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Colin Hinson

In the village of Blunham, Bedfordshire.



AP116B-0906-1

3rd Edition June 91

(Superseding 2nd Edition dated Dec 1977)

ARI 23237 SERIES PERSONAL LOCATOR BEACON EQUIPMENT

GENERAL AND TECHNICAL INFORMATION

BY COMMAND OF THE DEFENCE COUNCIL

Ministry of Defence

Sponsored for use in the

ROYAL NAVY by HAD(N)

ARMY by HQ DEME

ROYAL AIR FORCE by D air Eng (RAF)

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Service users should send their comments through

the channel prescribed for the purpose:

Naval Aircraft Maintenance Manual (RN)

EMER Aircraft A040 (Army)

AP 100B-01, Order 0504 (RAF)

WARNINGS

CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH

MAKE SURE YOU KNOW THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS BEFORE YOU USE A HAZARDOUS SUBSTANCE.

READ THE LABEL ON THE CONTAINER IN WHICH THE SUBSTANCE IS SUPPLIED.

READ THE DATA SHEET APPLICABLE TO THE SUBSTANCE, OBEY THE LOCAL ORDERS AND REGULATIONS.

WARNINGS:-

- 1) BERYLLIUM/BERYLLIA- THIS EQUIPMENT IS FITTED WITH TRANSISTORS WHICH CONTAIN BERYLLIUM MATERIAL. REFER TO JSP(F)395.
- 2) MERCURY- THIS EQUIPMENT IS FITTED WITH BATTERIES CONTAINING MERCURY. REFER TO JSP(F)395.
- 3) ADHESIVE- LOCTITE IS USED DURING THE SERVICING OF THIS EQUIPMENT. REFER TO JSP(F)395.

PREFACE

Changes of technical import within each new or revised leaf provided to amend this publication will be identified by a suitable indicator. Such indicators will be omitted when the leaf is next reissued. When the whole of a prime element is reissued by amendment action and the content is so changed or reorientated that the inclusion of amendment indicators would be impracticable, "(Completely revised)" will appear under the head of the relevant page or chapter. Where servicing is mentioned in the text Royal Navy should read Maintenance.

The 3rd Edition of AP 116B-0906-1 supersedes the 2nd edition dated December 1977.

LIST OF ASSOCIATED PUBLICATIONS

116B-0906-6	ARI 23237 Series, PLB Equipment
108F-0806-12	Life Preserver Aircrew Mks 20/20A, 12/12A and 27/27A
108F-0816-12	Life Preserver Aircrew Mks 25/25N and A Sizes
108F-0826-12	Life Preserver Aircrew Mk 30L

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2-2 Serviceability and Pressure Tests
2-3 Minor Repairs
3 PLB Test Set

CHAPTER 1-0

LEADING PARTICULARS

Equipment Reference

ARI 23237/1	PLB General Assembly Distress	5821-99-626-9732
ARI 23237/2	PLB General Assembly Training	5821-99-626-9733

PLB Sub-Assembly

Distress	5821-99-630-9247
Training	5821-99-630-9248

<u>Aerial</u>	5821-99-631-1153
---------------	------------------

<u>Auto-Aerial Cable Assembly</u>	5821-99-778-2434
-----------------------------------	------------------

<u>Battery</u>	6135-99-639-5829
----------------	------------------

<u>Interconnecting Cable*</u>	5821-99-646-3987
-------------------------------	------------------

<u>Latch</u>	5930-99-630-9949
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<u>Safety Cover</u>	5821-99-646-3988
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Operating Frequencies

ARI 23237/1	243.0 MHz (Distress)
	282.8 MHz (Auxiliary)
ARI 23237/2	245.1 MHz (Training)

<u>Operating Frequency Tolerance</u>	±0.005%
--------------------------------------	---------

Detection Range

Line of sight to an aircraft fitted with effective homing equipment flying at 3048 metres (10,000 feet) under average conditions over sea.

Beacon (Distress channel)	111 km (60 nautical miles) min
---------------------------	--------------------------------

R/T (Distress and Auxiliary channels)	18.6 km (10 nautical miles) min
---------------------------------------	---------------------------------

Power Output

Peak envelope power	400 mW typical, 300mW min
---------------------	---------------------------

Beacon Modulation

Beacon modulation (swept tone)	1 kHz to 300 Hz
--------------------------------	-----------------

Beacon tone (sweep rate)	2-3 Hz
--------------------------	--------

Modulation depth	67% minimum (80% typical)
------------------	---------------------------

* Not part of ARI, but associated PLB equipment

Emission characteristic -
interrupted carrier:

Mark/Space Ratio	0.65 sec 'ON', 1.05 sec 'OFF'
Repetition Rate	1 cycle per 1.7 sec nominal
Operation Duration (at 0°C)	24 hours min on one standard battery

Dimensions and Weight

Nominal Dimensions:

ARI 23237/1 & 2	150 mm x 77 mm x 36 mm
PLB Sub-Assembly with interconnecting cable attached	102 mm x 77 mm x 36 mm
Battery with interconnecting cable attached	79 mm x 77 mm x 36 mm

Weight:

ARI 23237/1 & 2	0.9 kg
ARI 23237/ 1 & 2 with interconnecting cable	1.06 kg

Weight Post Mod B0877

ARI 23237/1 & 2	0.3 kg
ARI 23237/1 & 2 with interconnecting cable	0.4 kg

Associated Test Equipment

PLB Test Set	10T/6625-99-634-0556
Battery Dry 1.5V, No 1	6135-99-910-1101

MODIFICATION RECORD

This publication is technically up-to-date in respect of the modifications listed below which relate to the Service equipment:

Contractors' Mod. No.	RMC Mod. Number	Mod. Plate Strike No.	Purpose
PLB/003	A7685	1	Introduces Module B
PLB/002	A7686	2	Introduces Module C
7T/221-054	B0877	3	Introduce improved circuitry
HQ159	B1742	4	Protects internal battery cables

CHAPTER 1-1
GENERAL DESCRIPTION
(ARI 23237/1)

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GENERAL INFORMATION

INTRODUCTION

1. The Distress PLB (ARI 23237/1), fig. 1, is a compact, dual channel crystal-controlled transceiver, with both beacon transmission and speech communication modes of operation. This primary function is to provide, in association with suitably equipped search aircraft, a means of locating personnel in distress. Two-way speech communication between the survivor and rescue service is available on both the distress channel and an auxiliary channel. The PLB can be used with an Interconnecting Cable interposed between the PLB sub-assembly and the battery, enabling the battery to be located in a separate pocket.

2. The beacon transmits an easily distinguishable swept-tone signal on the International Aviation U.H.F. distress frequency of 243.0 MHz. Suitably equipped search aircraft within range, and equipped with any of the following direction finding equipment, will home onto the PLB:

- (1) ARI 18120 - Violet Picture
- (2) ARI 23233 - BE 373
- (3) ARI 18220 - PTR 377
- (4) ARI 23120 - ARA 50

The Auxiliary channel operates on the International Scene of Search frequency of 282.8 MHz and enables the Distress channel to be cleared while continuing two-way communication, once visual contact has been made. It should be noted that item 4 above requires to receive a continuous beacon signal to home effectively rather than an interrupted tone as generated by the PLB's.

3. The equipment incorporates test facilities by which a rapid confidence check may be carried out during emergency use, by simply pressing a push-button and observing a green indicator lamp.

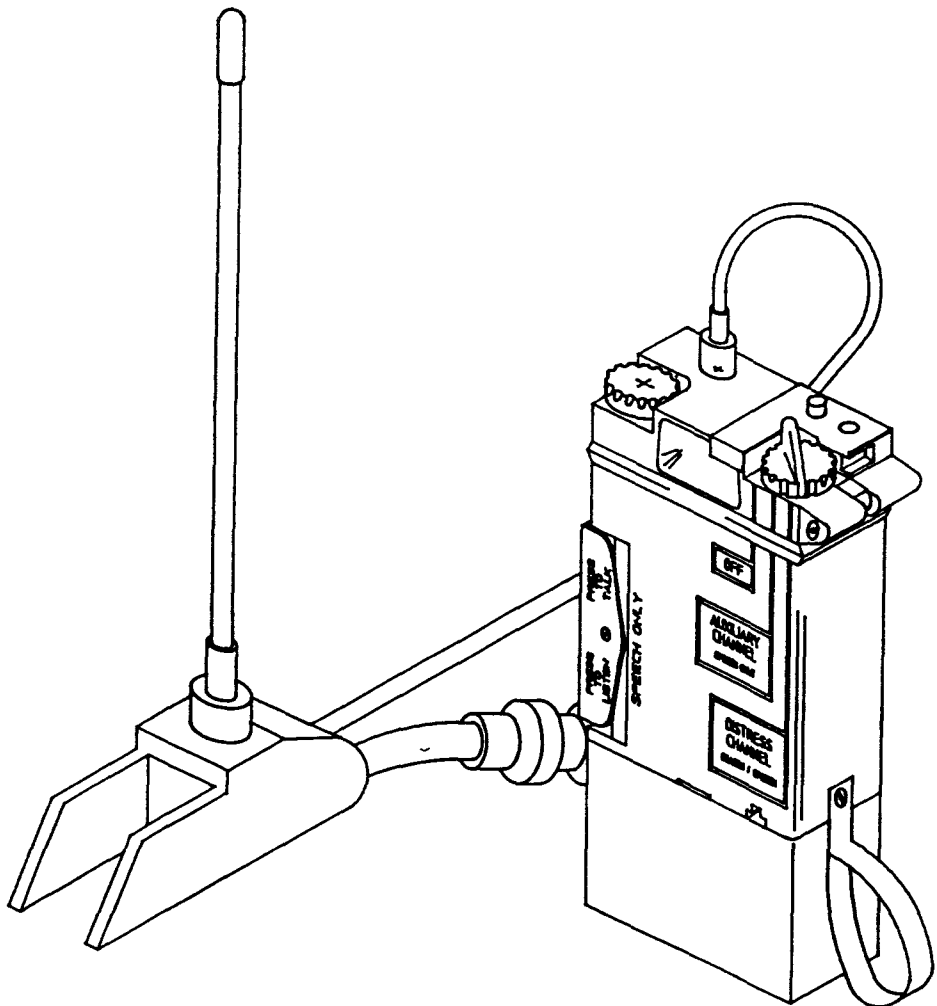


Fig. 1 Distress PLB (ARI 23237/1)

4. The PLB comprises three major sub-assemblies; the PLB Sub-Assembly, the battery pack and the aerial. The electronics are of solid-state modular construction, fully utilising hybrid integrated circuits, which increase reliability and simplify servicing. A minimum number of controls are arranged to enable one-handed operation under arduous conditions. A detachable safety cover is located over the selector switch to ensure correct selection of the distress channel under operational conditions. The battery pack, which is an encapsulated assembly of mercury or alkaline cells, is both electrically and mechanically coupled to the PLB Sub-Assembly by a single device; battery replacement is therefore a very simple operation. The aerial can be connected in either a land or sea environment arrangement. In the land environment role it forms a monopole connected directly into a co-axial connector on top of the PLB Sub-Assembly. In the sea environment role the aerial becomes a dipole connected via a spring loaded auto-aerial assembly and a length of co-axial cable stowed within the deflated life preserver.

BRIEF DESCRIPTION

5. The PLB is a compact, lightweight, hand-held two-channel equipment contained within a single case. A moulded battery is secured to the underside of the PLB Sub-Assembly by a waterproof latching device which also provides an electrical coupling. Thick film hybrid integrated circuits are used extensively to facilitate miniaturisation and reliability. Complementary Metal Oxide semiconductors (CMOS) and Bi-metal Field Effect Transistor (BiFET) circuit modules have been introduced on post Strike Off No3 PLBs to further increase reliability. Ergonomic considerations have resulted in the physical arrangement of controls; volume and channel selection/off on the top, a talk/listen rocker switch on the side.

6. The aerial coupling is made through a co-axial connector on the top of the PLB Sub-Assembly. For use with a Life Preserver the aerial is stowed around the collar and coupled via an auto-aerial assembly and an extension lead to the PLB. The auto-aerial assembly comprises an element which combines with the aerial to form a dipole and an anchorage which incorporates a spring loaded mechanism which erects the Aerial when the Preserver is inflated. When the user is not wearing a Life Preserver or wishes to hold the PLB in the hand independent of the assembly, the Aerial may be coupled directly into the co-axial connector on the PLB Sub-Assembly.

7. The PLB Sub-Assembly is constructed in two cast alloy sections, a body and a top cover; a gasket ensures adequate waterproof protection when assembled. The transmitter and receiver circuits, beacon tone generator, aerial switching and combining unit, together with ancillary circuits, are interconnected through a printed circuit motherboard. Audio output volume is controlled with a rotary variable resistor, channel selection is made with a rotary switch and R/T talk/listen is selected with a rocker assembly which incorporates reed switches. In order to reduce movement of the pcb and modules, the internal electronic assembly is inserted into a plastic sleeve, supported on either side by two rubber pads. A hole is drilled in the horn assembly to prevent air being trapped when the PLB is submersed.

8. For the purposes of a brief technical description the equipment can be considered to comprise the items shown in the simplified block diagram fig 1. A 243.0 MHz transmitter provides speech, and in conjunction with a beacon tone generator, beacon transmission through the aerial switching and combining unit on the International Distress Frequency. A second transmitter, on 282.8 MHz, provides speech transmission only on the International Scene of S

Two similar receivers one operating on 243.0 MHz and the other on 282.8 MHz receive voice communication transmissions within range. A single transducer functions as both microphone and loudspeaker. There are a number of additional modules and complex interconnections which are not shown in this illustration. A more detailed description supported by diagrams is provided in the Topic 6.

9. A press-to-test button and a green light emitting diode indicator located on the top cover, provides a confidence check of 243.0 MHz beacon function to the user when the PLB is in emergency operation.

OPERATION

10. When used in association with a Life Preserver the PLB can be arranged to be automatically activated in the Distress Frequency beacon transmission mode, on man/seat separation, thereby transmitting a distress signal during the descent phase. Alternatively, in application where the escape method is other than ejection, a cord is fitted to the auto-activate mechanism of the PLB which, when pulled by the user, initiates Distress frequency transmission, as above. Thereafter it will continue to transmit a Distress signal for the duration of battery life or until the channel selection switch is operated to either the Auxiliary frequency, 282.8 MHz, or OFF. R/T communication can take place on either the Distress or Auxiliary channel.

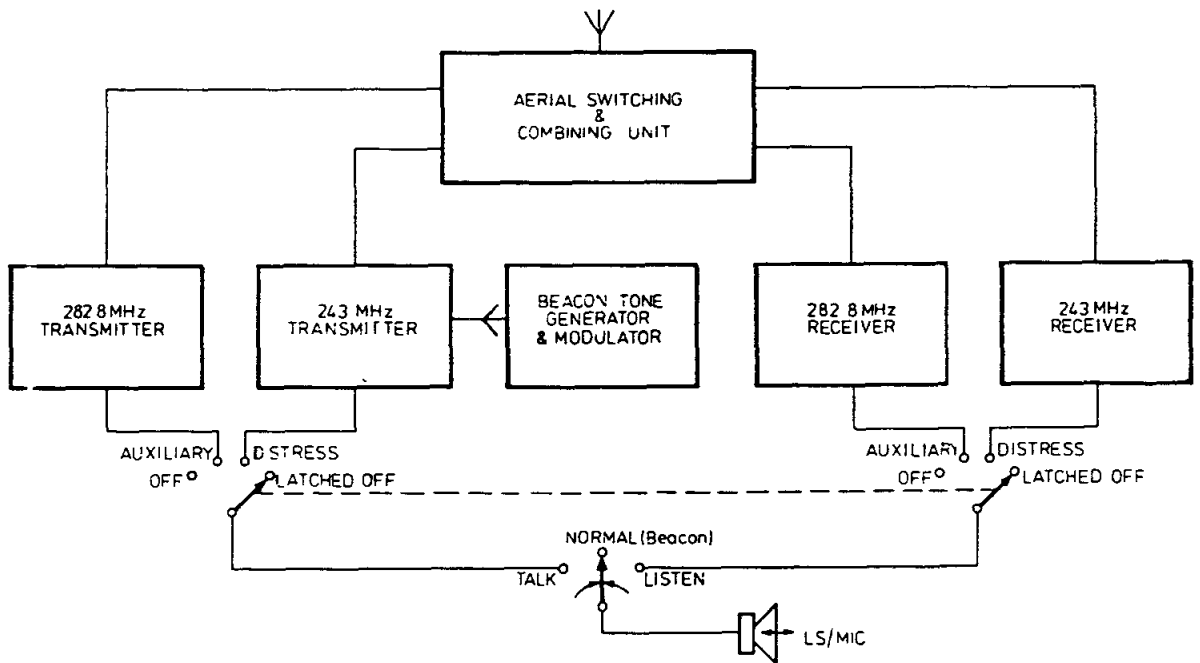


Fig 2. Block Diagram of Distress PLB (ARI 23237/1)

11. There are two switches on the operational beacon; the Channel Selection switch and the PRESS-TO-TALK/PRESS-TO-LISTEN switch. Their functions are as follows:-

Table 1
Channel Selection Switch Functions

Switch Position	Function
Latched 'off'	Isolates battery power from all channels position maintained by auto-activate latch*
DISTRESS CHANNEL	Connects battery power to the 243.0 MHz channel
AUXILIARY CHANNEL	Connects battery power to the 282.8 MHz channel
OFF	Isolates battery power from all channels

* A detachable safety cover is fitted over the Channel Selection switch to prevent the switch knob travelling beyond the DISTRESS CHANNEL position when the auto-activate latch is removed.

The PRESS-TO-TALK/PRESS-TO-LISTEN switch is a rocker action and may be operated to select either the talk/beacon or listen/beacon function. Used in conjunction with the channel selection switch described above, the following functions are available as given in table 2.

Table 2
Combined Functions of Channel Selection Switch
and PRESS-TO-TALK-/PRESS-TO-LISTEN Switch

Channel Selection Switch	PRESS-TO-TALK PRESS-TO-LISTEN Switch	Function
OFF or latched 'off'	Any position	None
DISTRESS	Normal (Central biased position)	Beacon transmission on 243.0 MHz
DISTRESS	Press-to-talk	Voice transmission on 243.0 MHz
DISTRESS	Press-to-listen	Voice reception on 243.0 MHz
AUXILIARY	Normal or Press-to-listen	Voice reception on 282.8 MHz
AUXILIARY	Press-to-talk	Voice transmission on 282.8 MHz

2. Apart from the differences mentioned in the previous paragraph, the beacon is basically the same as the Operational version. The functional differences are highlighted in fig. 1 (compared with fig.2 of Chap 1-1). Figure 2 below depicts the Training beacon.

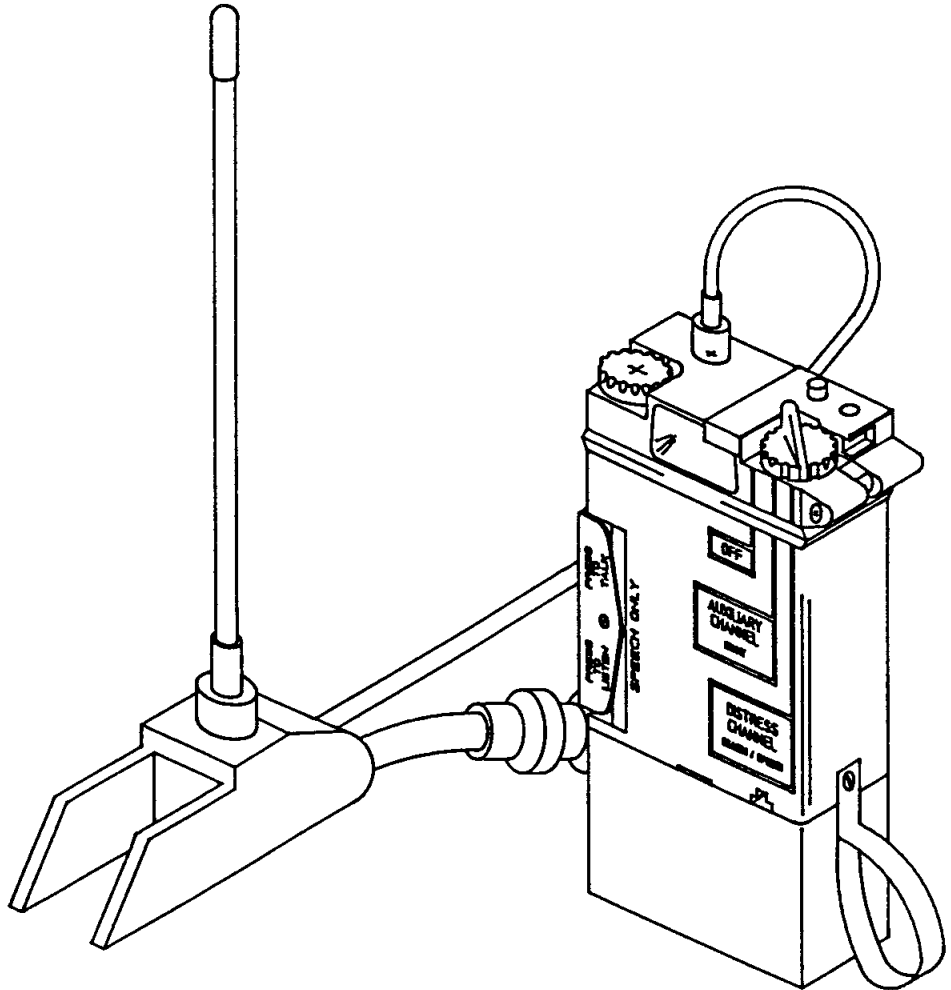


Fig 2. PLB - Training Version (ARI 23237/2)

OPERATION

3. There are two switches on the Training version; the Channel Selection switch and the PRESS-TO-TALK/PRESS-TO-LISTEN switch. Their functions are as follows:

Table 1

Channel Selection Switch Functions

Switch Position	Function
Latched 'Off'	Isolates battery power. Position maintained by auto-activate latch.*
DISTRESS CHANNEL	Connects battery power to the 245.1 MHz channel.
AUXILIARY CHANNEL	Non-Functional
OFF	Isolates battery power.

* A detachable safety cover is fitted over the Channel Selection switch to prevent the switch knob travelling beyond the DISTRESS CHANNEL position when the auto-activate latch is removed.

The PRESS-TO-TALK/PRESS-TO-LISTEN switch is a rocker action and may be operated to select either the talk/beacon or listen/beacon function. Used in conjunction with the channel selection switch described above, the following functions are available as given in table 2.

Table 2

Combined Functions of Channel Selection Switch
and PRESS-TO-TALK/PRESS-TO-LISTEN Switch

Channel Selection Switch	PRESS-TO-TALK PRESS-TO-LISTEN Switch	Function
OFF or latched 'OFF'	Any position	None
DISTRESS	Normal (central biased position)	Beacon transmission on 245.1 MHz
DISTRESS	Press to talk	Voice transmission on 245.1 MHz
DISTRESS	Press to listen	Voice reception on 245.1 MHz
AUXILIARY (Dummy)	Normal or Press to listen	Non-functional
AUXILIARY (Dummy)	Press to talk	Non-functional

CHAPTER 2-0

MAINTENANCE

(ARI 23237/1 & 2)

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ROYAL NAVY MAINTENANCE POLICY

1. First Line - nil

2. Second Line

(1) All Ships and Establishments operating RN aircraft - Functional checks and battery replacement to be carried out in accordance with procedures laid down in AP116B-0906-1. In order to avoid excessive drain on the battery, the use of the Self Test facility is to be confined to Survival Equipment Personnel during routine testing.

(2) Survival Equipment Workshops - Minor repairs in accordance with procedures laid down in AP116B-0906-1.

3. Third Line

Direct exchange with 14 MU in accordance with AP 3381.

4. The RN scheduled maintenance periodicities for ARI 23237/1 & 2 are detailed in AP 108F-0001-5F(N).

ARMY MAINTENANCE POLICY

5. First Line maintenance of this equipment requires no technical skills and utilises simple test equipment designed to be operated by users. Accordingly it is recommended that first line maintenance should be carried out by AAC personnel at user units. The work will comprise:-

(1) Visual inspection and SST on receipt and a routine SST every 15 weeks or whenever serviceability is suspect. This inspection is to be carried out in accordance with Chapter 2-2. The equipment required is listed in Table 2 and will be held and issued from Squadron LADS.

(2) Repair by replacement of PLB sub-assembly, battery, aerial cable, aerial rod and interconnecting cable. Repair in this instance involves only simple item replacement by unmating and remating connectors.

6. Second Line maintenance will be carried out by avionic technicians in Aircraft Workshops REME using equipment as at para 5 (2). The work will comprise:-

(1) Visual inspection and SST as a filter check to confirm first line diagnosis on defective ARIs.

(2) Fault diagnosis and repair by replacement of readily replaceable components including volume control, rocker switch, aerial assembly, battery and interconnecting cable.

7. Third and Fourth Line maintenance - RAF

ROYAL AIR FORCE MAINTENANCE POLICY

8. First Line Nil

(1) Routine, 15 weekly visual inspection of PLB assemblies, including replacement of batteries on life expiry. This inspection to be carried out in accordance with 2-1.

9. Second Line To be carried out in Station Safety Equipment Sections by Survival Equipment tradesmen.

(1) 15 weekly and acceptance checks using the PLB Test Set in accordance with Chapter 2-2.

(2) Fault diagnosis and repair by replacement of PLB sub-assembly, battery, aerial cable assembly, aerial rod and interconnecting Cable (if fitted).

(3) Minor repairs in accordance with Chapter 2-3.

10. Third Line At No. 14 MU, the diagnosis, replacement and repair of sub-assembly modules, sub-modules and components.

11. Fourth Line Repair beyond the capacity of third line, to be arranged by SM47 as required.

12. SERVICING NOTES

- (1) Refer to prelim. page v/vi for warnings.
- (2) The PLB ARI 23237 exists in two different forms:

ARI 23237/1 PLB General Assembly Distress
ARI 23237/2 PLB General Assembly Training
- (3) PLB Servicing Chapters 2-1 and 2-2.
 - (a) ARI 23237/1 & 2: Carry out servicing as detailed, disregarding all references to Interconnecting Cable.
 - (b) ARI 23237/1 & 2 with interconnecting Cable. Carry out servicing as detailed.
- (4) Cosmetic Damage to Cases - If the damage is confined to the paint being scraped it may be 'touched up' using semi-gloss epoxy base paint to DEF STAN 1059A, colour Olive Green (ARI 23237/1) or Canary Yellow (ARI 23237/2). Reference JSP(F)395.
- (5) Salt Water Immersion/Contamination - When a PLB has been immersed in salt water or contaminated with any corrosive fluid, the battery and the aerial must be removed and the units immersed in fresh water to remove any loose contamination/salt deposits as soon as possible. Using a small brush, warm water and soap (0474/942-5921), scrub all the external areas of the PLB and associated units. Each unit is to be rinsed in fresh running water to remove all soap and remaining contamination. Particular care must be taken to direct a jet of water into all recesses and behind the P-T-T switch. After washing, the PLB and associated units should be thoroughly dried with a lint free cloth and warm air drier.

WARNING ...

- (6) Battery Electrolyte Contamination - Contact between the Battery electrolyte and the skin is to be avoided. Should contamination of the skin or clothing occur, the contaminated areas should be thoroughly washed in warm soapy water.

CAUTIONS

- (7) Removal of Loctite - To prevent irreparable damage to the PLB case, extreme care is to be taken when cleaning Loctite from threads with the 2-64 UNF taps.
- (8) When fitting replacement battery, ensure battery 'expiry date' is entered on battery label and PLB Servicing Record.
- (9) Test Set
 - (a) Should the test set have to be returned to stores the test set battery must be removed.
 - (b) When carrying out transmission tests the test set lid must be closed and secured.
 - (c) Connect earth terminal on back of Test Set to a suitable earth point.

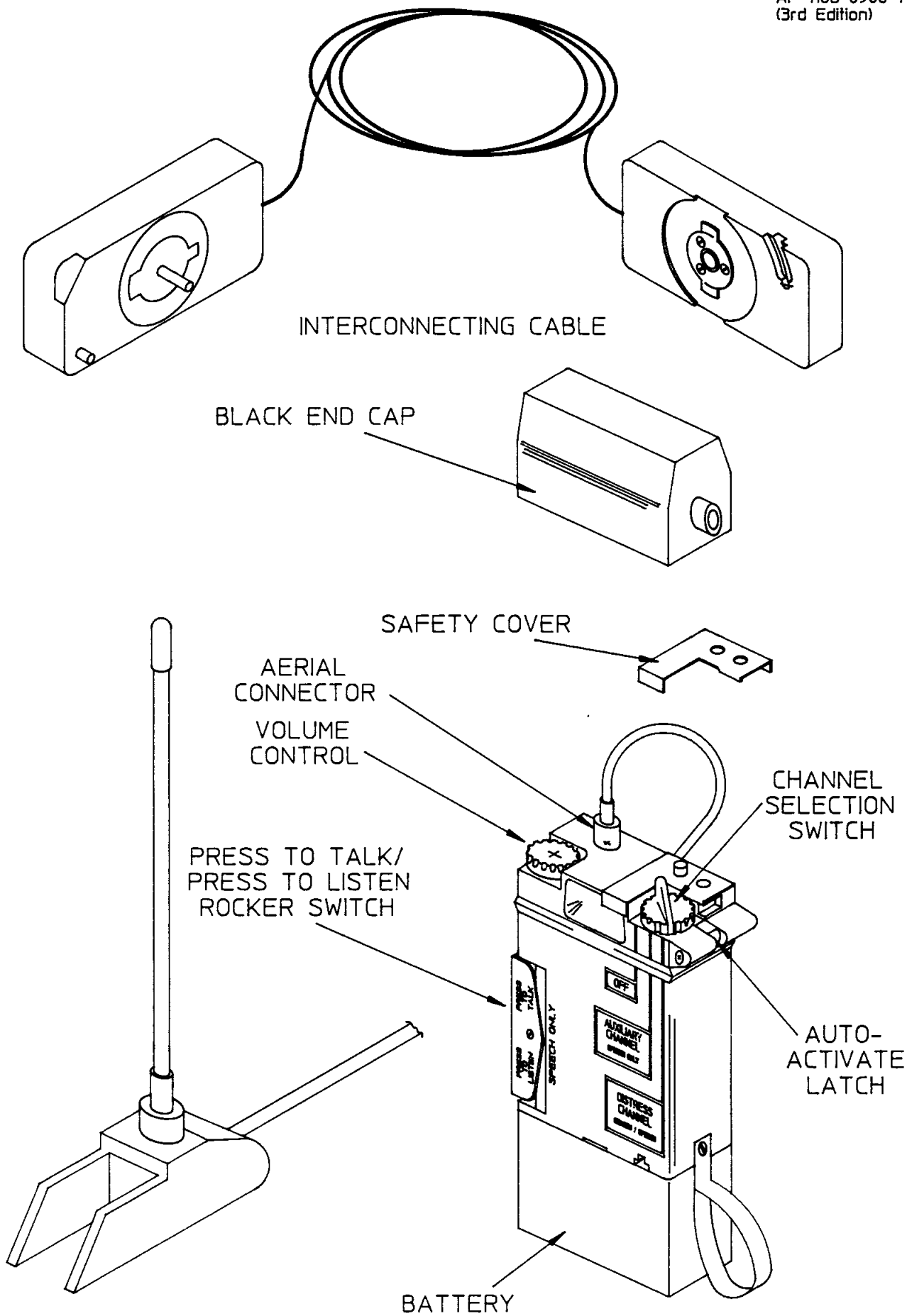


FIG.1 PERSONAL LOCATOR BEACON AND ASSOCIATED EQUIPMENT

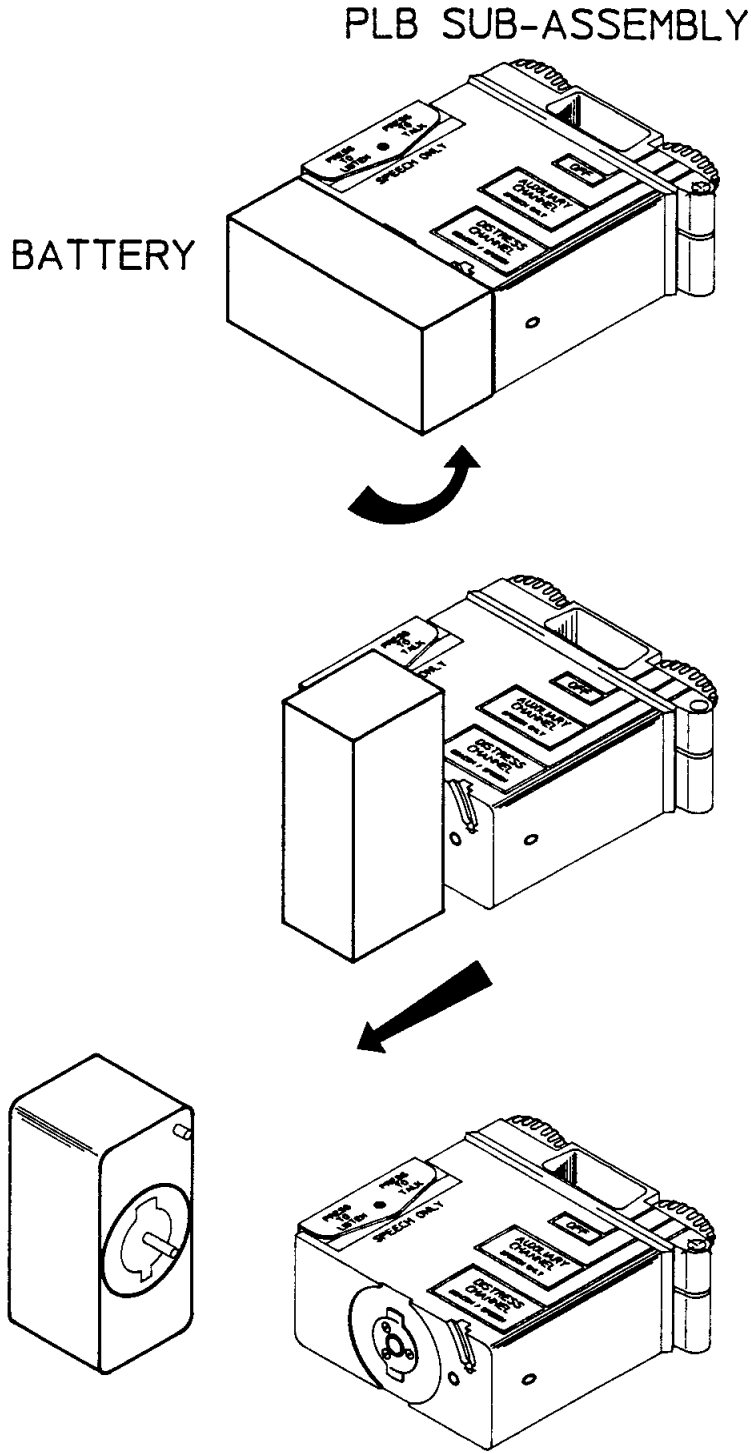


Fig. 2 - PLB Sub-assembly - Battery Disconnection Procedure

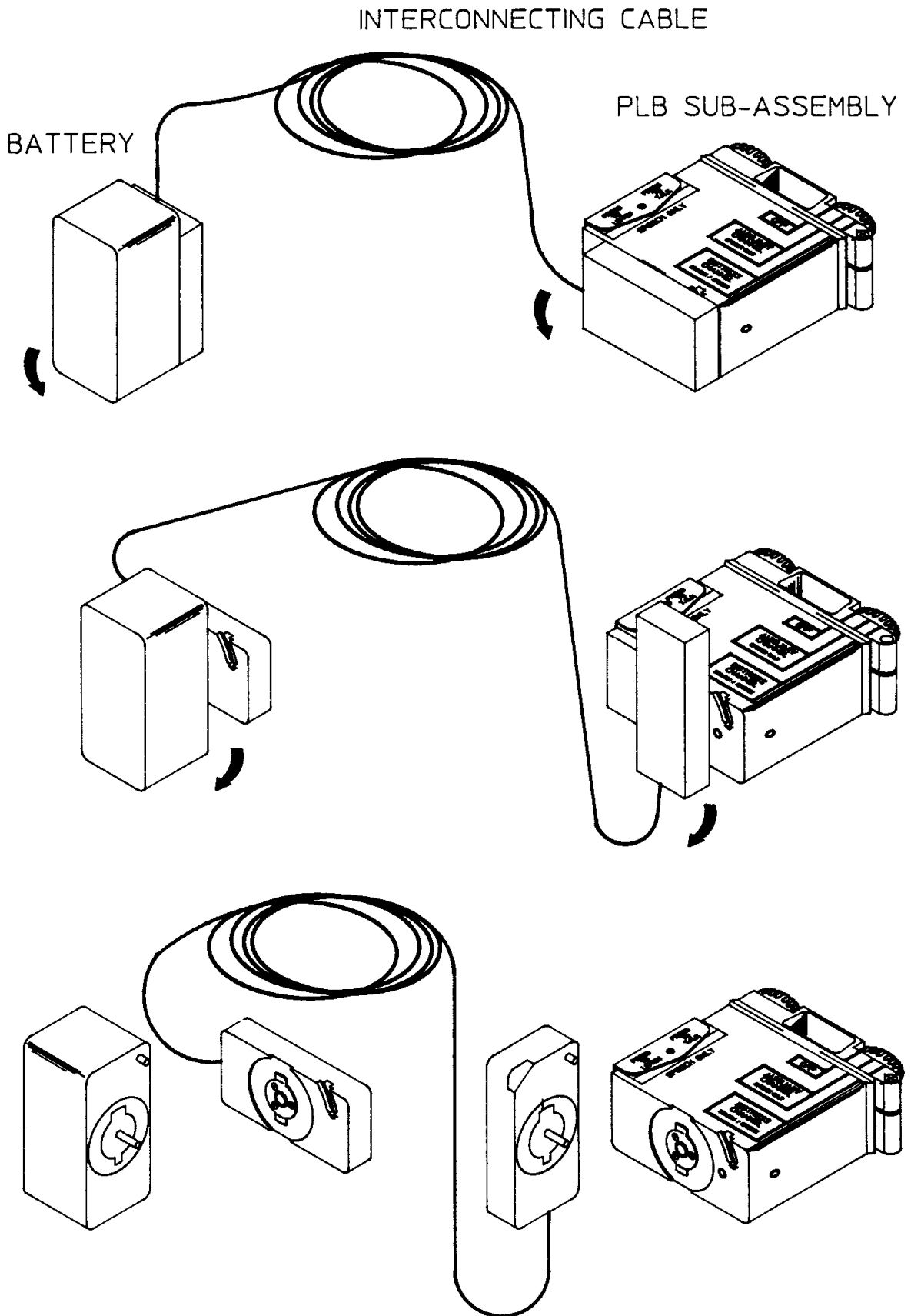


FIG.3 PERSONAL LOCATOR BEACON SUB-ASSEMBLY
INTERCONNECTING CABLE AND BATTERY DISCONNECTION PROCEDURE.

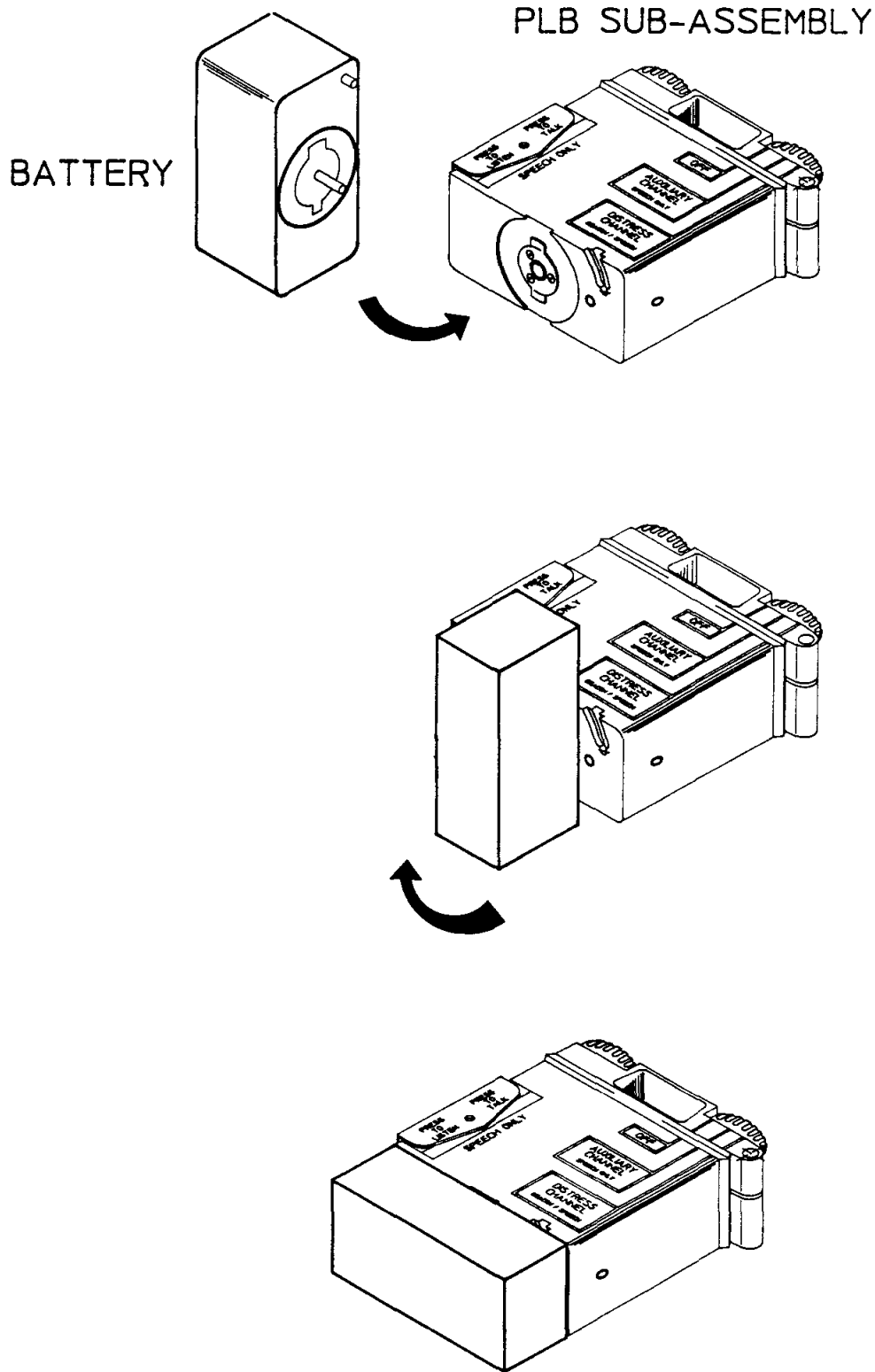


Fig. 4 - PLB Sub-assembly - Battery Connection Procedures

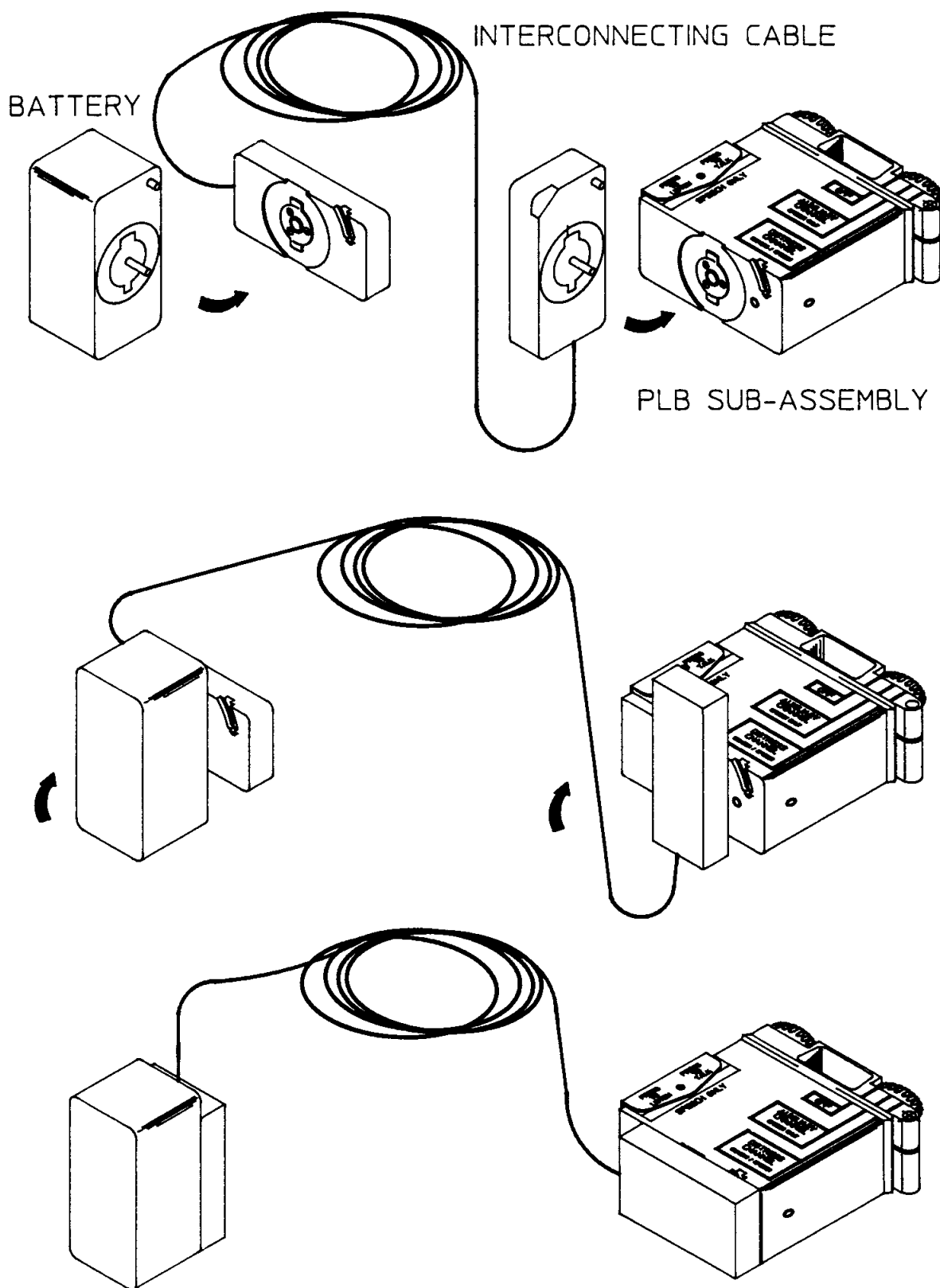


FIG.5 PERSONAL LOCATOR BEACON SUB-ASSEMBLY
INTERCONNECTING CABLE AND BATTERY CONNECTION PROCEDURE.

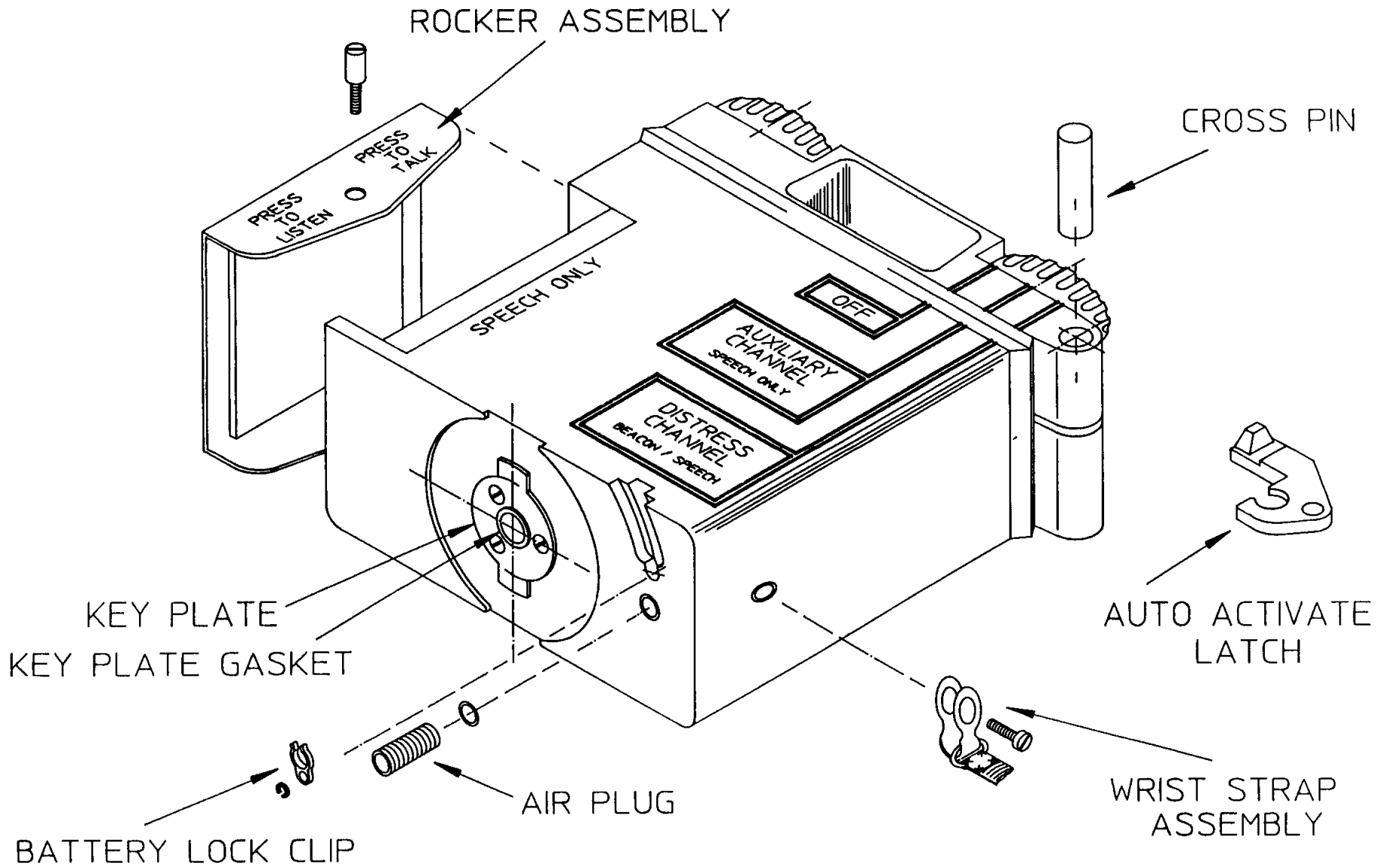


Fig. 6 - PLB Sub-assembly - Exploded View

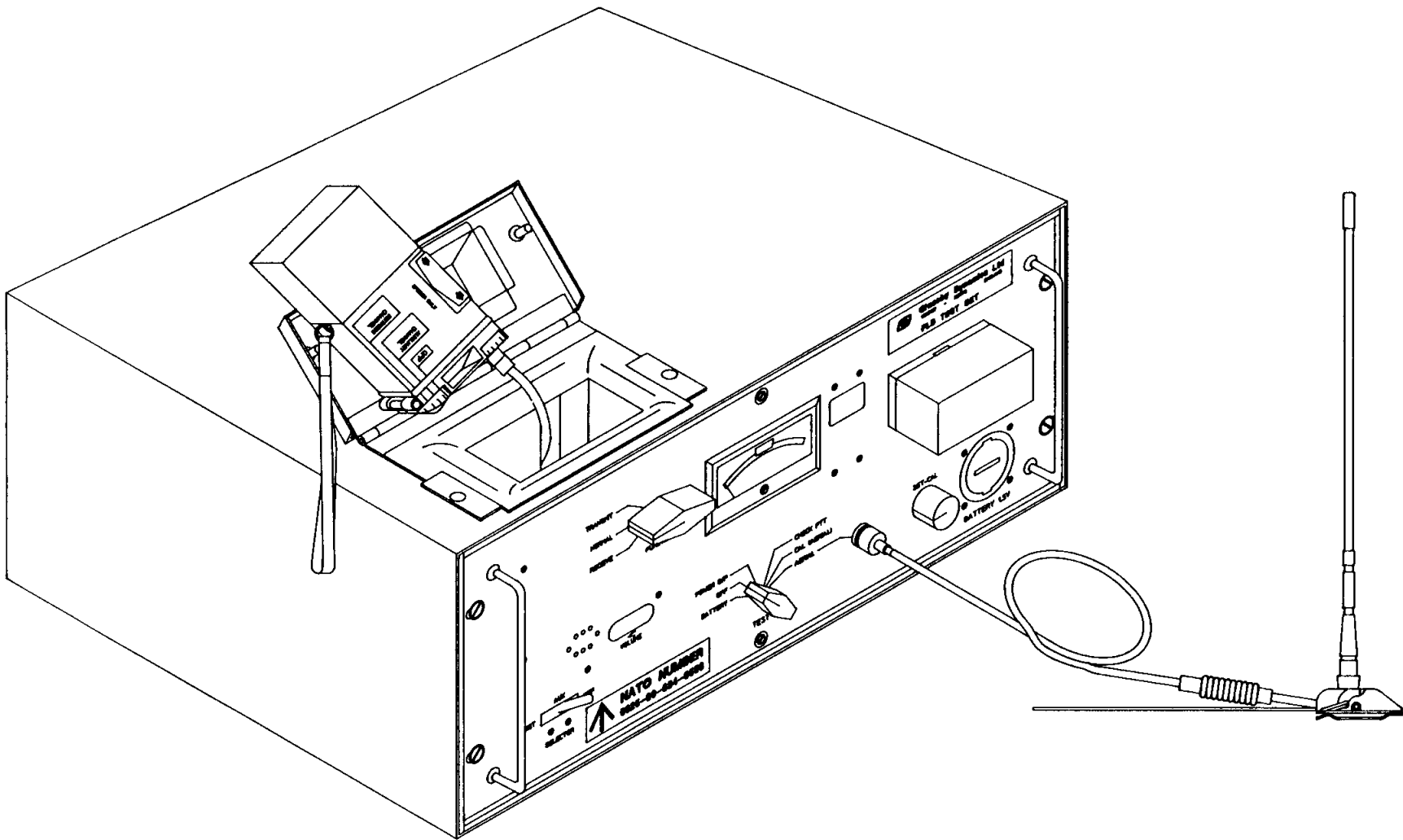


Fig. 7 - PLB TEST SET

Table 1

Consumable Materials List

Item	Nomenclature	NSN
ML1	Loctite Type Assure 425 (Plastic Rocker Switch)	Ref. JSP(F)395
ML2	Loctite Type 241 (10cc) (Metal Rocker Switch)	8030-99-224-8261 Ref. JSP(F)395
ML3	Battery, Dry 1.5V, Nol	6135-99-910-1101
ML4	Ring, Sealing Toroidal	5330-99-633-7569
NOTE:	a) LOCTITE TYPE ASSURE 425 CAN BE USED ON BOTH METAL AND PLASTIC ROCKER SWITCHES	
	b) LOCTITE TYPE 241 (10cc) CAN ONLY BE USED ON METAL ROCKER SWITCHES	

Table 2

Test Apparatus and Tools

Nomenclature	NSN
PLB Test Set	6625-99-634-0556
Pump Pressuring	4320-99-104-7435
Pump, Kismet	4320-99-972-4172 (RN)
Gauge	4190-99-107-5943 (RN)
Adaptor, Air Plug	5999-99-620-9291
Wrench Key, Socket head screw 3/32 in AF	5120-99-910-6060
Wrench Key, Socket head screw 0.050 in AF	5120-99-910-6057
Soltork Screwdriver (1.5 lbf/in) Part No 76/190	5120-99-138-0161
Soltork Screwdriver (2.5 lbf/in) Part No 76/149	5120-99-127-8034
Spring Balance, covering range 0-10 kg (0-22 lb) 0-44 lb (RN)	6670-99-139-0771 6670-99-523-2167
2nd Plug Tap 2-64 UNF	5136-99-910-1580
Wrench Torque	1C/2524818
Wrench Hex Plug	1L/5960930

Note: Where no service is shown it means that the item is common to all services.

CHAPTER 2-1

VISUAL INSPECTION AND SELF TEST

RAF (15 WEEKS)
RN (30 WEEKS)

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1. Battery Warning

WARNINGS ...

- (1) CARE MUST BE TAKEN TO ENSURE THAT THE BATTERY TERMINALS ARE NOT SHORT-CIRCUITED DURING HANDLING.
- (2) ONCE A BATTERY HAS BEEN USED FOR A RESCUE OPERATION IT MUST BE REPLACED REGARDLESS OF UNEXPIRED LIFE.
- (3) BATTERIES FITTED TO TRAINING BEACONS MUST BE IDENTIFIED AND MUST NOT BE SUBSEQUENTLY FITTED TO DISTRESS BEACONS.
- (4) BATTERIES NOT SATISFYING THE FOLLOWING REQUIREMENTS MUST BE DISPOSED OF IN ACCORDANCE WITH APPROVED CURRENT PRACTICE - REFER TO WARNING ON PRELIM. PAGE (v) IN FRONT OF BOOK.
- (5) IF EITHER SKIN OR CLOTHING IS IN CONTACT WITH BATTERY ELECTROLYTE IT IS TO BE WASHED IMMEDIATELY - SEE CHAP. 2-0 PARA 12 (6).

2. Maintenance and Servicing Policies

The above policies are detailed separately in Chapter 2.0.

3. Preparation (refer to fig.1, Chap. 2-0)

- (1) Disconnect the aerial and auto aerial cable assembly.
- (2) Separate the PLB Sub-assembly, battery and interconnecting cable (refer to fig. 3, Chap 2-0).

4. Battery Checks

- (1) Battery Inspection
 - a) Inspect the battery case for mechanical damage, distortion (swelling) and leakage.
 - b) Inspect the electrical connector on the battery for degradation and corrosion.

(2) An unsatisfactory batter should be replaced. The 'expiry date' of the new battery is to be clearly marked in the space provided on the new battery identification label. The method to calculate the battery expiry date, using the date of manufacture and cold storage details recorded on the battery packaging label, is detailed in sub-para 4(4). Carry out the procedures set out in Chapter 2-2 paras 6 to 12. Otherwise proceed as follows:-

(3) Check that the life expiration date will not be reached before the next schedule check.

(4) Battery Life

(a) In Use Life. This is the maximum time a battery can spend out of cold storage from the date of manufacture. It is made up of time spent in transit (e.g. manufacturer to cold storage) plus actual 'IN USE' time on a station.

(b) Storage Conditions. The batteries may be stored under the following conditions:-

(i) Cold Storage The cold storage temperature for the batteries is to be between -10 and -15 degrees centigrade.

(ii) Temperate Storage The temperature storage temperature for the batteries is not to exceed +25 degrees centigrade.

(c) Temperature/Desert Climate. The 'IN USE' life of the battery is 14 months/60 weeks. The total life comprising 'COLD/TEMPERATE STORAGE' and 'IN USE' life must not exceed 36 months/180 weeks from the date of manufacture.

Example

Manf. Date	Cold Storage Time (months)	RN Weeks	In use Life (months)	RN Weeks	Total Life (months)	RN Weeks	Expiry Date
1 Jan 81	0	0	14	60	14	60	1 Mar 82
1 Jan 81	6	30	14	60	20	90	1 Oct 82
1 Jan 81	12	60	14	60	26	120	1 Mar 83
1 Jan 81	24	120	12	60	36	180	1 Jan 84
1 Jan 81	36	180	0	0	36	180	1 Jan 84

(d) Tropical Climate. The 'IN USE' life of the battery is 6 months/30 weeks from the date of manufacture. The total life comprising 'COLD STORAGE' and 'IN USE' life must not exceed 18 months/90 weeks from the date of manufacture.

PERSONAL LOCATOR BEACON EQUIPMENT

MINISTRY OF DEFENCE

ADVANCED INFORMATION LEAFLET //95

Oct 1995

Insert this leaflet to face Chapter 2-1 Page 3
Record the incorporation of this AIL on the AIL Record Page

This information leaflet introduces a resistance check if the battery is found to be discharged on the 15 or 30 week servicing.

4. Battery Checks

(2) An unsatisfactory battery should be replaced. If the battery is found to be discharged, then with the Channel Selection Switch in either of the 'OFF' positions measure the resistance between the battery terminals on the PLB Sub-Assembly. The reading should be an open circuit. If any other reading is obtained, then quarantine the PLB Sub-Assembly and report the fault using MOD Form F760. The 'expiry' date of the new battery is to be clearly marked in the space provided on the new battery identification label. The method to calculate the battery expiry date, using the date of manufacturer and cold storage details recorded on the battery packaging label, is detailed in sub-para 4(4). Carry out the procedures set out in Chapter 2-2 paras 6 to 12. Otherwise proceed as follows: -

NOTE

(1) Due to the relatively short remaining life of ARI 23237 the information contained in this leaflet will not be superseded by formal amendment.

PERSONAL LOCATOR BEACON EQUIPMENT

MINISTRY OF DEFENCE

ADVANCE INFORMATION LEAFLET 5/93
Sept 1993
(Supersedes AIL 3/93 dated June 1993)

Remove and destroy AIL 3/93 dated June 1993
Insert this leaflet to face Chapter 2-1 Page 3
Record the incorporation of this AIL on the AIL Record Page

This information leaflet introduces new life details for an alternative Alkaline-Manganese PLB battery (Non-Hazardous NSN 6135-99-6395829).

4a Battery Life (Non-Hazardous)

- (a) The battery has a shelf life of a maximum of 2 years from the date of manufacture.
- (b) The 'In-Use' Temperate battery life is 60 wks.
- (c) The 'In-Use' Tropical battery life is 30 wks.
- (d) There are no exceptional storage conditions.

NOTE

- (1) The information contained in this leaflet will be incorporated by normal amendment action in due course.
- (2) If after receipt of this leaflet, an amendment with prior date and conflicting information is received, the information in this leaflet is to take precedence.

PERSONAL LOCATOR BEACON EQUIPMENT

MINISTRY OF DEFENCE

ADVANCE INFORMATION LEAFLET 6/93
Sept 1993
(Supersedes AIL 4/93 dated June 1993)

Remove and destroy AIL 4/93 dated June 1993
Insert this leaflet to face Chapter 2-2 Page 3
Record the incorporation of this AIL on the AIL Record Page

This information leaflet introduces new life details for an alternative Alkaline-Manganese PLB battery (Non-Hazardous NSN 6135-99-6395829).

4a Battery Life (Non-Hazardous)

- (a) The battery has a shelf life of a maximum of 2 years from the date of manufacture.
- (b) The 'In-Use' Temperate battery life is 60 wks.
- (c) The 'In-Use' Tropical battery life is 30 wks.
- (d) There are no exceptional storage conditions.

NOTE

- (1) The information contained in this leaflet will be incorporated by normal amendment action in due course.
- (2) If after receipt of this leaflet, an amendment with prior date and conflicting information is received, the information in this leaflet is to take precedence.

Example

Manf. Date	Cold Storage Time (months)	RN Weeks	In use Life (months)	RN Weeks	Total Life (months)	RN Weeks	Expiry Date
1 Jan 81	0	0	6	30	6	30	1 Jul 81
1 Jan 81	6	30	6	30	12	60	1 Jan 82
1 Jan 81	12	60	6	30	18	90	1 Jul 82
1 Jan 81	18	90	0	0	18	90	1 Jul 82

(5) If battery life is expired replace in accordance with para. 4.

5. Replacement Battery

(1) Using the PLB Test Set (Fig. 7) carry out the Battery-on-Load Volgate check.

(2) Ensure that the TEST switch on the Test Set is in the OFF position. Connect the PLB battery to the BATTERY TEST socket on the PLB Test Set front panel ensuring correct orientation.

(3) Switch the TEST Switch to BATTERY and leave in that position until a meter deflection in the GREEN band has been obtained for at least 5 seconds. If this has not been obtained after 40 seconds, terminate test and replace battery.

(4) If the battery is accepted, return the TEST switch to the OFF position, remove the PLB battery from the Test Set and continue with visual inspection.

6. PLB Sub-Assembly

(1) Examine the PLB Sub-assembly for damage and corrosion, paying particular attention to the battery connector, key plate gasket and the battery locking clip on the base of the Sub-assembly.

(2) Examine the aerial connector on top of PLB Sub-assembly for damage, distortion or corrosion.

(3) Check that the Transmit/Receive rocker switch and the Volume control knob move freely.

7. Interconnecting Cable

(1) Examine the electrical connectors and battery locking clip for damage and corrosion.

(2) Examine interconnecting lead and key plate gasket for signs of damage.

8. Serviceability Checks

- (1) Remove and preserve auto-activate latch from PLB Sub-assembly and turn function switch to 'OFF' position.
- (2) Reassemble the PLB Sub-assembly, interconnecting cable and battery (figs 4 & 5, Chap. 2-0).
- (3) Set VOLUME control to maximum.
- (4) Connect the aerial and auto aerial assembly to the PLB.

CAUTION ...

For Distress Beacon ARI 23237/1, carry out sub para 5 (a) only.
For Training Beacon ARI 23237/2, carry out sub para 5 (b) only.
These tests should be completed as rapidly as possible to ensure minimum radiation.

- (5) (a) Distress Beacon ARI 23237/1

Switch to AUXILIARY CHANNEL and operate PLB rocker switch to PRESS-TO-TALK position. By now whistling into the PLB microphone whilst simultaneously pressing the RED PRESS-TO-TEST button, the light emitting diode should be seen to light up. Release rocker switch.

- (b) Training beacon ARI 23237/2

Switch to DISTRESS CHANNEL and operate PLB rocker switch to PRESS-TO-TALK position. By now whistling into the PLB microphone whilst simultaneously pressing the RED PRESS-TO-TEST button, the light emitting diode should light up. Release rocker switch.

- (6) Switch the PLB to the 'OFF' position. Hold the PRESS-TO-TALK/PRESS-TO-LISTEN rocker switch in the PRESS-TO-LISTEN position. (Prevents Transmitting on DISTRESS).
- (7) Move the Channel Selection switch through the AUXILIARY CHANNEL and DISTRESS CHANNEL positions to the 'latched off' position, setting the auto-activate latch into the recess on the Channel Selector switch knob. Release PRESS-TO-TALK/PRESS-TO-LISTEN rocker switch.

Note: At the AUXILIARY and DISTRESS CHANNEL positions, an audio hiss should be heard. If not present, test in accordance with Chapter 2-2.

Note: The operation at para (8) is to be certified by a supervisory NCO/rating.

- (8) Maintenance forms - complete

CHAPTER 2-2

SERVICEABILITY AND PRESSURE TESTS

15 WEEKS RAF
30 WEEKS RN

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1. Battery Warnings

- (1) ONCE A BATTERY HAS BEEN USED FOR A RESCUE OPERATION IT MUST BE REPLACED REGARDLESS OF UNEXPIRED LIFE.
- (2) BATTERIES FITTED TO TRAINING BEACONS MUST BE IDENTIFIED AND MUST NOT BE SUBSEQUENTLY FITTED TO DISTRESS BEACONS.
- (3) BATTERIES NOT SATISFYING THE FOLLOWING REQUIREMENTS MUST BE DISPOSED OF IN ACCORDANCE WITH APPROVED CURRENT PRACTICE - REFER TO WARNING ON PRELIM. PAGE (v) IN FRONT OF BOOK
- (4) IF EITHER SKIN OR CLOTHING IS IN CONTACT WITH BATTER ELECTROLYTE IT IS TO BE WASHED IMMEDIATELY - SEE CHAP. 2-0 PARA. 12 (6).

2. Maintenance and Servicing Policies

The above policies are detailed separately in Chapter 3-0.

3. Preparation

- (1) Remove the PLB from its parent item e.g. Life preserver in accordance with the instructions for PLB removal in the relevant publication for that item.
- (2) Referring to Chap 2-0 as necessary separate the sub-assembly, battery, interconnecting cable and auto aerial assembly.

4. (1) Battery Checks

- (a) Inspect the battery case for mechanical damage, distortion (swelling) and leakage.
- (b) Inspect the electrical connector on the battery for degradation and corrosion.

(2) An unsatisfactory battery should be replaced. The 'expiry date' of the new battery is to be clearly marked in the space provided on the new battery identification label. The method to calculate the battery expiry date, using the date of manufacture and cold storage details recorded on the battery packing label, is detailed in sub-para 3(4). Carry out the procedures set out in Chapter 2-2 paras 6 to 12. Otherwise proceed as follows:-

(3) Check that the life expiration date will not be reached before the next scheduled check.

(4) Battery Life

(a) In Use Life. This is the maximum time a battery can spend out of cold storage from the date of manufacture. It is made up of time spent in transit (e.g. manufacture to cold storage) plus actual 'IN USE' time on a station.

(b) Storage Conditions. The batteries may be stored under the following conditions:-

(i) Cold Storage. The cold storage temperature for the batteries is to be between -10 and -15 degrees centigrade.

(ii) Temperate Storage. The temperate storage temperature for the batteries is not to exceed +25 degrees centigrade.

(c) Temperate/Desert Climate The 'IN USE' life of the battery is 14 months/60 weeks. The total life comprising 'COLD/TEMPERATE STORAGE' and 'IN USE' life must not exceed 36 months/180 weeks from the date of manufacture.

Example

Manf. Date	Cold Storage Time (months)	In use Life (Weeks)	Total Life (months)	Expiry Date
1 Jan 81	0	0	14	1 Mar 82
1 Jan 81	6	30	20	1 Oct 82
1 Jan 81	12	60	26	1 Mar 83
1 Jan 81	24	90	36	1 Jan 84
1 Jan 81	36	180	0	1 Jan 84

(d) Tropical Climate. The 'IN USE' life of the battery is 6 months/30 weeks from the date of manufacture. The total life comprising 'COLD STORAGE' and 'IN USE' life must not exceed 18 months/90 weeks from the date of manufacture.

PERSONAL LOCATOR BEACON EQUIPMENT

MINISTRY OF DEFENCE

ADVANCED INFORMATION LEAFLET 2/95
Oct 1995

Insert this leaflet to face Chapter 2-2 Page 3
Record the incorporation of this AIL on the AIL Record Page

This information leaflet introduces a resistance check if the battery is found to be discharged on the 15 or 30 week servicing.

4. Battery Checks

(2) An unsatisfactory battery should be replaced. If the battery is found to be discharged, then with the Channel Selection Switch in either of the 'OFF' positions measure the resistance between the battery terminals on the PLB Sub-Assembly. The reading should be an open circuit. If any other reading is obtained, then quarantine the PLB Sub-Assembly and report the fault using MOD Form F760. The 'expiry' date of the new battery is to be clearly marked in the space provided on the new battery identification label. The method to calculate the battery expiry date, using the date of manufacturer and cold storage details recorded on the battery packaging label, is detailed in sub-para 4(4). Carry out the procedures set out in Chapter 2-2 paras 6 to 12. Otherwise proceed as follows: -

NOTE

(1) Due to the relatively short remaining life of ARI 23237 the information contained in this leaflet will not be superseded by formal amendment.

Example

Manf. Date	Cold Storage Time		In use Life		Total Life		Expiry Date
	(months)	(weeks)	(months)	(weeks)	(months)	(weeks)	
1 Jan 81	0	0	6	30	6	30	1 Jul 81
1 Jan 81	6	30	6	30	12	60	1 Jan 82
1 Jan 81	12	60	6	30	18	90	1 Jul 82
1 Jan 81	18	90	0	0	18	90	1 Jul 82

(5) If battery life is expired replace in accordance with para. 4.

5. PLB Sub-Assembly

- (1) Ensure the battery is disconnected.
- (2) Using a spring balance pull the auto-activate latch (without snatching) and check that the channel selector switch turns automatically from the latched 'OFF' position to the DISTRESS CHANNEL position. The force required to pull off the latch should not be less than 3.5 kg (8 lbs) and not more than 6.8 kg (15 lbs); see Chapter 2-3 para. 7 for replacement procedure. Examine the crosspin, if there is evidence of deep scoring, the crosspin and latch must be replaced see chapters 2-3 para 7 and 2-3 para. 8 (3) for replacement procedure.
- (3) Disconnect the auto Aerial Cable Assembly and check Aerial and Auto Aerial cable assembly for signs of damage.
- (4) Examine PLB Sub-assembly for damage and corrosion. Also examine the electrical connections, Interconnecting cable, Key Plate Gasket and battery locking clip on the base of the PLB Sub-assembly. Where replacement is considered necessary refer to Chapter 2-3 paras 4 & 5.
- (5) Check that the Transmit/receive rocker switch and the volume control knob move freely, inspecting particularly for dust or dirt - see Chapter 2-3 para. 6 for cleaning and replacement details.
- (6) Examine the aerial connector on top of the PLB Sub-assembly for damage, distortion or corrosion.
- (7) Examine wrist-strap assembly for security of attachment and serviceable condition. Where replacement is considered necessary refer to Chapter 2-3 paras 2 and 3.
- (8) Ensure that the auto-activate latch cord assembly is in a serviceable condition, see Chapter 2-3 para. 9 for details.

6. Pressure Testing

To establish that the PLB is sufficiently watertight carry out the following procedure. This involves increasing the air pressure within the PLB Sub-Assembly, immersing the PLB in water and observing for any escape of air.

- (1) Ensure the Auto-Aerial Cable assembly is disconnected from the PLB.
- (2) Ensure battery is removed.
- (3) Using a wrench, Allen Key 3/32 in A/F remove and preserve the air-plug from the underside of the PLB Sub-assembly. Lift out and discard the 'O' ring. Fit the special adaptor (given in Table 2). Note: Before using the pump and pressure gauge ensure the dessicants are fully activated and there is no moisture in the hose and schraeder valve.
- (4) Connect the air pump and pressure gauge (given in table 2).
- (5) Increase the air pressure in the PLB to 103 kN/m (15 lb/in). DO NOT EXCEED THIS LEVEL.
- (6) Disconnect the pump and gauge.
- (7) Place the PLB in clear water. Ensuring the PLB Sub-assembly is completely immersed, vigorously agitate the Sub-assembly so that any trapped air bubbles are released. Leave the PLB Sub-assembly immersed for one minute and observe for any air escaping. Air leaks from the key-plate may be cured by replacement of key-plate gasket (see Chap 2-3 para 5). If replacement of key-plate gasket does not effect a cure or air leaks are present in other areas, the PLB Sub-assembly should be returned to 3rd line.
- (8) Remove the PLB from the water and dry thoroughly.
- (9) Withdraw the special adaptor.
- (10) Fit new 'O' ring ensuring that it is seated correctly. Refit air-plug and tighten to 8 +/- 1.6 oz F ins. using tool wrench torque (1C/8626), and wrench hex plug complete with (1L/5960930).

7. Operational Tests Using PLB Test Set

Operation tests are to be carried out in accordance with the following procedures.

CAUTION ...

Tests must be rigorously followed to avoid accidental radiation by the PLB.

8. Preparation Before Testing

- (1) Ensure Test Set Battery is fitted (see Table 1, Chap 2-0), and serviceable in accordance with Chap 2-2 para 9 (1) and (2) inclusive. A defective Battery must be replaced with a serviceable item.
- (2) Fit PLB location clamp into opening on Test Set hinged flap. Ensure the sloping side is to the front and foam insert to the left of the Test Set (see fig.7, Chap 2-0).
- (3) Ensure the Auto-Aerial Cable Assembly is disconnected from the PLB.

- (4) Ensure the battery is removed from the PLB.
- (5) Remove the Auto-activate Latch from the PLB and turn the PLB channel selector switch clockwise to the 'OFF' position.
- (6) Connect the interconnecting cable to the PLB Test Set Battery Test Socket.

9. Battery On Load Voltage Check

- (1) Ensure that the TEST switch on the Test Set is in the 'OFF' position. Connect the PLB battery via the interconnecting cable to the BATTERY TEST socket on the PLB Test Set from panel ensuring correct orientation.
- (2) Switch the TEST switch to BATTERY and leave in that position until a meter deflection in the GREEN band has been obtained for at least 5 seconds. If this has not been obtained after 40 seconds, terminate test and proceed with (3) (a) through to (e).
- (3) A deflection in the RED band indicates a faulty battery and/or a faulty interconnecting cable. The following tests should be carried out to establish the faulty item:-
 - (a) Return TEST switch to the 'OFF' position, disconnect PLB battery from interconnecting cable.
 - (b) Disconnect interconnecting cable from PLB Test Set.
 - (c) Connect PLB battery to the BATTERY TEST socket on the PLB Test Set.
 - (d) Switch TEST switch to BATTERY and leave in this position for 30 to 40 seconds. If a correct deflection is now obtained, replace the interconnecting cable with a new one and repeat tests (1) and (2).
 - (e) If the correct deflection is not obtained, the PLB battery should be replaced with a new one. Clearly mark the new battery expiry date in the space provided on the replacement battery identification label and repeat tests (1) and (2).
- (4) When a correct deflection has been obtained from a complete interconnecting cable and PLB battery assembly, return the TEST switch to the 'OFF' position.
- (5) Disconnect PLB battery from interconnecting cable, then disconnect interconnecting cable from Test Set.

10. Aerial and Auto Aerial Cable Assembly Checks

- (1) Ensuring that the TEST switch on the test set is in the OFF position, connect the aerial via the auto-aerial cable assembly, to the AERIAL socket on the test set.
- (2) Switch the TEST switch to the CAL (AERIAL) position and adjust the SET CAL knob, for a central indication on the meter, i.e. the CAL mark on the scale.

Note: If this deflection cannot be obtained by adjustment of the SET CAL knob the 1.5V test set battery should be replaced with a serviceable item - see Table 1, Chap 2-0.

- (3) Once the meter has been calibrated, move the TEST switch to the AERIAL position - a meter deflection within the central CHECK AERIAL band indicates a functional aerial and auto-aerial cable assembly. Gently manipulate the auto-aerial cable at the pre-formed bend (approximately 40mm from the connector end) and ensure the reading remains in the check aerial band.
- (4) Any other deflection indicates a faulty aerial and/or a faulty auto-aerial cable assembly, and the following tests should be carried out to establish the faulty unit.
 - (a) Return the TEST switch to the CAL position, and disconnect the auto-aerial Cable Assembly from the Test Set.
 - (b) Remove the Aerial from the auto-aerial Cable Assembly, and connect the aerial directly to the Test Set.
 - (c) Switch the TEST switch to the Aerial position again.
 - (d) If a correct deflection is now obtained, replace the auto-aerial cable assembly with a new one, and repeat tests (1) to (4) inclusive.
 - (e) If the correct deflection still cannot be obtained, the aerial should be replaced with a new one, and the tests (1) to (4) repeated.

NOTE:- Four aerial elements are currently in service. Three are marked with coloured sleeves namely red, blue, and blue/green whilst the fourth has no ident sleeve.

- (5) When the correct deflection has been obtained for a complete Aerial and auto-aerial Cable Assembly, return the TEST switch to the OFF position, and remove the aerial assembly from the test set.

11. Beacon - Transmit Check

- (1) Ensure that the PLB channel selector switch is set to 'OFF' and its volume control set fully clockwise to 'max', and connect the PLB battery to the PLB Sub-assembly (figs 4 or 5, Chap 2-0).
- (2) Connect the test set coaxial lead to the PLB aerial socket and insert the PLB into the test set ensuring that the loop of the wrist strap protrudes from the test set.
- (3) Ensure that the manual controls engage as the PLB is inserted, wind wrist strap clockwise around PLB battery and tuck in, close the test set lid and operate the retaining clips.
- (4) Set the TEST switch to POWER O/P, and the SELECTOR switch to DISTRESS. A fluctuating meter deflection into the green band indicates an acceptable power level.
- (5) The beacon tone should also be heard from the grille on the test set.

- (6) If the power level is acceptable, switch TEST switch to CHECK PTT. A fluctuating meter deflection indicates satisfactory operation of the press-to-test facility.
- (7) With the DISTRESS CHANNEL still selected, set the TEST switch to POWER O/P, hold the FUNCTION switch towards the TRANSMIT position. A meter deflection in the green band indicates an acceptable power level.
Release FUNCTION switch.
- (8) If the power level is acceptable switch the TEST SWITCH to CHECK PTT, hold FUNCTION switch towards TRANSMIT position, and whistle into the grille on the test set. A meter deflection indicates satisfactory operation of the press-to-test facility, and also indicates correct operation of the speech modulator. Release FUNCTION switch.

NOTE ...

For Training Beacon ARI 23237/2, omit sub para (9),
(10), and (11).

- (9) Return the TEST switch to POWER O/P and switch the SELECTOR switch to AUX.
- (10) By operating the FUNCTION switch towards the TRANSMIT position, a meter deflection in the green band should be obtained, indicating an acceptable power level. Release FUNCTION switch.
- (11) If power level is acceptable, switch the TEST switch to CHECK PTT, hold FUNCTION switch towards TRANSMIT position, and whistle into the grille on the test set. A meter deflection indicates satisfactory operation of the press-to-test facility and the speech modulator. Release FUNCTION switch.

11. Beacon - Receive Check

- (1) Set the SELECTOR to DISTRESS, and hold the FUNCTION switch towards the RECEIVE position. An audio hiss should be heard from the grille on the test set, which should reduce with the volume control. No noise indicates a faulty receiver. Release the FUNCTION switch.

Note: For Training Beacon ARI 23237/2, omit sub para (2) -
proceed to sub para (3).

- (2) Set the SELECTOR switch to AUX, set the FUNCTION switch towards receive and then release to NORMAL. In each case an audio hiss should be heard from the grille on the test set, which should reduce with the volume control. No noise indicates a faulty receiver.
- (3) Return the SELECTOR and the test set TEST switch to the OFF position.

12. Serviceability Checks

Note 1. Before removing the PLB from the test set, ensure that the SELECTOR and the TEST SWITCH are returned to the OFF positions.

Note 2. If the PLB assembly is to be fitted/refitted to a Life preserver the installation instructions contained in specific Life preserver publications include the required serviceability checks. Therefore sub para 2 to 7 need not be complied with.

- (1) Remove the PLB from the test set, disconnect the test set coaxial lead from the PLB and remove battery from the PLB Sub-assembly.
- (2) Ensuring PLB is selected to 'OFF', assemble the PLB Sub-assembly, interconnecting cable and battery.
- (3) VOLUME control to MAXIMUM.
- (4) Connect the Aerial and Auto Aerial assembly to the PLB.

CAUTION ...

For Distress Beacon ARI23237/1, carry out sub para 5(a) only.
For Training Beacon ARI23237/2, carry out sub para 5(b) only.
These tests should be completed as rapidly as possible to ensure minimum radiation.

- (5) (a) Distress Beacon ARI 23237/1

Switch to AUXILIARY CHANNEL and operate PLB rocker switch to PRESS-TO-TALK position. By now whistling into the PLB microphone whilst simultaneously pressing the RED PRESS-TO-TEST button, the light emitting diode should be seen to light up. Release rocker switch.

- (b) Training Beacon ARI 23237/2

Switch to DISTRESS CHANNEL and operate PLB rocker switch to PRESS-TO-TALK position. By now whistling into the PLB microphone whilst simultaneously pressing the RED PRESS-TO-TEST button, the light emitting diode should light up. Release rocker switch.

- (6) Switch the PLB to the 'OFF' position. Hold the PRESS-TO-TALK/PRESS-TO-LISTEN rocker switch to the PRESS-TO-LISTEN position. (Prevents transmitting on DISTRESS).
- (7) Move the Channel Selection switch through the AUXILIARY CHANNEL and DISTRESS CHANNEL positions to the 'latched off' position, setting the auto-activate latch into the recess on the Channel Selector switch knob. Release PRESS-TO-TALK/PRESS-TO-LISTEN rocker switch.

Note ...

At the AUXILIARY and DISTRESS CHANNEL position, an audio hiss should be heard. If not present, re-test in accordance with this Chapter.

- (8) Servicing forms - sign.

CHAPTER 2-3

MINOR REPAIRS

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1. Introduction

This Chapter provides instructions to carry out minor repairs which do not involve opening the PLB sub-assembly. Paras 4 and 5 apply to both PLB sub-assembly and the interconnecting cable.

CAUTION

Extreme care is to be taken when cleaning Loctite from threads with taps. Damage to threads will render the case irreparable.

2. Wrist Strap Assembly and Securing Screw Replacement (Fig 6, Chap 2-0)

- (1) Remove the screw securing the Wrist Strap Assembly to the Beacon together with the plastic washer. Discard the screw, washer and strap assembly.
- (2) Clean any Loctite from the screw thread in the case, using 2/64 UNF second plug tap.
- (3) Apply Loctite 241 to the tapped hole and reassemble new washer, wrist strap assembly and screw to the case.

3. Silk Screen Replacement Label

- (1) Thoroughly clean and degrease the face of the Beacon where the silk screen markings are present.
- (2) Remove the protective backing from the label (Drawing Nos 3D-202-078 Distress and 3D-202-079 Training) and ensuring that the control markings of the label line up with the present silk screening, stick the label over the existing markings.

4. Battery Locking Clip Replacement (fig 6, Chap 2-0)

Carry out the procedure as follows:-

- (1) Release the battery locking clip by removing the circlip (screw on early PLB Sub-assemblies); discard the circlip and locking clip.
- (2) Fit replacement locking clip and secure in position with new circlip or screw using Loctite 241.

5. Key Plate and Gasket Replacement (Fig 6, Chap 2-0)

Carry out the procedure as follows:-

- (1) Withdraw the three securing screws on the key plate and discard the screws.

Note:- These screws are secured with Loctite. If found unduly difficult to remove return the complete sub assembly to 3rd line at No 14 MU. Lift the plate clear and remove the gasket. Discard the plate and gasket.

- (2) Clear the threads of Loctite using a 2/64 UNF second plug tap.
- (3) Apply the Loctite 241 to the holes, fit new gasket to the case and secure new key plate with three new screws ensuring correct orientation. Torque screws to $0.282 \pm .028$ Nm. (2.5 ± 0.25 lbf in).

6. ROCKER ASSEMBLY CLEANING AND REPLACEMENT (fig 6, Chap 2-0)

Carry out the procedure as follows:-

- (1) Withdraw two fillister head, machine screws releasing the assembly from the case. Thoroughly clean and replace where necessary.
- (2) Remove any Loctite remaining in the tapped holes using a 2/64 UNF second plug tap.
- (3) Apply Loctite to the threaded holes ENSURING NO OVERFLOW.

NOTE. Loctite 241 is not to be used when plastic rocker switch fitted. See materials list Chap 2-0 Page 12.

- (4) Reassemble and secure with the two fillister head machine screws. Use torque loading of $0.170 \pm .028$ Nm. (1.5 ± 0.25 lbf in).

7. Auto-Activate Latch Replacement (fig 6, Chap 2-0)

The latch is matched to a beacon during manufacture and it is preferable that the original item be re-used. If a new item is required, however, the following procedure should be followed:-

- (1) Fit the replacement latch ensuring undue force is not required.
- (2) Pull off the latch using spring balance and noting the force required. If the force is greater than 9.0 kg (20 lb) refer to the Cross Pin Adjustment procedure, para 8 (1).
- (3) If the force is greater than 4 kg (9 lb) and less than 9.0 kg (20 lb), refit the latch and pull off a further 30 times. Repeat a further three times using a spring balance and note the force required. The force should be greater than 4 kg (9 lb) and less than 6.8 kg (15 lb), if this condition has not been achieved refer to para 8 (2).

8. Cross Pin Adjustment (Fig 6, Chap 2-0)

The cross pin is matched to a beacon and latch during manufacture and it is preferable that the original item be re-used unless it is excessively worn.

- (1) If the pull off force, as measured in para 7 (2), was excessive, squeeze the exposed portion of the pin to reduce the effective diameter, use smooth-nosed pliers and take care not to damage the pin. Repeat the procedure set out in para.7 but reduce the number of pull-offs to 10 if the original recommended 30 have been carried out.
- (2) If the pull-off force as measured in para. 7 (2) was less than 3.5 kg (8 lbs), proceed as follows:
 - (a) Remove the crosspin securing pin spring (see AP116B-0906-3A1, Chap. 2-1, Fig. 3 Item 7-8).
 - (b) Remove crosspin and gently prise open end of crosspin apart.
 - (c) Refit crosspin and repeat procedure in para. 7 but reduce the number of pull-offs to 10 if the original recommended 30 have been carried out.
 - (d) Secure crosspin with new pin spring.
- (3) If the crosspin shows signs of deep scoring proceed as follows:
 - (a) Remove the crosspin securing pin spring (see AP116B-0906-3A1 Chap. 2-1, Fig 3. Item 8) and discard.
 - (b) Remove scored crosspin and discard.
 - (c) Fit new crosspin, and new pin, spring.
 - (d) Fit new latch (green) then proceed as in Chapter 2-3 para 7.

Discard items to be disposed of in accordance with current regulations.

9. Latch Cord Assembly

The Latch Cord Assembly is manufactured locally by the designated Safety Equipment Section as laid down in the following publications:-

Applicable Life Preserver Publication (RN)

The relevant life preserver publication (RAF, ARMY)

10. Replacement of Detached Magnets

NOTE This repair is to be carried out at third line, 14 MU only.

Carry out the procedure as follows:-

- (1) Remove the Rocker Assembly as detailed in Chap. 3-3 para. 6 (1).
- (2) Thoroughly clean and remove all the remaining adhesive from the surfaces of both the Beacon support plates and the detached Magnet.

- (3) Thoroughly clean the surface of the support plate and magnet using Acetone. Reference JSP(F)395.
- (4) Thinly coat the surface of the support plate with Araldite type AV129 and hardener HV997 mixed in a ratio of 100 to 90 by volume respectively. Reference JSP(F)395.
- (5) Position magnet against shoulder on support plate and allow 16 hours for the adhesive to cure at room temperature.
- (7) Carry out the tests as detailed in the MWS 779/1 (Distress) or MWS 779/2 (Training) as applicable.

CHAPTER 3

PLB TEST SET

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ILLUSTRATIONS

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Appendix

1 Test Set maintenance policies

1 LEADING PARTICULARS

(1) Equipment Reference

PLB Test Set 6625-99-634-0556

(2) Frequencies

243.0-245.1/282.8 MHz

(3) Pass/Fail Parameters

Beacon pass/fail power level	180 mW
Distress CW pass/fail power level	76 mW
Auxiliary CW pass/fail power level	76 mW (nominal)
Battery pass/fail voltage level	12.3 V
Aerial CAL level	3.3 k ohm
Aerial pass band	3.0 to 3.6 k ohm

(4) Power Supplies

Internal battery, dry 1.5V, No 1 6135-99-910-1101

(5) Dimensions (nominal)

Height	Width	Depth
200mm	500mm	320mm

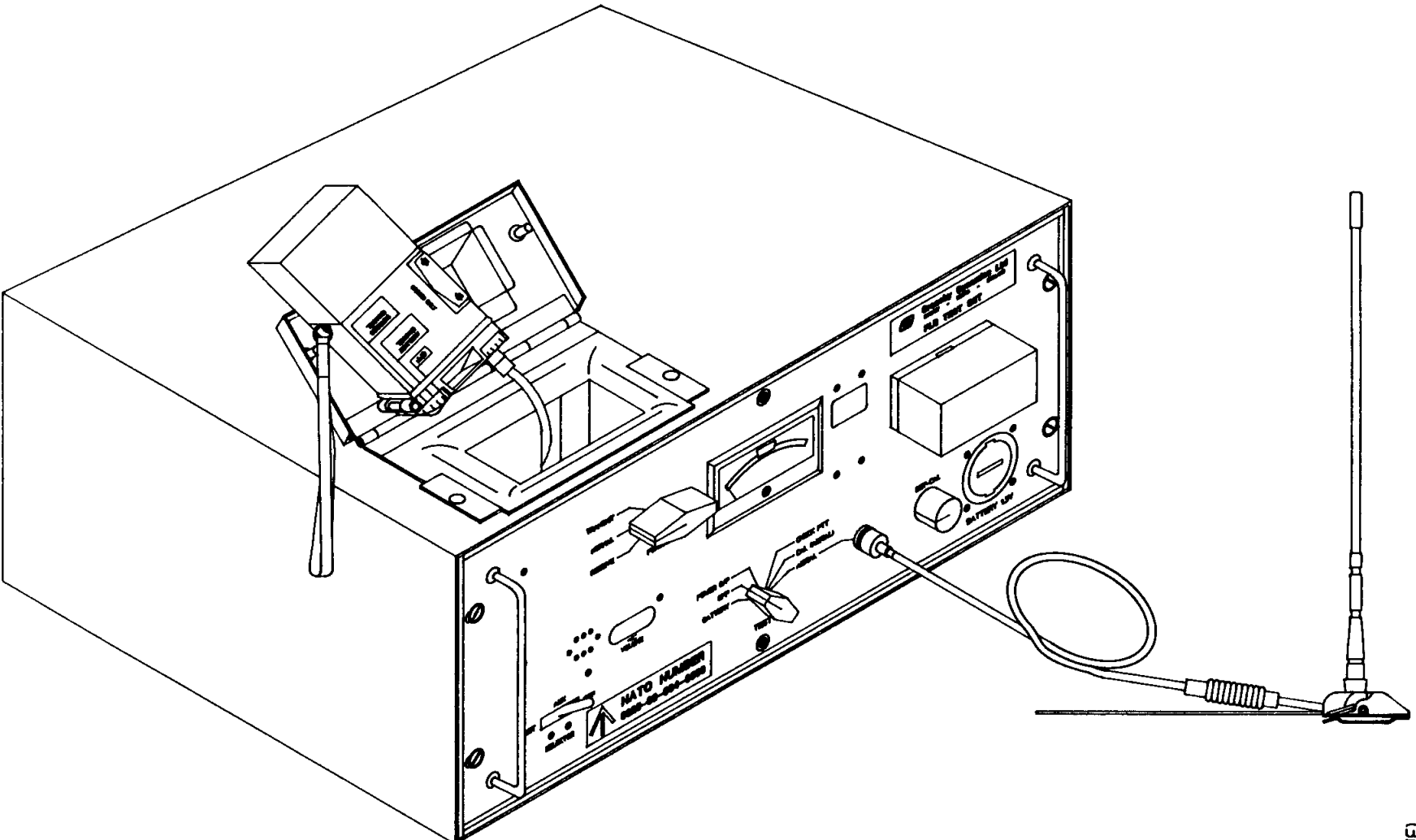


FIG.1 PERSONAL LOCATOR BEACON TEST SET
SHOWING PLB BEING INSERTED.

INTRODUCTION

- 2 The PLB Test Set (fig 1) enables a PLB (ARI23237/1&2) to be checked out as follows:
 - (1) Functionally in all transmit modes.
 - (2) Auto-aerial cable assembly and aerial continuity and insulation.
 - (3) Self-test facility in transmission modes.
 - (4) Operation of volume control.
 - (5) Very limited assessment of the receive channels.
 - (6) On-load battery voltage check.
- 3 During checks (1) and (3) to (5) the PLB under test is totally enclosed within the Test Set, the case of which provides effective screening to reduce rf radiation to a negligible level. The rf radiated by the PLB is significantly reduced by the substitution of a dummy load for the aerial.
- 4 The Test Set is constructed on a standard 19-inch panel, housed in a modified 19-inch case. A 1.5V battery is incorporated and the set requires no external power supplies. All controls are on the front panel and their functions are listed in table 1.
- 5 A hinged 'top hat' cover on the top surface of the case, held in position by two quick-release catches, locates the PLB in its test position. With the cover open access is gained for loading the PLB and for connecting an rf cable to the aerial socket. The rf connecting cable may be withdrawn from the unit for convenience and is retracted by a spring tensioned cord when the PLB is lowered into position.

OPERATING

- 6 The procedures for using this test set to carry out serviceability checks on a PLB (ARI23237/1 & 2) are detailed in Chap. 2-2. However, as an assistance to understanding the operation of the test set a list of controls, together with their functions are set out in table 1 and a sequence of tests for which it has been designed are given in tables 2, 3 and 4.

CAUTION: Care is to be exercised when using the PLB Test Set, as damage to the bezel may occur on inspection and extraction of the PLB.

TABLE 1 - LIST OF CONTROLS

CONTROL	POSITION	FUNCTION
FUNCTION	TRANSMIT NORMAL * RECEIVE	Mechanically operates the PRESS-TO-TALK/PRESS TO-LISTEN rocker switch on the side of the PLB under test and S2 within the test set.
SELECTOR	DIST AUX * OFF	Mechanically operates the 'Channel Selection' switch through DISTRESS CHANNEL, AUXILIARY CHANNEL and OFF positions.
* Individual position functions of the SELECTOR switch and FUNCTION combined with SELECTOR switches are as set out for the ARI23237/2 PLB in Chap 1-2 tables 1 and 2 respectively.		
VOLUME	Not applicable	The volume control of the PLB is directly adjusted through the aperture marked VOLUME. Perforations adjacent to the aperture enable sound to pass to and from the PLB microphone/speaker transducer.
TEST	BATTERY	The output of a battery, connected to the BATTERY terminal on the front panel, is applied across a battery test circuit. The meter is switched to indicate battery voltage on a PASS/FAIL scale.
	OFF	The meter is isolated from all test circuits. The internal battery is not connected in this position, or in BATTERY or POWER O/P.
	POWER O/P	rf output from the PLB is fed to a measuring circuit, the output of which is monitored by the meter.
	CHECK PTT (PLB self-check facility)	The output of a photo-cell, positioned opposite the PLB press-to-test illuminating button, is connected to a detector circuit powered by the battery. The meter indicates PASS or FAIL.
	CAR AERIAL	A bridge circuit with a potential provided by the battery and SET CAL variable resistor in one arm is monitored by the meter. The meter needle must be set to the CAL position before proceeding to the AERIAL test position.
	AERIAL	The PLB aerial or auto-aerial cable assembly is substituted for a precision resistance in the bridge and any unbalance of the bridge is indicated on the meter. A CHECK AERIAL band on the meter scale defines acceptable limits. For this test the aerial or auto-aerial cable assembly to be checked is coupled to the AERIAL connector on the front panel.

TABLE 2

Sequence of operations to check PLB battery on load and aerial and auto-aerial cable assembly continuity

TEST	SWITCH POSITIONS			ADDITIONAL ACTIONS	METER INDICATION
	TEST	SELECTOR	FUNCTION		
Battery on-load voltage check	OFF	OFF	NORMAL	Connect PLB battery to BATTERY test socket	None
	BATTERY	OFF	NORMAL	None	Green PASS band: battery serviceable Red FAIL band: battery unserviceable
	OFF	OFF	NORMAL	Remove PLB battery	None
Aerial and Auto-aerial cable assembly continuity check					
(1) Initial Calibration	CAL (AERIAL)	OFF	NORMAL	Adjust SET CAL	CAL mark*
(2) Aerial Check	AERIAL	OFF	NORMAL	Connect Aerial or Auto-aerial cable assembly to AERIAL test socket Remove Aerial or Auto-aerial cable assembly	Within CHECK AERIAL band: pass Outside CHECK AERIAL band: fail

* If this cannot be attained by adjustment of the SET CAL control, replace the test set battery

TABLE 3

Sequence of operations for checking audio output volume

TEST	SWITCH POSITIONS			ADDITIONAL ACTIONS	INDICATIONS	
	TEST	SELECTOR	FUNCTION		METER	AUDIO
Volume in Distress mode	Any	DIST	RECEIVE	Turn VOLUME control through range from minimum to maximum	Not applicable	*Noise output should range with VOLUME control movement
Volume in Auxiliary mode	Any	AUX	RECEIVE	Turn VOLUME control through range from minimum to maximum	Not applicable	* Noise output should range with VOLUME movement

* No audio output indicates a faulty receiver; noise, however, does not necessarily indicate the receiver is working

TABLE 4

Sequence of operation for checking beacon, distress channel speech, auxiliary channel speech transmissions and the PLB self-test facility in each of these modes

TEST	SWITCH POSITIONS			ADDITIONAL ACTIONS	INDICATIONS	
	TEST	SELECTOR	FUNCTION		METER	AUDIO
Beacon Transmission	POWER O/P	DIST	NORMAL	None	Green band: pass Red band: fail	Beacon tone
PLB Self-test facility in Beacon mode	CHECK PTT	DIST	NORMAL	None	Green band: pass Red band: fail	Beacon tone
Speech Transmission on Distress frequency	POWER O/P	DIST	TRANSMIT	None	Green band: pass Red band: fail	None
PLB Self-test facility in Distress speech transmission mode	CHECK PTT	DIST	TRANSMIT	Whistle into perforations adjacent to VOLUME control	Green band: pass Red band: fail	None
Speech Transmission on Auxiliary frequency	POWER O/P	AUX	TRANSMIT	None	Green band: pass Red band: fail	None
PLB Self-test facility in Auxiliary Speech transmission mod	CHECK PTT	AUX	TRANSMIT	Whistle into perforations	Green band: pass Red band: fail	None

ALWAYS RETURN THE TEST SWITCH TO OFF WHEN NOT IN USE TO PREVENT BATTERY DRAIN

MINOR REPAIRS

Cable retraction cord replacement (fig 2)

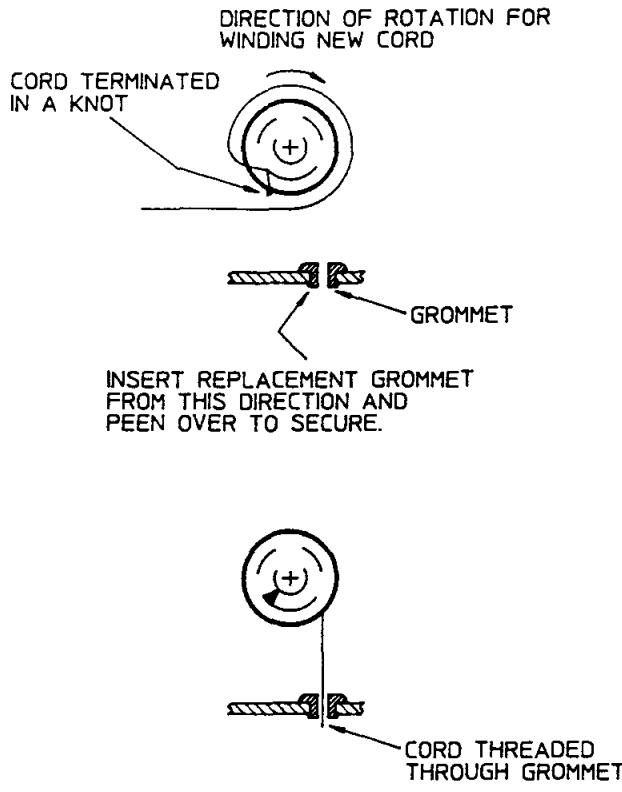
7 To replace the cord which retracts the rf connection cable, proceed as follows:

- (1) Remove the six screws securing the front panel to the test set case and lay the front panel face downwards resting on the carrying handles.
- (2) Remove and discard any cord remaining around the plastic pulley.
- (3) At the connector end of the cable cut the cord flush with the sleeve (do not damage or remove the sleeve).
- (4) Cut 0.5 metre of replacement cord and tie a knot at one end.
- (5) Pass the cord through the hole in the side wall of the pulley and draw through, trapping the knot against the external face of the pulley. Wind 8 turns of cord neatly onto the pulley in the direction of rotation shown and leave the remainder free (do not turn the pulley during this part of the procedure).
- (6) Thread the free end of the cord through the grommet and pull the cord until the pulley rotates by 1.5 revolutions.
- (7) Mark the cord with ink just below the point where it passes through the grommet. Draw the cord through the grommet against the spring tension and secure the cord around the cable so that the paint marked with ink coincides with the cord exit hole on the sleeve.
- (8) Ensure cord allows the cable to extend to its limit of extension (without straining the cable) and then allow it to retract, checking that the cable connector is drawn back to location near the grommet.
- (9) Refit the front panel to the test set and secure with six screws.

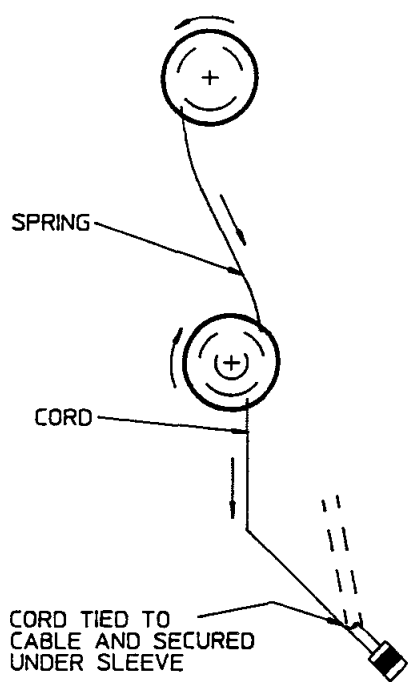
Grommet replacement (fig 2)

8 To replace a worn or damaged grommet proceed as follows:

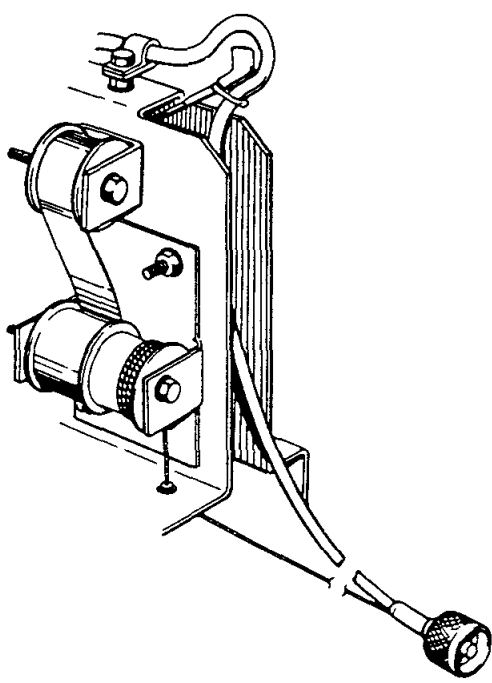
- (1) Remove the six screws securing the front panel to the test set case and lay the front panel face downwards resting on the carrying handles.
- (2) At the connector end cut the cord flush with the sleeve, pull the cord through the grommet. Remove and discard the old grommet.
- (3) Locate replacement grommet in position and peen over to secure.
- (4) Fit a replacement card in accordance with para. 7.



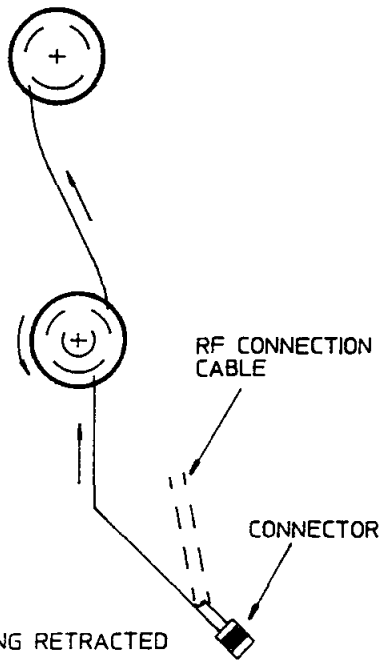
CORD RETHREADING PROCEDURE



CABLE BEING DRAWN OUT



GENERAL VIEW OF MECHANISM



CABLE BEING RETRACTED

FIG.2 CABLE RETRACTION MECHANISM

Appendix 1

TEST SET MAINTENANCE POLICIES

Introduction

1. The approved maintenance policies for the PLB Test Set are set out below for each service:

Royal Navy

- | | |
|----------|--|
| 1st Line | Not applicable |
| 2nd Line | Depth A. Replacement of battery and knock-off items (those items not affecting calibration). |
| 3rd Line | Depth C. Calibration and replacement of all discrete components by the calibration laboratories at as detailed in AP100P-0101. |
| 4th Line | Depth D. Return to Contractor. |

Royal Air Force

- | | |
|--------------|---|
| 1st Line | Not applicable |
| 2nd Line | Replacement of battery and knock-off items (these items not affecting calibration) |
| 3rd/4th Line | Calibration and repair in accordance with AP 3413 (Partially superseded by AP100C-50) |

Army

- | | |
|----------|--|
| 1st Line | Periodic functional test. Repair by replacement of knock-off spares. |
| 2nd Line | Periodic functional test. Repair by replacement of components that do not affect test set calibration. |