

ROYAL CANADIAN AIR FORCE



FITTING INSTRUCTIONS

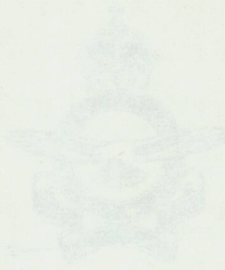
MARKER BEACON RECEIVER MN-53B

FOR INFORMATION PURPOSES
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R_VISIONS

ISSUED ON AUTHORITY OF THE CHIEF OF THE AIR STAFF

LIST OF RCAF REVISIONS

Date	Page No	Date	Page No
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MARKER BEACON RECEIVER MN-23B

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31 DEC 55

002

FIRST AID IN CASE OF ELECTRIC SHOCK

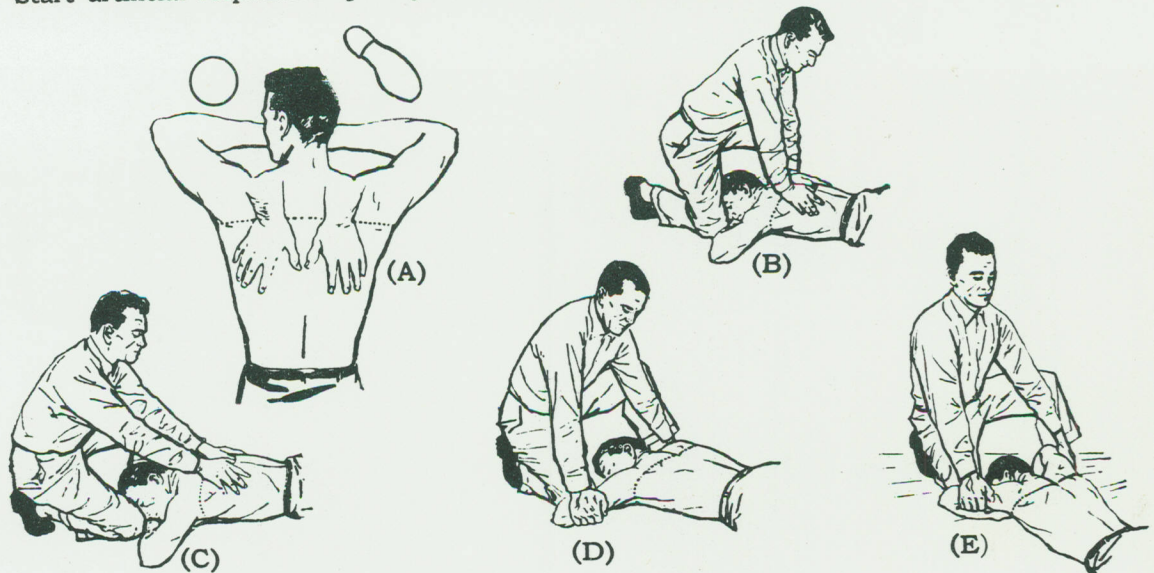
Protect yourself with dry insulating material.

Break the circuit by opening the power switch or by pulling the victim free of the live conductor.

Don't touch victim with your bare hands until the circuit is broken.

Remove false teeth, tobacco or gum from the patient's mouth.

Start artificial respiration quickly and send help for a doctor.



1. LAY PATIENT FACE DOWN, bend his elbows, place hands one on the other, turn the face on one side and place the cheek upon hand.
2. KNEEL FACING THE SUBJECT with one knee at side of the head.
3. PLACE PALMS OF YOUR HANDS ON PATIENT'S BACK with little fingers just touching the lower ribs.
4. ROCK FORWARD until the arms are directly vertical, keep elbows straight and pressure exerted almost directly downward on the back.
5. RELEASE THE PRESSURE, place your hands upon the patient's arms just above his elbows and commence to rock backwards drawing his arms upwards and towards you until you feel the resistance of the patient's shoulders.
6. DROP THE ARMS gently which completes the full cycle.
7. The cycle should be completed twelve times per minute.
8. While artificial respiration is continued have someone else loosen the patient's clothing and keep the patient warm.
9. Four hours or more may be required.
10. Do not give liquids until the patient is conscious.

TABLE OF CONTENTS

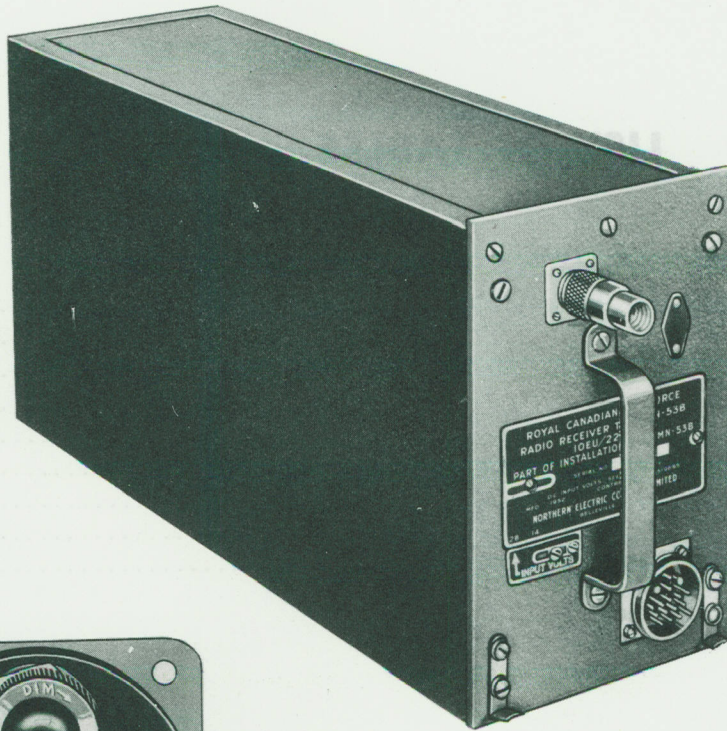
<i>Part</i>	<i>Section</i>	<i>Title</i>	<i>Page</i>
1		PRE-FITTING BENCH TESTS.....	1
	1.	Major Items.....	1
	2.	Assembly and Disassembly of Receiver.....	1
	3.	Test Equipment Required.....	1
	4.	Test Procedure.....	4
	a.	Preliminary.....	4
	b.	Expander Adjustment.....	4
	c.	Outer Marker Test.....	4
	d.	Inner Marker Test.....	4
	e.	Airways Test.....	4
	f.	Noise Level Test.....	4
	g.	Microphonic Tubes Test.....	4
2		FITTING OF UNITS.....	5
	1.	Cables.....	5
	a.	Location.....	5
	b.	Fitting of Cables.....	5
	c.	Cables, General Information.....	5
	d.	Antenna Lead-In.....	5
	e.	Cable 1, Aural Indication.....	6
	f.	Cable 2, Indicator IN-5A.....	6
	g.	Cable 3, Receiver MN-53B.....	6
	h.	Cable 4, Power.....	7
	2.	Shockmount and Marker Receiver.....	9
	a.	Location.....	9
	b.	Fitting of Shockmount MR-64A.....	9
	c.	Fitting of Receiver Unit.....	9
	3.	Indicator IN-5A.....	9
	a.	Location.....	9
	b.	Fitting of Indicator IN-5A.....	10
	4.	Junction Box.....	10
	a.	Requirements.....	10
	b.	Location.....	10
	c.	Fitting.....	10
	5.	Battery Connections.....	10
	6.	Substitution of High Voltage Source for Dynamotor.....	10
3		POST-FITTING OPERATIONS.....	11
	1.	General.....	11
	2.	Pre-operational Adjustments.....	11
	3.	Operational Check.....	11
	4.	Operation.....	11
	a.	General.....	11
4		b. Operation by Pilot.....	12
		SUPPLEMENTARY DATA.....	13
		Index.....	17

LIST OF ILLUSTRATIONS

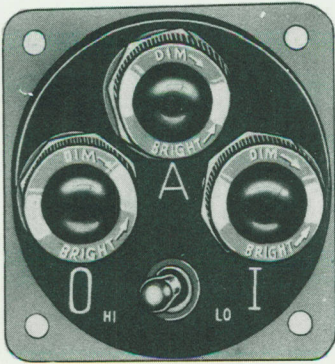
<i>Figure</i>	<i>Description</i>	<i>Page</i>
1-1	Major Items.....	iv
1-2	Test Set-Up.....	1
1-3	Type MN-53B Marker Receiver Chassis, Top View.....	2
1-4	Type MN-53B Marker Receiver Chassis, Bottom Oblique View.....	3
2-1	Type of Cable Terminations Available.....	5
2-2	Outline Dimensions of MN-53B Marker Receiver Mounted on Type MR-64A Shockmount.....	8
2-3	Mounting Dimensions of Type MR-64A Shockmount.....	9
2-4	Mounting Dimensions of Type IN-5A Indicator.....	10
3-1	R-F Filter Trimmers, Their Front Panel Location and Their Schematic.....	12
4-1	Type MN-53B Marker Installation, System Diagram.....	13-14
4-2	Type MN-53B Marker Receiver, Schematic.....	15-16

LIST OF TABLES

<i>Table</i>	<i>Title</i>	<i>Page</i>
1-1	Major Items.....	1
2-1	Cable 2, Available Terminations.....	6
2-2	Cable 2, Construction Parts.....	6
2-3	Cable 3, Available Terminations.....	7
2-4	Cable 3, Wiring.....	7
2-5	Cable 3, Construction Parts.....	7
2-6	Cable 4, Available Terminations.....	8
2-7	Cable 4, Construction Parts.....	8
3-1	Marker Identification Chart.....	11



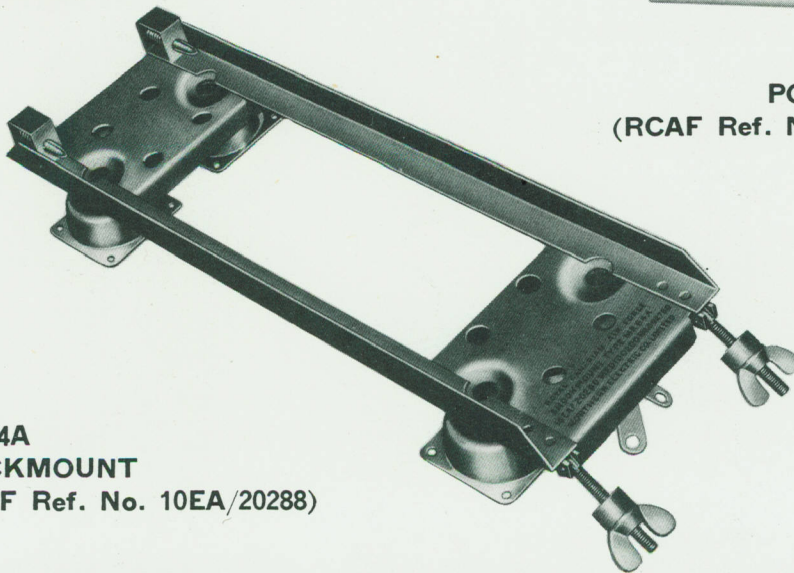
**MN-53B
RECEIVER UNIT**
(RCAF Ref. No. 10EU/22717)



**IN-5A
INDICATOR**
(RCAF Ref. No. 10EA/20731)



**MP-37D
POWER SUPPLY**
(RCAF Ref. No. 10EA/20287)



**MR-64A
SHOCKMOUNT**
(RCAF Ref. No. 10EA/20288)

Figure 1-1. Major Items

PART 1

PRE-FITTING BENCH TESTS

1. MAJOR ITEMS

The four major items of the MN-53B Marker Beacon Receiver Installation are shipped by the supplier as separate units. (See figure 1-1.)

The identification of the major items is given in table 1-1.

Table 1-1. Major Items

Description	Bendix Type	RCAF Sec/Ref	Northern Electric Code No.
Unit Receiver, Air	MN-53B	10EU/22717	R16871
Power Supply, Rotary	MP-37D	10EA/20287	R18400
Indicator, Pilot, Lamp	IN-5A	10EA/20731	R18397
Shockmount Metal	MR-64A	10EA/20288	R18393

2. ASSEMBLY AND DISASSEMBLY OF RECEIVER

a. As a preliminary step it is necessary to install the MP-37D Power Supply in the receiver unit. Proceed as follows:

(1) Remove dust cover from receiver by unlocking the spring fastener holding dust cover to chassis and then sliding the chassis out. To unlock the spring fastener holding dust cover to chassis, use a wide blade screwdriver and turn the slotted stud located at rear of dust cover 90° counterclockwise.

(2) With receiver chassis out of dust cover locate receptacle J102 (See figure 1-3), observe polarity of J102 and plug in Power Supply MP-37D in J102. The four tapped holes in the mounting bracket of the power supply will then match four clearance holes in the chassis. The assembly is completed by fastening the power supply to the chassis with the four No. 8-32

screws and No. 8 lockwashers furnished with the receiver. The screws and lockwashers are shipped in a cotton bag tied to the receiver chassis.

3. TEST EQUIPMENT REQUIRED

The test equipment required for the pre-fitting bench tests is as follows.

- a. Signal Generator calibrated for 75 mc \pm 0.01% and capable of 30% modulation at 400 cps \pm 2.0%, 1300 cps \pm 2.0% and 3000 cps \pm 2.0%. The output terminals of the signal generator shall match a 50 ohm load through a 6db pad. The modulation may be obtained from a separate audio oscillator but shall not contain more than 5.0% distortion at the level required to modulate the signal generator 30%.
- b. 600 ohm output meter with sensitivity better than one milliwatt (General Radio Type 583-A or equivalent). (RCAF Ref. No. 10EU/3510).
- c. High impedance headset, 2000 ohms min.
- d. High impedance (1000 ohm per volt or better) ac voltmeter, 0-10 volt range.
- e. Test set-up per figure 1-2.

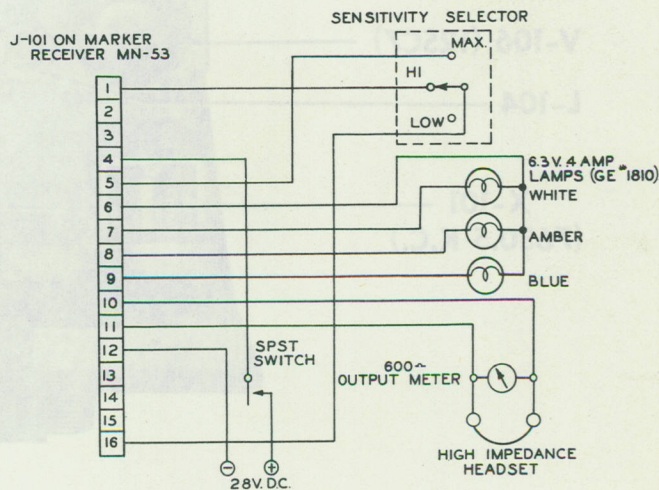


Figure 1-2. Marker Receiver Output and DC Input Connections for Test Set-Up

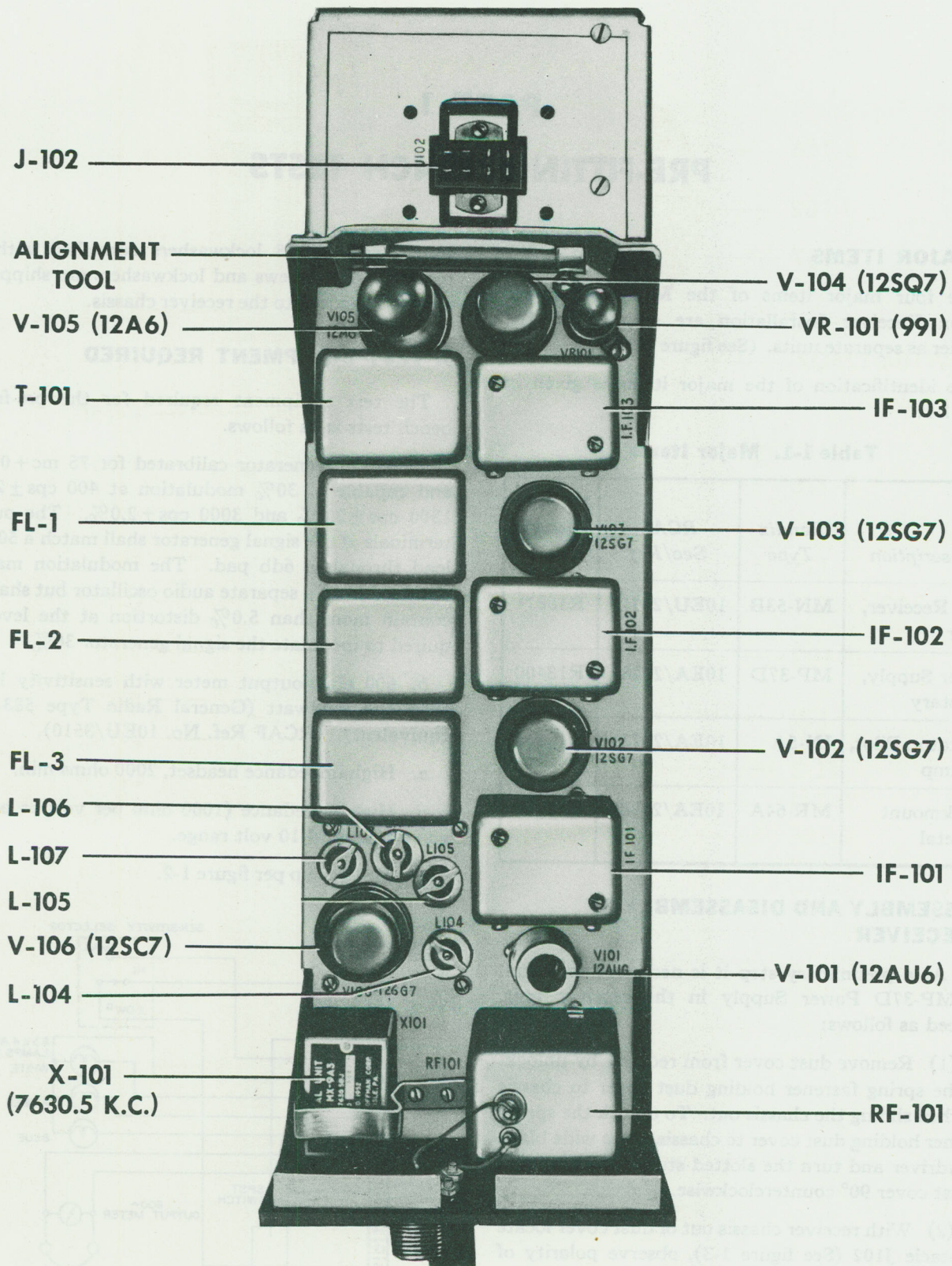


Figure 1-3. Type MN-53B Marker Receiver Chassis, Top View

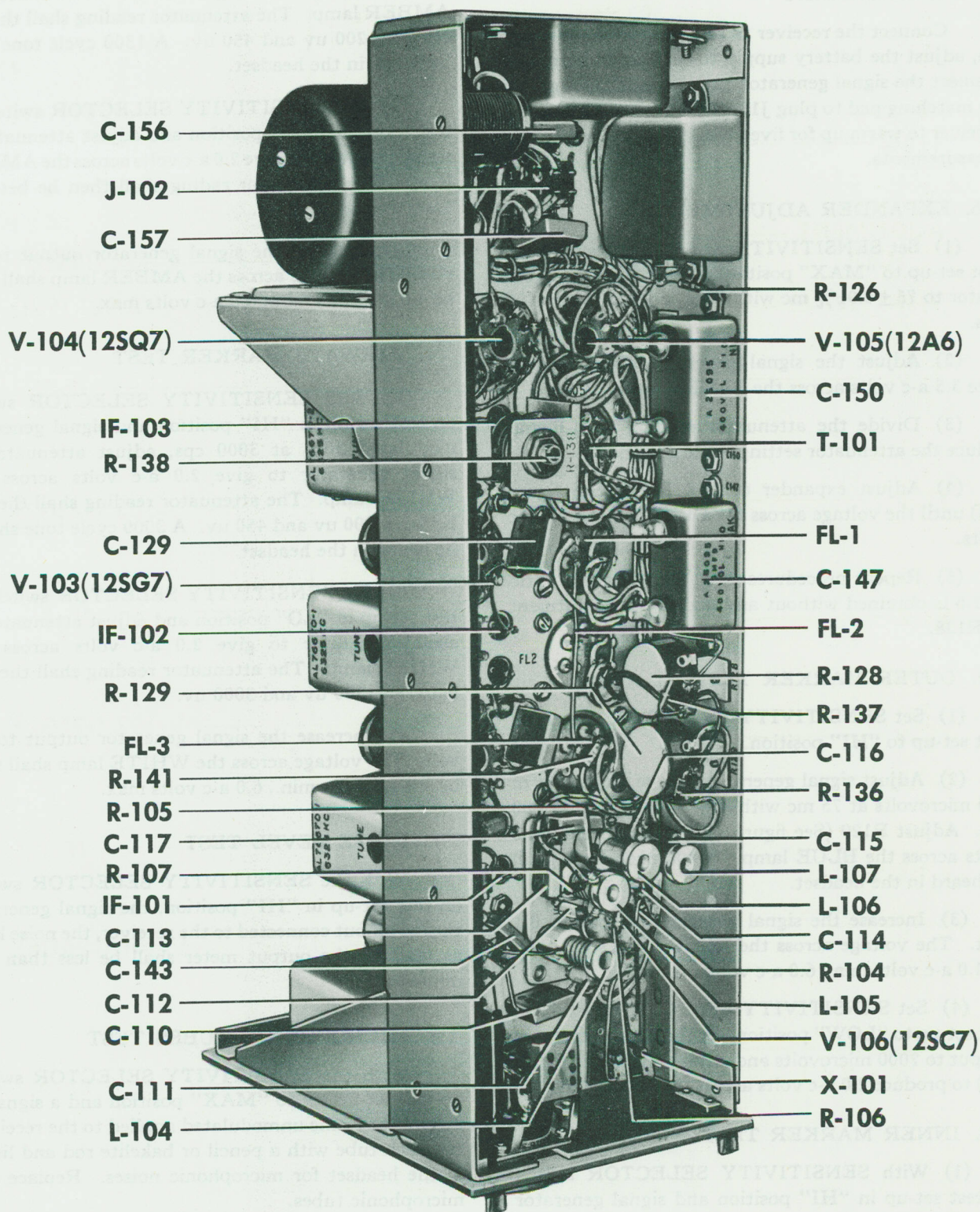


Figure 1-4. Type MN-53B Marker Receiver Chassis, Bottom Right Oblique View

4. TEST PROCEDURE

a. PRELIMINARY

Connect the receiver to be tested to the test set-up, adjust the battery supply to furnish 28 volts and connect the signal generator output leads through a 6 db matching pad to plug J103-1 of receiver. Allow the receiver to warm up for five minutes before taking any measurements.

b. EXPANDER ADJUSTMENT

(1) Set SENSITIVITY SELECTOR switch on test set-up to "MAX" position and set the signal generator to $75 \pm 0.01\%$ mc with 30% modulation at 400 cps.

(2) Adjust the signal generator attenuator to give 3.5 a-c volts across the BLUE lamp.

(3) Divide the attenuator reading by 1.6 and reduce the attenuator setting to this quotient.

(4) Adjust expander control R138 (See figure 1-3) until the voltage across the BLUE lamp is 1.5 a-c volts.

(5) Repeat procedures 2, 3, and 4 until a ratio of 1.6 is obtained without any additional adjustment of R138.

c. OUTER MARKER TEST

(1) Set SENSITIVITY SELECTOR switch on test set-up to "HI" position.

(2) Adjust signal generator to give an output of 300 microvolts at 75 mc with 30% modulation at 400 cps. Adjust R129 (See figure 1-3) to produce 2.0 a-c volts across the BLUE lamp. A 400 cycle tone shall be heard in the headset.

(3) Increase the signal generator output to 0.1 volt. The voltage across the BLUE lamp shall then be 4.0 a-c volts min., 6.0 a-c volts max.

(4) Set SENSITIVITY SELECTOR switch on test set-up to "LOW" position, set the signal generator output to 2000 microvolts and adjust R128 (See figure 1-3) to produce 2.0 a-c volts across the BLUE lamp.

d. INNER MARKER TEST

(1) With SENSITIVITY SELECTOR switch on test set-up in "HI" position and signal generator

75mc modulated 30% at 1300 cps, adjust attenuator of signal generator to give 2.0 a-c volts across the AMBER lamp. The attenuator reading shall then be between 200 uv and 450 uv. A 1300 cycle tone shall be heard in the headset.

(2) Set SENSITIVITY SELECTOR switch on test set-up in "LO" position and adjust attenuator of signal generator to give 2.0 a-c volts across the AMBER lamp. The attenuator reading shall then be between 1300 uv and 3000 uv.

(3) Increase the signal generator output to 0.1 volt. The voltage across the AMBER lamp shall then be 4.0 a-c volts min., 6.0 a-c volts max.

e. AIRWAYS MARKER TEST

(1) With SENSITIVITY SELECTOR switch on test set-up in "HI" position and signal generator modulated 30% at 3000 cps, adjust attenuator of signal generator to give 2.0 a-c volts across the WHITE lamp. The attenuator reading shall then be between 200 uv and 450 uv. A 3000 cycle tone should be heard in the headset.

(2) Set SENSITIVITY SELECTOR switch on test set-up in "LO" position and adjust attenuator of signal generator to give 2.0 a-c volts across the WHITE lamp. The attenuator reading shall then be between 1300 uv and 3000 uv.

(3) Increase the signal generator output to 0.1 volt. The voltage across the WHITE lamp shall then be 4.0 a-c volts min., 6.0 a-c volts max.

f. NOISE LEVEL TEST

With the SENSITIVITY SELECTOR switch on test set-up in "HI" position, the signal generator turned off but connected to the receiver, the noise level as read on the output meter shall be less than one milliwatt.

g. MICROPHONIC TUBES TEST

With the SENSITIVITY SELECTOR switch on test set-up set to "MAX" position and a signal of 0.1 volt at 75 mc unmodulated applied to the receiver, tap each tube with a pencil or bakelite rod and listen in the headset for microphonic noises. Replace any microphonic tubes.

PART 2

FITTING OF UNITS

1. CABLES

a. LOCATION

Cables shall be located in areas normally maintained at a low ambient temperature and comparatively free from r-f disturbances. Where a duct or wire way forms part of the airframe, the cables shall be run in the duct or wire way if physically possible.

NOTE

Heat is detrimental to the insulation of the wire used in cable assemblies.

If a cable or part of a cable is accidentally subjected to a temperature in excess of 100° C (212°F), the cable shall be replaced.

b. FITTING OF CABLES

Cables shall be mounted in a manner that will relieve strain on the cable housings and prevent friction with adjacent surfaces. Where a cable housing is likely to make intermittent contact with a metallic surface or component, the cable housing shall be electrically bonded to the metallic surface or component.

Clamps or straps designed to hold the cable securely without crushing shall be used where support is necessary.

c. CABLES, GENERAL INFORMATION

(1) The cables required for the MN-53B RECEIVER INSTALLATION are not furnished as part of the equipment but may be ordered after the length and terminations of each cable required for the installation are determined.

(2) Each cable is housed in a shielded flexible conduit. The wire used is in accordance with specification JAN-C-76, Type WL, with cotton outer braid except that the wire carrying the audio output of the receiver to the junction box and to the aural indicator is further protected by a braided copper shield and an insulating braid over the shield.

(3) Cables requiring plug termination are available with straight plug or with 90° plug. See figure 2-1.

(4) Cables ordered for connection to the junction box may have either a clamp type or coupling nut type connector and 25 inches of wire will be allowed for connection to the terminal strip, unless otherwise specified. See figure 2-1.

d. ANTENNA LEAD-IN

The antenna lead-in shall consist of 50 ohm co-axial cable (RG-8/U or RG-8A/U) of suitable length terminated at the antenna end with a connector or lugs as required by the antenna installed on the aircraft and

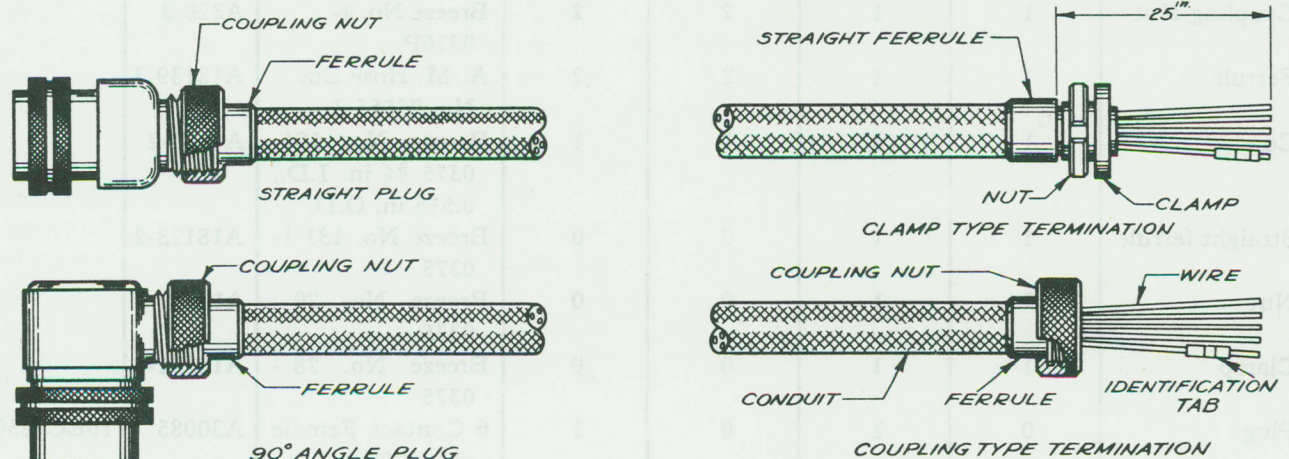


Figure 2-1. Type of Cable Terminations Available

terminated at the receiver end with a connector to match J-103-1 on the receiver. Amphenol connector 83-1SPN (RCAF Ref. No. 10EC/8351) may be used singly or with Amphenol right angle adaptor 83-1AP (RCAF Ref. No. 10EC/11950) at the receiver end of the antenna lead-in.

e. CABLE 1 AURAL INDICATION

Cable 1 (See figure 4-1) carries the audio output of the Marker Receiver to the Headset Selector Switch. Where the junction box is common to other radio gear, Cable 1 may consist of jumpers between terminals in the junction box. The wire connected to terminal 3 of the junction box shall be shielded No. 22AWG wire. The shield shall be grounded in the junction box only, the other end of the shield shall not be grounded.

f. CABLE 2 INDICATOR IN-5A

Cable 2 (See figure 4-1) required to connect the Indicator Unit to the junction box consists of six No. 18AWG white wires housed in a shielded flexible conduit (Breeze No. 101-0375, $\frac{3}{8}$ in. I.D., 0.515 in. O.D.) terminated with a six contact female plug at the indicator end and retained by either a clamp or a coupling nut at the junction box end.

Cable 2 may be ordered from Table 2-1 by specifying the Bendix cable number and the required length. Parts required for the manufacture of housings for Cable 2 are listed in table 2-2.

Table 2-1. Cable 2, Available Terminations

Bendix Cable Number	Termination	
	Indicator End	Junction Box End
AC 64664-1	6 Contact female plug, straight	Clamp
AC 64664-2	6 Contact female plug, 90°	Clamp
AC 64664-3	6 Contact female plug, straight	Coupling Nut
AC 64664-4	6 Contact female plug, 90°	Coupling Nut

g. CABLE 3, RECEIVER MN-53B

Cable 3 (See figure 4-1) required to connect the receiver unit to the junction box consists of:

One No. 14AWG White Wire

Five No. 18AWG White Wires

Four No. 18AWG Blue-White Wires

One No. 22AWG Blue-White Wire, Shielded

housed in a shielded flexible conduit (Breeze No. 101-0625, $\frac{5}{8}$ inch I.D., 0.765 inch O.D.) terminated with a 16 contact female plug at the receiver end and either a clamp or a coupling nut at the junction box end. Wire used is in accordance with specification JAN-C-76, Type WL, with cotton outer braid.

Table 2-2. Cable 2, Construction Parts

Part	Quantity Used On Each Cable				Description	Bendix Part No.	RCAF Ref. No.
	AC 64664-1	AC 64664-2	AC 64664-3	AC 64664-4			
Plug	1	0	1	0	6 Contact Female plug, straight	A30088	10EC/3431
Coupling Nut	1	1	2	2	Breeze No. 4-0376P	A320-3	
Ferrule	1	1	2	2	A. M. Hose Co. No. 75565-3	A18139-3	
Conduit	1	1	1	1	Breeze No. 101-0375 $\frac{3}{8}$ in. I.D., 0.515 in. O.D.	A4651-2	
Straight ferrule	1	1	0	0	Breeze No. 131-1-0375	A18123-2	
Nut	1	1	0	0	Breeze No. 79 - 0375	A18122-1	
Clamp	1	1	0	0	Breeze No. 78 - 0375	A18121-1	
Plug	0	1	0	1	6 Contact Female plug, 90°	A30085	10EC/3509
Tubing	6 in.	6 in.	6 in.	6 in.	0.118 in. I.D. Varflex	A13296-3	

Cable 3 may be ordered from table 2-3 by specifying the Bendix cable number and the required length.

Parts required for the manufacture of housings for cable 3 are listed in table 2-5 and the wiring is per table 2-4.

Table 2-4. Cable 3, Wiring

Plug Pin No.	Wire Colour	Wire Size, AWG	Max. Dia. of wire (Inches)
1	White	18	0.095
2	White	18	0.095
3	Not used		
4	White	14	0.137
5	White	18	0.095
6	Blue-White	18	0.095
7	Blue-White	18	0.095
8	Blue-White	18	0.095
9	Blue-White	18	0.095
10	Blue-White	18	0.095
11	Blue-White	22 (Shielded)	0.080
12	White	18	0.095
13	Not used		
14	Not used		
15	Not used		
16	White	18	0.095

Table 2-3. Cable 3, Available Terminations

Bendix Cable Number	Termination	
	Receiver End	Junction Box End
AC 65518-1	16 Contact female plug, straight	Clamp
AC 65518-2	16 Contact female plug, 90°	Clamp
AC 65518-3	16 Contact female plug, straight	Coupling Nut
AC 65518-4	16 Contact female plug, 90°	Coupling Nut

h. CABLE 4, POWER SUPPLY

Cable 4 (See figure 4-1) required to connect the 28 volt dc source to the junction box consists of:

One No. 12 AWG Black Wire

One No. 12 AWG Brown Wire

housed in a shielded flexible conduit (Breeze No. 101-0375, $\frac{3}{8}$ inch I.D., 0.515 inch O.D.) terminated with either clamps, coupling nuts or a combination thereof at the ends. Wire used is in accordance with specification JAN-C-76, Type WL, with cotton outer braid.

Table 2-5. Cable 3, Construction Parts

Part	Quantity Used On Each Cable				Description	Bendix Part No.	RCAF Ref. No.
	AC 65518-1	AC 65518-2	AC 65518-3	AC 65518-4			
Plug	1	0	1	0	16 Contact female plug, straight	A30852	10EC/7587
Coupling nut	1	1	2	2	Breeze No. 4-0625P	A320-5	
Ferrule	1	1	2	2	A.M. Hose Co. No. 75565-5	A18139-5	10A/9849
Conduit	1	1	1	1	Breeze No. 101-0625 $\frac{5}{8}$ in. I.D., 0.765 in. O.D.	A4651-4	
Straight ferrule	1	1	0	0	Breeze No. 113-1-0625	A18123-4	
Nut	1	1	0	0	Breeze No. 79 - 0625	A18122-7	
Clamp	1	1	0	0	Breeze No. 78 - 0625	A18121-7	
Plug	0	1	0	1	16 Contact female plug, 90°	A100144	10EC/5553
Tubing	8 in.	8 in.	8 in.	8 in.	0.133 in. I.D. Varflex	A13296-6	
Tubing	4 in.	4 in.	4 in.	4 in.	0.118 in. I.D. Varflex	A13296-3	

**Part 2
Section 1**

EO 35AA-10MN53B-10

Cable 4 may be ordered from table 2-6 by specifying the Bendix cable number and the required length.

Parts required for the manufacture of housings for Cable 4 are listed in table 2-7. The brown wire connects the positive side of the power supply to terminal No. 1 of the junction box. The black wire is the negative return and connects to terminal No. 2 of the junction box.

Table 2-6. Cable 4, Available Terminations

Bendix Cable Number	Termination	
	One End	Other End
AC 59727-1	Clamp	Clamp
AC 59727-2	Coupling Nut	Coupling Nut
AC 59727-3	Clamp	Coupling Nut

Table 2-7. Cable 4, Construction Parts

Part	Quantity Used On Each Cable			Description	Bendix Part No.	RCAF Ref. No.
	AC 59727-1	AC 59727-2	AC 59727-3			
Conduit	1	1	1	Breeze No. 101-0375 3/8 in. I.D., 0.515 in. O.D.	A4651-2	
Tubing	3 in.	3 in.	3 in.	0.166 in. I.D. Varflex	A13296-4	
Clamp	2	0	1	Breeze No. 78-0375	A18121-1	
Nut	2	0	1	Breeze No. 79-0375	A18122-1	
Straight ferrule	2	0	1	Breeze No. 113-1-0375	A18123-2	
Ferrule	0	2	1	A.M. Hose Co. No. 75565-3	A18139-3	10A/9847
Coupling Nut	0	2	1	Breeze No. 4-0376P	A320-3	

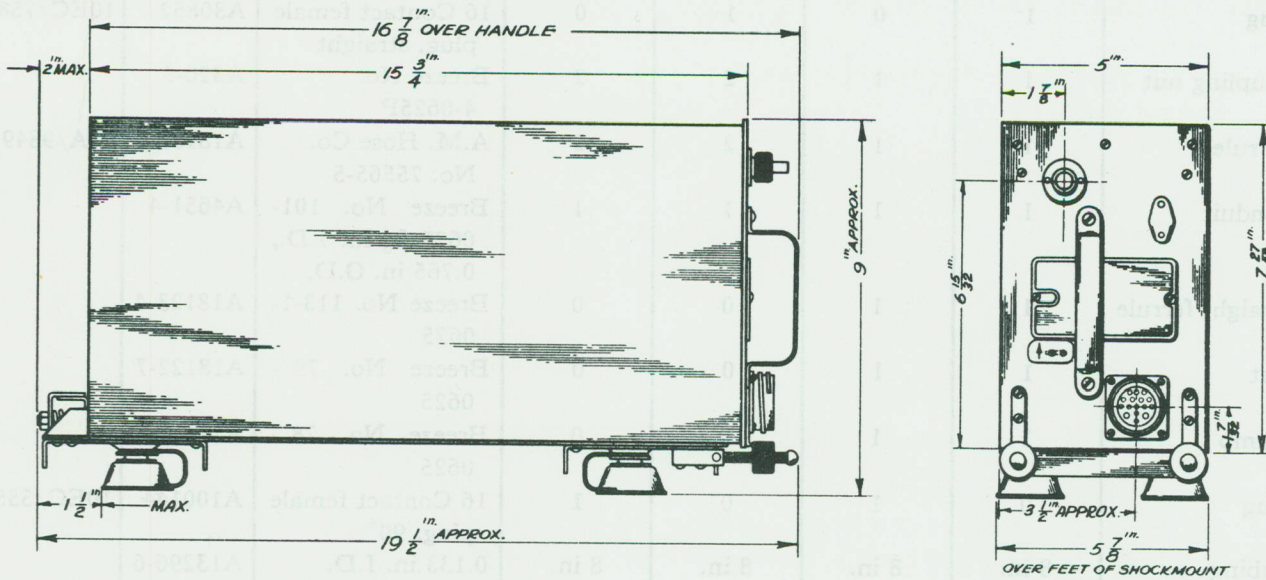


Figure 2-2. Outline Dimensions of MN-53B Marker Receiver Mounted on Type MR-64A Shockmount

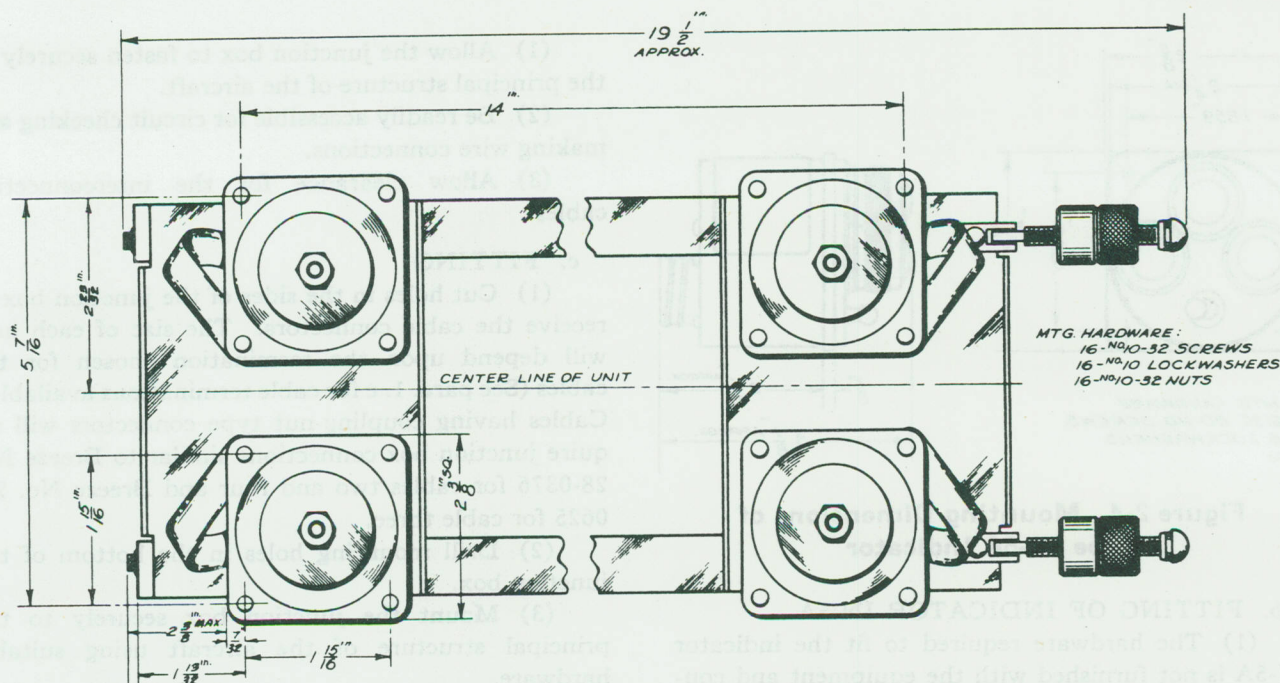


Figure 2-3. Mounting Dimensions of Type MR-64A Shockmount

2. SHOCKMOUNT AND MARKER RECEIVER

a. LOCATION

The location of the receiver unit in the aircraft is not critical provided it is convenient to the antenna connection and free from interference. A space the size of the receiver must be clear in front of the shockmount to allow for placing or removing the receiver. Figures 2-2 and 2-3 show the space required for the receiver mounted on its shockmount.

b. FITTING OF SHOCKMOUNT MR-64A

(1) The hardware required to fit the shockmount is not furnished with the equipment and consists of:

- 16 No. 10-32 Round Head Steel Screws
- 16 No. 10 Lockwashers
- 16 No. 10-32 Nuts

(2) To fit the shockmount to the airframe it is necessary to:

- i. Drill 16 clearance holes for No. 10-32 screws in the mounting surface, these holes to match the four clearance holes in the bottom flange of each of the four shockproof mounts. The relation between holes is shown in figure 2-3.
- ii. Bend the four ground straps so the clearance hole in each ground strap matches a clearance hole in each shockproof mount.
- iii. Attach the shockmount to the airframe using the No. 10-32 screws, lockwashers and nuts keeping the four ground straps between the head of the screws and the flange of the shockproof mounts (See figure 2-3).

c. FITTING OF RECEIVER UNIT

(1) Before proceeding with the fitting, make sure that the dust cover is properly secured to the receiver chassis. The spring fastener locking the cover to the chassis is located near the lower left corner on the back of the unit and when the chassis and cover are properly mated the locking action will take place when the slotted head stud is turned clockwise by 90°.

(2) Slide the receiver unit on the shockmount until the two spring loaded pins extending from the rear of the shockmount engage the receiver. Lock the receiver in place with the two locking devices located on the front of the shockmount by fitting the ferrules of the locking devices over the two small feet on the front of the receiver and tightening the wing nuts until the receiver is secure.

(3) The wing nuts of the locking devices are provided with holes for the safetying wire.

(4) Complete the fitting by connecting the antenna lead to P-103-1 and the interconnecting cable to J-101. Receptacles P-103-1 and J-101 are located on the front panel of the receiver unit. Cable fittings should make electrical contact to the receiver and should be mechanically tight.

3. INDICATOR, IN-5A

a. LOCATION

Place the indicator where it can be seen conveniently by the pilot, probably on the instrument panel near the other flight instruments. The amount of space required for the indicator is shown in figure 2-4. Allow clearance in the rear of the panel for fitting one connecting cable.

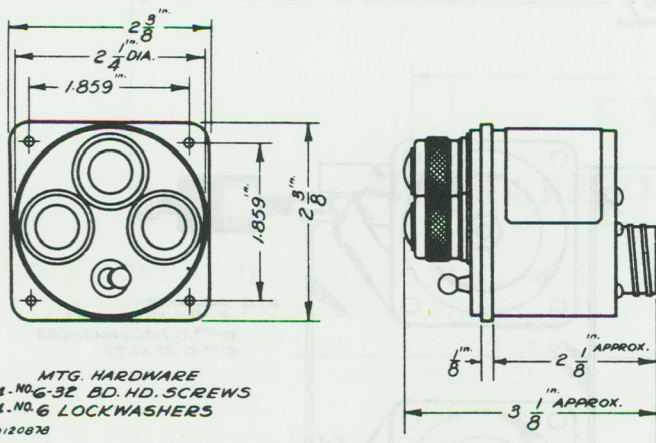


Figure 2-4. Mounting Dimensions of Type IN-5A Indicator

b. FITTING OF INDICATOR IN-5A

(1) The hardware required to fit the indicator IN-5A is not furnished with the equipment and consists of:

- Four No. 6-32 Binder Head Screws
- Four No. 6 Lockwashers

(2) To fit the indicator to the aircraft it is necessary to:

- i. Drill one clearance hole for the 2 1/4 inch diameter panel of the indicator in the center of the mounting surface and four clearance holes for No. 6-32 screws to match the tapped holes in the flange of the indicator. The relation between holes is shown in figure 2-4.
- ii. Insert the indicator from behind the instrument panel and mount with the four No. 6-32 screws and lockwashers.
- iii. Complete the fitting by attaching the interconnecting cable to J-401 located at the rear of the indicator. Cable fitting should make electrical contact to the indicator and should be mechanically tight.

4. JUNCTION BOX

a. REQUIREMENTS

Marker receiving equipment requires a minimum of eleven terminals in a junction box for interconnecting the components of the installation. A separate junction box need not be used if the required terminals are available in the junction box used for other radio equipment in the aircraft.

If a separate junction box must be used, Type MS-14A Junction Box will be suitable.

b. LOCATION

Choose a location that will:

- (1) Allow the junction box to fasten securely to the principal structure of the aircraft.
- (2) Be readily accessible for circuit checking and making wire connections.
- (3) Allow clearance for the interconnecting cables.

c. FITTING

(1) Cut holes in the sides of the junction box to receive the cable connectors. The size of each hole will depend upon the termination chosen for the cables (See para. 1. c for cable terminations available). Cables having coupling-nut type connectors will require junction box connections similar to Breeze No. 28-0376 for cables two and four and Breeze No. 28-0625 for cable three.

(2) Drill mounting holes in the bottom of the junction box.

(3) Mount the junction box securely to the principal structure of the aircraft using suitable hardware.

(4) Fasten the cables to the junction box and connect the wires to the terminals of the junction box by means of lugs. Do not connect more than four wires to each terminal. See figure 4-1 for System Diagram.

(5) Make a solid ground connection from terminal 2 of the junction box to the metal surface.

(6) Check wiring for continuity with an ohmmeter.

5. BATTERY CONNECTIONS

In addition to cables, it will be necessary to wire the battery connections through a master switch and fuse. Fuse the d-c input to the marker receiver by a 3.2 ampere SLO-BLO fuse. It is desirable that this fuse serve only the marker receiver to prevent failure of other equipment on the plane from interrupting operation of the marker receiver.

6. SUBSTITUTION OF HIGH VOLTAGE SOURCE FOR DYNAMOTOR

a. If an external power source can supply plus 250 volts dc at 0.060 ampere to the marker receiver, this external source may be used to replace the MP-37D POWER SUPPLY in the receiver unit.

(1) Substitute dummy plug P102-2 shown in figure 4-2 for the dynamotor in the receiver. Plug P102-2 consists of receptacle Jones Part No. S308-AB (Bendix No. A119576 wired as shown in figure 4-2).

(2) Connect the positive side of the external 250 volt dc source to terminal No. 11 of the junction box.

(3) Ground the negative side of the external 250 volt dc source to terminal No. 2 of the junction box.

(4) Do not disturb the 28 volt source connected to terminals No. 1 and No. 2 of the junction box.

PART 3

POST-FITTING OPERATIONS

1. GENERAL

a. After fitting, check the following items:

(1) That the power supply in the receiver unit is Type MP-37D and that the arrow below the lower left corner of the receiver nameplate points to 28, the input voltage required.

(2) That the vacuum tubes are securely seated in their sockets and that the tube shield over V-101 is locked in place.

(3) That the receiver chassis is properly locked to the dust cover.

(4) That the receiver unit is mounted securely in the shockmount.

(5) That all mounting screws are tight.

(6) That all cable fittings are mechanically tight and make electrical contact with the unit.

(7) That battery voltage and polarity are as required.

(8) That the power circuit is fused with a 3.2 ampere SLO-BLO fuse.

2. PRE-OPERATIONAL ADJUSTMENTS

a. Trimmers C-104, C-103 and C-101 shall be adjusted after the receiver is connected to the antenna. See figure 3-1 for location of trimmer. Trimmer C-104 is protected by a small swinging cover, trimmers C-103 and C-101 are located under the receiver nameplate.

(1) Connect a 600 ohm output meter across the audio output terminals of the receiver or across the headset.

(2) Radiate a signal of $75 \pm 0.01\%$ mc modulated 30% at 400 cps from a signal generator to the antenna on the plane.

(3) Adjust trimmers C-104, C-103 and C-101 in the order mentioned to give the maximum reading on the output meter. Keep the output below 10mw by reducing the input from the signal generator. If a trimmer produces two peaks, disregard the weaker peak.

(4) Repeat operation 3 several times until no further gain in output can be obtained.

(5) Replace the nameplate and close the cover over C-104.

3. OPERATIONAL CHECK

a. Make the operational check after adjusting the antenna trimmers.

(1) Set HI-LO switch on IN-5A INDICATOR to HI position and increase input from signal generator (See section 2. a. 2) until the BLUE lamp on IN-5A INDICATOR glows. A 400 cps tone should be heard in the headset.

(2) Modulate the signal generator 30% at 1300 cps, the BLUE lamp shall go out and the AMBER lamp shall glow. A 1300 cps tone should be heard in the headset.

(3) Modulate the signal generator 30% at 3000 cps, the AMBER lamp shall go out and the WHITE lamp shall glow. A 3000 cps should be heard in the headset.

(4) Set the HI-LO switch on IN-5A INDICATOR to LO position. The lamp shall then require approximately seven times the input from the signal generator to produce the same intensity of light as in 1, 2, 3, above.

Table 3-1. Marker Identification Chart

<i>Visual Identification (Color of Indicator Lamp)</i>	<i>Aural Identification (Tone in Headset)</i>	<i>Type of Marker</i>
*White	3000 cps steady tone	Airways (Z-marker)
*White (on-off in dashes)	3000 cps dashed tone	Airways (fan marker)
*Amber (on-off in dots)	1300 cps dotted tone	Inner marker (Instrument landing system)
*Blue (on-off in dashes)	400 cps dashed tone	Outer marker (Instrument landing system)

*Shutter-type light, turn clockwise to dim, counter-clockwise to brighten.

4. OPERATION

a. GENERAL

The marker receiver gives the pilot automatic visual and aural identification when his plane is in the vicinity of a marker and distinguishes the type of marker by a tone heard in the headset and by a lamp which

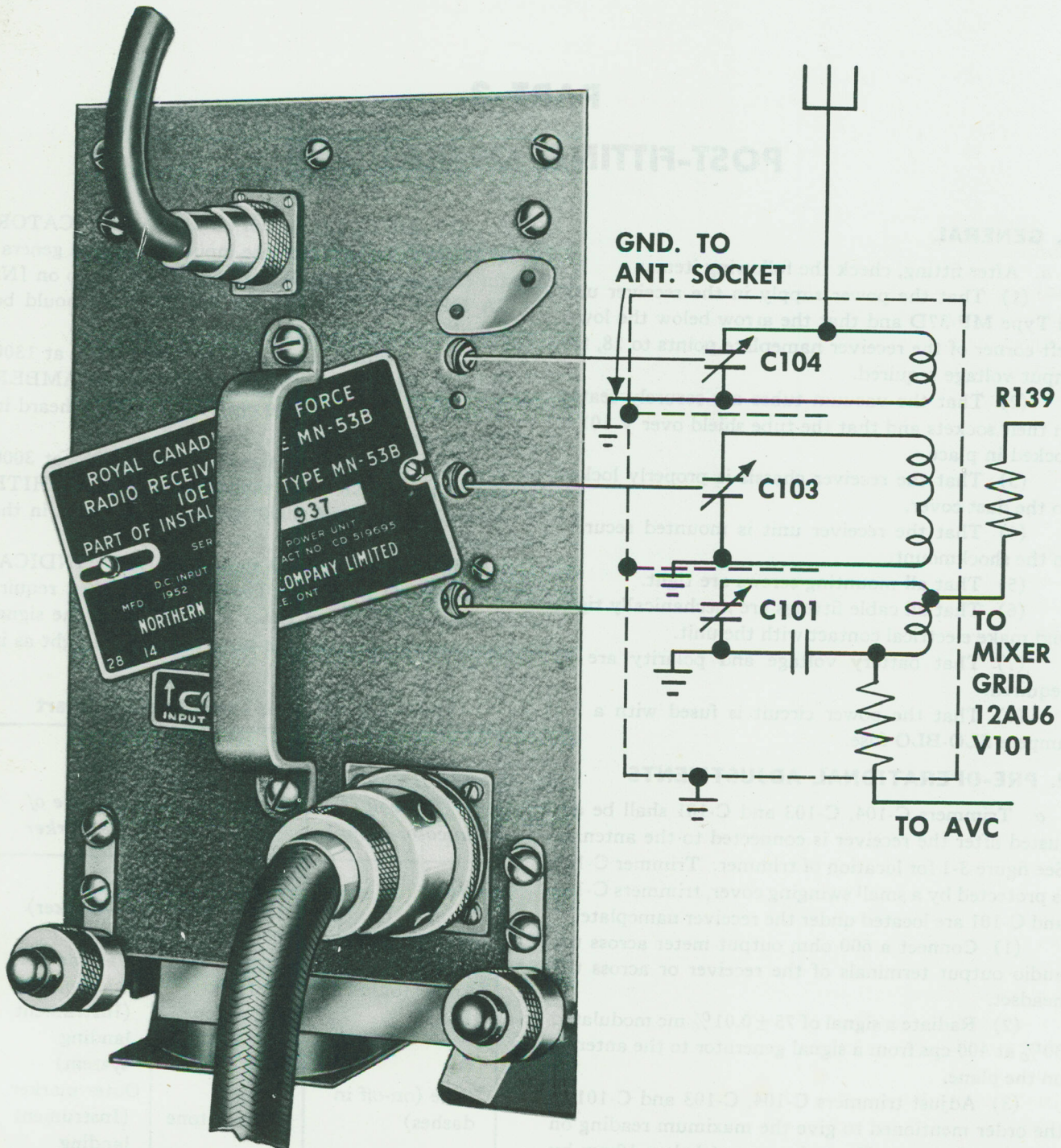


Figure 3-1. R-F Filter Trimmers, Their Front Panel Location and Their Schematic

lights on the IN-5A INDICATOR. The type of marker received may be identified from Table 3-1.

b. OPERATION BY PILOT

The pilot has to do nothing to receive these indications except listen in his headset and watch the indicator; the marker receiver is automatically turned on with the rest of the radio gear and it has no tuning controls. For the remote selection of high or low receiver sensitivity there is a toggle switch on IN-5A

INDICATOR marked "HI-LO", the position of this sensitivity switch will be determined under flight conditions.

The position of the switch is determined by the desired duration of the visual and aural identification for each marker and by the type of receiving antenna system used. In general the dual indication lasts longer with the switch on "HI", and lasts a shorter length of time with the switch on "LO".

INDEX

<i>Subject</i>	<i>Page</i>	<i>Subject</i>	<i>Page</i>
Adjustment of Antenna Trimmers.....	11	Location of IN-5A Indicator....	9
Adjustment of Expander.....	4	Location of Junction Box.....	10
Adjustments, Preoperational.....	11	Location of Shockmount and Receiver.....	9
Airways Marker Test.....	4	Major Items, List of.....	1
Antenna Lead-In.....	5	Marker, Airways, Test.....	4
Antenna Trimmers, Adjustment.....	11	Marker, Identification of.....	11
Antenna Trimmers, Location of.....	12	Marker, Inner, Test.....	4
Assembly and Disassembly of Receiver.....	1	Marker, Outer, Test.....	4
Aural Indication, Cable for.....	6	Microphonic Tubes, Test.....	4
Battery Connections.....	7	Noise Level Test.....	4
Bench Tests, Pre-Fitting.....	1	Operation, General.....	11
Cable 1, Aural Indicator, Description of.....	6	Operation by Pilot.....	12
Cable 2, Indicator IN-5A, Description of.....	6	Operational Check.....	11
Cable 3, Receiver MN-53B, Description of.....	6	Outer Marker Test.....	4
Cable 4, Power Supply, Description of.....	7	Output Meter.....	1
Cables, Fitting of.....	5	Post-Fitting Operations.....	11
Cables, General Information.....	5	Power Supply, Fitting of.....	1
Cables, Location of.....	5	Power Supply Cable.....	7
Cables, Terminations Available.....	5	Pre-Fitting Bench Tests.....	1
Chart, Identification of Markers.....	11	Pre-operational Adjustments.....	11
Check, Operational.....	11	Procedure, Test.....	4
Dynamotor, Fitting of.....	1	Receiver, Assembly and Disassembly of.....	1
Dynamotor, Substitution of		Receiver MN-53B, Cable.....	6
High Voltage Source for.....	10	Receiver Unit, Fitting of.....	9
Expander, Adjustment of.....	4	Requirements, Junction Box.....	10
Fitting of Cables.....	5	Schematic, RF Filter.....	12
Fitting of Indicator IN-5A.....	9	Set-Up, Test.....	1
Fitting of Junction Box.....	10	Shockmount, Fitting of.....	9
Fitting of Receiver Unit.....	9	Shockmount, Location.....	9
Fitting of Shockmount.....	9	Signal Generator Requirements.....	1
Fuse.....	10	Substitution of High Voltage Source.....	10
High Voltage Source, Substitution of.....	10	Supply, Power, Cable for.....	7
Identification of Markers.....	11	Table of Major Components.....	1
IN-5A Indicator Cable.....	6	Terminations, Cables.....	5
IN-5A Indicator, Fitting of.....	10	Test, Airways Marker.....	4
IN-5A Indicator, Location.....	9	Test, Inner Marker.....	4
Indicator IN-5A, Cable.....	6	Test, Microphonic Tubes.....	4
Indicator, IN-5A, Fitting of.....	10	Test, Noise Level.....	4
Indicator IN-5A, Location.....	9	Test, Outer Marker.....	4
Inner Marker Test.....	4	Test Equipment Required.....	1
Junction Box, Fitting of.....	10	Test Procedure.....	4
Junction Box, Location of.....	10	Test Set-Up.....	1
Junction Box, Requirements.....	10	Test Signal Generator.....	1
Lead-In, Antenna.....	5	Voltmeter Requirements, AC.....	1
Location of Cables.....	5		

INDEX

Page	Subject	Page	Subject
1	Location of IX-5A Indicator	11	Adjustment of Antenna Transmitter
10	Location of Junction Box	11	Adjustment of Expansion
1	Location of Shockmount and Receiver	11	Adjustment of Frequency
1	Major Items List of	1	Always Marker Test
11	Marker, Always Test	11	Antenna Lead in
1	Marker, Identification of	11	Antenna Transmitter Adjustment
1	Marker, Jammer Test	11	Antenna Transmitter Location of
1	Marker, Outer Test	11	Assembly and Disassembly of Receiver
1	Microphone Tubes, Test	11	Antal Indication Cable for
1	Moisture Level Test	11	Battery Connections
1	Operation, General	11	Branch Test, Performance
1	Operation by Pilot	11	Cable I, Antal Indicator, Description of
1	Operational Check	11	Cable II, Indicator IN-5A, Description of
1	Outer Marker Test	11	Cable III, Receiver MN-11B, Description of
1	Output Meter	11	Cable IV, Power Supply, Description of
1	Post-Firing Operations	11	Cables, Firing of
1	Power Supply, Firing of	11	Cables, General Information
1	Power Supply Cable	11	Cables, Location of
1	Pre-Firing Bench Test	11	Cables, Transmitters Available
1	Pre-operational Adjustments	11	Chart, Identification of Markers
1	Procedure Test	11	Check, Operational
1	Receiver, Assembly and Disassembly of	11	Dynamometer, Firing of
10	Receiver MN-11B, Cable	11	Dynamometer, Synchronization of
1	Receiver Unit, Firing of	11	High Voltage Source for
1	Replenishment Junction Box	11	Expansion, Adjustment of
1	Schedule, RP Filter	11	Firing of Cables
1	Set-Up, Test	11	Firing of Indicator IN-5A
1	Shockmount, Firing of	11	Firing of Junction Box
1	Shockmount, Location	11	Firing of Receiver Unit
1	Signal Generator Requirements	11	Firing of Shockmount
1	Substitution of High Voltage Source	11	Test
1	Supply Power, Cable for	11	High Voltage Source, Substitution of
1	Table of Major Components	11	Identification of Markers
1	Transmission, Cable	11	IN-5A Indicator Cable
1	Test, Always Marker	11	IN-5A Indicator, Firing of
1	Test, Inner Marker	11	IN-5A Indicator, Location
1	Test, Microphone Tubes	11	Indicator IN-5A, Cable
1	Test, Moisture Level	11	Indicator, IN-5A, Firing of
1	Test, Outer Marker	11	Indicator IN-5A, Location
1	Test, Equipment Required	11	Inner Marker Test
1	Test, Receiver	11	Junction Box, Firing of
1	Test, Set-Up	11	Junction Box, Location of
1	Test, Signal Generator	11	Junction Box, Requirements
1	Voltage Requirements, AC	11	Test in Action
		11	Location of Cables