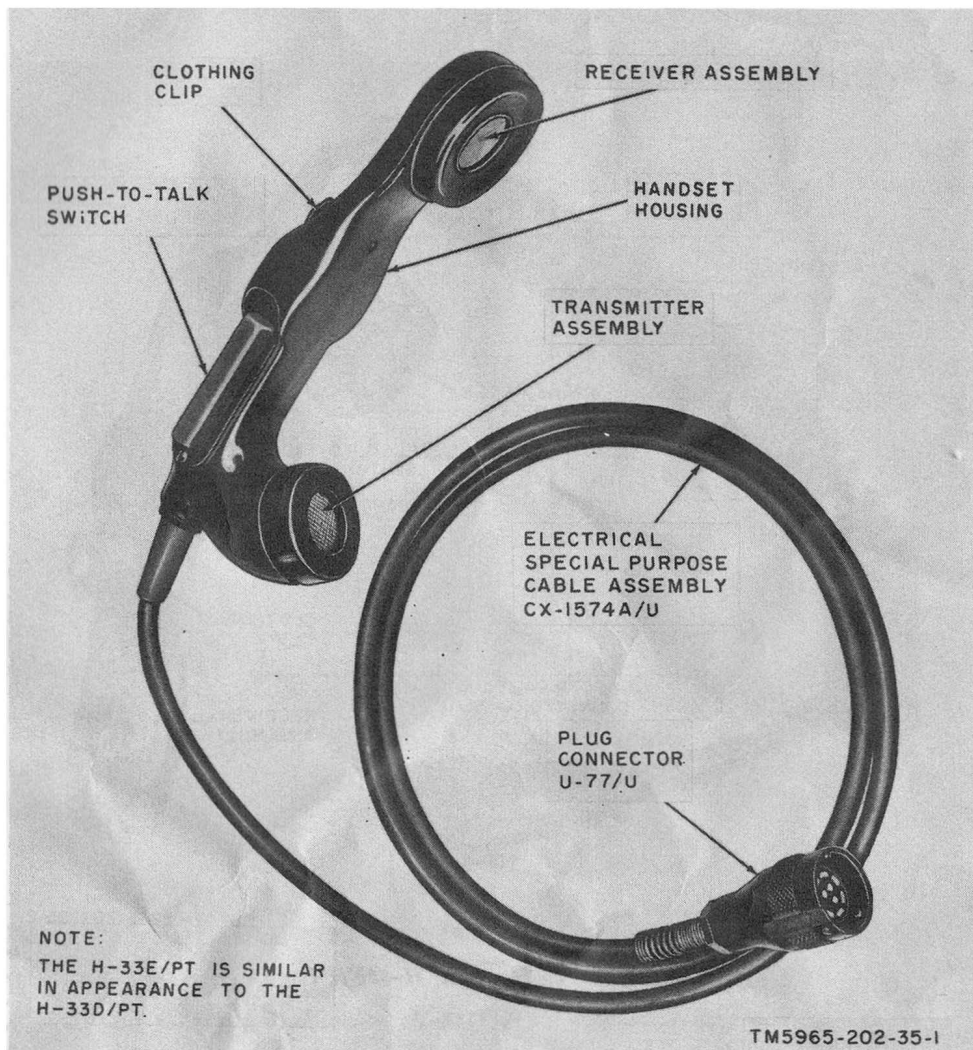
- (1) If the handset transmitting circuit

*is not* to be controlled by push-to-talk switch S1, only terminals C and D of connector P1 are connected to the transmitting circuit in the equipment with which the handset is used.

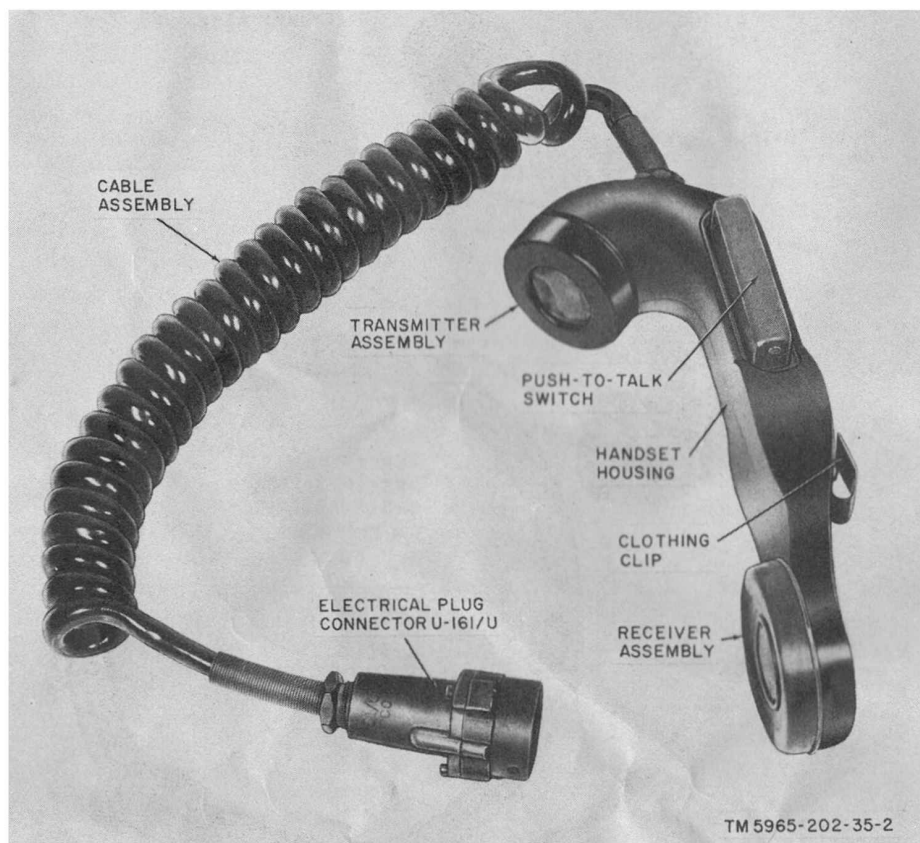
- (2) If the handset transmitting circuit *is* to be controlled by push-to-talk switch S1, only terminals C and E of connector P1 are connected to the transmitting circuit in the equipment with which the handset is used.

*b.* The receiving circuit always terminates at terminals A and B of connector P1.

\* *Note.* Handsets H-33/PT, H-33B/PT, and H-33C/PT are similar to Handset H-33D/PT. For minor differences in parts, refer to the applicable Repair Parts and Special Tools List.



*Figure 1. Handset H-33D/PT.*



*Figure 2. Handset H-33F/PT.*

c. The two-part switching circuit is controlled by operation of push-to-talk switch S1. When switch S1 is operated, contacts 1 and 3 complete the transmitting circuit (a(2)

above) and contacts 2 and 4 complete a *control* circuit in the equipment with which the handset is to be used.

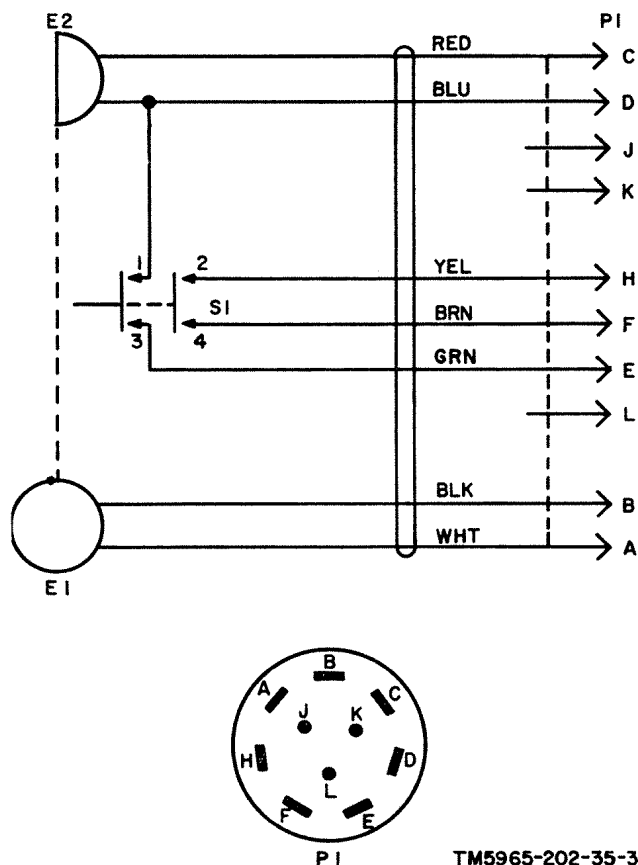


Figure 3. Handset H-33(\*)/PT, schematic diagram.



## SECTION II

### TROUBLESHOOTING AND REPAIR

#### 4. General

*a. Scope of Troubleshooting and Repair.* Troubleshooting and repair at the field and depot maintenance level include all the techniques necessary to determine the nature and extent of repair needed, the repair or replacement required, and the tests to assure the serviceability of the repaired equipment.

*b. Tools, Materials, and Test Equipment.* The following tools, materials, and test equipment are required for field and depot maintenance of Handset H-33(\*)/PT:

- Tool Equipment TE-41
- Tool Equipment TE-113
- Multimeter ME-77/U
- Telephone Test Set AN/PTM-6
- Receptacle Connector U-79/U (Federal stock No. 5935-549-2646)
- (Wire single-conductor common telephone wire or equal), 4 pieces, one each

white, black, red, and blue, each piece approximately 12 inches long.

#### 5. Troubleshooting and Repair Procedures (fig. 3)

*a.* Localize the trouble to the transmitting, receiving, or switching circuit of the handset (par. 3) by making continuity tests at the terminals of connector P1; use Multimeter ME-77/U. Useful test data are provided in paragraph 6.

*b.* Isolate the defective part within the faulty circuit by making additional continuity tests; also test for shorts. Use Telephone Test Set AN/PTM-6 to test microphone element E2 and earphone element E1 (par. 7).

*c.* Repair or replace the defective part (par. 8).

*d.* Test the repaired handset to be sure it meets the requirements specified in paragraphs 6 and 7.

#### 6. Continuity Tests (fig. 3)

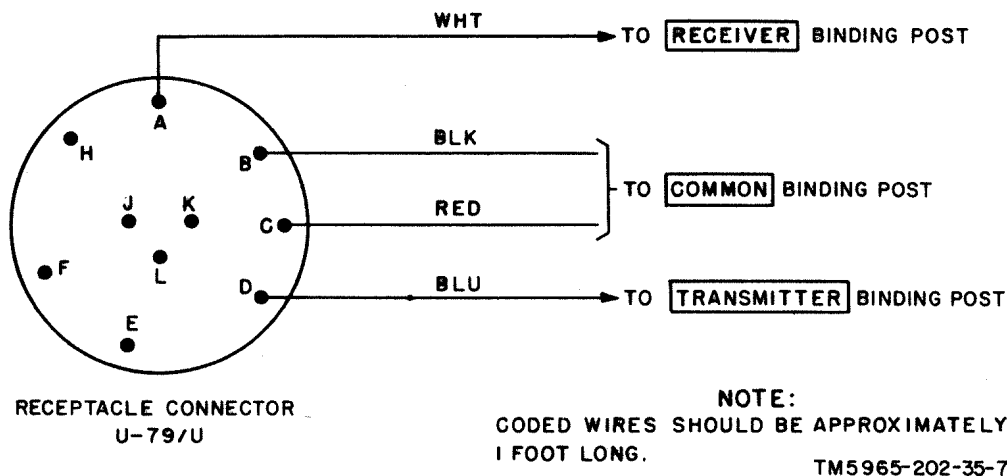
Circuit under test	Connector plug test terminals	Position of switch S1	Test requirements	
			Continuity	Resistance
Transmitting	C and D	Not applicable	Yes	Approx. 150 ohms
Receiving	A and B	Not applicable	Yes	Approx. 30 ohms
Switching	F and H	Unoperated	No	Infinite
	F and H	Operated	Yes	0
	D and E	Unoperated	No	Infinite
	D and E	Operated	Yes	0

#### 7. Transmitting and Receiving Efficiency Tests

Transmitting and receiving efficiency tests are useful in troubleshooting to check the condition of microphone and earphone elements suspected to be faulty and to test the overall operation of Handset H-33(\*)/PT after repair. Use Telephone Test Set AN/PTM-6 to make the transmitting and receiving efficiency

tests outlined in *a* through *c* below. Refer to TM 11-2062, Test Sets I-142, I-142-A, and I-142-B and Telephone Test Set AN/PTM-6, for information on Telephone Test Set AN/PTM-6.

*Note.* Test Sets I-142, I-142-A, and I-142-B are similar to Telephone Test Set AN/PTM-6 and can be used interchangeably with the AN/PTM-6 to make the transmitting and receiving efficiency tests described below.



*Figure 4. Diagram of test connections to Receptacle Connector U-79/U and Telephone Test Set AN/PTM-6.*

**a. Preliminary Procedures.**

- (1) Prepare the test set for use in accordance with the instructions in TM 11-2062.
- (2) Attach short length (approximately 12 inches) of color-coded telephone wire to the terminals of Receptacle Connector U-79/U and connect the free ends of these wires to the RECEIVER, COMMON, and TRANSMITTER binding posts of the test set as indicated in figure 4.
- (3) Connect the handset plug connector (U-77/U or U-161/U) to Receptacle Connector U-79/U.

**b. Transmitting Efficiency Test.**

- (1) Operate test set control TRANS D1 to the 2 position.
- (2) Operate control TRANS D3 to the 4 position.
- (3) Operate control CIRCUIT D5 to the 1 position.
- (4) Place the EQUALIZER (S2) control in the IN position.
- (5) Operate switch No. 1 to the LBPE position.
- (6) Operate switch No. 2 to the RCT position.
- (7) Operate switch No. 8 to the TRANS position.
- (8) See that all other test set switches and controls are in their normal unoperated positions.

- (9) Place test set switch S1 in the ON position. Allow the test set to warm up for about 5 minutes before proceeding with the test unless the test set already is warm because of pre-operational adjustments (a(1) above) or recent previous use.

- (10) Immediately before testing the transmitter, remove the transmitter assembly cap and press the handset push-to-talk switch to equalize the air pressure within the handset. Hold the switch operated and reinstall the cap. Release the switch after the cap has been replaced.

*Note.* This procedure usually is not necessary when Handset H-33F/PT is being tested. In this model of the handset, the push-to-talk switch assembly includes a breather bar to prevent inequalities in air pressure.

- (11) Hold the handset with the plane of Microphone Element M-35/U vertical and slowly turn the handset back and forth through approximately 180° about the central axis of the transmitter assembly. Without jarring, immediately place the transmitter assembly in front of the sound source of the test set with the opening of the cap at the center of and flush against the sound source screen.
- (12) Press the handset push-to-talk switch and hold it depressed.

- (13) Press switch No. 9 of the test set and hold it depressed; read meter M1 of the test set. Release switch No. 9 and the push-to-talk switch.
- (14) A meter reading to the right of 0 indicates that the transmitting efficiency of the handset is satisfactory.

*c. Receiving Efficiency Test.*

- (1) Operate test set control REC D2 to the 2 position.
- (2) Operate control REC D4 to the 7 position.
- (3) Operate control CIRCUIT D5 to the 1 position.
- (4) Place switch No. 1 in the LBPE position.
- (5) Place switch No. 2 in the RCT position.
- (6) Place switch No. 8 in the REC position.
- (7) See that all other test set switches and controls are in their normal un-operated positions.
- (8) Place test set switch S1 in the ON position. Allow the test set to warm up for about 5 minutes before proceeding with the test unless the test set already is warm because of pre-operational adjustments (a(1) above) or recent previous use.
- (9) Hold the receiver assembly of the handset in front of the sound source of the test set with the opening in the cap at the center of and flush against the sound source screen.
- (10) Press test set switch No. 9 and hold it depressed; read test set meter M1. Release switch No. 9.
- (11) A meter reading to the right of 0 indicates that the receiving efficiency of the handset is satisfactory.

## 8. Replacement of Parts (figs. 5 and 6)

When any part is replaced, examine all associated parts of the assembly, including the hardware, and replace any other unsatisfactory parts at the same time.

*Note.* To identify parts of Handset H-33D/PT and

H-33E/PT, refer to figure 5; to identify parts of Handsets H-33F/PT, refer to figure 6.

*a. Earphone Element.*

- (1) Remove the receiver-assembly retaining screw, flat washer, and rubber washer (38, 39, 40, fig. 5 or 41, 42, and 43, fig. 6) from the back of the handset housing (1) and carefully lift the receiver assembly out of the housing.
- (2) Loosen the setscrews (2) and withdraw the cable lead terminals (4). Remove the earphone element (3) from the receiver-assembly cap (5); be careful not to damage the receiver-assembly moisture shield (6) inside the cap.
- (3) Place a new earphone element in the receiver-assembly cap, insert the cable lead terminals, and tighten the setscrews.
- (4) Place the receiver assembly in the cavity in the handset housing and secure it in position with the original fastenings. Be sure the rubber washer (40, fig. 5 or 43, fig. 6) is under the flat washer and against the handset housing.

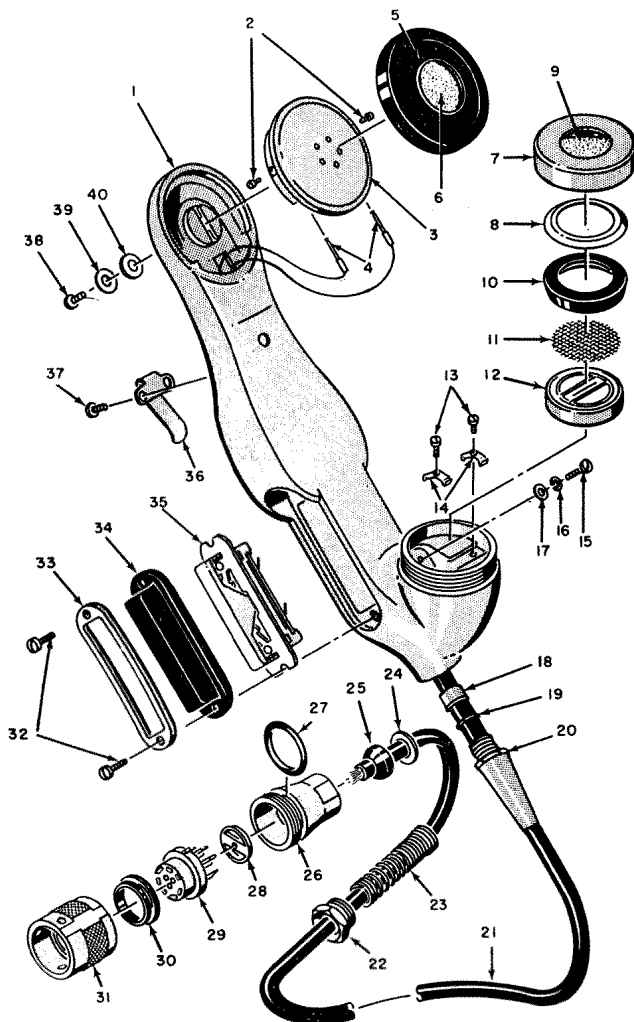
*b. Microphone Element M-35/U and Transmitter Assembly Contacts.*

- (1) Unscrew the transmitter-assembly cap (7) from the handset housing (1) and remove Microphone Element M-35/U (12) from the cavity in the handset housing.

**Caution:** Be careful that Microphone Element M-5/U does not fall out while the transmitter-assembly cap is being removed.

- (2) To replace the transmitter-assembly contacts (14), take out the screws (13) and disconnect the leads from the contacts. Connect the leads to the new contacts and install the contacts. Connect leads in accordance with figure 3.
- (3) Place a new Microphone Element M-35/U in the cavity in the handset housing and screw the transmitter-assembly cap into place; be careful not to cross the threads.





NOTES:

1. THE H-33E/PT IS SIMILAR TO THE H-33D/PT.
2. SOME HANDSETS HAVE A SPIRAL CABLE PROTECTOR INSTEAD OF THE MOLDED BUSHING (20) SHOWN.

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- 1 Handset housing.
- 2 Setscrews.
- 3 Earphone element
- 4 Terminals.
- 5 Receiver-assembly cap.
- 6 Receiver-assembly moisture shield.
- 7 Transmitter-assembly cap.
- 8 Washer.
- 9 Transmitter-assembly moisture shield.
- 10 Rubber gasket.
- 11 Screen.
- 12 Microphone Element M-35/U.
- 13 Screws.
- 14 Transmitter-assembly contacts.
- 15 Stay-cord screw.
- 16 Lockwasher.
- 17 Flat washer.
- 18 Preformed packing.
- 19 Flat washer.
- 20 Molded bushing.
- 21 Electrical Special Purpose Cable WM-111/U (part of Electrical Special Purpose Cable Assembly CX-1574A/U).
- 22 Bushing.
- 23 Cable protector.
- 24 Washer.
- 25 Preformed packing
- 26 Plug body.
- 27 Washer.
- 28 Wire spacer.
- 29 Insert.
- 30 Plug collar.
- 31 Plug shell.
- 32 Switch retaining screws.
- 33 Switch clamp.
- 34 Switch cover.
- 35 Push-to-talk switch S1.
- 36 Clothing clip.
- 37 Clothing-clip retaining screw.
- 38 Receiver-assembly retaining screw.
- 39 Flat washer.
- 40 Rubber washer.

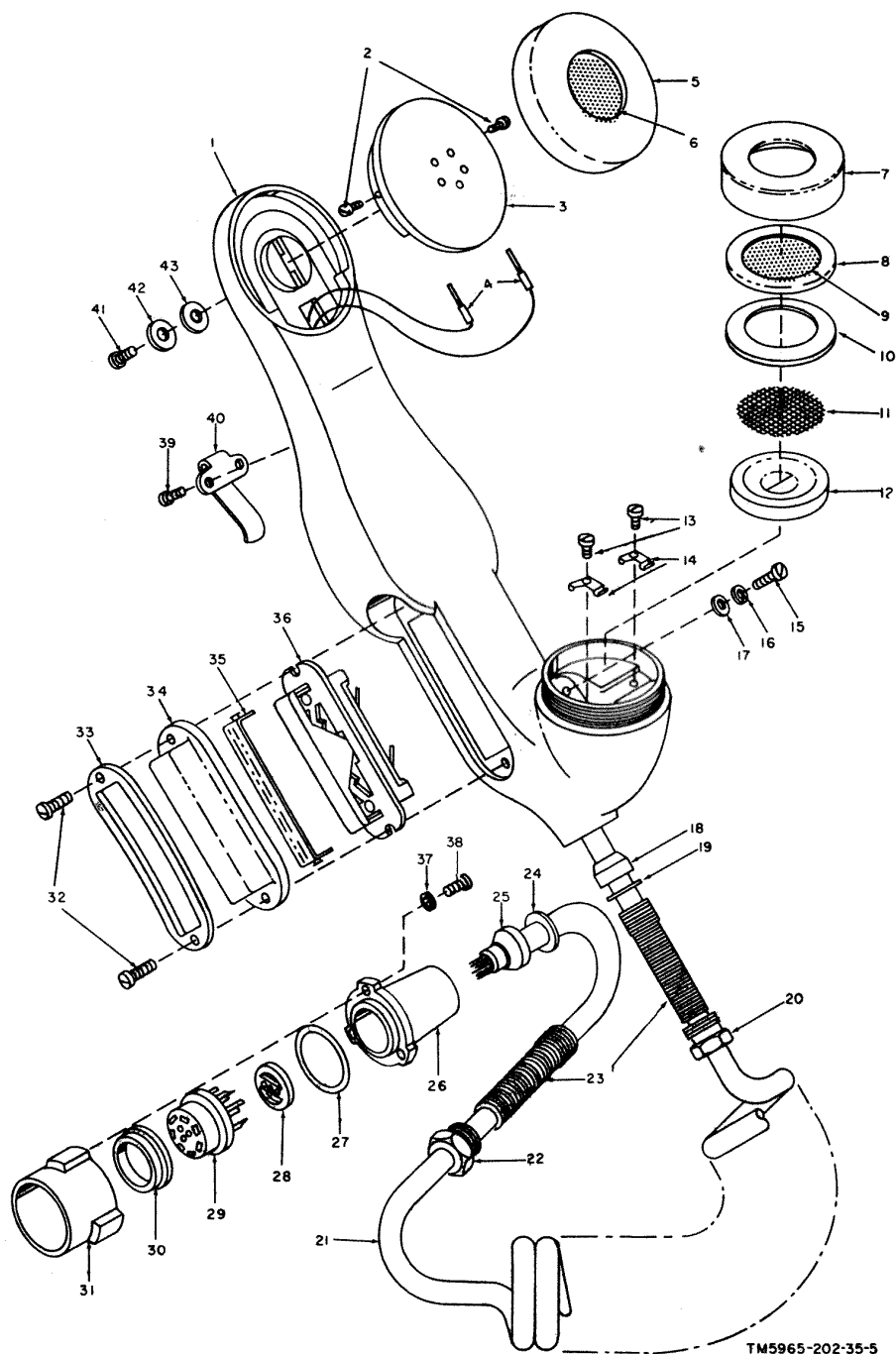
Figure 5. Handset H-33D/PT, exploded view.

c. Push-to-talk Switch S1.

- (1) Remove the switch retaining screws and clamp (32 and 33) and lift the push-to-talk switch assembly out of the handset housing (1).
- (2) Stretch one end of the switch cover (34) and pull the cover from switch S1 (35, fig. 5 or 36, fig. 6). On the

H-33F/PT, the switch cover includes a breather bar (35, fig. 6).

- (3) On the H-33D/PT and the H-33E/PT, unsolder the cable leads from the switch terminals. On the H-33F/PT, withdraw the taper pin terminals of the leads from the sleeve terminals of the switch.



TM5965-202-35-5

Figure 6. Handset H-33F/PT, exploded view.

- |   |                                       |
|---|---------------------------------------|
| 1 Handset housing MP1.                      | 23 Cable protector MP8.               |
| 2 Setscrews.                                | 24 Washer H8.                         |
| 3 Earphone element E1.                      | 25 Preformed packing MP9.             |
| 4 Terminals.                                | 26 Plug body.                         |
| 5 Receiver-assembly cap MP1.                | 27 Washer.                            |
| 6 Receiver-assembly moisture shield.        | 28 Wire spacer.                       |
| 7 Transmitter-assembly cap MP2.             | 29 Insert.                            |
| 8 Washer.                                   | 30 Plug collar.                       |
| 9 Transmitter-assembly moisture shield MP3. | 31 Plug shell.                        |
| 10 Rubber gasket.                           | 32 Switch retaining screws.           |
| 11 Screen.                                  | 33 Switch clamp MP4.                  |
| 12 Microphone Element M-35/U.               | 34 Switch cover MP5.                  |
| 13 Screws H4.                               | 35 Breather bar.                      |
| 14 Transmitter-assembly contacts.           | 36 Push-to-talk switch S1.            |
| 15 Stay-cord screw H5.                      | 37 Washer.                            |
| 16 Lockwasher H6.                           | 38 Screw.                             |
| 17 Flat washer H7.                          | 39 Clothing-clip retaining screw H9.  |
| 18 Preformed packing MP9.                   | 40 Clothing clip MP10.                |
| 19 Flat washer.                             | 41 Receiver-assembly retaining screw. |
| 20 Bushing MP7.                             | 42 Flat washer H2.                    |
| 21 Cable assembly W1.                       | 43 Rubber washer H3.                  |
| 22 Bushing MP7.                             |                                       |

Figure 6—Continued.

- (4) Connect the leads to new switch S1, reassemble and reinstall the push-to-talk switch assembly. Follow the instructions in (1) through (3) above, in reverse sequence. Connect leads in accordance with figure 3.

*d. Plug Connector U-77/U or Electrical Plug Connector U-161/U.*

- (1) Unscrew the bushing (22) from the plug body (26) and slide back the bushing, the cable protector (23), and the washer (24). Work the preformed packing (25) out of the plug body and pull the packing back a few inches.
- (2) Remove the plug shell (31) and the plug collar (30) from the plug body. Push the plug body back on the cable until the insert (29) and the wire spacer (28) are accessible.
- (3) On the U-77/U (H-33/PT and H-33E/PT), unsolder the cable leads from the terminals of the insert. On the U-161/U (H-33F/PT), carefully withdraw the pin terminals of the cable leads from the sleeve terminals of the insert; do not unsolder the leads from the pin terminals.
- (4) Slide the wire spacer and the plug body off the cable.
- (5) To install a new plug, follow the instructions in (1) through (4) above, in reverse sequence. Connect leads in accordance with figure 3. Terminal

designations on the U-77/U and the U-161/U are identical.

*e. Cable Assembly.*

- (1) Remove the receiver assembly (*a* above), the transmitter assembly (*b* above), and the push-to-talk switch assembly (*c* above).
- (2) Remove the screws (13) that secure the transmitter-assembly contacts (14) and disconnect the leads from the contacts. Remove the stay-cord screw, lockwasher, and flat washer (15, 16, and 17) that secure the red lead.
- (3) Unscrew the bushing (20) from the handset housing and slide the bushing, cable protector (23, fig. 6), washer (19) and preformed packing (18) back along the cable assembly. Pull the cable assembly from the handset housing.

*Note.* Some Handsets H-33D/PT and H-33F/PT have a molded bushing (20, fig. 5) instead of a cable protector.

- (4) If the plug connector (U-77/U or U-161/U) is to be reused, disconnect it from the cable assembly (*d* above).

*Note.* Electrical Special Purpose Cable Assembly CX-1574A/U includes Plug Connector U-77/U.

- (5) To install a new cable assembly, follow the instructions in (1) through (4) above, in reverse sequence. Connect leads in accordance with figure 3.

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11-537 (2)  
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11-592 (2)  
11-597 (2)

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.