

**ARMY TM 11-5805-201-35  
AIR FORCE TO 31W1-2PT-292**

---

**DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL  
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS**

**TELEPHONE SET TA-312/PT**

**(NSN 5805-00-543-0012)**

**This copy is a reprint which includes current  
pages from Changes 1 through 5.**

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**DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
SEPTEMBER 1967**



CHANGE

No. 5

**Direct Support, General Support, and Depot Maintenance Manual  
TELEPHONE SETS  
TA-312/PT (NSN 5805-00-543-0012)  
AND  
TA-312A/PT (NSN 5805-01-217-7310)**

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DEPARTMENTS OF THE ARMY  
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**Direct Support, General Support, and Depot Maintenance Manual**

**TELEPHONE SETS  
TA-312/PT (NSN 5805-00-543-0012)  
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CHANGE  
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DEPARTMENTS OF THE ARMY  
AND THE AIRFORCE  
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**DS, GS, AND DEPOT MAINTENANCE MANUAL**  
**TELEPHONE SET TA-312/PT (NSN 5805-00-543-0012)**

TM 11-5805-201-35/TO 31W1-2PT-292, 15 September 1967, is changed as follows:

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4-1 through 44 . . . . .	4-1 through 443
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Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

**WARNING**

SEVERE SHOCK OR DEATH MAY RESULT  
FROM CONTACT BETWEEN FIELD WIRE AND  
POWER LINES

Do not lay, place, or throw field wire on or near power lines or transformers. Dangerous high voltages exist at these structures. Follow the five emergency steps for electric shock. Be careful when using the TA-312/PT during storms. Lightning may pose a shock hazard.

**WARNING**

HIGH VOLTAGE MAY BE PRESENT IN THIS EQUIPMENT.

90 to 100 volts DC may be present on the field wire terminals of the TA-312/PT. Don't take chances.



# **5**

## **SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK**

**1**

**DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL**

**2**

**IF POSSIBLE, TURN OFF THE ELECTRICAL POWER**

**3**

**IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A WOODEN POLE OR A ROPE OR SOME OTHER INSULATING MATERIAL**

**4**

**SEND FOR HELP AS SOON AS POSSIBLE**

**5**

**AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION**

Technical Manual  
No. 11-5805-201-35  
Technical Order  
No. 31W1-2PT-292

DEPARTMENTS OF THE ARMY  
AND THE AIR FORCE

Washington, DC, 15 September 1967

**DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE MANUAL  
TELEPHONE SETS  
TA-312/PT (NSN 5805-00-543-0012)  
AND  
TA-312A/PT (NSN 5805-01-217-7310)**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this manual. If you find any mistakes or if you know of away to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5000.

For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to prime ALC/MST.

In either case a reply will be furnished direct to you.

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\*This manual, together with TM 11-5805-201-12, 22 June 1967, supersedes TM 11-2155, 27 December 1975, including C 1, 3 June 1960; C 3, 13 March 1963; and C 4, 18 November 1963.

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## CHAPTER 1

### INTRODUCTION

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#### 1-1. Scope

*a.* This manual contains instructions for direct support of Telephone Sets TA-312/PT and TA - 312A/PT. Unless otherwise indicated, wherever a reference to TA-312/PT appears, the information also applies to the TA-312A/PT. It includes instructions for troubleshooting, testing, disassembly, assembly, and repair of the equipment. The functioning of the TA-312/PT is explained in Chapter 2. Familiarity with the TA-312/PT and knowing how it functions, facilitates rapid and effective troubleshooting.

*b.* Operating instructions, installation, organizational maintenance, and maintenance allocation for the TA-312/PT are contained in TM 11-5805-201-12. Appendix A contains a listing of applicable references.

#### NOTE

For applicable forms and records, see paragraph 1-3. TM 11-5805-201-12.

#### 1-2. Consolidated Index of Army Publications and Blank Forms

Refer to the latest issue of DA Pam 25-30 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

#### 1-3. Maintenance Forms, Records, and Reports

*a. Reports of Maintenance and Unsatisfactory Equipment.* Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA Pam 738-750 as contained in Maintenance Management update. Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for

unsatisfactory equipment reporting.

*b. Report of Packaging and Handling Deficiencies.* Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55 /NAVMATINST 4355.73B/AFR 400-54/MCO 4430.3H.

*c. Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCOP4610.19D/DLAR 4500.15.

#### 1-4. Reporting Equipment Improvement Recommendations (EIR)

*a. Army.* If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, U.S. Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-PA-MA-D, Fort Monmouth, New Jersey 07703-5000. We'll send you a reply.

*b. Air Force.* Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.



## CHAPTER 2

### FUNCTIONING

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#### 2-1. General (fig. 5-1)

a. Telephone Set TA-312/PT may be used with any manual, two-wire field telephone system using local battery (LB), common battery (CB), or common battery signaling (CBS). The majority of the circuits in the TA-312/PT are contained in Impedance Matching Network CU-350/PT. In addition to the CU-350/PT, the TA-312/PT contains Handset H-60/PT, Generator, Hand Ringing G42A/PT, Buzzer BZ-23/PT, three switches, and Connector, Receptacle U-79/U for connecting external Handset-Headset H-144(\*)/U. Local battery power is supplied by two Batteries BA-30, located in the battery compartment, or by an external 3-volt power source connected through the BAT. terminals. Common battery power, signaling, and voice signals are connected to the line through terminals LINE 1-2.

*Note.* Handset-Headset H-144(\*)/U designates Handset-Headset H-144/U, H-144A/U, H-144B/U, or H-144CW.

b. The G-42A/PT is a handcrank signaling device which produces a 90-volt, 20-cycle-per-second (cps) ringing signal when it is cranked at normal speed. Turning the crank operates an internal switch, connecting the G42A/PT to the LINE 1-2 terminals, and disconnecting the BZ-23/PT. The G-42A/PT is operated with the H-60/PT in the retaining cradle, which holds the contacts of hook switch S2 open. When the G-42A/PT is not being cranked, the internal switch remains open, disconnecting the G-42A/PT and connecting the BZ-23/PT to the LINE 1-2 posts.

c. Selector switch S1 is a screwdriver-adjusted switch having three positions: CB (common battery), LB (local battery), and CBS (common battery signaling). Selector

switch S1 is initially operated to the proper position during installation, according to the type of system in use. Hook switch S2 is located in the retaining cradle. When the H-60/PT is in the retaining cradle, all of the contacts are held open. When the H-60/PT is lifted from the retaining cradle, all of the contacts close. INT-EXT switch S3 selects either the H-60/PT (INT position) or the H-144(\*)/U (EXT position ) for use in the circuit.

#### 2-2. Signaling

a. *Incoming Signals.* The incoming 20-cps ringing signals are received through the LINE 1-2 terminals and applied to Buzzer BZ-23/PT. Capacitor P of the CU-350/PT, in series with the BZ-23/PT, acts as a direct current (dc) block, preventing draining of the batteries through the BZ-23/PT.

b. *LB Signaling.* In an LB connection, the LINE 1-2 terminals are connected through a two-wire line to a local battery switchboard, another TA-312/PT, or a similar telephone set. Selector switch S1 is in the LB position, and the H-60/PT is in the retaining cradle. When the G-42A/PT is cranked, its internal switch closes and it generates a 20-cps ringing signal which is connected to the line through the LINE 1-2 terminals.

c. *Signaling CB Switchboard.* When the TA-312/PT is connected to a common battery switchboard, dc signaling is used. Lifting the H-60/PT from the retaining cradle operates hook switch S2 and completes the dc path for signaling the switchboard.

d. *Signaling CBS Switchboard.* In CBS operation, dc signaling power is provided by the switchboard, and the local batteries are used for transmission. As in CB operation, lifting the H-60/PT from the retaining cradle closes

the contacts of hook switch S2 and completes the dc signaling path.

*e. Signaling Using H-144(\*)/U.* When the H-144(\*)/U is used, the H-60/PT is left in the retaining cradle, holding the contacts of hook switch S2 open; S2 disconnects the H-60/PT from the circuit. INT-EXT switch S3 is operated to EXT. The dc signaling path is then provided through the contacts of S3, the jumper across pins K and J of Connector, Plug U-77/U, and contacts 3 and 4 of the H-144(\*)/U press-talk switch.

*f. Controlling Remote Equipment.* The TA-312/PT may be used to control the operation of a remote equipment, such as a radio set. Selector switch S1 is operated to LB, and dc may then be switched on or off on the line by operating the press-to-talk switch in the H-60/PT or the H-144(\*)/U.

### 2-3. Transmission Using Handset H-60/PT

#### *a. Transmitting, LB and CBS Operation.*

- (1) *Battery supply.* Current is supplied to the transmitter from the internal battery through inductor E of the CU-350/PT, switch S1 contacts 9 and 10, the transmitter and press-to-talk contacts of the H-60/PT, and contacts 5 and 6 of hook switch S2. Inductor E in the CU-350/PT has a high impedance to audiofrequencies and prevents the voice signals from being shunted through the battery.
- (2) *Voice current path.* Voice current is produced in the H-60/PT transmitter and is applied to the line through coil A, resistor N, and capacitor M of the CU-350/PT. Part of the voice current is shunted through coil H of the CU-350/PT to reduce the sidetone level in the receiver.

#### *b. Transmitting, CB Operation.*

- (1) *Battery supply.* For CB operation, battery power is supplied from the central office. With selector switch S1 at CB, contact 10 is open and the local battery is disconnected. Dc from the central office is connected through LINE terminals 1 and 2,

resistor L, and coil A of the CU-350/PT, and the contacts of hook switch S2 to the transmitter of the H-60/PT. A stabilizing circuit, consisting of resistor G, varistor CR1, and capacitor K, is bridged across the inputs from the LINE terminals. This circuit compensates for differences in dc voltage supplied to the TA-312/PT from the central office, depending on the length of line involved. If the central office is close to the TA-312/PT, the line voltage is high and varistor CR1 resistance is low to shunt the power from the transmitter and receiver circuits. If the distance is greater, the line voltage will be lower, the resistance of varistor CR1 will be higher, and more of the line voltage will be available for the transmitter and receiver circuits. The action of the varistor maintains a relatively constant dc level for the TA-312/PT circuits. Capacitor K is a high-frequency shunt across varistor CR1.

- (2) *Voice current path.* Voice current produced in the transmitter of the H-60/PT is applied to the line through coil A and resistor L of the CU-350/PT. As in LB operation, part of the transmitter voice current is shunted through coil of the CU-350/PT to reduce the sidetone level.

*c. Receiving.* The incoming voice signals received at LINE terminals 1 and 2 are applied across coils A and H of the CU-350/PT. These coils act as the primary of a transformer, with coil C as the secondary winding. The secondary circuit remains the same in all modes of operation, with resistor B of the CU-350/PT in series with the receiver of the H-60/PT. In LB and CBS operation, capacitor M and resistor N in the CU-350/PT are connected in series with the primary circuit. In CB operation, they are bypassed through the contacts of selector switch S1.

*d. Antisidetone Circuit.* Windings A, C, and H of the CU-350/PT form an antisidetone circuit. Transmitter voice current flows through



windings A and H in opposite directions, inducing opposing currents in winding C, and reducing the level of the receiver sidetone. Voice current received through LINE terminals 1 and 2 flows through winding A and divides, part of it flowing through the transmitter and the rest glowing through winding H. The currents in windings A and H are in the same direction and induce a greater voltage in winding C. The balancing network, composed of capacitors D and F, resistor B, and varistor CR2, matches the impedance characteristics of the line and maintains sidetone balance over a

wide range of voice frequencies and battery voltages.

#### **2-4. Transmission Using Handset-Headset H-144(\*)/U**

Handset-Headset H-144(\*)/U is connected in parallel with Handset H-60/PT through the terminals of Receptacle-Connector U-79/U. The signaling, transmitting, and receiving circuits remain the same as described in paragraph 2-3. INT-EXT switch S3 is set to EXT. The H-60/PT remains in the retaining cradle during operation with the H-144(\*)/U.



## CHAPTER 3

### MAINTENANCE

#### NOTE

General support maintenance shall be considered direct support maintenance.

#### Section I. DIRECT SUPPORT MAINTENANCE

##### 3-1. Scope of Direct Support Maintenance

Direct support maintenance of the TA-312/PT includes repair or replacement of all exterior and interior components and of Handset H-60/PT. Direct support troubleshooting procedures are presented in paragraphs 3-3 and 3-4. Resistance and continuity measurements used to supplement these procedures are presented in paragraph 3-5. Procedures for removing and replacing parts are presented in paragraphs 3-6 through 3-23. Cleaning and lubrication procedures are presented in paragraphs 3-24 and 3-25.

##### 3-2. Test Equipment, Tools, and Materials

All test equipment and tools required for direct support maintenance of the TA-312/PT are listed in the maintenance allocation chart in TM 11-5805-201-12. Special materials required are listed in *a* through *e* below.

- a. Trichlorotrifluoroethane,  
(NSN 6180-00-105-3084)
- b. Gasket Compound, Sealing 6G240.4.
- c. Grease, Aircraft, and Instrument (GL)  
(NSN 9150-00-261-8297)
- d. Wax, Pariffin (NSN 9160-00-285-2044).
- e. Talcum, Technical Powder,  
(NSN 6810-00-270-9989)

##### 3-3. Troubleshooting Procedures

Troubleshooting the TA-312/PT is performed through the operational checks (*a* below), mechanical inspections (*b* below), the symptoms listed in the troubleshooting chart (para 3-4), and resistance and continuity measurements (para 3-5).

##### *a. Operational Checks.*

- (1) *LB transmission and signaling, Handset H-60/PT.* Connect the TA-312/PT under test to another TA-312/PT, Telephone Set TA-43/PT, or similar equipment for local battery operation. Perform the preliminary operational checks in TM 11-5805-201-12.
- (2) *LB transmission and signaling, Handset-Headset H-144(\*)/U.*
  - (a) Connect the H-144(\*)/U to Connector, Receptacle U-79/U. Operate the INT-EXT switch to EXT and repeat the procedure in (1) above, using the H-144(\*)/U. Leave the H-60/PT in the retaining cradle.
  - (b) Operate the INT-EXT switch to INT. Transmission and reception should not be possible.
- (3) *CB transmission and signaling.*
  - (a) Connect the TA-312/PT to a common battery switchboard. Operate the INT-EXT switch to INT and the circuit selector switch to CB.
  - (b) Lift the H-60/PT from the retaining cradle; this should signal the switchboard.
  - (c) Talk to the switchboard operator; transmission and reception should be loud and clear.
- (4) *CBS transmission and signaling.* Operate the selector switch to CBS, and repeat the procedure in (3) above. Check to see that batteries are installed.

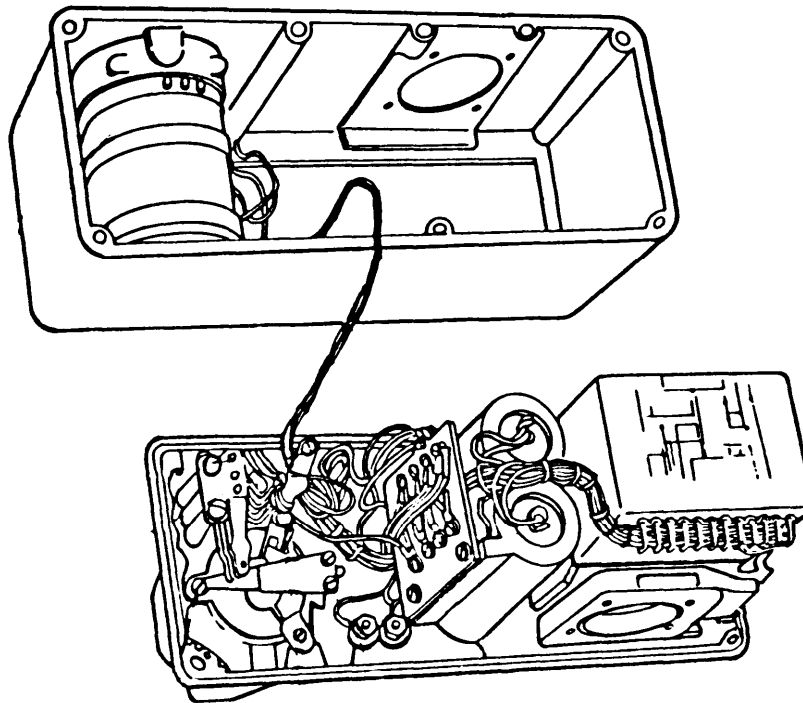
- (5) *Alternate check of CBS operation.* If a common battery switchboard is not available, check CBS operation as follows:
- (a) Check to see that batteries are installed in the TA-312/PT; operate the selector switch to CBS, and connect the LINE 1-2 binding posts to another local battery telephone.
  - (b) Operate the press-to-talk switch on the H-60/PT, and talk to someone at the other telephone; transmission and reception should be loud and clear.
  - (c) Remove the H-60/PT from the retaining cradle, and operate the G-42A/PT. Considerable force should be required to operate the handcrank. This tests the continuity of hold coil J in the CU-350/PT.

*b. Mechanical Inspection*

- (1) *Panel and housing assembly.* Check the panel gasket and buzzer gasket (fig. 3-1 )

and gaskets on the panel screws for aging and cracking. The panel and buzzer gaskets should be cemented firmly in place. Remove grease or grime from the three waterproof air valves on the generator spacer.

- (2) *Generator, Hand Ringing G-42A/PT.* Check the G-42A/PT by rotating the handcrank rapidly for two or three turns and then stopping it. The generator switch should open about 1 second later, making a dull sound.
- (3) *Handset H-60/PT (fig.3-3).*
  - (a) Check the deicing screen, the rubber cover on the press-to-talk switch, and the gasket on the hook switch to be sure they are not dried out, cracked, or worn.
  - (b) Check the internal wiring for damaged insulation, and check all connections.



CEOX0005

Figure 3-1. TA-312/PT with panel assembly removed from housing.

Section II. TROUBLESHOOTING

3-4. Troubleshooting Chart

Item No.	Symptom	Probable trouble	Correction
1	No transmission or reception.	Poor line connections -----	Clean incoming line wire.
		Defective H-60/PT cord -----	Replace cord.
		Defective hook switch -----	Adjust or replace hook switch.
		Loose connections on terminal board.	Tighten loose connection.
		Loose connections or broken wiring.	Resolder loose connection; repair or replace broken wiring.
		Defective switch contacts in G-42A/PT.	Replace G-42A/PT.
		Defective CU-350/PT-----	Replace CU-350/PT.
2	Cannot transmit or receive in LB or CBS operation.	Defective resistor N or capacitor P in CU-350/PT.	Replace CU-360/PT.
		Shorted hold coil J-----	Replace CU4150/PT.
3	Cannot transmit or receive in CB operation.	Defective selector switch contacts 1 and 2.	Adjust contacts.
4	No transmission-----	Defective transmitter-----	Replace transmitter.
		Defective H-60/PT cord-----	Replace cord.
		Defective capacitor in H-60/PT.	Replace capacitor.
		Defective hook switch contacts 1 and 2.	Adjust or replace hook switch.
		Loose connection on terminal board.	Tighten all connections.
5	Cannot transmit in LB or CBS operation	Defective CU-350/PT-----	Replace CU-350/PT.
		Defective Batteries BA-30-----	Replace Batteries BA-30.
		Defective hook switch contacts 5 and 6.	Adjust contacts or replace switch.
6	Cannot transmit in CB operation.	Loose connections or broken wiring.	Resolder loose connections; repair or replace broken wiring.
		Defective press-b-talk switch -----	Replace press-to-talk switch.
		Defective CU-350/PT -----	Replace CU-350/PT.
		Open resistor L in CU-350/PT.	Replace CU-350/PT.
7	Cannot receive -----	Loose connections or broken wiring.	Tighten connections; repair or replace broken wiring.
		Defective receiver-----	Replace receiver.
		Shorted varistor CR3	Replace varistor.
		Defective cord on H-60/PT -----	Replace cord.
		Loose connections or broken wiring.	Tighten connections; repair or replace broken wiring.
8	Weak or distorted transmission and reception in LB, CB, and CBS.	Defective hook switch contacts 7 and 8.	Adjust contacts or replace switch.
		Defective CU-350 PT (open or shorted winding C; open resistor B).	Replace CU-350/PT.
		Defective antisidetone and balancing circuit in CU450/PT.	Replace CU-350/PT.

Item No.	Symptom	Probable trouble	Correction
9	Weak or distorted transmission and reception in CB operation.	Shorted resistor G or varistor CR1 in CU-350/PT.	Replace CU-350/PT.
10	Weak or distorted reception.	Defective receiver-----	Replace receiver.
11	Increased sidetone -----	Defective winding H in CU-350/PT.	Replace CU-350/PT.
12	Loud clicks in receiver.	Open or defective varistor CR3.	Replace varistor.
13	Weak or distorted transmission.	Defective transmitter element -----	Replace transmitter element.
14	Weak transmission in LB and CBS.	Weak Batteries BA-30-----	Replace Batteries BA-30.
16	Cannot signal in LB operation.	Loose connection at G42A/PT. Defective switch in G-42A/PT. Defective G-42A/PT-----	Resolder connections on G-42A/PT. Replace G-42A/PT. Replace G-42A/PT.
16	Cannot signal in CBS operation.	Broken wiring----- Open hold coil J in CU-350/PT. Defective selector switch contacts 9 and 11.	Repair or replace wiring. Replace CU-350/PT. Adjust switch.
17	Buzzer does not sound on incoming signals.	Loose connection at terminal board Defective Buzzer BZ-23/PT.----- Defective or broken wiring----- Defective G-42A/PT contacts----- Defective capacitor P in CU-350/PT.	Tighten connections. Replace BZ-23/PT. Repair or replace broken wiring. Replace G-42A/PT. Replace CU-350/PT.
18	Cannot operate remote equipment in LB operation.	Open hold coil J in CU-350/PT.  Defective selector switch contacts 8 and 9. Loose connections or defective wiring. Defective press-to-talk switch----- Defective H-60/PT cord-----	Replace CU-350/PT.  Burnish contacts. Tighten connections; repair or replace defective wiring. Replace press-to-talk switch. Replace cord.
19	Cannot receive or transmit with 144(*)/U.	Loose connection or defective wiring. Defective U-79/U-----	Tighten connections; repair or replace defective wiring. Replace U-79/U.

**3-5. Resistance Measurements**  
(fig. 3-2)

The following chart lists resistance measurements which may be made in the TA-312/PT during troubleshooting. Not all of the circuits

in the CU-350/PT can be measured with the Multimeter TS-352B/U since they include capacitors or varistors in series. The resistance of a varistor cannot be measured accurately since it varies with the voltage applied to it.

Component	Terminal or test point	Ohms	Remarks
Resistor B	CU-350/PT term. 7-10. . . . .	.100 ± 10	Measure with hook switch contacts open <sup>a</sup>
Resistor L	CU-350/PT term. 6-11 . . . . .	.22 ± 2	Selector switch at CB.
Winding A	CU-350/PT term. 8-10. . . . .	.27 ± 3	
Winding C	CU-350/PT term. 9-10 . . . . .	.12 ± 1	Hook switch contacts open.
Coil J	CU-350/PT term. 4-5. . . . .	.50 ± 5	Selector switch at CB.
Coil E	CU-350/PT term. 2-3 . . . . .	.85 ± 9	Selector switch at CB.
G42A/PT	LINE 1-2 posts . . . . .	.750 ± 75	Generator switch contacts open <sup>b</sup>
BZ-23/PT	Across terminals . . . . .	.3,240 to 4,100	Hook switch contacts open.
Receiver	Across terminals . . . . .	.35 ± 4	CR3 disconnect and hook switch contacts

- a. The H-60/PT is in the cradle or the hook switch is held open manually.
- b. Turn the G42A/PT handcrank far enough to close the switch contacts without actually operating the G42A/PT.

**3-6. Replacing Handset H-60/PT Components**  
(fig. 3-3)

**NOTE**

Repair parts for Handset H-60/PT are listed in TM 11-5965-224-14P.

*a. Transmitter Element.*

- (1) *Removal* Remove the deicing screen (1). Unscrew and remove the transmitter cap (2) and the retaining ring (3). Lift out the transmitter (4 through 8) as a unit. Loosen the screws (4), and disconnect the leads from the bottom of the contact assembly (8).
- (2) *Disassembly.* Remove the screws (4) and capacitor (5) from the contact assembly. Separate the gasket (6) from the transmitter element (7) and contact assembly (8).
- (3) *Replacement and reassembly.*
  - (a) Reassemble the transmitter as indicated in figure 3-3; the reassembly sequence is the reverse of the disassembly procedure. Clean the contact springs on the contact assembly, and check to see that they mate with the contacts on the transmitter element. Seat the gasket (6) evenly around the transmitter element and contact assembly.
  - (b) Reconnect the leads to the contact assembly (8).
  - (c) Replace the transmitter element in the handle.
  - (d) Replace the retaining ring (3) on top of the gasket (6), and replace the transmitter cap (2).

*b. Receiver Element.*

- (1) *Removal.*

- (a) Unscrew and remove the receiver cap (9).
- (b) Hold the handset handle (23) cap side down, and tap the handset remove the receiver element (10) and receiver gasket (11 ). The receiver gasket is cemented to the receiver element and must not be removed unless it is damaged.
- (c) Disconnect the receiver leads by loosening the two screws (12) on the rear of the receiver element (10).

(2) *Replacement.*

- (a) Check to see that the receiver gasket (11 ) is cemented securely in place.
- (b) Reconnect the receiver leads.
- (c) Replace the receiver element (10) in the handset handle (23).
- (d) Replace the receiver cap (9).

*c. Press-To-Talk Switch.*

(1) *Removal.*

- (a) Remove the two screws (13) and plate (14).
- (b) Remove the press-to-talk switch ( 16) and rubber cover (15). Disconnect the three leads. Disconnect the fourth lead from the screw terminal on the contact assembly (8).
- (c) Remove the rubber cover (15) from the press-to-talk switch assembly ( 16).

- (2) *Replacement.* Apply a thin coating of talcum (NSN 6810-00-270-9989) to the interior of the rubber cover. Replace the press-to-talk switch as indicated in figure 3-3. Tighten the two screws (13) alternately to insure an even compression of the flange on the rubber cover.

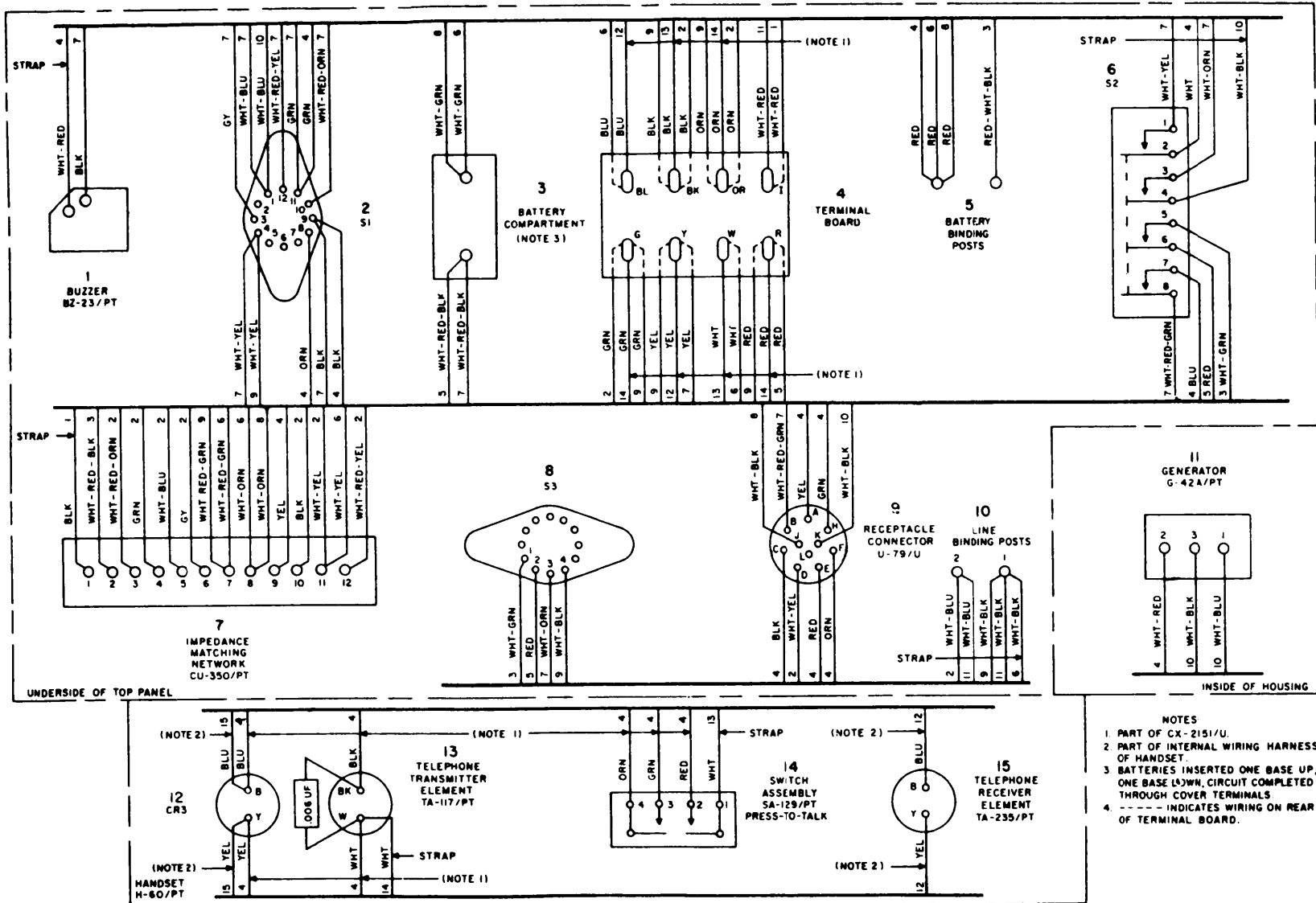


Figure 3-2. Telephone Set TA-512/PT, wiring diagram.



*d. Varistor CR3.*

- (1) *Removal.* Lift out the transmitter (*a* (1) above) to expose the varistor (18). Remove the screw (19) to loosen the handset cord (20). Remove the screws (17) and the varistor (18).
- (2) *Replacement.* Replace the varistor as indicated in figure 3-3; the replacement sequence is the reverse of the removal procedure.

*e. H-60/PT Cord.*

- (1) *Removal*
  - (a) Perform the procedures in a(1), c(1) (*a*) and (*b*), and d(1) above to disconnect the handset cord conductors.
  - (b) Remove the screw (19), and carefully work the handset cord (20) out of the handset handle (23).
- (2) *Replacement*
  - (a) Apply a thin coating of paraffin wax to the end of the handset cord, and slip it through the opening in the end of the H-60/PT.
  - (b) Replace the screw (19).
  - (c) Reconnect the cord leads to the varistor (18), press-to-talk switch (16) and contact assembly (8).

*f. Wiring Harness.*

- (1) *Removal.*
  - (a) Perform the procedures in *a*(1) and *b*(1) above, but disconnect only the leads from the receiver element.
  - (b) Disconnect the yellow and blue leads from the varistor (18).
  - (c) Pull the wiring harness (22) from the receiver end of the H-60/PT handle.
- (2) *Replacement.* Apply a thin coating of electrical insulation and sealing compound to the inside of the flange on the molded rubber barrier of the wiring harness (22). Replace the wiring harness as indicated in figure 3-3. The sequence for replacing the wiring harness is the reverse of the removal procedure in (1) above.

**3-7. Removing and Replacing Panel Assembly**

(figs. 3-1, 3-5 and 3-6)

*a. Removal.*

- (1) Loosen the carrying case retaining strap, and remove the carrying case from the panel and housing assembly.
- (2) Remove the six panel screws, washers, and gaskets, and the four screws that secure Buzzer BZ-23/PT to the housing assembly.
- (3) Lift the panel straight out of the housing. The panel will remain attached to the housing by the CJ-42A/PT leads.
- (4) Disconnect the leads from the G-42A/PT terminals to separate the panel from the housing.

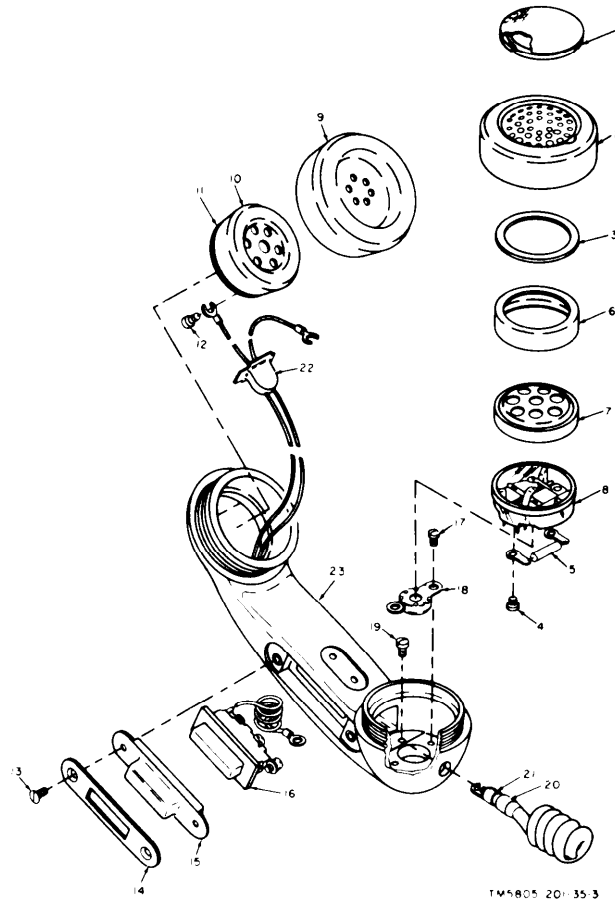
*b. Replacement.*

- (1) Replace the panel or buzzer gaskets if they are damaged or defective (para 3-8).
- (2) Position the panel over the housing and dress the slack in the G-42A/PT leads between the G-42A/PT and the back of the housing. Connect the leads to the terminals of the G-42A/PT.
- (3) Seat the panel on the housing.
- (4) Replace the panel and BZ-23/PT mounting screws, washers, and gaskets. Tighten the screws evenly to insure even pressure on the gaskets.

**3-8. Replacing Panel or Buzzer Gasket**

- a.* Pull the defective gasket from the recess, and clean off all traces of adhesive on the recess.
- b.* Apply Gasket Scaling compound to the recess, and allow it to dry thoroughly at room temperature.
- c.* Carefully seat the gasket in the recess. Be sure the gasket is properly positioned and is not wrinkled or cracked.

**Paragraph 3-9 deleted.**



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- |                     |                         |                   |
|---------------------|-------------------------|-------------------|
| Deicing screen      | 9 Receiver cap          | 17 Screw          |
| Transmitter cap     | 10 Receiver element     | 18 Varistor       |
| Retaining ring      | 11 Receiver gasket      | 19 Screw          |
| Screw               | 12 Screw                | 20 Handset cord   |
| .006 uf capacitor   | 13 Screw                | 21 Stay cord hook |
| Gasket              | 14 Plate                | 22 Wiring harness |
| Transmitter element | 15 Rubber cover         | 23 Handset handle |
| Contact assembly    | 16 Press-to-talk switch |                   |

Figure 3-3. Handset H-60/PT, exploded view.

**Figure 3-4 deleted.**

**3-10. Replacing H-60/PT Cord (Fig. 3-5)**

*a. Removal.*

(1) Remove the panel assembly from the housing (para 3-7).

(2) Disconnect the H-60/PT cord leads from the terminal board (5, fig. 3-6).

(3) Remove the screw (47, fig. 3-5) and the stay cord hook (48).

(4) Carefully remove the H-60/PT cord (49) from the panel.

(5) Remove the other end of the cord (para 3-6e(1)).

*b. Replacement.* Replace the cord as indicated in figure 3-5; the sequence for replacing the cord is the reverse of the removal procedures (*a* above). Coat the end of the cord with paraffin wax to permit pulling the cord grommet into the panel assembly. Replace the panel assembly on the housing.

**Paragraph 3-11 deleted.**

**Paragraph 3-12 deleted.**

**3-13. Replacing Connector, Receptacle U-79/U**  
(fig. 3-5)

*a. Removal.*

- (1) Remove the panel assembly from the housing (para 3-7).
- (2) Tag and unsolder the leads from the underside of Connector, Receptacle U-79/U (28).
- (3) Use a spanner wrench to remove the round nut (26) from the front of the panel assembly.
- (4) Remove Connector, Receptacle U-79/U (28) and the gasket (27) from the underside of the panel assembly.

*b. Replacement.* Replace Connector, Receptacle U-79/U as indicated in figure 3-5; the sequence for replacing the U-79/U is the reverse of the removal procedures (*a* above). Replace the panel assembly on the housing.

**3-14. Replacing Terminal Board**  
(fig. 3-6)

*a. Removal.*

- (1) Remove the panel assembly from the housing (para 3-7).
- (2) Loosen the screws (1), and disconnect the leads on the front of the terminal board (5).
- (3) Take out the three screws (2), lockwashers (3), and flat washers (4).
- (4) Lift up the terminal board (5) and cut or untie the lacing that secures the wiring harness.
- (5) Unsolder the leads from the rear of the terminal board.

*b. Replacement.*

- (1) Solder the wiring harness leads in place.
- (2) Splice a short length of lacing cord in the wiring harness, and tie the wiring harness to the upper notch (6) at the top of the terminal board (5).

- (3) Fit the leads to the front of the terminal board through the lower notch (7) on the bottom.
- (4) Replace the three screws (2), lockwashers (8), and flat washers (4).
- (5) Secure the leads to the front of the terminal board (5).
- (6) Replace the panel assembly on the housing.

**3-15. Replacing Hook Switch**  
(fig. 3-6)

*a. Removal.* Remove the panel assembly from the housing (para 3-7) before performing the procedures in (1) through (3) below.

(1) *Return spring.*

- (a) Take out the two screws (8), lockwashers (9), and the flat plate (10).
- (b) Carefully lift out the return spring (11).

(2) *Actuator bar, gasket, and bridge clamp.*

- (a) Take out the three screws (12), lockwashers (13), and flat washers (14) from the bridge clamp (18). Carefully lift the actuator bar (17), bridge clamp (18), and gasket (16) from the bottom of the panel assembly.
- (b) Pull the gasket (15) from the actuator bar (17).
- (c) Use a pair of long-nosed pliers to remove the retaining ring (16) from the actuator bar (17); withdraw the actuator bar from the bridge clamp (18).

(3) *Hook switch.*

- (a) Unsolder the leads connected to the hook switch (21) springs.
- (b) Take out the two screws (19) and lockwashers (20); remove the hook switch (21).

*b. Replacement.*

- (1) *Hook switch.* Replace the hook switch as indicated in figure 3-6; the sequence for replacing the hook switch is the reverse of the removal procedures (a(3) above).
- (2) *Actuator bar, gasket, and bridge clamp.* Replace these components as indicated in figure 3-6; the sequence for replacing the components is the reverse of the removal procedures (a(2) above). Be sure the gasket (15) is properly seated in the recess in the actuator bar (17). The gasket should protrude evenly around the circumference of the bridge clamp (18) when the screws (12) are tightened.
- (3) *Return spring.* Replace the return spring as indicated in figure 3-6; the sequence for replacing the return spring is the reverse of the removal procedures (a(1) above). Replace the panel assembly in the housing.

**3-16. Replacing Buzzer BZ-23/PT**

(fig. 3-5 through 3-7)

*a. Removal.*

- (1) Remove the panel assembly from the housing.
- (2) Turn the BZ-23/PT volume control knob (38, fig. 3-5) to expose both ends of the wire coupling pin (22, fig. 3-6). straighten one end of the

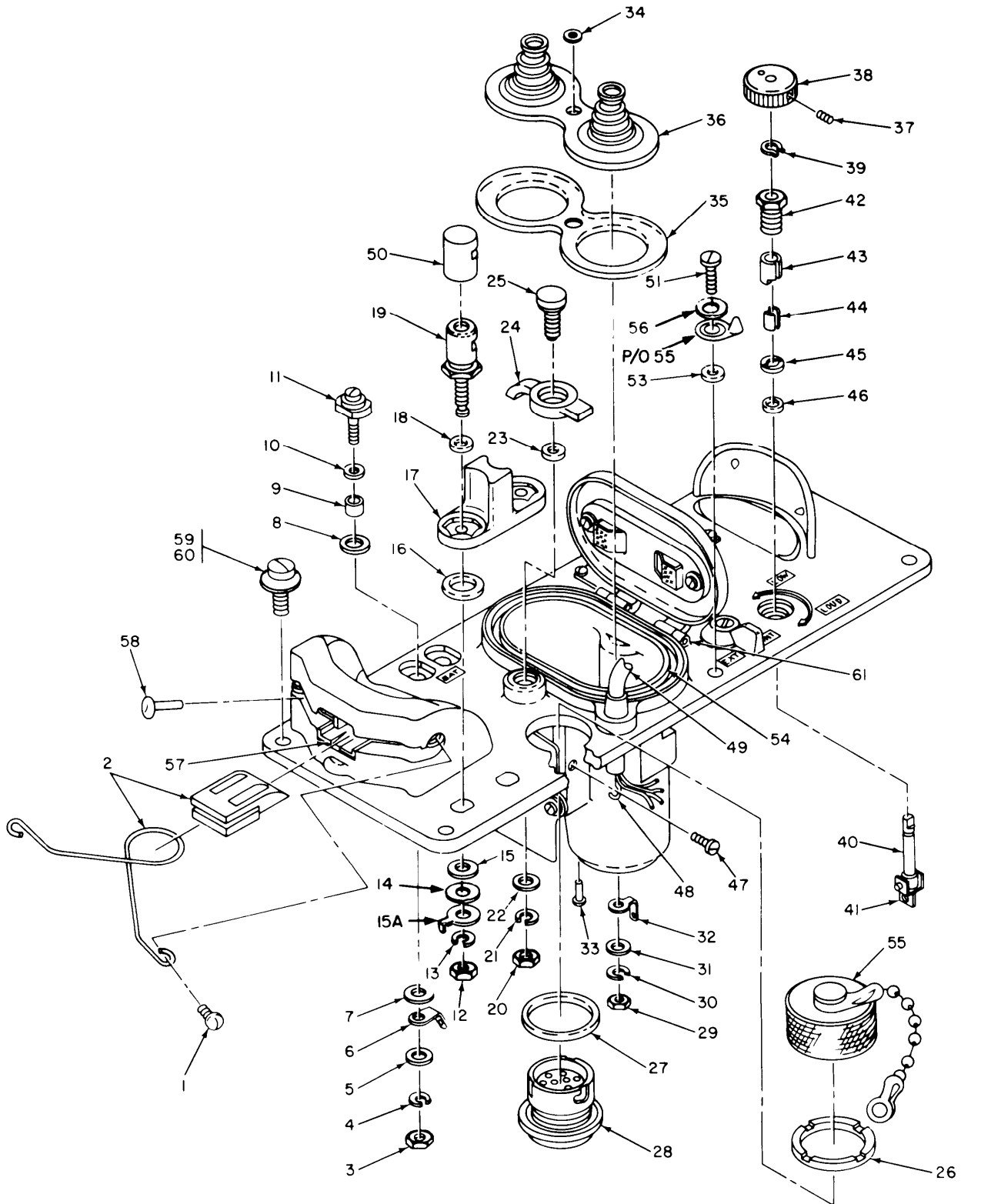
coupling pin by carefully bending it with a pair of long-nosed pliers; remove the coupling pin.

- (3) Turn the volume control knob to the full LOUD or full LOW position, and withdraw the BZ-23/PT (24, fig. 3-6) from the BZ-23/PT volume control shaft (40, fig. 3-5).
- (4) Unsolder the leads from the BZ-23/PT terminal board (fig. 3-7).

*b. Replacement.*

- (1) Turn the volume control shaft to the full LOUD position.
- (2) Turn the shaft on the BZ-23/PT to the position which allows the greatest travel of the clapper ball (fig. 3-7).
- (3) Carefully replace the BZ-23/PT so that the clevis (41, fig. 3-5) fits into the slot in the BZ-23/PT volume control shaft (40).
- (4) Insert the wire coupling pin (22, fig. 3-6) or a small cotter pin through the hole in the BZ-23/PT shaft, and carefully bend the ends around the shaft.
- (5) Solder the leads to the BZ-23/PT terminal board (fig. 3-7).
- (6) Replace the panel assembly on the housing.

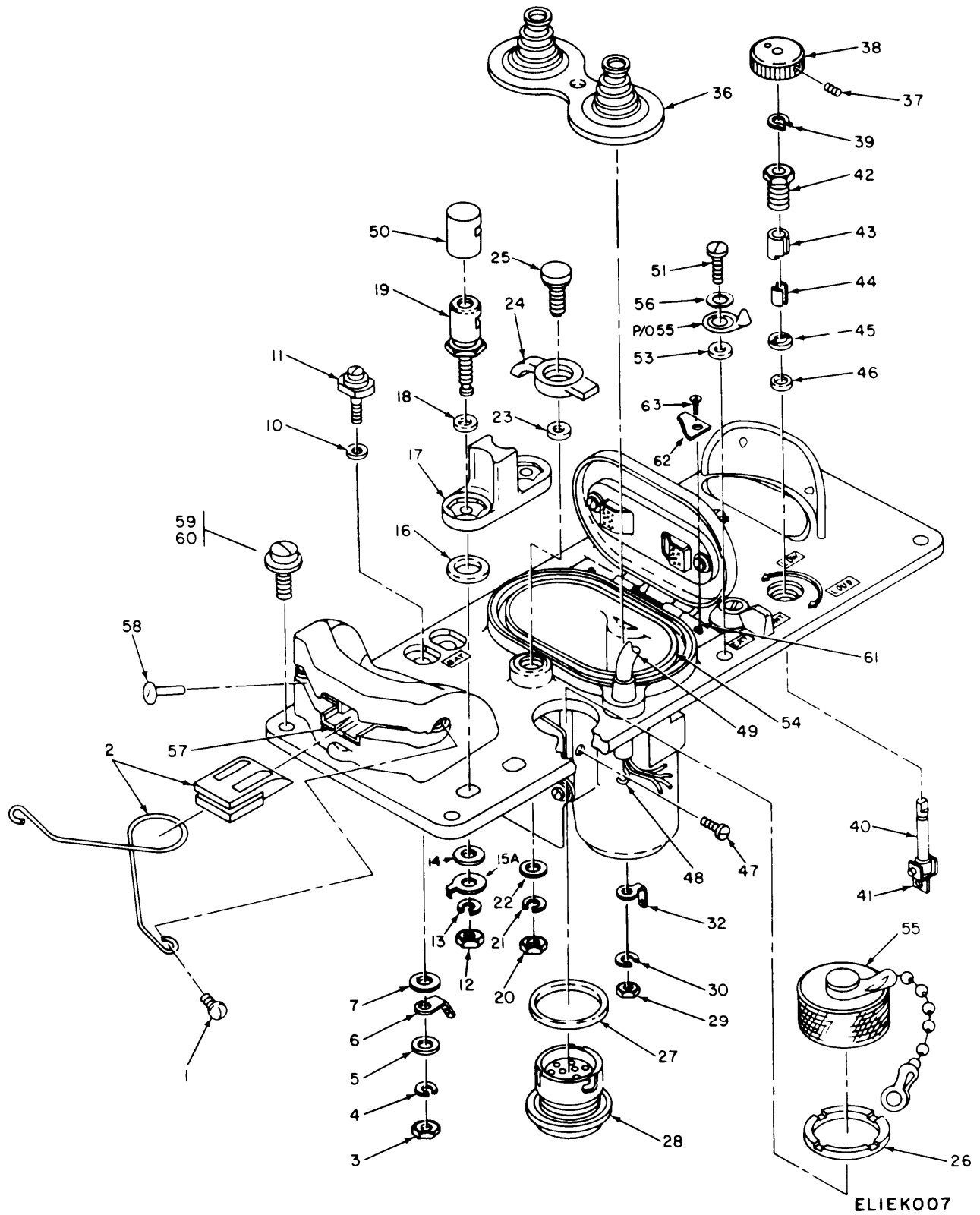
**Paragraph 3-17 deleted.**



# TA-312/PT

ELIEK009

Figure 3-5. Panel assembly, top exploded view (Sheet 1 of 3)



# TA-312A/PT

Figure 3-5. Panel assembly, top exploded view (Sheet 2 of 3).





1 Screw	21 Lockwasher	41 Clevis
2 Retainer Assembly	22 Flat washer	42 Bushing
3 Nut	23 Gasket	43 Retaining ring
4 Lockwasher	24 Battery compartment cover latch	44 Split sleeve bearing
5 Flat washer	25 Shoulder bolt	45 Flat washer
6 Terminal lug	26 Round nut	46 Gasket
* 7 Insulating washer	27 Gasket	47 Screw
* 8 Insulating washer	28 Connector, Receptacle U-79/U	48 Stay cord hook
* 9 Insulating bushing	29 Nut	49 H-60/PT cord
10 Gasket	30 Lockwasher	50 Rubber cap
11 BAT. terminal	31 Flat washer	51 Screw
12 Nut	32 Terminal lug	52 Deleted
13 Lockwasher	* 33 Rivet	53 Seal washer
14 Flat washer	* 34 Washer	54 Gasket
* 15 Insulating washer	* 35 Gasket	55 Cover
15A Terminal Lug	36 Contact assembly	56 Flat washer
16 Gasket	37 Setscrew	57 Bracket
17 Insulator angle bracket	38 BZ-23/PT volume control knob	58 Drive screw
18 Gasket	39 Retaining ring	59 Screw
19 LINE 1-2 binding post	40 BZ-23/PT volume control shaft	60 Seal washer
20 Nut		61 Pin, hinge
	Note	**62 Bracket
	* TA-312/PT only	**63 Screw
	** TA312A/PT only	

Figure 3-5. Panel assembly, top exploded view (Sheet 3 of 3).

### 3-18. Adjustment of Buzzer BZ-23/PT

Remove the BZ-23/PT from the panel assembly (pare 3-16) before performing the adjustments in a and b below.

#### a. Volume Adjustment.

(1) *Clearance between clapper ball and diaphragm (A, fig. 3-9).*

(a) Turn the volume control lever to the extreme LOW position.

(b) With the armature in the nonoperated position as shown, adjust the volume adjusting screw for .005 -inch maximum clearance between the clapper ball and the diaphragm.

(2) *Clearance between clapper ball and volume control lever (C, fig. 3-9).*

(a) Turn the volume control lever to the extreme LOUD POSITION.

(b) Hold the armature in the operated position. The clearance between the clapper ball and the volume control lever should not exceed .012 inch. The parts may remain in contact with each other.

(c) If the clearance exceeds .012 inch, use a pair of long-nosed pliers to bend the clapper spring at the point where it joins the armature.

#### b. Restoring Spring Adjustment.

(1) *Restoring action (B, fig. 3-9).* The free

end of the restoring spring should press against the adjustable arm of the bracket assembly but should not touch the tab on the end of the bracket assembly.

(a) Manually operate the armature, then release it. The armature should restore to the nonoperated position when released.

(b) Hold the BZ-23/PT upside down, and repeat the procedure in (a ) above.

#### (2) Minimum operating voltage.

(a) Construct the test circuit, and connect the BZ-23/PT as shown in figure 3-10 using Multimeter TS-352B/U.

(b) Slowly increase the voltage across the armature winding until the armature moves from the nonoperated to the operated position. The voltage on the meter should be between 38 and 46 volts.

(c) If the requirement in (b) above is not met, adjust the restoring spring adjusting screw (B, fig. 3-9) until the requirement is met.

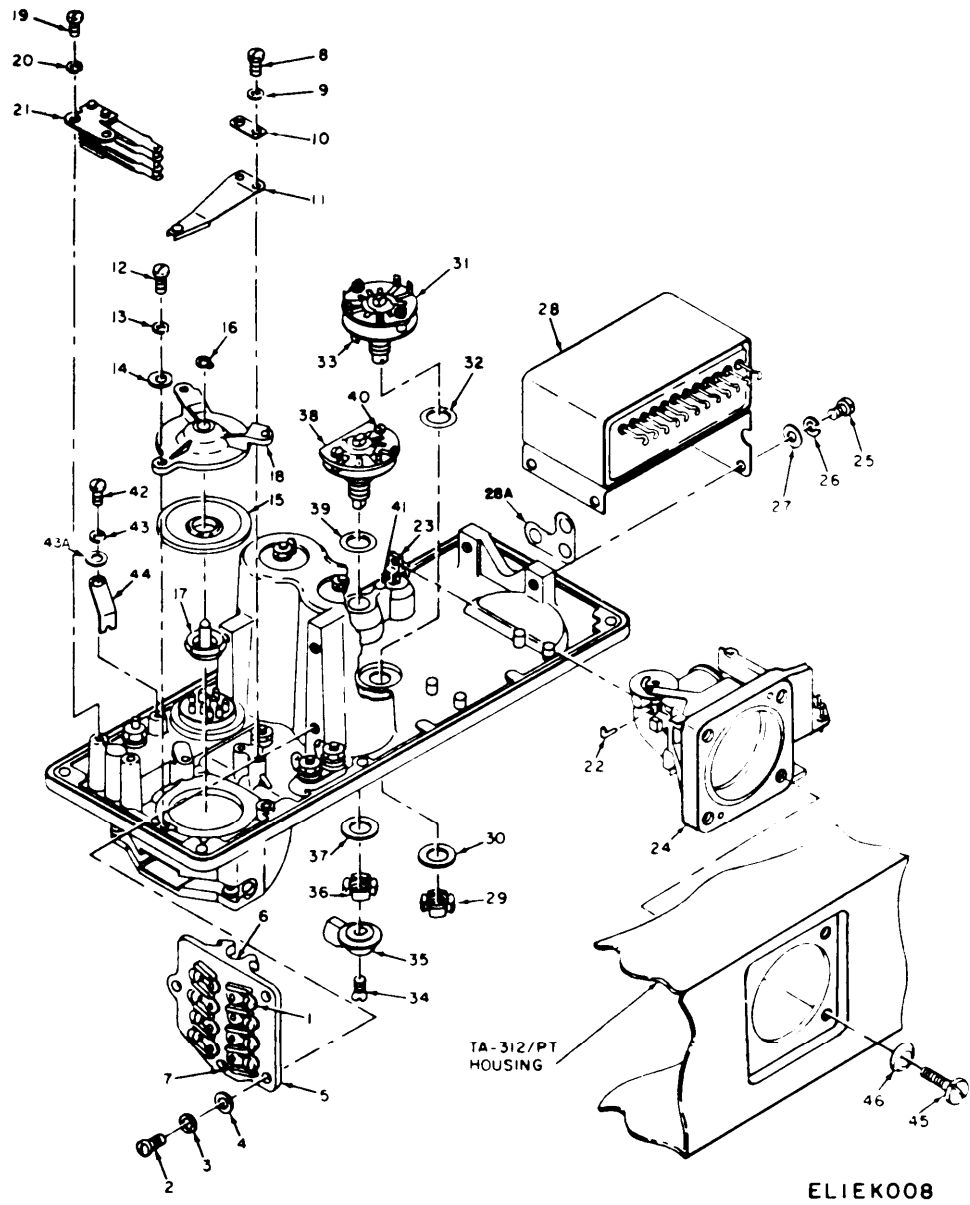
### 3-19. Replacing Network, Impedance Matching CU-350/PT

(fig. 3-6)

#### a. Removal.

(1) Remove the panel assembly from the housing (para 3-7).

(2) Remove the BZ-23/PT (pare 3-16).

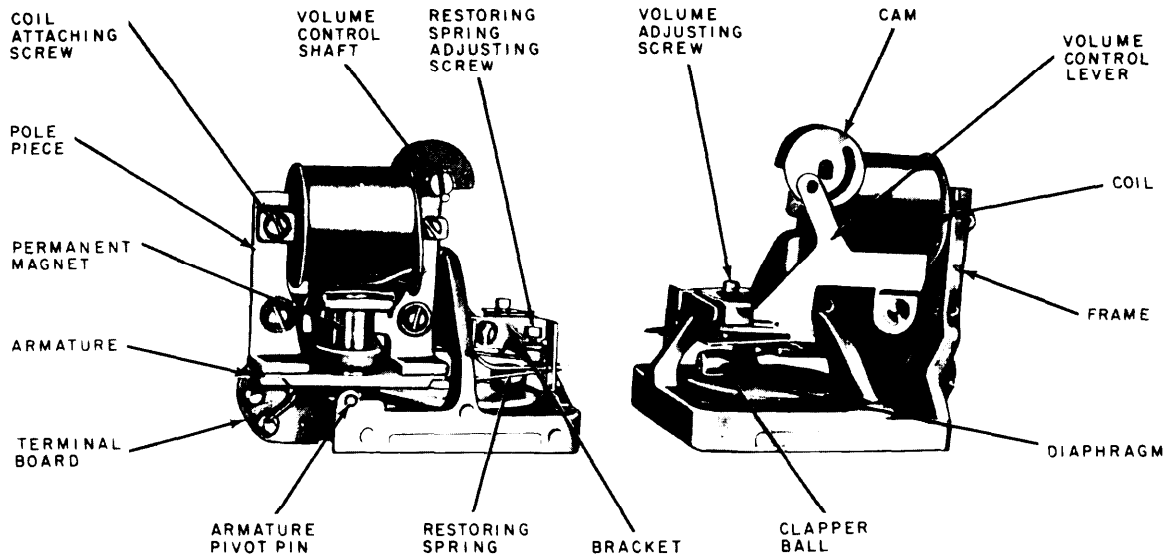


- |                  |                  |
|------------------|------------------|
| 1 Screw          | 9 Lockwasher     |
| 2 Screw          | 10 Flat plate    |
| 3 Lockwasher     | 11 Return spring |
| 4 Flat washer    | 12 Screw         |
| 5 Terminal board | 13 Lockwasher    |
| 6 Upper notch    | 14 Flat washer   |
| 7 Lower notch    | 15 Gasket        |
| 8 Screw          |                  |

Figure 3-6. Panel assembly, bottom, exploded view.

- |                |                            |                   |
|----------------|----------------------------|-------------------|
| Retaining ring | 27 Flat washer             | 38 INT-EXT switch |
| Actuator bar   | 28 CU-350/PT               | 39 Gasket         |
| Bridge clamp   | ■ **28A Bracket            | 40 Screw          |
| Screw          | 29 Nut                     | 41 Alignment well |
| Lockwasher     | ■ * 30 Insulating washer   | 42 Screw          |
| Hook switch    | 31 Circuit selector switch | 43 Lockwasher     |
| Pin            | 32 Gasket                  | ■ 43A Flat washer |
| Clevis         | 33 Alignment tab           | 44 Clamp          |
| BZ-23/PT       | 34 Screw                   | 45 Screw          |
| Screw          | 35 Knob                    | 46 Seal washer    |
| Lockwasher     | 36 Nut                     |                   |
|                | ■ * 37 Insulating washer   |                   |
- Note  
 ■ \* TA-312/PT only  
 ■ \*\* TA-312A/PT only

Figure 3-6 - Continued.



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Figure 3-7. Buzzer BZ-23/PT.

(3) Unsolder and tag the leads from the CU-350/PT terminals.

(4) Remove the four screws (25), lockwashers (26), and flat washers (27), and remove the CU-350/PT.

*b. Replacement.* Replace the CU-350/PT as indicated in figure 3-6; the sequence for replacing the CU-350/PT is the reverse of the removal procedures (*a* above).

### 3-20. Replacing BZ-23/PT Volume Control Knob and Shaft

(fig. 3-5)

#### *a. Removal.*

(1) Remove the BZ-23/PT (para 3-16a); and the CU-350/PT (para 3-19a); *do not unsolder any leads.*

(2) Use a 5/64-inch Allen wrench to loosen the two setscrews (37), and remove the BZ-23/PT volume control knob (38).

(3) Carefully remove the retaining ring (39) with a pair of long-nosed pliers.

(4) Pull the BZ-23/PT volume control shaft (40), with clevis (41) attached, from the bottom of the housing.

(5) Unscrew the bushing (42) from the panel assembly. Turn the panel assembly upside down, and tap it gently to remove the retaining ring (43) and flat washer (45).

(6) Remove the gasket (46) from the bottom of the shaft mounting hole in the panel.

**Figure 3-8 deleted.**

*Caution:* Do not remove the split sleeve bearing (44) from inside the retaining ring (43) unless it has been damaged.

*b. Replacement.*

- (1) Replace the gasket (46) in the bottom of the shaft mounting hole.

- (2) If the split sleeve bearing (44) was removed, carefully insert the two halves of the split sleeve bearing into the retaining ring (43). Align the top of the split sleeve bearing with the top of the retaining ring. Assemble retaining ring (43), split sleeve bearing (44), and flat washer (45) and place into bushing (42). Place panel on side. Carefully attach this assembly into panel. Torque to 10-12 inch pounds.

**Paragraph 3-21 deleted.**

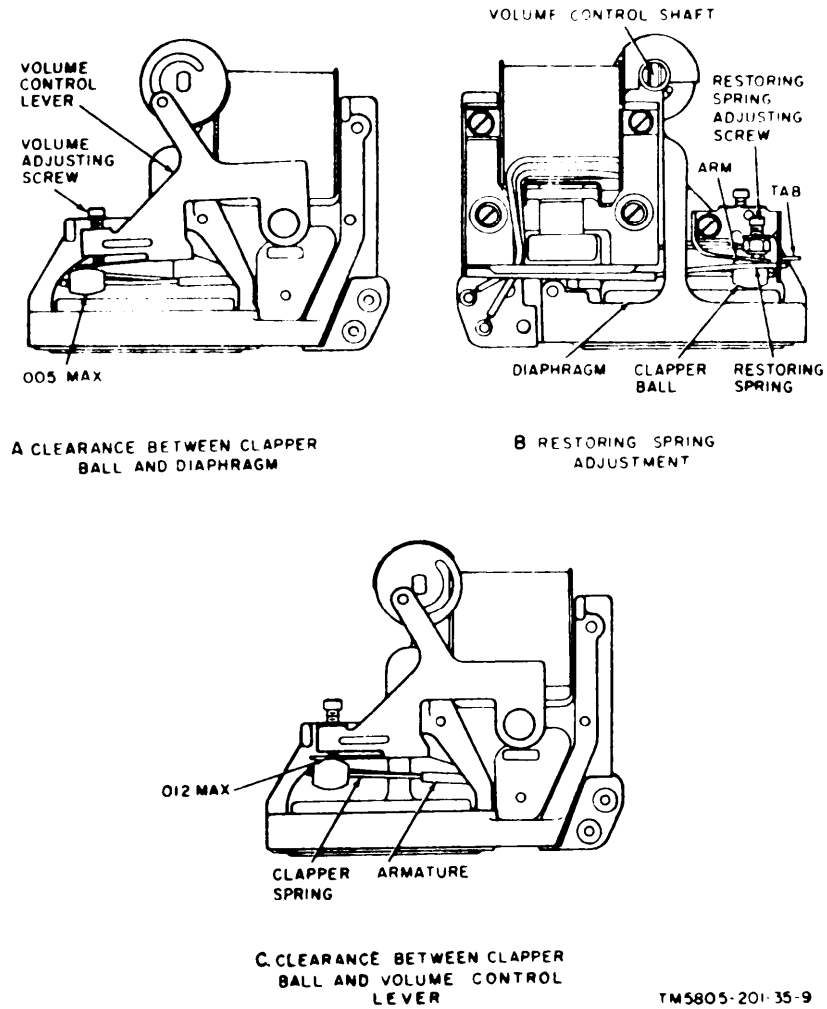


Figure 3-9. Buzzer BZ-23/PT, adjustment data.

Paragraph 3-22 deleted.

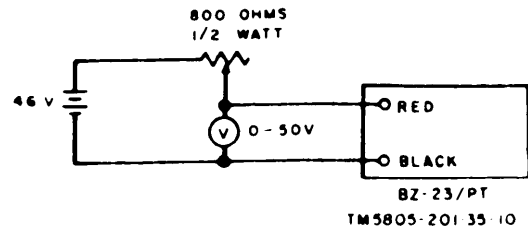


Figure 3-10. BZ-23/PT test connections.

### 3-23. Replacing Generator, Hand Ringing G-42A/PT (fig. 3-11)

#### *a. Removal.*

(1) Remove the panel assembly from the housing (para 3-7).

#### **NOTE**

If the G-42A/PT is to be removed for inspection and adjustment only, do not perform the procedure in (2) below.

(2) Unsolder the leads connected to the terminals on the generator (18).

(3) Remove the screw (1), lockwasher (2), and flat washer (3) that secure one end of the clamp (10) to the housing.

(4) Lift out the wiring harness (6) and the spacer (4). Spread apart the clamp (5), and remove it from the wiring harness (6).

(5) Remove the screw (7), lockwasher (8), and flat washer (9) that secure the other end of the clamp (10) to the housing. Remove the clamp (10) from the generator (18).

(6) Remove the handwheel retaining screw (11) and lockwasher (12), and remove the handwheel (13).

(7) Remove the generator retaining nut (14), using spanner wrench, NSN 5120-00-537-8730. Slide the generator (18) into the housing, and lift it out.

(8) The spacer (16) with gaskets (15 and 17) will fall free when the generator is removed. Do not remove the gaskets from the spacer unless they are loose or damaged.

#### *b. Replacement.*

(1) Replace the gaskets (15 and 17) as described in paragraph 3-8, if required.

(2) Replace the C-42A/PT as indicated in figure 3-11; the sequence for replacing the G

42A/PT is the reverse of the removal procedure (a above).

(3) Replace the panel assembly in the housing (para 3-7).

### 3-24. Cleaning

#### **WARNING**

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves that the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

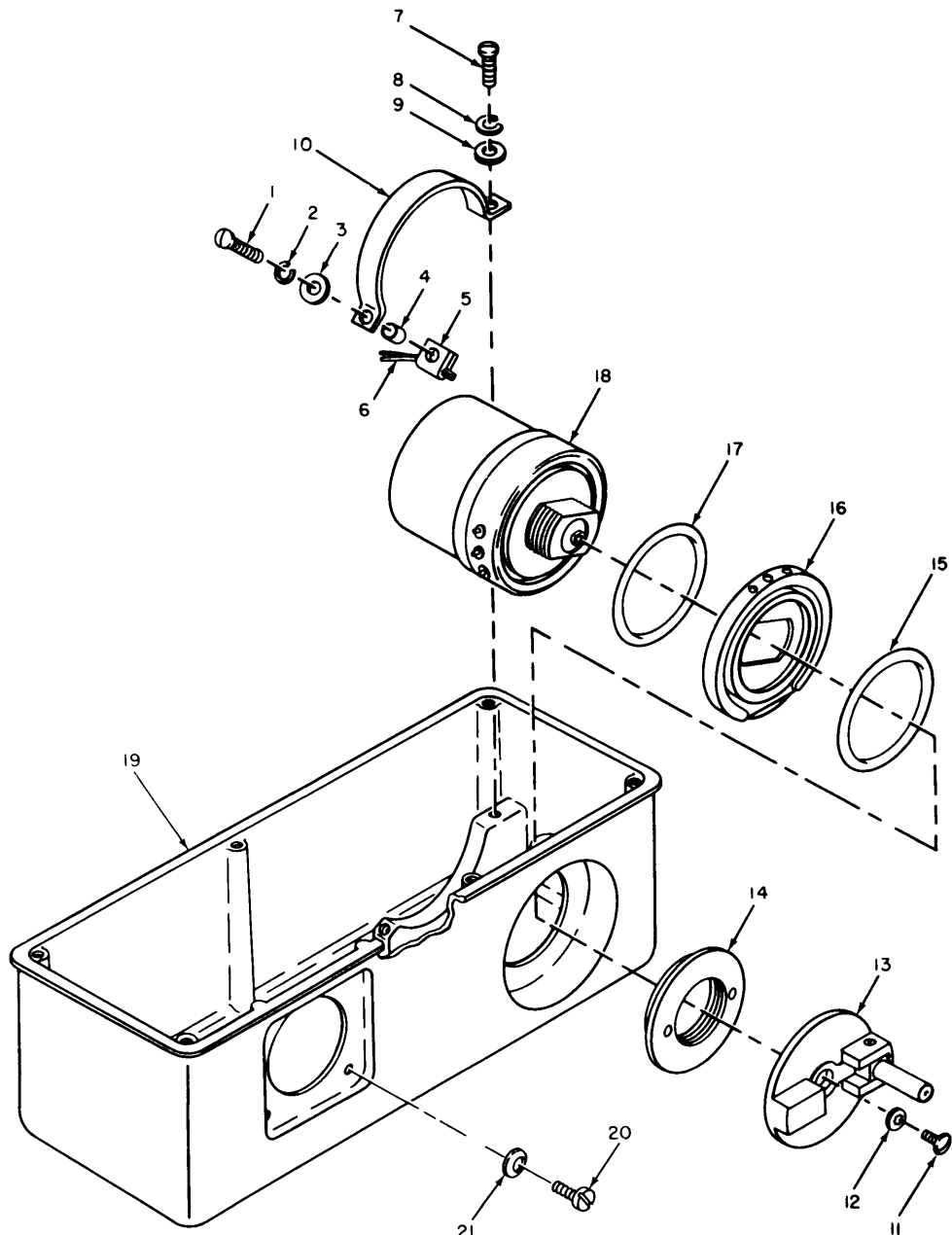
*a* Use a dry, clean, lint-free cloth or brush to remove dust or other dirt. If necessary, moisten the brush or cloth with trichlorotrifluoroethane. After cleaning, wipe dry with a clean cloth.

*b* Remove corrosion from the battery compartment with No. 0000 sandpaper.

*c* Use Burnisher TL-557 to clean electrical contacts.

### 3-25. Lubrication

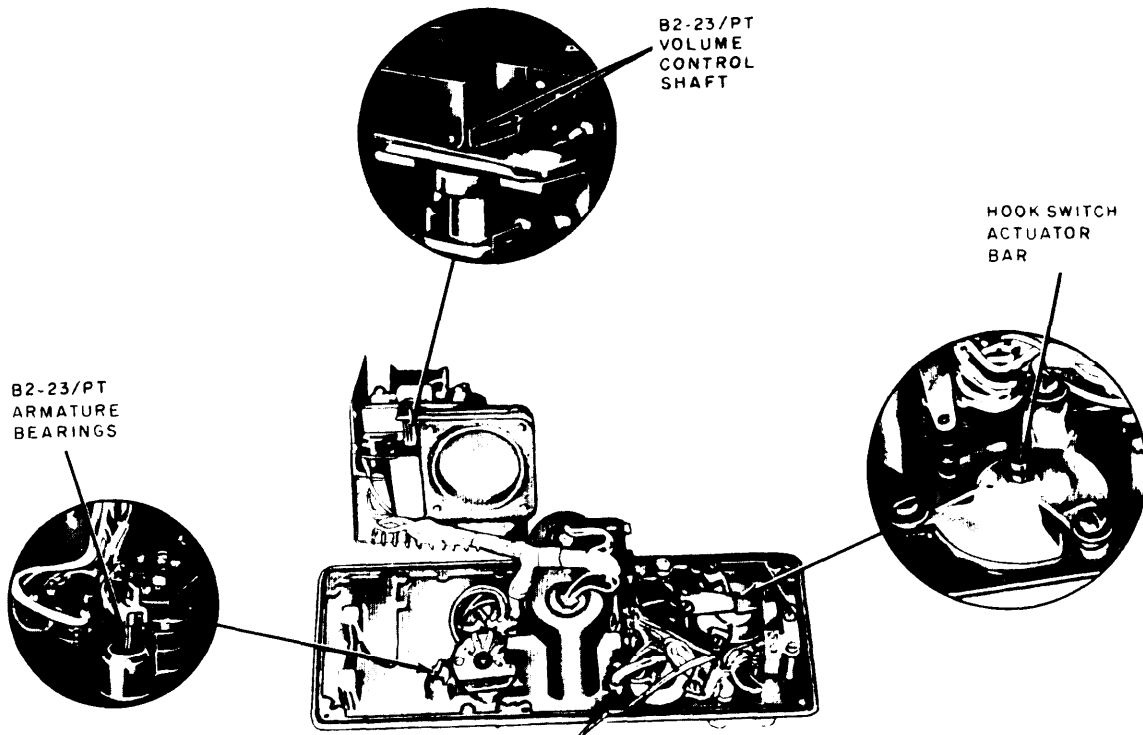
Telephone Set TA-312/PT is lubricated during manufacture. No additional lubrication is required unless parts have been replaced or if the original lubrication is removed during repair or adjustment. The points requiring lubrication are the BZ-23/PT armature bearings and volume control shaft and the hook switch actuator bar (fig. 3-12). Lubricate these points with Grease, Aircraft. and Instrument (GL). Make sure that the parts are clean and free of grit and dirt before lubricating them.



TM5805-201-35-11

- |                  |                              |                |
|------------------|------------------------------|----------------|
| 1 Screw          | 8 Lockwasher                 | 16 Spacer      |
| 2 Lockwasher     | 9 Flat washer                | 17 Gasket      |
| 3 Flat washer    | 10 Clamp                     | 18 Generator   |
| 4 Spacer         | 11 Handwheel retaining screw | 19 Housing     |
| 5 Clamp          | 12 Lockwasher                | 20 Screw       |
| 6 Wiring harness | 13 Handwheel                 | 21 Seal washer |
| 7 Screw          | 14 Generator retaining nut   |                |
|                  | 15 Gasket                    |                |

■ Figure 3-11. G-42A/PT and housing, exploded view.



TM5805-201-35-12

Figure 3-12. TA-312/PT interior lubrication points.

**NOTE**

Material in this section is to be considered direct support maintenance.

**Section III. GENERAL SUPPORT AND DEPOT MAINTENANCE**

**3-26. Scope of General Support Maintenance**

General support maintenance includes all functions performed by the organizational and direct support categories and the additional function of adjustment of the hook switch. This adjustment procedure is presented in paragraph 3-27. General support testing procedures, used to determine the acceptability of repaired equipment, are presented in chapter 4. All tools and test equipment for general support and depot maintenance are listed in the maintenance allocation chart in TM 11-5805-201-12.

**3-27. Hook Switch Adjustment**  
(fig. 3-13)

*Note.* Unless otherwise specified, the hook switch must be operated by removing and replacing the H-

60/PT in the retaining cradle. Since the H-60/PT does not depress the actuator bar all the way, adjustments cannot be made correctly by depressing the actuator bar with the finger. Measure the tension with Gage TL-391, unless otherwise specified.

*a. Alignment of Switch and Return Spring.* Remove the panel assembly from the housing (para 3-7) before performing the adjustments described in (1) through (7) and *b* through *e* below.

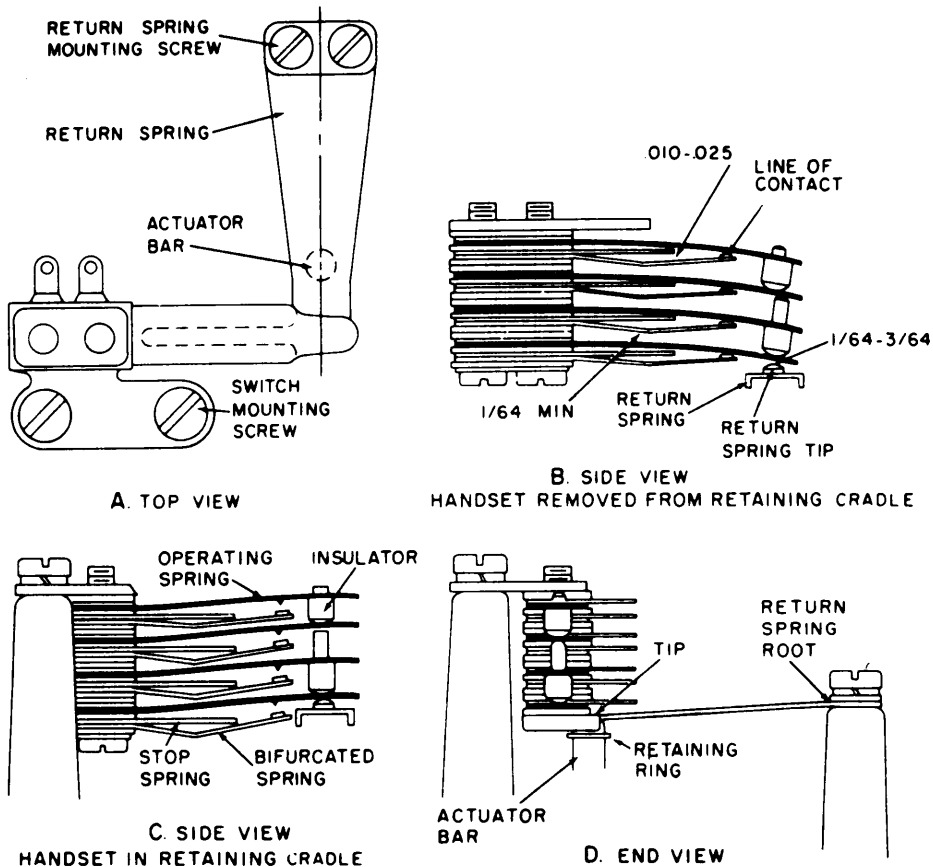
- (1) Loosen the return spring mounting screws (A, fig. 3-13), align the center line of the return spring with the center of the actuator bar, and re-tighten the screws.
- (2) Hold the hook switch in the operated position (B, fig. 3-13) by pressing down on the bottom of the operating spring.



- (3) When the panel assembly is held face down, the force required to lift the return spring from the actuator bar should be between 15 and 50 grams. Make the measurement at the point of contact between the return spring and the actuator bar (B and D, fig. 3-13).
  - (4) If necessary, use a 'pair of duckbill pliers to adjust the return spring to meet the requirements of (3) above by bending the return spring at the root (D, fig. 3-13).
  - (5) Loosen the hook switch mounting screws slightly, and adjust the position of the switch so that the insulators on the operating springs are lined up with the return spring tip (B and C, fig. 3-13) when the switch is in the operated position. Retighten the switch mounting screws.
  - (6) The tip portion of the return spring should be parallel to the surface of the panel assembly. With the H-60/PT removed from the retaining cradle, the clearance between the return spring tip and the adjacent operating spring (B, fig. 3-13) should be between one sixty-fourth and three sixty-fourths of an inch.
  - (7) If necessary, adjust the return spring to meet the requirements of (6) above by bending the return spring at the tip (B, fig. 3-13) with a pair of duckbill pliers.
- b. Contact Pressure.*
- (1) With the H-60/PT removed from the retaining cradle, the force required to separate each operating spring from its mating spring should be at least 15 grams (measured at the line of contact).
  - (2) If necessary, use spring adjuster 6R41215A to adjust the operating springs to meet the requirement of (1) above. Recheck the clearance in a(6) above if the operating springs have been adjusted.
- c. Contact Separation.*
- (1) The separation between each pair of mating contacts when the H-60/PT is in the retaining cradle (C, fig. 3-13) is 0.030 inch to 0.070 inch.
  - (2) If necessary, use spring adjuster 6R41215A to adjust the bifurcated springs to meet the requirements of (1) above.
- d. Clearance.*
- (1) When the H-60/PT is removed from the retaining cradle (B, fig. 3-13), the clearance between each bifurcated spring and the adjacent stop spring should be 0.010 to 0.025 inch, and the clearance between the bifurcated spring and the operating spring directly below it should be at least one sixty-fourth inch.
  - (2) If necessary, use spring adjuster 6R41215A to adjust the bifurcated springs to meet the requirements of (1) above. Recheck the adjustments in a(6) and b(1) above if the bifurcated springs have been adjusted.
- e. Actuator Bar Movement.* The hook switch should operate easily when depressed and released with the fingers. If the hook switch is difficult to depress, or if the actuator bar movement is sluggish, proceed as follows:
- (1) Check the actuator bar to see that it is not binding.
  - (2) Clean and lubricate the actuator bar (para 3-24 and 3-25).
  - (3) Replace damaged parts as required (para 3-16 and 3-17).
  - (4) Reduce the tension on the return spring (a above) and the tension on the operating springs (b above).

### 3-28. Scope of Depot Maintenance

Depot maintenance includes all maintenance functions performed at organizational, direct support, and general support categories and includes complete rebuilding of the TA-312/PT. Final testing of a rebuilt TA412/PT must be performed in accordance with the depot overhaul standards in chapter 5 before the rebuilt equipment is returned to stock or is reissued.



NOTE:  
 DIMENSIONS ARE IN INCHES

TM5805-201-35-13

Figure 3-13. Hook switch adjustment data.

**CHAPTER 4**  
**GENERAL SUPPORT TESTING PROCEDURES**

**NOTE**

Material in this chapter is to be considered direct support maintenance.

**4-1. General**

*a.* These testing procedures are prepared for use by Electronics Field Maintenance Shops and Service Organizations responsible for general support maintenance of electronic equipment to determine the acceptability of repaired electronic equipment. These procedures set forth specific requirements that repaired equipment *must* meet before it is returned to the using organization. Perform the physical tests and inspection (para 4-4) on the TA-312/PT. Refer to paragraphs 4-5 and 4-6 for the performance tests. A summary of performance standards is provided in paragraph 4-7.

*b.* For each test, comply with the instructions preceding the chart before proceeding to the chart. Perform each step in sequence. Do not vary the sequence. For each step, perform all the actions required in the *control settings* columns, and then perform each specific test procedure, and check results against the performance standard.

**4-2. Test Equipment and Materials**

*a. General.* All test equipment and materials required to perform the testing procedures are listed in the following charts. They are authorized under TA 11-17, Signal Field Maintenance Shops, and TA 11-100 ( 11-1 7), Allowances of Signal Corps Expendable Supplies for Signal Field Maintenance Shop, Continental United States.

*b. Test Equipment*

Nomenclature	NSN	Technical manual
Test Set, Telephone TS-716/U	662-00-965-1433	TM 11-6625-596-12
Light assembly, Electric MX-1292/PAQ.	6695-00-537-4470	TM 11-5540

*c. Materials.* Two Batteries BA-30, NSN 61354X)-1 20-1020, are required.

assume that no modification work orders have been performed. A list of current modification work orders is provided in DA Pam 310-1.

**4-3. Modification Work Orders**

The performance standards listed in the tests



#### 4-4. Physical Tests and Inspections

a. *Test Equipment.* Light Assembly, Electric MX-1292/PAQ.

b. *Test Connections and Conditions.*

(1) Remove the TA-312/PT from the carrying case.

(2) Remove the panel assembly from the housing.

c. *Procedure.*

Step No.	Test equipment	Control settings	Equipment under test	Test procedure	Performance standard
1	N/A		Controls may be in any position.	<p>a. Inspect all controls and mechanical assemblies for loose or missing screws, bolts, and nuts.</p> <p>b. Inspect connector for looseness and damage.</p> <p>c. Inspect housing and both sides of panel assembly for damaged or missing parts, and inspect condition of finish and panel marking.</p> <p><i>Note.</i> Touchup painting is recommended instead of refinishing whenever practicable. Refer to the applicable refinishing practices specified in TB 746-10. Screwheads, binding posts, receptacles, and plated fastener parts will not be painted or polished with abrasives.</p> <p>d. Inspect carrying case and strap for cuts, tears, fungus growth, faulty snap fasteners and zipper, and loose stitching.</p> <p>e. Inspect H-60/PT cord for cuts or frayed insulation.</p> <p>f. Inspect gaskets under panel and battery compartment cover. Inspect gaskets around G-42A/PT handcrank and BZ-23/PT diaphragm. Check for improperly cemented areas, breaks, and cuts. Inspect hook switch seal for looseness, breaks, and cuts.</p> <p>g. Open battery compartment. Inspect interior for dirt and corrosion. Inspect contact springs for cleanliness, tension, and resilience.</p>	<p>a. Screws, bolts, and nuts are tight; none missing.</p> <p>b. No looseness or damage evident</p> <p>c. No damaged or missing parts evident. Painted external surfaces do not show bare metal. Panel markings are legible.</p> <p>d. Carrying case and strap are free from damage and fungus growth. Stitches are tight and not frayed. Zipper and fasteners are in good condition and operate freely.</p> <p>e. No cuts or fraying evident. Insulation is sound and free of deterioration.</p> <p>f. Gaskets are firmly cemented in place throughout entire circumference. No cuts or breaks are evident. Hook switch seal is tight in its mounting.</p> <p>g. Battery compartment and contact springs are clean and free from corrosion. Contact springs have sufficient tension and resilience to make good contact with Batteries BA-30 when cover is closed.</p>
2	N/A		Controls may be in any position.	<p>a. Operate and release hook and press-to-talk switches.</p> <p>b. Operate INT-EXT and circuit selector switches to all positions.</p> <p>c. Turn BZ-23/PT volume control from LOW to LOUD.</p> <p>d. Place H-60/PT in retaining bracket, and turn panel assembly to vertical position.</p>	<p>a. Switches operate and restore freely without binding.</p> <p>b. Switches operate without binding. Detents hold switches firmly in each position.</p> <p>c. Control turns smoothly without binding; knob is tight and properly indexed.</p> <p>d. Retaining springs engage H-60/PT grooves with enough tension to hold H-60/PT firmly in place.</p>
3	MX-1892/PAQ: Connect mercury vapor lamp. 245V FOR M.V. LAMP switch: ON.		Controls may be in any position.	<p>a. Expose repaired portion of equipment to direct rays of lamp and inspect condition of moistureproofing and fungiproofing (MFP) varnish.</p> <p><i>Note.</i> MFP varnish will appear blue-gray. There should be no MFP varnish on switch contacts.</p> <p>b. Turn 245V FOR M. V. LAMP switch to OFF. Reassemble TA-312/PT.</p>	<p>a. All required or disturbed electrical components, connections, and chassis are covered.</p> <p>b. None.</p>

Figure FO-1. Physical Tests and Inspections.

Change 3 4-3

TM 11-6095-201-35/TO 31W1-2PT-282



**4-5. Signaling, Ringing, and Transmission Efficiency Tests**

*a. Test Equipment and Materials.*

- (1) Test Set, Telephone TS-716/U.
- (2) Batteries, BA-30 (2 required).
- (3) Cable C, Assembly (p/o TS-716/U).
- (4) Cable E, Assembly (p/o TS-716/U).

*b. Initial Test Equipment Calibration.*

- (1) Set TS-716/U controls as follows:
  - Power switch . . . . . OFF
  - NOISE GEN ADJ button . . . . . Depressed
  - CALIBRATE controls:
  - NOISE GENERATOR . . . . . Fully CCW
  - METER SENSITIVITY . . . . . Fully CCW
  - INSULATION RESISTANCE . . . . . Fully CCW
  - DIAL SPEED . . . . . Fully CCW
  - DIAL BREAK . . . . . Fully CCW
  - TEST CONDITION switch . . . . . COUPLER
  - NOISE GENERATOR switch. . . . . LOAD
  - MICROPHONE LOAD switch . . . . . OFF
  - RECEIVER LOAD switch. . . . . OFF
  - MICROPHONE CURRENT control . . . . . OFF
  - LEVEL A and B controls . . . . . Any
  - VALUE C and D controls. . . . . Any

(2) Turn the power switch on and allow 30 minutes for equipment to warm up.

(3) Adjust the NOISE GENERATOR CALIBRATE control until the meter needle moves to CAL (red mark on midscale).

**NOTE**

The needle of the meter will normally fluctuate slightly. Set the NOISE GENERATOR CALIBRATE control so that the needle swings equally to the left and right of the red mark.

(4) Depress the METER ADJ button.

(5) Adjust the METER SENSITIVITY CALIBRATE control until meter again reads midscale.

(6) Set up the acoustic coupler with the test microphone directly over and touching the test loudspeaker screen.

(7) Turn the NOISE GENERATOR switch to DRIVER.

**CAUTION**

No power should be applied to Telephone Test Set TS-716/U before preliminary control settings are followed as indicated below. These settings may prevent the possibility of overloading the panel meter and/or damaging the power amplifier.

(8) Adjust the METER SENSITIVITY CALIBRATE control until the meter reads midscale.

(9) Depress the EARPHONES button.

(10) Set the LEVEL and VALUE controls as follows:

- A . . . . 10
- B . . . . 8
- C . . . . 6
- D . . . . 9

(11) Push the 1 LOW, 2 CENTER, and 3 HIGH buttons in sequence. The meter should read in the green region. If the meter does not read in the green region, the equipment is not operating properly, refer to TM 11-6625-596-12.

*c. Test Connections and Conditions.* Install two Batteries BA-30 in the TA-312/PT. Connect the equipment as shown in figure 4-1 for step 3 and 4 only.

*d. Procedure*

Step No.	Test Equipment	Control settings	Equipment under test	Test procedure	Performance standard
1	TS-716/U: Connect TEL LINE L1 L2 to telephone line terminals. Hand Generator button: depressed (meter should read 0). NOISE GENERATOR switch: LOAD		Controls may be in any position.	a. With the H-60/PT in the retaining cradle, turn the G-42A/PT handcrank rapidly (approximately 150 to 200 rpm), and observe the indication on the meter.	a. Meter should read 30 or above.
2	TS-716/U: Same as step 1		BZ-23/PT volume control: LOUD Circuit selector switch: LB	a. With the H-60/PT in the retaining cradle, depress RINGER button 5300. Turn the TA-312/PT volume control from LOUD to LOW, and listen to the buzzer.	a. Volume of buzzer decreases as volume control is turned to LOW. BZ-23/PT sound is audible at LOW, but clapper does not strike diaphragm.
3	TS-716/U: BATTERY switch: CB-CBS TEST CONDITION switch: COUPLER NOISE GENERATOR switch: DRIVER MICROPHONE LOAD switch: OFF RECEIVER LOAD switch: OFF MICROPHONE CURRENT control: OFF TELEPHONE EFFICIENCY-SEND button: Depressed LEVEL A control: 10 LEVEL B control: 8 LEVEL C control: 16 (Meter should read midscale. If meter does not read midscale, adjust METER SENSITIVITY CALIBRATE control for a midscale reading.)		EXT-INT switch: INT Circuit selector switch: CB	a. Remove H-60/PT from retaining cradle, and deicing screen from transmitter. b. Insert the H-60/PT handset in the coupler. The receiver should fit squarely over the test microphone. Fit the transmitter over the test loudspeaker. The test loudspeaker should be about in its midposition for the test. Press the LONG LINE button. Note and record indication on meter. c. Set the TEST CONDITION switch to TEL LINE. Press LONG LINE button. Note and record indication on meter. d. Set the TEST CONDITION switch to COUPLER. Operate TA-312/PT circuit selector to CBS. Repeat procedure in <i>b</i> above with H-60/PT press-to-talk switch pressed. e. Repeat procedure in <i>c</i> above with H-60/PT press-to-talk switch pressed. f. Set the TEST CONDITION switch to COUPLER. Repeat procedure in <i>b</i> above with H-60/PT press-to-talk switch pressed.	a. None b. Indication on meter shall be between 30 and 70. c. Indication on meter shall be between 30 and 60. d. Indication on meter shall be between 30 and 76. e. Indication on meter shall be between 30 and 76. f. Indication on meter shall be between 30 and 76.
	BATTERY switch: LB LEVEL A control: 10 LEVEL B control: 7 LEVEL C control: 20		Circuit selector switch: LB		



<i>Step No.</i>	<i>Test Equipment</i>	<i>Equipment under test</i>	<i>Test procedure</i>	<i>Performance standard</i>
4	TS-716/U: BATTERY switch: CB-CBS TEST CONDITION switch: COUPLER NOISE GENERATOR switch: LOAD MICROPHONE LOAD switch: OFF RECEIVER LOAD switch: OFF MICROPHONE CURRENT control: OFF TELEPHONE EFFICIENCY-RECEIVER button: Depressed  LEVEL A control: 20 LEVEL B control: 2 LEVEL C control: 0 (Meter should read midscale. If meter does not read midscale, adjust METER SENSITIVITY CALIBRATE control for a midscale reading.)	Same as step 3.	g. Repeat procedure in <i>c</i> above with H-60/PT press-to-talk switch pressed.  a. Same as step 3a. b. Same as step 3b.  c. Restore all switches to normal positions and disconnect cable assembly.  d. Replace deicing screen and remove batteries BA-30.	g. Indication on meter shall be between 30 and 60.  a. None b. Indication on meter shall be between 35 and 70. c. None  d. None

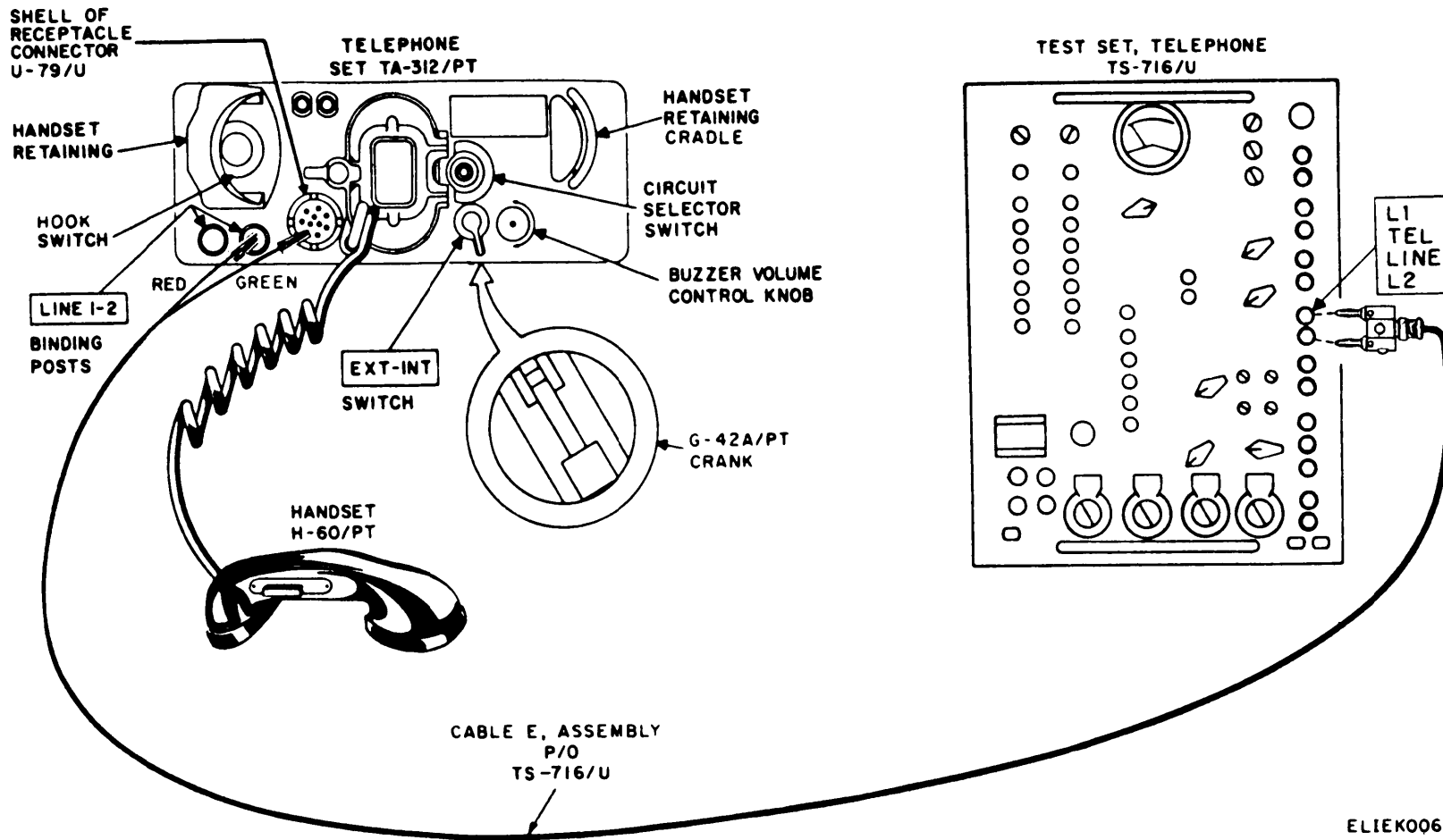


Figure 4-2. Insulation breakdown test connections.

**4-6. -Insulation Breakdown Tests**

- a. *Test Equipment and Materials.* Test Set, Telephone TS-716/U.
- b. *Test Connections and Conditions.* Connect the TA-312/PT to the calibrated TS-716/U as shown in figure 4-2. Make certain that the green lead is securely connected to the shell of the U-79/U. Place the H-60/PT in the retaining cradle so that the hook switch is depressed.
- c. *Procedure.*

Step No.	Test equipment	Control settings	Equipment under test	Test procedure	Performance standard
1	TS-716/U: Connect TEL LINE L1 L2 to telephone terminals. INSULATION RESISTANCE button: Depressed (Adjust the INSULATION RESISTANCE CALIBRATE control for midscale reading on the meter.) NOISE GENERATOR switch: LOAD		Circuit selector switch: CB INT-EXT switch: INT	a. Press the Test button. b. Restore TEST button and disconnect equipment.	a. Meter should read midscale or below. b. None

**WARNING**

When INSULATION RESISTANCE switch is depressed, up to 100 Volts may be present on TEL-LINE L1 L2

**4-7. Summary of Performance Standards**

Personnel may find it convenient to arrange test data in a manner similar to that shown below.

- a.* G-42A/PTTEST: Meter should read 30 or above.
- b.* BZ-23/PT TEST:
  - (1) Audible signal.
  - (2) Volume decrease where volume control is rotated from LOUD to LOW. Audible signal is heard in the LOW position, but the clapper does not strike the diaphragm.
  
- c.* TRANSMITTER EFFICIENCY TEST:
  - (1) LB: Meter should read between 30 and 76.
  - (2) CBS: Meter should read between 30 and 70.
  - (3) CB: Meter should read between 30 and 70.
- d.* RECEIVER EFFICIENCY TEST: Meter should read between 36 and 70.
- e.* INSULATION BREAKDOWN TEST: Meter should read between or below.

## CHAPTER 5

### DEPOT OVERHAUL STANDARDS

#### 5-1. Applicability of Depot Overhaul Standards

The depot overhaul standards are designed to measure the performance capability of repaired equipment. Equipment that meets the minimum standards will have performance capabilities equivalent to that of new equipment.

#### 5-2. Applicable References

*a. Repair Standards.* Applicable procedures of the depot performing these tests and the general standards for repaired electronic equipment given

in **TB SIG 355-1, TB SIG 355-2, and TB SIG 355-3** form a part of the requirements for testing this equipment.

*b. Modification Work Orders.* Perform all modification work orders applicable to the equipment before performing the tests specified. DA Pam 25-30 lists all available MWO'S.

#### 5-3. Test Facilities and Equipment Required

The following test equipment is required for the performance of the specific tests.

<i>Test equipment</i>	<i>NSN</i>	<i>Quantity</i>	<i>Technical manual</i>
Test Set, Telephone TS-71 6/U	6625-00-965-1433	1	TM 11-6625-596-12
Multimeter TS-352B/U	6625-00-242-5023	1	TM 11-6625-366-15

#### 5-4. General Test Conditions

Install two Batteries BA-30 in the TA-312/PT. Connect and calibrate the TS-716/U according to the procedures in paragraph 4-5b.

housing. Do not disconnect any leads from the TA-312/PT. Remove Batteries BA-30 from the battery compartment. Remove H-60/PT from retaining cradle.

*b.* With the TS-353B/U, check the continuity between the terminals on the terminal board and the contacts on the U-79/U as indicated in the chart below.

#### 5-5. Continuity Tests

*a.* Remove the TA-312/PT from its carrying case, and remove the panel assembly from the

<i>Terminal Board contacts</i>	<i>U-79/U contacts</i>	<i>Remarks</i>
Y	A	
BL	B	
BK	C	
OR	F	
G	H	
R	E	
L1	K	
L2	D	Operate circuit selector switch to CB; TS-352B/U should indicate 22 ± 4 ohm.
L1	J	Operate INT-EXTswitch to EXT; TS-352B/U indicates continuity

*c.* Strap the BAT. binding posts together. Check for continuity between the BAT posts, terminal R on the terminal board and terminal 2 on the impedance matching network.

*d.* Replace the H-60/PT in the retaining cradle, and connect a jumper across the BAT. terminals. Connect the TS-352B/U across the contacts of the battery compartment.

- (1) Set the INT-EXT switch to INT; the TS-352 B/U indicates an open circuit.
- (2) Set the INT-EXT switch to EXT; the TS-352 B/U indicates continuity.

*e.* Reassemble the TA-312/PT, and install Batteries BA-30 in the battery compartment.

#### **5-6. Electrical Tests**

Perform the general support test procedures as outlined in paragraphs 4-5d and 4-6c. Be sure that the TA-312/PT meets all of the performance standards specified in these tests.

#### **5-7. Immersion Test.**

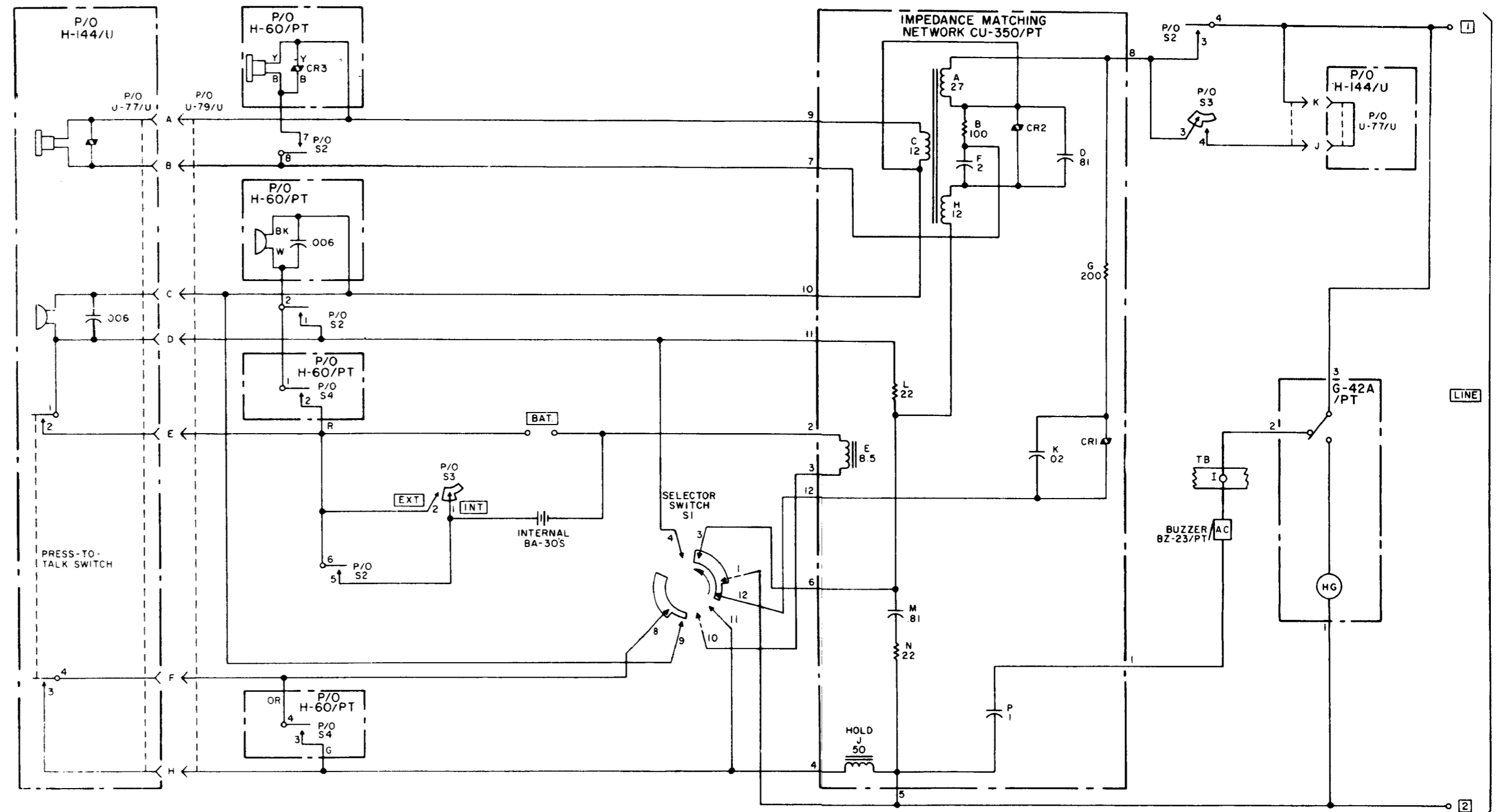
*a.* Lots of 10 each TA-312/PT telephones under

repair will be formed for immersion testing. One telephone from each lot will be subjected to the test.

*b.* The panel assembly of the telephone will be removed and replaced twice to insure that the gaskets form a proper seal.

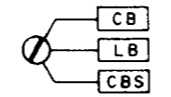
*c.* The equipment, without carrying case, will be immersed in fresh water to a minimum depth of 3 feet for 10 minutes. The equipment and the water shall be at ambient room temperature. After 10 minutes the equipment will be removed from the water and wiped dry on the exterior surfaces.

*d.* When the equipment is opened, there shall be no evidence of leakage except 2 or 3 drops at the ceramic breathers.



NOTES:

1. [ ] INDICATES EQUIPMENT MARKING.
2. RESISTANCES (INCLUDING COILS) ARE IN OHMS AND CAPACITANCES ARE IN UF.
3. SWITCH S2 SHOWN UNOPERATED (HANDSET IN CRADLE).
4. SWITCH S1 SHOWN IN [CB] POSITION.



5. CONNECTORS VIEWED FROM RECEPTACLE END.

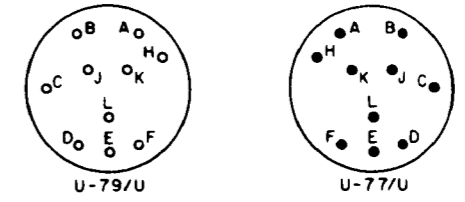


Figure 5-1. Telephone Set TA-312/PT with Handset-Headset H-144\*/U, schematic diagram.

EL1EK002





**APPENDIX**  
**REFERENCES**

Following is a list of applicable references that should be available to the DS maintenance personnel for Telephone Set TA-312/PT:

AR 310-25	Dictionary of United States Army Terms (Short Title:AD).
AR 310-50	Authorized Abbreviations and Brevity Codes.
AR-750-1	Army Materiel Maintenance Concepts and Policies.
DA Pam 25-30	Consolidated Index of Army Publications and Blank Forms.
DA Pam 738-750	The Army Maintenance Management Systems (TAMMS).
SB 11-6	FSC Class 6135, Primary Battery Supply Data.
TB 43-0118	Field Instructions for Painting and Preserving Communications-Electronics Equipment.
TB SIG 222	Solder and Soldering.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TM 11-644	Theory and Use of Electronic Test Equipment.
TM 11-5540	Electric Light Assembly MX-1292/PAQ(NSN 6895-00-378-5449).
TM 11-5805-201-12	Operator's and Organizational Maintenance Manual for Telephone Set TA-312/PT (NSN 5805-00-543-0012).
TM 11-5805-201-30P	Direct Support and General Support Maintenance Repair Parts and Special Tools List for Telephone Sets TA-312/PT and TA-312A/PT.
TM 11-5965-224-14P	Operator's Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools): Handsets, H-60/PT (NSN 5965-00-669-9145) and H-165/U(NSN 5965-00-543-1837).
TM 11-6625-3-66-15	Operator's Organizational, Direct Support, General Support and Depot Maintenance Manual: Multimeter TS-352 B/U (NSN 6625-00-553-0142).
TM 11-6625-596-12	Operators and Organizational Maintenance Manual (including Repair Parts and Special Tools Lists) Telephone Test Set TS-716/U.
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).



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





