

NAVSHIPS 91338

RESTRICTED

INSTRUCTION BOOK

for

ANTENNA
AT-150/SRC

and

ANTENNA ASSEMBLY
AS-390/SRC

BIRD ELECTRONIC CORPORATION
CLEVELAND, OHIO

BUREAU OF SHIPS

NAVY DEPARTMENT

Contract: NOBsr-43272

Approved by BuShips:

29 June 1950

LIST OF EFFECTIVE PAGES

Page Numbers	Change In Effect	Page Numbers	Change In Effect
Title Page	Original	3-0 to 3-5	Original
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2-0 to 2-1	Original		



DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 993-100
29 June 1950

From: Chief, Bureau of Ships
To: All Activities concerned with the Installation,
Operation and Maintenance of the Subject Equipment.

Subj: Instruction Book for Antenna AT-150/SRC and Antenna
Assembly AS-390/SRC, NAVSHIPS 91338.

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D. H. CLARK
Chief of Bureau

RECORD OF CORRECTIONS MADE

[illegible]

November 7, 1951

TEMPORARY CORRECTION T-1

To INSTRUCTION BOOK for

ANTENNA AT-150/SRC and ANTENNA ASSEMBLY AS-390/SRC

(NAVSHIPS 91338)

This correction sheet includes four BuShips contracts and all equipments as serial numbered in the table below. Equipments are allocated to the contracts as listed herein.

Applicable Contract Number and Date	Antenna AT-150/SRC Equipment Serial Numbers	Antenna Assembly AS-390/SRC Equipment Serial Numbers
NObsr 52114, 22 December, 1950		501 to 850
NObsr 52115, 12 December, 1950	2001 to 2650	
NObsr 52591, 14 June, 1951		851 to 1176
NObsr 52595, 14 June, 1951	2651 to 4114	

Contract number and contract date applying on this instruction book will be identified from equipment type and serial number according to the above table, and should be corrected in this Instruction Book in the following places:

1. **TITLE PAGE** - Contract number, lower left hand corner.
2. Page III, **FRONT MATTER** - Contract number and date at top of inscription block on **INSTALLATION RECORD**.
3. Page 1-3, Section 1, **DESCRIPTION**, Paragraph 6b - Contract number and date.
4. Page 1-4, Section 1, **DESCRIPTION**, Paragraph 7b - Contract number and date.

RESTRICTED

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(of 1 page)



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GUARANTEE

The equipment, including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation, is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b. any point within the continental limits of the United States designated by the Government, without delay and at no expense to the Government; provided that such guarantee will not obligate the Contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design with the understanding that if ten percent (10%) or more of any such said item, but not less than two of any such item, of the total quantity comprising such item furnished under the contract, are found to be defective as to design, such item will be conclusively presumed to be of de-

fective design and subject to one hundred percent (100%) correction or replacement by a suitably redesigned item.

All such defective items will be subject to ultimate return to the Contractor.

In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective items for repair or replacement without jeopardizing the integrity of Naval communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such items in order to prevent extended interruption of communications. In such cases the return of the defective items for examination by the Contractor prior to repair or replacement will not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for affecting expeditious adjustment under the provisions of this contractual guarantee.

The above one year period will not include any portion of time the equipment fails to perform satisfactorily due to any such defects, and any items repaired or replaced by the Contractor will be guaranteed anew under this provision.

INSTALLATION RECORD

Contract Number NObsr-43272

Date of Contract, 21 April 1949

Serial Number of Equipment _____

Date of acceptance by the Navy _____

Date of delivery to contract destination _____

Date of completion of installation _____

Date placed in service _____

REPORT OF FAILURE

Report of failure of any part of this equipment, during its entire service life, shall be made to the Bureau of Ships in accordance with current regulations using form NAVSHIPS NBS 383 (revised). The report shall

cover all details of the failure and give the date of installation of the equipment. For procedure in reporting failures see Chapter 67 of the Bureau of Ships Manual or superseding instructions.

ORDERING PARTS

All requests or requisitions for replacement material should include the following data:

1. Federal stock number or, when ordering from a Marine Corps or Signal Corps supply depot, the Signal Corps stock number.
2. Name and short description of part.

If the appropriate stock number is not available the

following shall be specified:

1. Equipment model or type designation, circuit symbol, and item number.
2. Name of part and complete description.
3. Manufacturer's designation.
4. Contractor's drawing and part number.
5. JAN or Navy Type number.

SAFETY NOTICE

The attention of officers and operating personnel is directed to Chapter 67 of the Bureau of Ships Manual or superseding instructions on the subject of radio-safety precautions to be observed.

RESUSCITATION

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY THE PRONE PRESSURE METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH RADIO, RADAR, OR SONAR ENCLOSURE. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

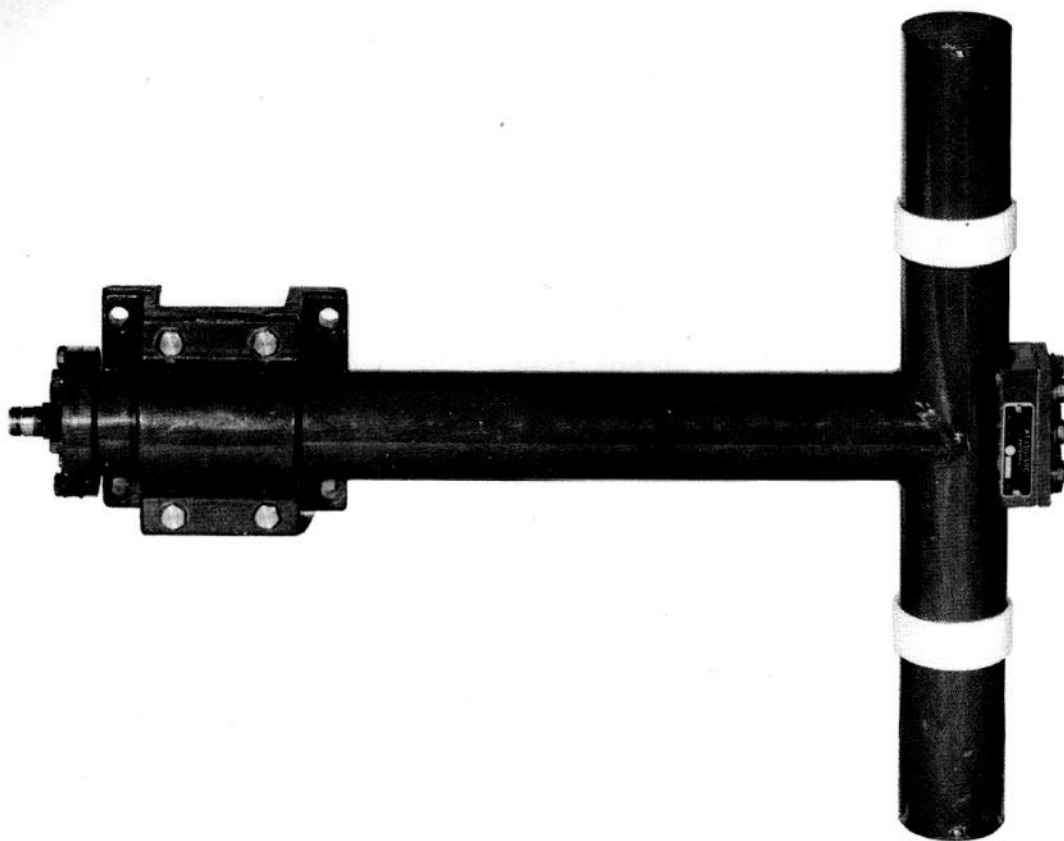


Figure 1-1. Antenna AT-150/SRC

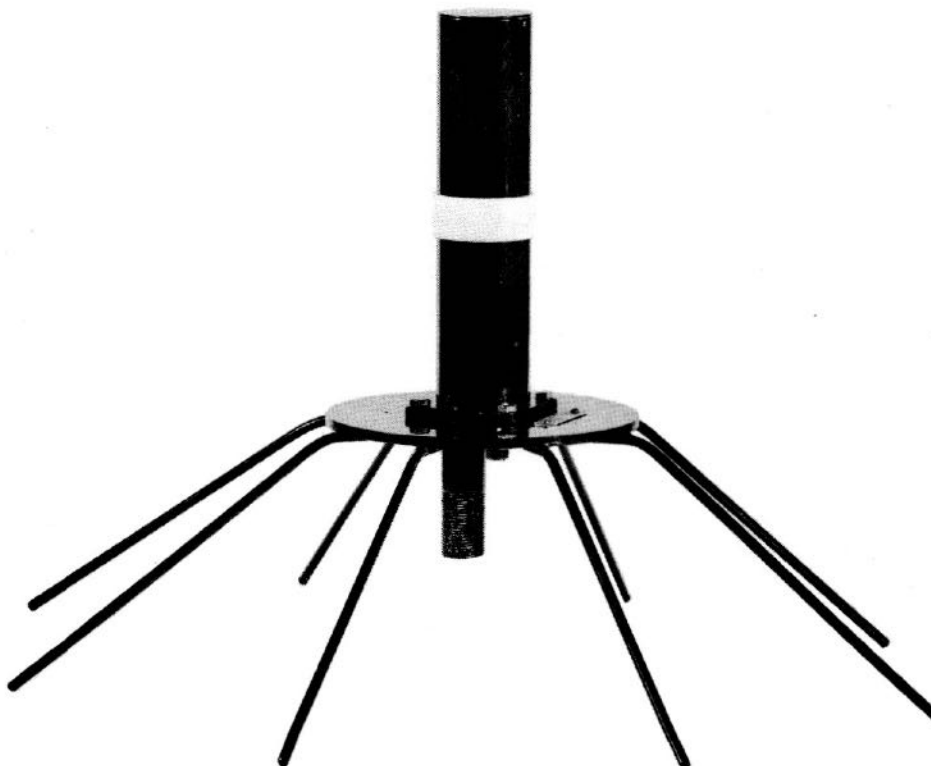


Figure 1-2. Antenna Assembly AS-390/SRC

SECTION 1 DESCRIPTION

1. INTRODUCTION

This instruction book is for Antenna AT-150/SRC and Antenna Assembly AS-390/SRC.

2. GENERAL DESCRIPTION, AT-150/SRC

This unit, shown in figure 1-1, is a broad band, coaxial dipole antenna and may be used for transmitting or receiving vertically polarized waves at frequencies from 220 to 400 megacycles. It is balanced with respect to ground and has a nominal input impedance of 52 ohms. The radiation pattern is similar to that of a conventional dipole.

3. GENERAL DESCRIPTION, AS-390/SRC

This unit, shown in figure 1-2, is a broad band coaxial stub antenna and may be used for transmitting or receiving vertically polarized radio waves at frequencies from 220 to 400 megacycles. It has a nominal input impedance of 52 ohms and is unbalanced to ground. The radiation pattern is similar to that of a conventional dipole.

4. DETAILED DESCRIPTION, AT-150/SRC

a. Frequency range. - The designed frequency range of the antenna is from 220 to 400 megacycles. The V.S.W.R. (voltage standing wave ratio) will not exceed 2.1 to 1 over the designed frequency range. The antenna may be used over a wider frequency range, than designed, with a nominal decrease in efficiency. For the voltage standing wave ratio, see figure 1-3.

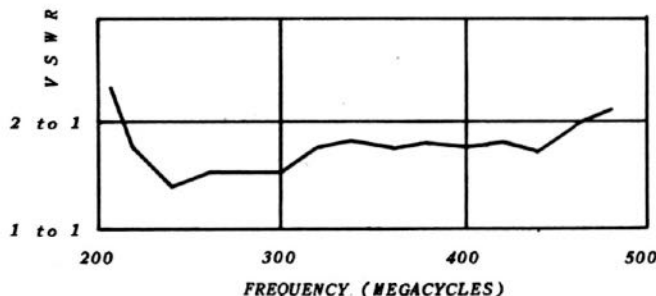


Figure 1-3. Antenna AT-150/SRC, Typical Voltage Standing Wave Ratios

b. RADIATION PATTERN. - The radiation pattern will be similar to that of a dipole except as affected by the external supporting structure and the proximity of metallic masses.

c. INPUT IMPEDANCE. - The nominal input impedance is 52 ohms. The actual input impedance as a function of frequency is shown in figure 1-5.

d. CONSTRUCTION. (See figure 1-4 and 3-2)

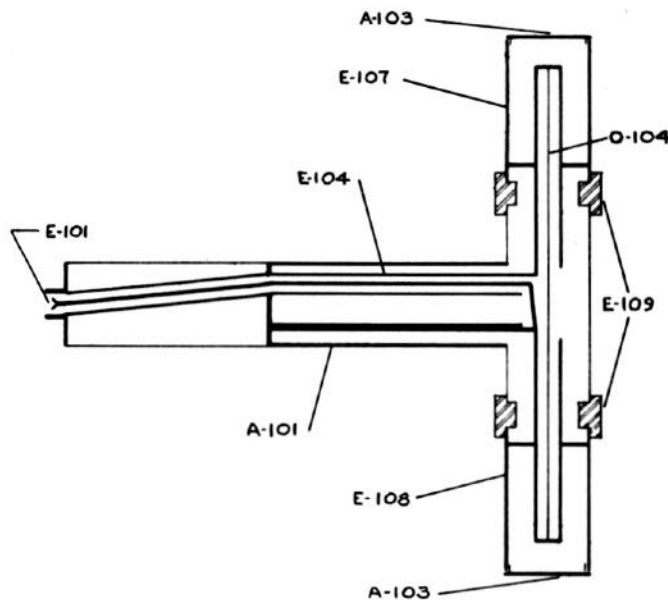
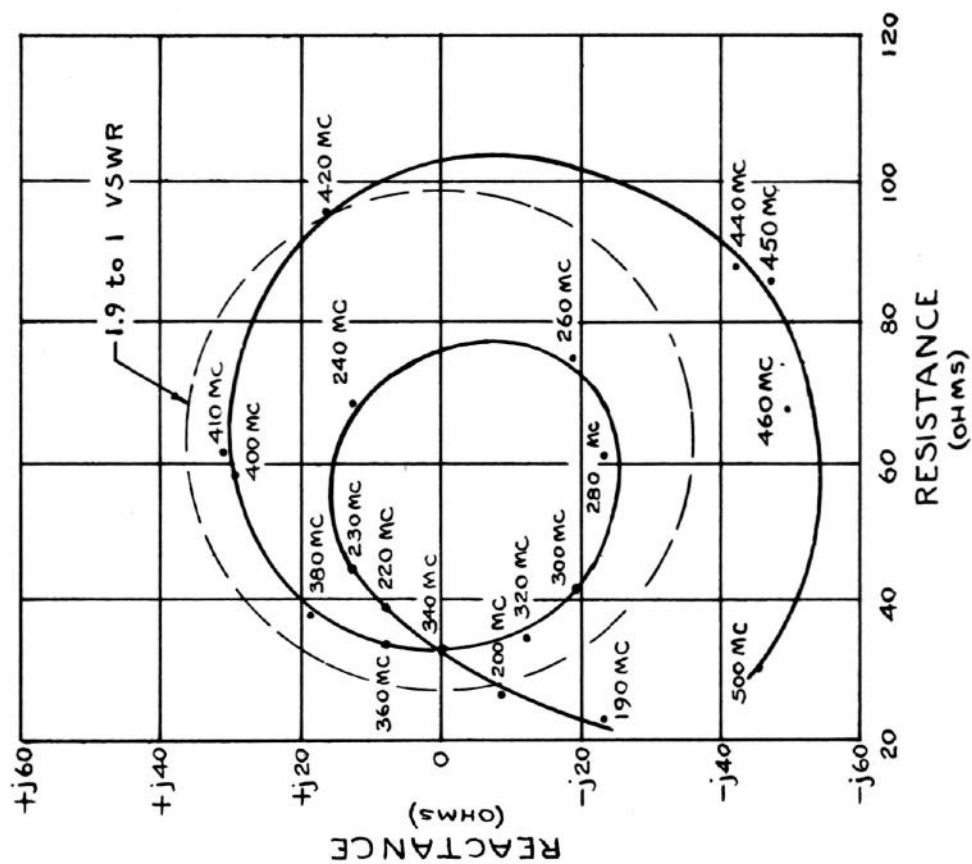
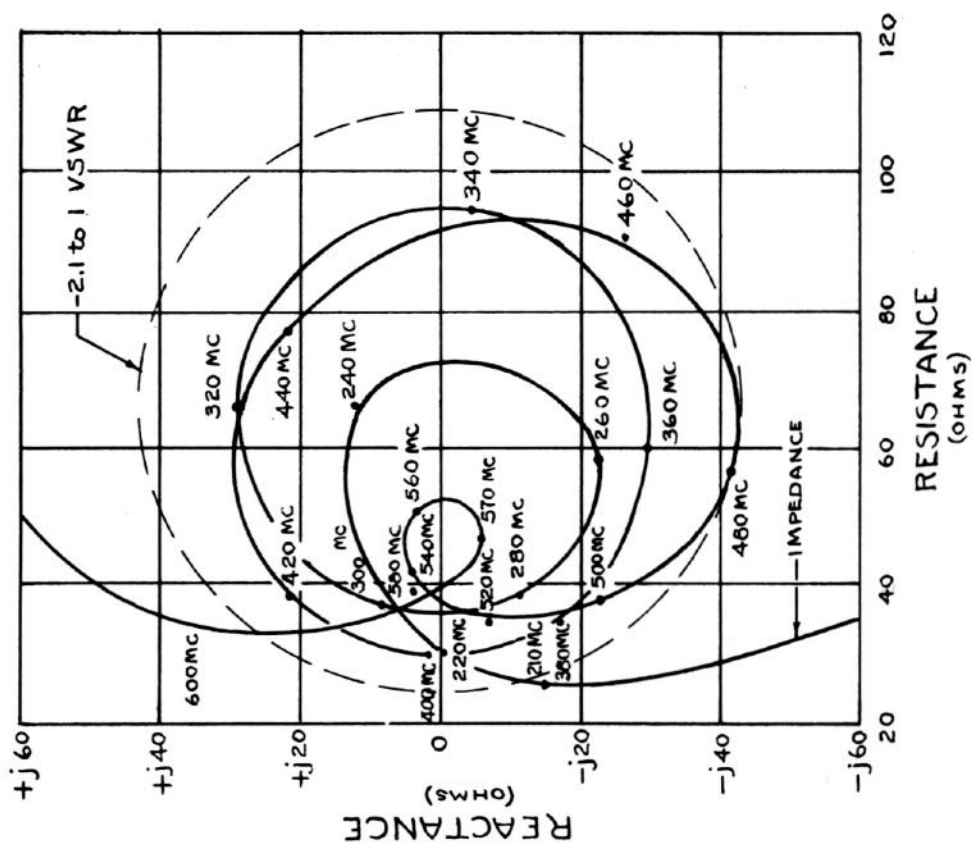


Figure 1-4. Antenna AT-150/SRC, Schematic Section

(1) The horizontal, non-radiating portion of the antenna, (A-101) support, antenna section, acts as a mounting arm and houses the antenna feedline. Input connection to the antenna is made through the connector plug (E-101) which in turn connects to a length of RG-81/U coaxial feedline (E-104). This coaxial feedline is connected at the opposite end not only to the inner concentric lines of the antenna section (E-108) but to a copper tube (shown in figure 1-4 with extra heavy black line) in the mounting arm. Also, the outer conductor of the coaxial line is connected at the feed point to the inner concentric lines of the other antenna section (E-107). The copper tube previously mentioned is short circuited to the coaxial feedline at a critical distance back toward the input, making a balun arrangement which serves to apply equal and opposite potentials to both sections of the radiating portions of the antenna.

(2) The vertical portion of the antenna forms the radiating element and is made up essentially of an inner coaxial line and an outer coaxial line, the two lines being concentric. The two 7/8-inch diameter aluminum tubes welded to the antenna sections (E-107 and E-108) serve as both the outer conductor of the inner coaxial line and the inner conductor of the outer coaxial line. The tie rod (0-104) is the inner conductor of the inner coaxial line and the outermost 2-1/4-inch diameter tube of the antenna section is the outer conductor of the outer coaxial line. An insulated gap is formed in each of the outermost conductors by the

Figure 1-6. Antenna Assembly AS-390/SRC,
Typical Input ImpedanceFigure 1-5. Antenna AT-150/SRC,
Typical Input Impedance

Paragraph 5d(2)

spacer insulator (E-109). The cover plate (A-102) is provided for access to the coaxial feedline terminals.

(3) The construction is sufficiently air tight to maintain a dielectrically stable atmosphere within the antenna. Lead gaskets and washers are used throughout for this purpose. The caps (A-103) are for protection of the lead seals. The heavy lock washer (H-106) is intended to maintain effective sealing at the spacer insulators (E-109) when differentials of expansion occur between the tie rod (O-104) and the outer tubes of the antenna sections (E-107 and E-108) and the antenna section support (A-101).

(4) The antenna clamp and mounting are provided for attaching to some suitable structure such as a mast or yardarm.

e. **OPERATING TEMPERATURE.** - The antenna should not be operated in ambient temperatures of more than 177°C (350°F).

5. DETAILED DESCRIPTION, AS-390/SRC

a. **FREQUENCY RANGE.** - The designed frequency range of the antenna is from 220 megacycles to 400 megacycles. The V.S.W.R. (voltage standing wave ratio) will not exceed 1.9 to 1 over the designed frequency range. The antenna may be used over a wider frequency range with a nominal decrease in efficiency. For the V.S.W.R., see Fig. 1-7.

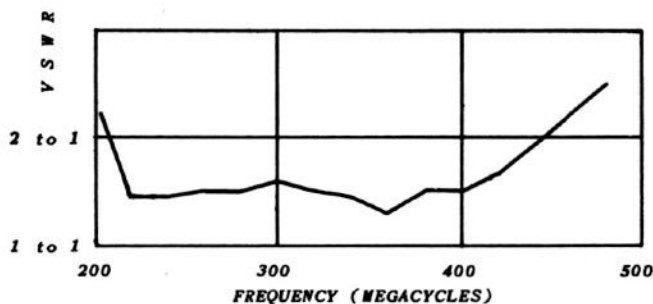


Figure 1-7. Antenna Assembly AS-390/SRC,
Typical Voltage Standing Wave Ratios

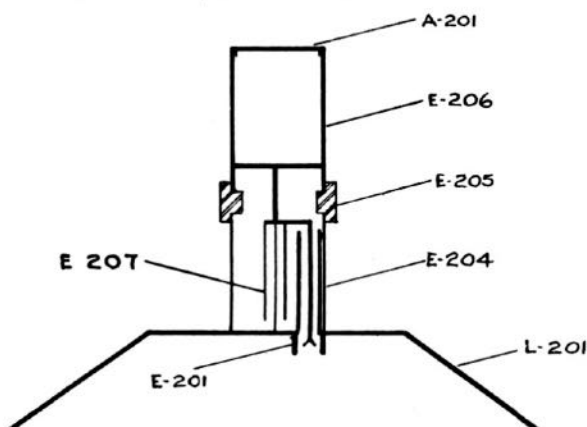


Figure 1-8. Antenna Assembly AS-390/SRC,
Schematic Section

b. **RADIATION PATTERN.** - The radiation pattern of this antenna will be similar to that of a dipole.

c. **INPUT IMPEDANCE.** - The nominal input impedance is 52 ohms. The actual input impedance as a function of frequency is shown in figure 1-6.

d. **CONSTRUCTION.** (See figure 1-8 and 3-3)

(1) The lower antenna section (E-204) unit acts as part of the radiating portion and also houses the coaxial feedline. The input connection to the antenna is made at the connector plug (E-201) which in turn is connected to a length of RG-81/U coaxial feedline. The inner conductor of the feedline is connected to a tie rod which is attached at one end to the upper antenna section (E-206) and at the other end to the base of the lower antenna section (E-204). The lower portion of this rod is encircled by a tuning stub (E-207) which is closed and threaded at the top end, and open at the bottom except for supporting insulator. By rotating this stub on the threads, the input impedance of the antenna may be varied. The sleeve is locked at a predetermined position for optimum performance of the antenna over the operating frequency range. Paragraph 3-3h. (Section 3 - Maintenance) describes proper position for fixing the tuning stub. Thus, a potential is applied to the antenna section across the gap formed by the spacer insulator (E-205).

(2) The radial type counterpoise furnished (L-201) will provide grounding for an optimum radiating pattern. Other surfaces or types of counterpoise will produce distorted radiation patterns. The counterpoise also provides a threaded stud for antenna mounting.

(3) The construction is sufficiently air tight to maintain a dielectrically stable atmosphere within the antenna. A lead gasket (O-202) and lead washer (H-202) are used at the tie rod to provide air tight sealing. Cap nut (H-205) and end cap (A-201) provide protection for these seals. The heavy lock washer (H-204) is intended to maintain effective tight sealing at the spacer insulator (E-205) when differentials of expansion occur between the tie rod and the outer tubes of the antenna sections.

e. **OPERATING TEMPERATURE.** - The antenna should not be operated in ambient temperatures of more than 177°C (350°F).

6. REFERENCE DATA, AT-150/SRC

a. **NOMENCLATURE.** - Antenna, Navy Type AT-150/SRC.

b. **CONTRACT.** - NObsr-43272, 21 April, 1949.

c. **CONTRACTOR.** - Bird Electronic Corporation, Cleveland, Ohio.

d. **COGNIZANT NAVAL INSPECTOR.** - Inspector of Naval Material, Cleveland, Ohio.

e. **NUMBER OF BOXES.** - One shipping box.

f. **TOTAL CUBICAL CONTENTS.** - 1-1/3 cubic feet crated, including spare parts. 3/4 cubic feet uncrated, including spare parts.

g. TOTAL WEIGHT. - 10.5 pounds crated, including spare parts. 6.75 pounds uncrated, including spare parts. Antenna only, 4.5 pounds.

h. FREQUENCY RANGE. - 220 to 400 megacycles.

i. INPUT IMPEDANCE. - 52 ohms.

7. REFERENCE DATA, AS-390/SRC

a. NOMENCLATURE. - Antenna Assembly, AS-390/SRC.

b. CONTRACT. - NObsr-43272, 21 April, 1949.

c. CONTRACTOR. - Bird Electronic Corporation, Cleveland, Ohio.

d. COGNIZANT NAVAL INSPECTOR. - Inspector of Naval Material, Cleveland, Ohio.

e. NUMBER OF BOXES. - One shipping box.

f. TOTAL CUBICAL CONTENTS. - 2-1/4 cubic feet crated, including spare parts. 4 cubic feet uncrated, including spare parts.

g. TOTAL WEIGHT. - 8.5 pounds crated, including spare parts, 5.625 pounds uncrated, including spare parts. Antenna assembly only, 3.625 pounds.

h. FREQUENCY RANGE. - 220 to 400 megacycles.

i. INPUT IMPEDANCE. - 52 ohms.

TABLE 1-1

EQUIPMENT SUPPLIED - ANTENNA AT-150/SRC.

OVER-ALL DIMENSIONS

QUANTITY PER EQUIPMENT	NAME OF UNIT	DESIGNATIONS	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	VOLUME (cu ft)	WEIGHT (lb)
1	Antenna	AT-150/SRC	17-3/8	22-7/16	3-1/4	3/4	4.5
1	Maintenance parts kit (includes box)		4	4	3	.029	2.25
2	Instruction books	NAVSHIPS 91338	11	8-1/2	3/16	.010	1.3

EQUIPMENT SUPPLIED - ANTENNA ASSEMBLY AS-390/SRC

OVER-ALL DIMENSIONS

QUANTITY PER EQUIPMENT	NAME OF UNIT	DESIGNATIONS	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	VOLUME (cu ft)	WEIGHT (lb)
1	Antenna Assembly	AS-390/SRC	16	23	23	4	3.625
1	Wrench (in maintenance parts box)		5	5	11/16	.01	.3
1	Maintenance parts kit (includes box)		4	4	3	.029	2.0
2	Instruction books	NAVSHIPS 91338	11	8-1/2	3/16	.010	1.3

TABLE 1-2

SHIPPING DATA - ANTENNA AT-150/SRC.

OVER-ALL DIMENSIONS

SHIPPING BOX NUMBER	NAME	DESIGNATION	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	VOLUME (cu ft)	WEIGHT (lb)
A	Antenna	AT-150/SRC	4-3/4	23-1/2	18-1/2	1-1/3	10.5

Maintenance parts kit for AT-150/SRC packed inside antenna shipping carton.

SHIPPING DATA - ANTENNA ASSEMBLY AS-390/SRC

OVER-ALL DIMENSIONS

SHIPPING BOX NUMBER	NAME	DESIGNATION	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	VOLUME (cu ft)	WEIGHT (lb)
A	Antenna Assembly	AS-390/SRC	8	22	22	2-1/4	8.5

Includes Antenna Stub, Counterpoise, and Fastening Hardware disassembled.

Wrench packed inside maintenance parts box.

Maintenance parts kit for AS-390/SRC packed inside antenna shipping carton.

SECTION 2 INSTALLATION AND OPERATION

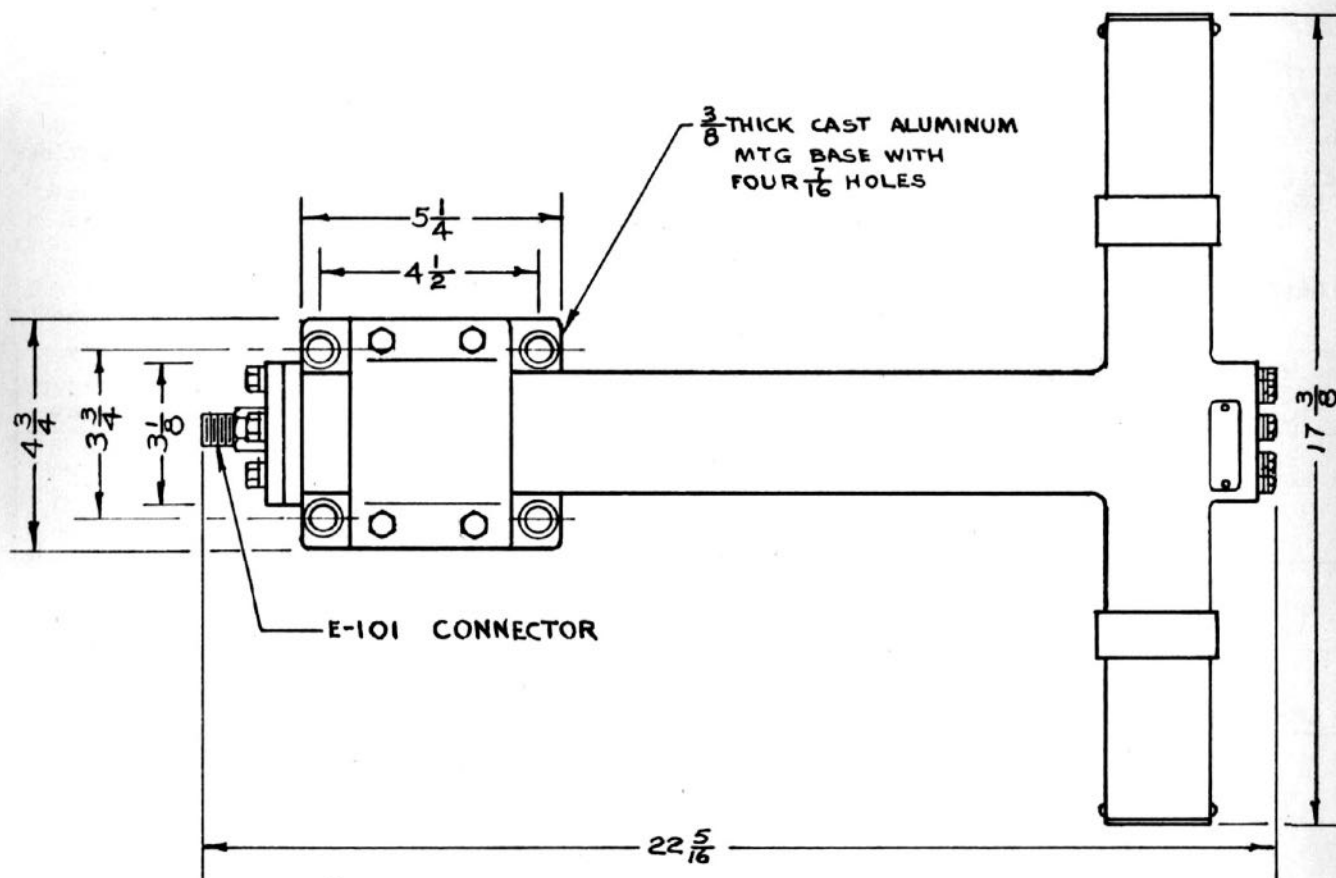


Figure 2-1. Antenna AT-150/SRC Installation Drawing

1. INSTALLATION, AT-150/SRC. (See figure 2-1.)

a. The antenna must be mounted with the radiating element in the vertical position by using the antenna clamp and mounting for attachment to a mast, yardarm or similar suitable structure. There are four 7/16-inch clearance holes for bolts in the mounting. The mounting should be positioned along the antenna section support as far from the radiating element as is practicable, so as to minimize the effect of the mounting structure upon the radiation pattern of the antenna.

b. Do not mount the antenna in stack gas drafts where the ambient temperature exceeds 177°C (350°F).

c. The antenna should be mounted high enough to clear all obstructions. Such obstructions may cause shielding of the "line of sight" transmission which is inherent at the operating frequencies. Location in ships should be in accordance with applicable Bureau of Ships plans.

d. While the antenna is to be mounted as high as practicable, the connecting cable from the transmitter or receiver should be as short as possible in order to minimize line losses.

e. Cable connection to the antenna is made by an RG-18/U cable with a UG-167A/U connector. As an alternative, RG-10/U cable with a UG-21B/U connector may be used.

f. In multiple antenna installations, minimum spacing between antennas is shown in figure 2-2. It is important to note that in the vertical plane, the vertical axes (antenna sections) of the units must be kept in a continuous line.

2. INSTALLATION, AS-390/SRC. (See figure 2-3.)

a. The antenna is provided with a 3/4-14 IPS thread 1-1/2 inches long for mounting.

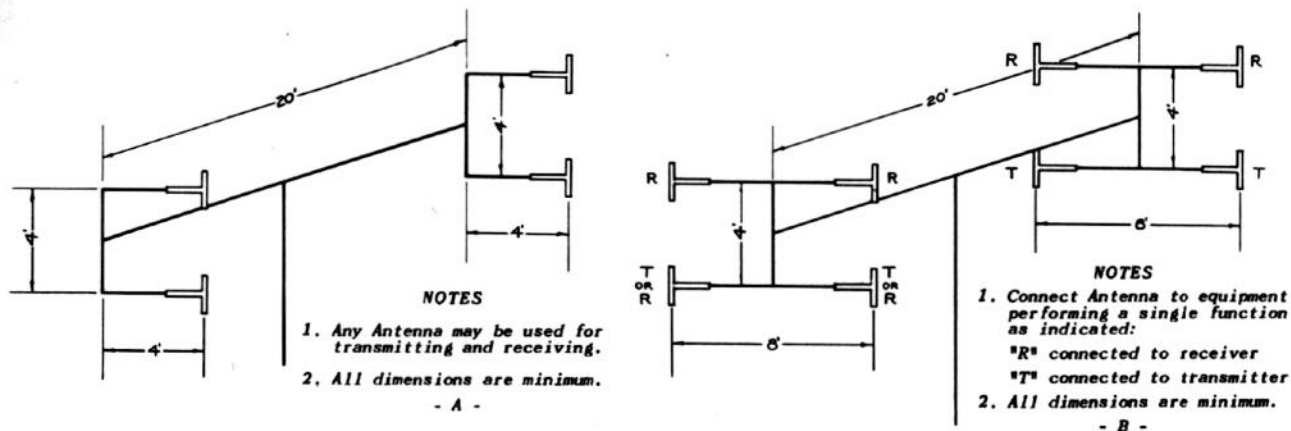


Figure 2-2. Antenna AT-150/SRC, Mounting Spacings

b. Do not mount the antenna in stack gas drafts where the ambient temperature exceeds 177°C (350°F).

c. The antenna should be mounted with its main axis vertical, high enough to clear all obstructions. Such obstructions may cause shielding of the "line of sight" transmission which is inherent at the operating frequencies.

d. While the antenna is to be mounted as high as practicable, the connecting cable from the transmitter

or receiver should be as short as possible in order to minimize line losses.

e. Cable connection to the antenna is made by an RG-18/U cable with a UG-16A/U connector. As an alternative, RG-10/U cable with a UG-21B/U connector may be used.

3. OPERATION, AT-150/SRC and AS-390/SRC.

Due to the nature of these antennas, there are no applicable operating procedures.

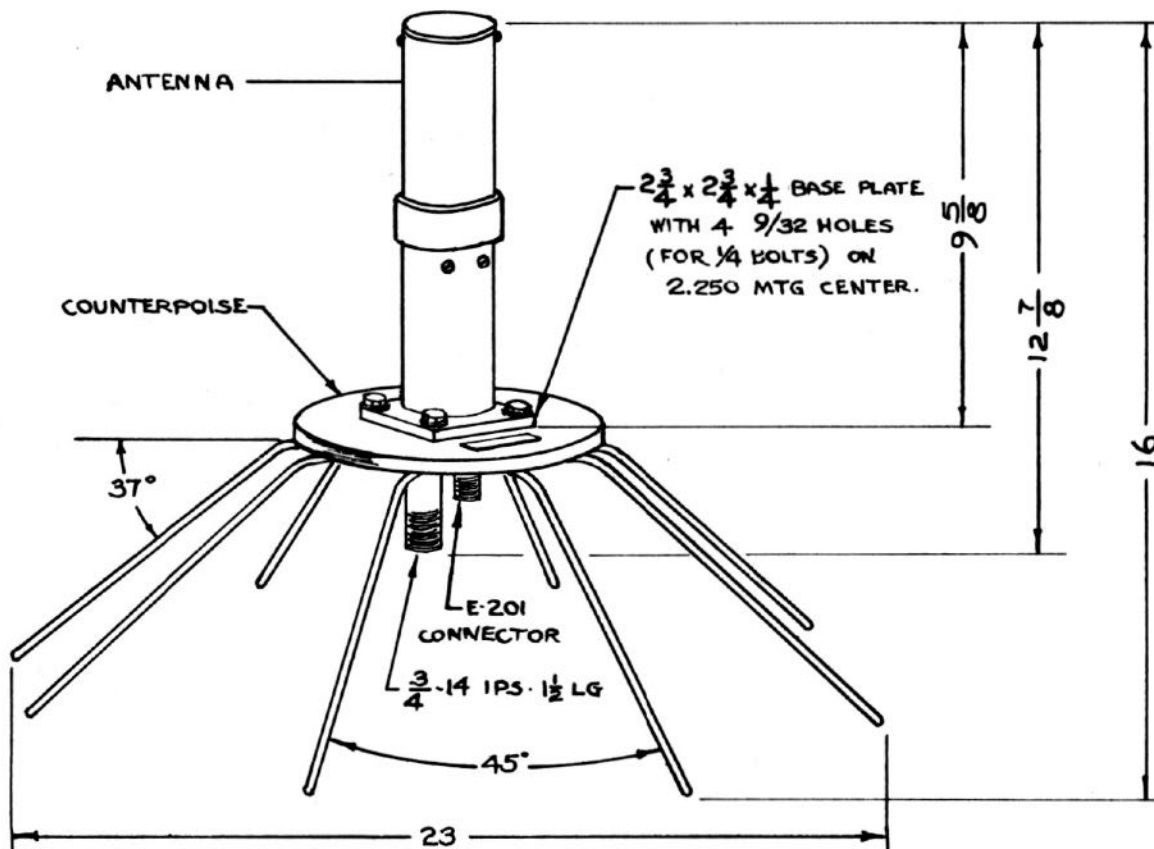


Figure 2-3. Antenna Assembly AS-390/SRC, Installation Drawing

FAILURE REPORTS

A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure

and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from any Electronics Officer.

FAILURE REPORT—ELECTRONIC EQUIPMENT
NAVSHIPS (NBS) 383 (REV. 8-45)
(FORMERLY NAVSHIPS (NBS) 383 AND NAVSHIPS (NBS) 384)
SHIP NUMBER AND NAME OR STATION

CHECK ONE: ☐ RADIO

EQUIPMENT MODEL DESIGNATION

TYPE NUMBER AND NAME OF MAJOR UNIT INVOLVED

TUBE TYPE, INCLUDING PREFIX LETTERS

TUBE MANUFACTURER

FAILURE OCCURRED IN:

☐ STORAGE ☐ OPERATION ☐ HANDLING ☐ OTHER (SPECIFY)

☐ INSTALLING

NATURE OF FAILURE AND REMARKS

ELECTRONIC EQUIPMENT FAILURE REPORT (SIG)
NAVSHIPS (NBS) 383 (REV. 11-45)

ORGANIZATION PERFORMING MAINTENANCE

EQUIPMENT INVOLVED

☐ Navy ☐ Army ☐ USMC ☐ JAF ☐ Commercial ☐ Other (Specify)

☐ Radio ☐ Radar ☐ Sensor ☐ Wire ☐ Tool ☐ Test ☐ Power ☐ Sound ☐ Other (Specify)

EQUIPMENT MODEL DESIGNATION

SERIAL NUMBER OF EQUIPMENT

NAME OF CONTRACTOR

CONTRACT NO.

TYPE NUMBER AND NAME OF MAJOR UNIT INVOLVED

SERIAL NUMBER OF UNIT

CONTRACT OR PO DATA OF UNIT

DATE EQUIPMENT RECEIVED

ITEM WHICH FAILED

THIS SIDE FOR TUBES

TUBE TYPE, INCLUDING PREFIX LETTERS

SERIAL NO. (NOTE 2)

NAME OF PART

CIRCUIT SYMBOL (e.g. T-130)

NAVY TYPE NO.

TUBE MANUFACTURER

CONTRACT NO. (NOTE 4)

SERIAL NO.

*CONTRACT DATA

*DATE RECD.

*ARMY STOCK NO.

FAILURE OCCURRED IN

QUARANTEED HOURS (NOTE 3)

DATE OF ACCEPTANCE (NOTE 4)

*CHECK-OFF OR TAG DATA (NOTE 5)

*MANUFACTURER'S DATA (NOTE 6)

☐ Storage ☐ Operation ☐ Other (Specify in remarks)

ACTUAL HOURS

DATE OF FAILURE

BRIEF DESCRIPTION AND CAUSE OF FAILURE, INCLUDING APPROXIMATE LIFE (CONTINUE ON BACK)

☐ Handling ☐ Installing

TYPE OF FAILURE (NOTE 7)

TUBE CIRCUIT SYMBOL

NATURE OF FAILURE AND REMARKS (NOTE 8) (CONTINUE ON BACK)

CONCLUSION:

☐ Normal replacement ☐ Shortage ☐ Modification ☐ Failure ☐ Transportation breakage ☐ Other (Specify)

*NOT REQUIRED FOR REPORTS SUBMITTED BY NAVAL ACTIVITIES.

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Figure 3-1. Failure Report, Sample Form

SECTION 3 MAINTENANCE

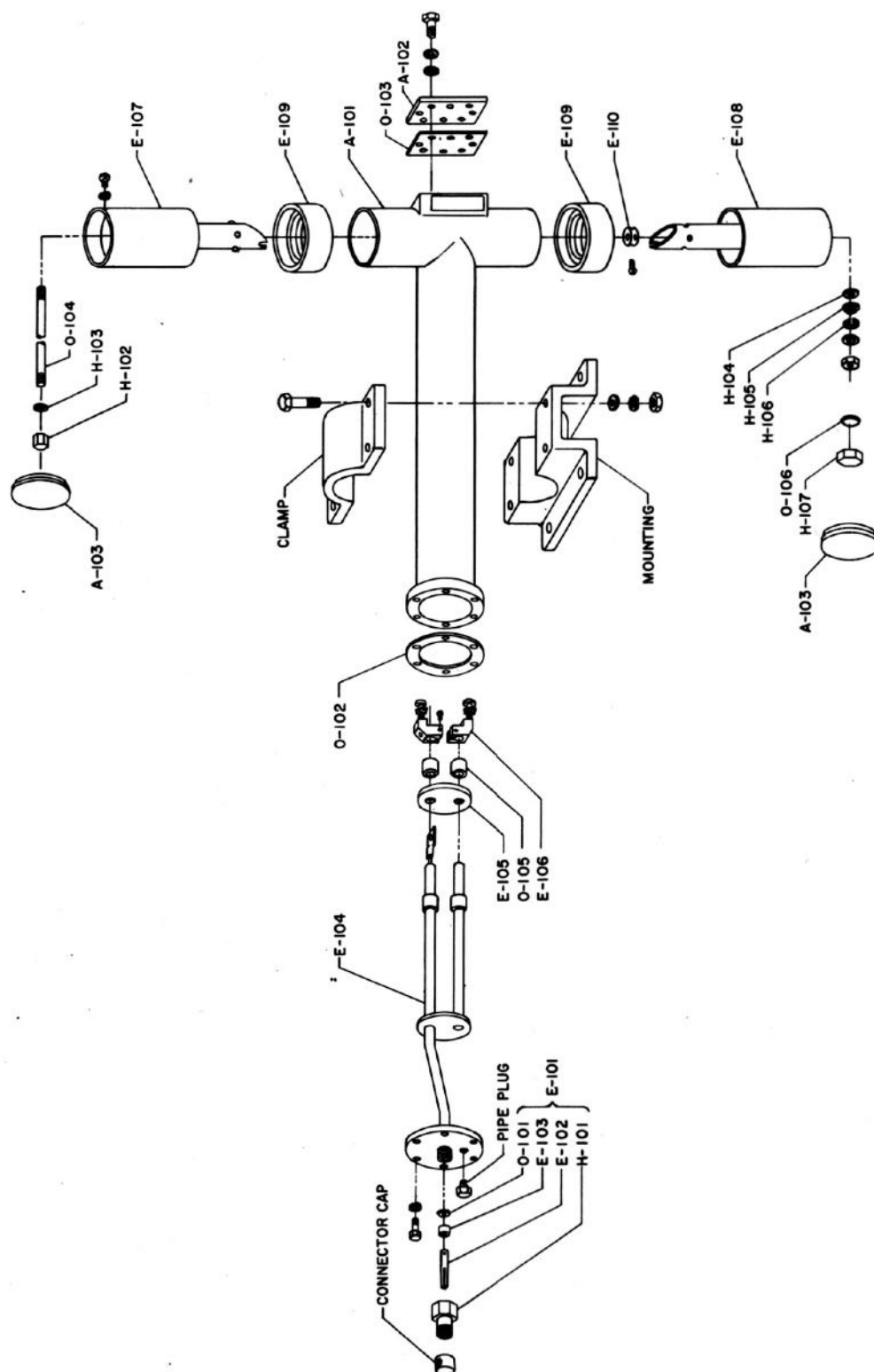


Figure 3-2. Antenna AT-150/SRC, Exploded View

1. INTRODUCTION

These antennas are of simple mechanical construction with no electrical or mechanical components subject to replacement other than those requiring replacement because of structural failure or wear. Therefore, there is a minimum of preventive and corrective maintenance that must be done but there are certain routine checks and tests and corrective measures to be observed.

The information in this section will apply for both the Antenna AT-150/SRC and the Antenna Assembly AS-390/SRC unless otherwise noted.

2. ROUTINE CHECKS

a. **MECHANICAL ASSEMBLY.** - Due to the usual nature of installation of this equipment, frequent access for detailed inspection is impractical. But, if at all possible, close inspection should be made at least once each month for rigidity and position of mounting, tightness of seals, cleanness, and general assembly condition.

b. **CONNECTOR.** - When checking mechanical assembly, also check the cable connector (not furnished with antenna) and antenna connector plug (figure 3-2, E-101 and figure 3-3, E-201). Check for general mechanical condition and corrosion of contacts. Use crocus cloth or No. 0000 sandpaper for removing corrosion.

c. **SPACER INSULATOR.** - These external insulators (figure 3-2, E-109 and figure 3-3, E-205) are subject to weathering and should be kept relatively clean. See paragraph 3-3j. Do not apply any sort of paint or varnish to these insulators.

d. Detailed instructions for disassembly are described in Section 3-3.

NOTE

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OF THE BUREAU OF SHIPS MANUAL, OF THE LATEST ISSUE.

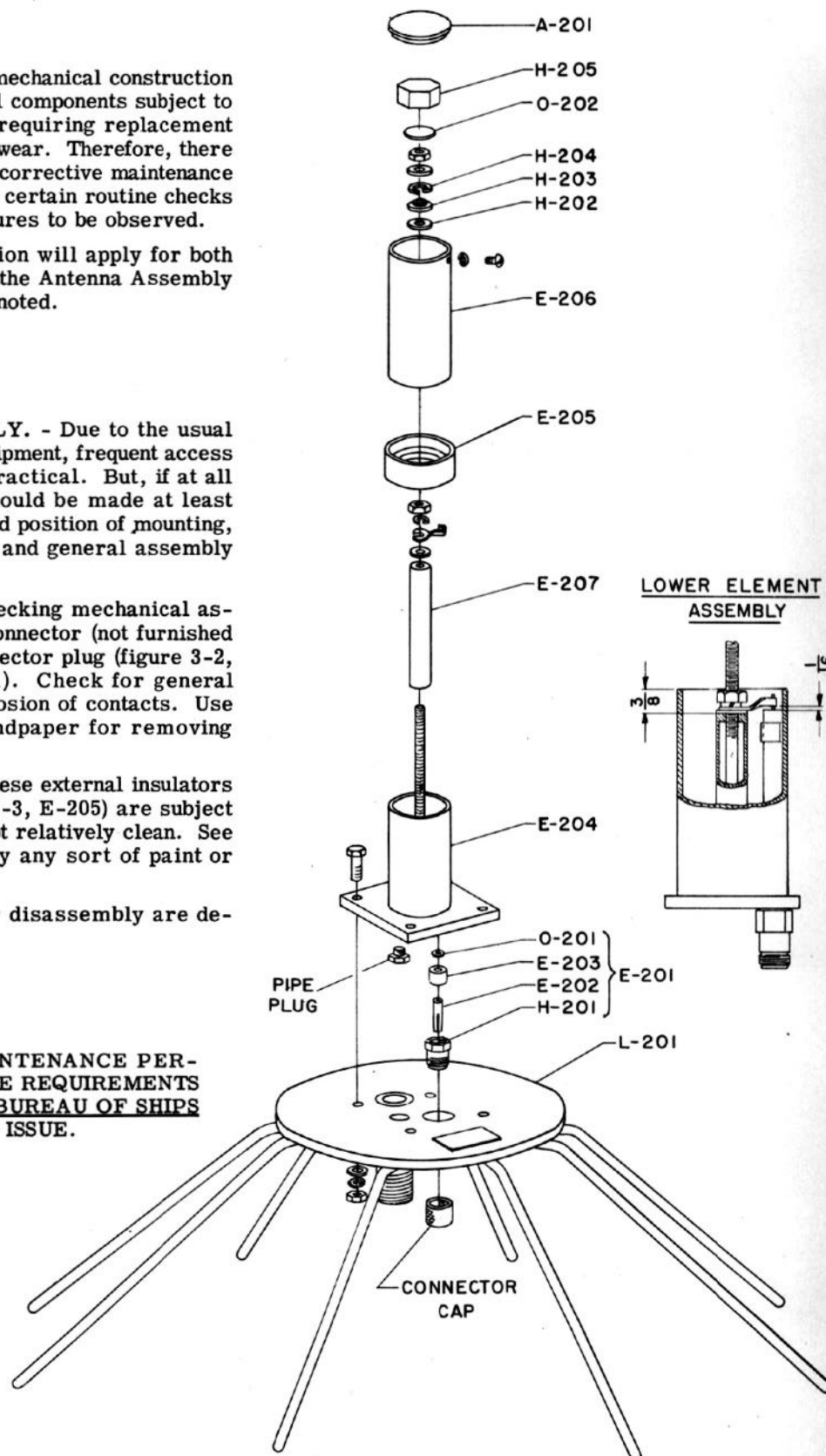


Figure 3-3. Antenna Assembly AS-390/SRC, Exploded View

TABLE 3-1 TROUBLE-SHOOTING

SYMPTOM	PROBABLE CAUSE	CORRECTIVE MEASURE
1. No signal.	a. Transmitter failure.	a. Check transmitter power output with RF Wattmeter ME-11/U.
	b. Receiver failure.	b. Check receiver by signal tracing.
	c. Loose or faulty connectors.	c. Check all connections for looseness or corrosion. Tighten connections, clean or remove corrosion with crocus cloth or No. 0000 sandpaper where necessary. If defective or damaged connectors are found on antennas; repair as described in paragraph 3-3a.
	d. Fault in connecting cable.	d. Check by using procedure similar to paragraph 3-4b.
	e. Fault in Antenna. e(1). External structural damage.	e(1). Will be obvious. Replace damaged parts as necessary using procedures set forth in section 3-3.
	e(2). Internal structural damage. (NOTE: This condition may be difficult to determine from outside observation. DC resistance cannot indicate shorts, as normal DC resistance is zero between antenna sections and both terminals of the input connector.	e(2). Disassemble antenna as necessary checking for loose parts or apparent structural damage. Replace damaged parts using procedures set forth in section 3-3. Check for moisture in antenna. Dry thoroughly and tighten seals. Replace gaskets if necessary.
2. Short transmitting range.	e(3). Short in coaxial feedline.	e(3). Check for short in line or moisture in dielectric powder per paragraph 3-4b. Note: Line cannot be checked until antenna is nearly disassembled.
	a. Excessive power loss in connecting cable.	a. Measure RF power at antenna by connecting RF Wattmeter ME-11/U to antenna end of connecting cable.
	b. Excessive power loss in antenna.	b. Check as in trouble shooting items 1e(1) and (2)
3. Reduced or no signal during wet weather.	c. Antenna orientation. Antenna sections of both AT-150/SRC and AS-390/SRC must be on vertical axes.	c. Check antenna mounting. Restore any units that have moved out of correct alignment and reclamp tightly.
	a. Moisture in antenna or antenna coaxial feedline.	a. Check for moisture as in Trouble Shooting items 1e(2) and (3).
4. Variation in signal strength with frequency.	a. Input impedance and radiation efficiency have been altered by structural damage, moisture, internal shorts or open circuits.	a. Check all antenna components for damage and proper assembly. Check as in Trouble Shooting items 1e(1) and (2).
5. Transmitter plate current too high or too low.	a. Change in antenna or connecting cable impedance.	a. Check as in Trouble Shooting items 1e(1) and (2)

3. CORRECTIVE MAINTENANCE

(See figures 3-2 and 3-3.)

a. CONNECTOR. - To replace connector plug (E-101, E-201) use a 11/16-inch wrench to remove connector adapter (H-101, H-201). Remove bushing insulator (E-103, E-203). Unsolder connector contact (E-102, E-202) and remove. Be careful not to bend coaxial inner conductor. Do not remove washer seal (0-101, 0-201) from coaxial line unless replacement is necessary, as this may disturb wax seal and permit the entry of moisture into the coaxial feedline dielectric powder. See paragraph 3-3f. Replace any worn or damaged parts and reassemble. Be certain that the contact (E-102, E-202) is solidly against seal (0-101, 0-201). Feed solder through small hole in contact and remove excess solder.

b. LEAD GASKETS AND WASHERS. - If any of the lead gaskets or washers become damaged or worn to the extent that poor sealing may result, make up duplicate from soft pure lead sheet .050 thick, and replace. Dimensions are given in Section 4, table 4-4. After reassembly, pressure test the antenna per paragraph 3-4a.

c. SPACER INSULATOR ON AT-150/SRC. - To replace the spacer insulators (E-109) the entire radiating section of the antenna must be disassembled. Remove cover plate (A-102) with lead gasket (0-103) and attaching hardware. Remove two caps (A-103) and attaching screws and washers. In order to release tie rod (0-104), remove hexagonal cap nut (H-107) containing lead gasket (0-106) on seal cup, and then remove hexagonal nut, plain washer, lock washer (H-106), extruded washer (H-105) and lead washer (H-104) on tie rod. Pull tie rod out from other end. After the tie rod has been removed, antenna sections (E-107 and E-108) may be removed by releasing screws (reached thru top access slot) attaching these sections to clamps (E-106). The insulating spacers (E-109) are then released. After replacement, the reverse procedure should be followed for reassembly. Be careful not to damage the lead washer and gasket. Also be careful to align all parts properly so as to maintain effective air tight sealing.

d. DISK INSULATOR ON AT-150/SRC. - To replace the disk insulator (E-110), disassemble as in paragraph 3-3c above. The insulator disk may be released from the antenna sections (E-107 and E-108) by removing four attaching screws. It may be necessary to carefully push the insulator from the antenna sections by using the tie rod (0-104).

e. DISK INSULATOR ON AT-150/SRC. - To replace the disk insulator on RF transmission line section (E-105) disassemble antenna fully according to instructions above in paragraph 3-3c. After antenna sections (E-107 and E-108) are free, remove attaching hardware from circular face plate at bottom of antenna section support (A-101). This releases the RF transmission line section (E-104) and gasket (0-102) which may now be pulled out of antenna section support. To slip two clamps (E-106) from tubes, loosen clamping

screws on sides. Then unsolder two copper spacing collars (0-105). Disk insulator (E-105) may then be removed and replaced from the maintenance parts kit. Reverse the above procedure for reassembly. Be careful not to break seal on coaxial feedline which is part of the RF transmission line section (E-104). If this seal is broken, follow procedure in 3-3f, following.

f. COAXIAL FEEDLINE. - This line is part of the RF transmission line section (E-104) in AT-150/SRC and part of the antenna section (E-204) in AS-390/SRC. The line is provided with a mechanical seal (Washer insulator 0-101, 0-201) and is sealed at both ends with Superla (or equal) wax. Replace washer seal and/or wax if line does not meet requirements of insulation test per paragraph 3-4b. If this line becomes unsealed for any reason, or if washer seal or gasket is to be replaced, observe the following procedure for re-sealing; Disassemble the antenna to procure clear access to both ends of line. Heat the line to 116° to 127°C. (240 to 260°F.) for 8 to 10 hours. Allow to cool to handle, then check d-c resistance with a megger. If resistance is above 50 megohms, seal both ends immediately with Superla (or equal) wax applied directly to the line with hot soldering iron. If resistance is below 50 megohms, heat longer as necessary to restore line condition. After hardening of wax, apply a drop of Dow Corning silicone liquid DC 200, and spread this over the surface of the wax.

g. SPACER INSULATOR ON AS-390/SRC. - To replace the spacer insulator (E-205) the upper section of the antenna must be disassembled. Remove cap (A-201) and attaching screws and lock washers. Use a one-inch socket wrench with extension bar to remove hexagonal cap nut (H-205) and gasket (0-202). Use special extension wrench provided with unit for removal of hexagonal nut, this permitting removal of plain washer, lock washer (H-204), extruded washer (H-203) and lead washer seal (0-202). The antenna section (E-206) may now be removed and insulating spacer (E-205) released. After replacement, the above procedure should be reversed in reassembling. Be careful not to damage lead washer and gasket. Also be careful to align all parts properly so as to maintain effective air tight sealing.

h. TIE ROD TUNING STUB ON AS-390/SRC. - This stub (E-207) must be tightly locked in the proper position by nut and lockwasher on tie rod. If the tuning stub becomes loosened or moved for any reason, it must be restored to correct position for the antenna to operate properly. This position is shown in Figure 3-3 (special sectional view) wherein the top of the sleeve is 3/8-inch below the rim of the lower element when the clamping nut is firmly tightened on the lockwasher, feedlug, and stainless steel washer.

i. COUNTERPOISE ON AS-390/SRC. - The radial rods of the counterpoise (L-201) should be maintained at equal radial spacing and the rods should project away from the antenna at an angle of 37° ± 2° with the counterpoise plate surface.

j. CLEANING OF AT-150/SRC and AS-390/SRC. - The parts made of white Teflon may be cleaned with ordinary soap and water.

CAUTION

Use carbon tetrachloride or unleaded gasoline in well ventilated space only.

All other parts of the antennas may be cleaned with carbon tetrachloride (Federal Specification O-C-141) or unleaded gasoline. Wipe all electrical contact surfaces with a dry lint-free cloth after cleaning.

k. **THREAD LUBRICANT.** - In the assembly of these antennas, Alcoa Thread Lubricant has been used on all threads. This resists seizing or binding of the threads. It is recommended that it be applied in re-assembling any threaded parts. Use lubricant material sparingly and wipe off any excess which may be visible after assembly.

4. TESTING

a. **PRESSURE TEST.** - If a source of compressed air is available, the antenna may be tested for leakage of air. Remove pipe plug at bottom (see figure 3-2 and 3-3) to make air line connection with standard 1/8-inch pipe fitting. The antenna should be capable of withstanding an internal pressure of 50 pounds per square inch without exhibiting any bubbles resulting from leakage when immersed in water. This test should be performed on all reassembled antennas each time the lead gaskets or washers have been removed.

b. **COAXIAL FEEDLINE INSULATION TEST.** - Disconnect terminal at antenna end of inner conductor. Use a megger and check the resistance between the inner and outer conductors. The meter should show at least 50 megohms. If the meter shows less than this figure, repair per paragraph 3-3f.

SECTION 4 PARTS LISTS

TABLE 4-1 WEIGHTS AND DIMENSIONS OF MAINTENANCE PARTS KIT

EQUIPMENT	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	VOLUME (cu ft)	WEIGHT (lb)
AT-150/SRC	4	4	3	.029	2-1/4
AS-390/SRC	4	4	3	.029	2-3/8

TABLE 4-2 SHIPPING WEIGHTS AND DIMENSIONS OF MAINTENANCE PARTS KIT

EQUIPMENT	HEIGHT (in.)	WIDTH (in.)	DEPTH (in.)	VOLUME (cu ft)	WEIGHT (lb)
AT-150/SRC	Maintenance Parts Kits are shipped inside the Antenna cartons.				
AS-390/SRC	Maintenance Parts Kits are shipped inside the Antenna cartons.				

TABLE 4-3 LIST OF MAJOR UNITS

SYMBOL GROUP	QUANTITY	NAME OF MAJOR UNIT	NAVY TYPE DESIGNATION
101-199	1	Antenna	AT-150/SRC
201-299	1	Antenna Assembly	AS-390/SRC

TABLE 4-4 TABLE OF REPLACEABLE PARTS

SYMBOL DESIGNATION	NAME OF PART AND DESCRIPTION	FUNCTION	STOCK NUMBER	MFGR. AND CONTRACTORS DRAWING NO.
101-199 Series	ANTENNA: AN Antenna AT-150/SRC; dipole; transmitting and receiving; coaxial; frequency range 220-400 mc; nominal input impedance 52 ohms		F16-A-51990-1201	Bird Electronic
A-101	SUPPORT, antenna section: aluminum tubing; welded "T" shape 2-1/4 d x 8-5/16 x 20 lg.	Mounting arm	N16-S-851091-101	Bird Electronic B78962
A-102	PLATE, cover: aluminum; 3 lg x 1-1/2 wd x 1/4 thk; eight 9/32 dia holes	Antenna terminal access cover	N16-P-401881-159	Bird Electronic A78904
A-103	CAP, antenna support: aluminum; 2-1/8 OD x 1/4 thk with 2-1/4 dia x 1/16 thk flange; two 4-40 tapped holes	Seal protector	N16-C-145091-669	Bird Electronic A78907
E-101	CONNECTOR, plug: consists of E-102, E-103, E-101 and O-101	Input connector	N17-C-71109-8950	Bird Electronic A79058
E-102	CONTACT, connector: center pin for input connector; round post shape .120 d, 21/32 lg, contact end slotted radially and closed	p/o input connector	N17-C-78512-5501	Bird Electronic A79033
E-103	INSULATOR, bushing: round post shape; Teflon, white; 1/4 h; dielectric and spacer in coaxial connector; 3/8 OD, 1/8 ID	p/o input connector	N17-I-48979-8301	Bird Electronic A79039
E-104	LINE SECTION, RF transmission: RG-81/U line and two 3/8 d copper tubes 7/8 centers with 2-1/8 d stainless stl shorting disk and 3-1/8 d mounting plate at bottom	Antenna feedline	N16-T-25301-1226	Bird Electronic B78960
E-105	INSULATOR, disk: disk shape with two 3/8 dia holes, 7/8 centers; Teflon, white; 3/16 h; 2-1/8 dia	Antenna feedline insulator	N17-I-57654-4401	Bird Electronic A78919
E-106	CLAMP: stainless steel; 7/8 x 1/2 sq o/a; with 8-32 tapped hole and 3/8 hole	Antenna feed connection	N16-C-300992-106	Bird Electronic A78916

TABLE 4-4 TABLE OF REPLACEABLE PARTS (Continued)

SYMBOL DESIGNATION	NAME OF PART AND DESCRIPTION	FUNCTION	STOCK NUMBER	MFGR. AND CONTRACTORS DRAWING NO.
E-107	ANTENNA SECTION: welded construction of inner tube .875 OD, outer tube 2.25 OD x 4 lg and plain spacer disks, overall 8 lg	Radiating element and p/o inner transmission line	N16-A-69491-1015	Bird Electronic A78953
E-108	ANTENNA SECTION: welded construction of inner tube .875 OD, outer tube 2.25 OD x 4 lg with threaded cup on spacer disk; overall 8 lg.	Radiating element and p/o inner transmission line	N16-A-69491-1016	Bird Electronic A78954
E-109	INSULATOR, spacer: round; Teflon, white; 1 h; 2-1/2 OD, 1-5/8 ID, 2.246 dia counterbore 0.76 deep each end	Gap insulator	N17-I-67046-1611	Bird Electronic A78914
E-110	INSULATOR, disk: round post shape; Teflon, white; 3/16 h; 7/8 OD, 1/4 ID	Tie rod spacer	N17-I-57649-8101	Bird Electronic A78915
H-101	ADAPTER CONNECTOR: transmission line, connector; brass, silver plated; post shaped, hex base internally threaded other end machine formed and externally threaded for "N" type connector 11/16 hex, 5/8 dia body, 1-7/32 lg o/a	p/o input connector	N17-A-27451-1053	Bird Electronic A79038
H-102	NUT, cap; hex; stainless steel; 1/2 across flats, 5/8 h; 1/4 -28 tapped hole 7/16 deep	Tie rod nut	N43-N-99500-165	Bird Electronic A78908
H-103	WASHER, flat: lead; round; 1/4 ID, 1/2 OD, 0.05 thk	Tie rod seal	N43-W-5508-9980	Bird Electronic A78909
H-104	WASHER, flat: lead; round; 1/4 ID, 5/8 OD, 0.05 thk	Tie rod seal	N43-W-5510-3500	Bird Electronic A78939
H-105	WASHER, extruded: stainless steel; round; 1/4 ID, 0.740 OD, 0.125 thk o/a including inner raised rim	Lock washer alignment	N43-W-7591-5520	Bird Electronic A78940
H-106	WASHER, lock: cadmium plated, steel; 7/16 ID x .740 OD x .156 thk; split-ring type; 450 lb pressure	Expansion compensator	N43-W-5978-1035	Bird Electronic A78941

TABLE 4-4 TABLE OF REPLACEABLE PARTS (Continued)

SYMBOL DESIGNATION	NAME OF PART AND DESCRIPTION	FUNCTION	STOCK NUMBER	MFGR. AND CONTRACTORS DRAWING NO.
H-107	NUT, cap: hex; aluminum; 15/16-20 tapped hole 9/32 d; 7/16 h o/a 1 flats	Tie rod nut	N43-N-99500-164	Bird Electronic A78945
O-101	INSULATOR, washer: mechanical seal to retain wax in end of RG-81/U cable; good grade electrical mica; 0.321 OD, 0.0635 ID, 0.030 thk	Feedline seal protector	N17-I-77155-4951	Bird Electronic A79037
O-102	GASKET: lead; round; 1-3/4 ID, 3-1/8 OD, 0.050 thk; six 9/32 dia holes equally spaced on 2-5/8 BC	Mounting arm seal	N17-G-162210-150	Bird Electronic A78923
O-103	GASKET: lead; 1-1/2 wd, 3 lg, 0.050 thk; eight 9/32 dia holes	Cover plate gasket	N17-G-154881-101	Bird Electronic A78905
O-104	ROD, tie: stainless steel, 16-7/16 lg, 1/4 thk; 1/4-28 threads 5/8 lg at each end	Antenna section tie rod	N16-R-686861-101	Bird Electronic A78911
O-105	COLLAR, spacing: 3/8 h, 0.500 OD, 0.380 ID	Feedline insulator clamp	N16-C-600001-206	Bird Electronic A78936
O-106	GASKET: lead; 7/8 dia, 0.050 thk	Tie rod seal	N17-G-161108-501	Bird Electronic A78944
201-299 Series	ANTENNA: AN Antenna Assembly AS-390/SRC; stub; transmitting and receiving; coaxial; frequency range 220-400 mc; nominal input impedance 52 ohms		F16-A-53590-1001	
A-201	Same as A-103	Seal protector		
E-201	Same as E-101	Input connector		
E-202	Same as E-102	p/o input connector		
E-203	Same as E-103	p/o input connector		
E-204	ANTENNA SECTION: welded construction of outer tube, base plate, tie rod with RG-81/U feedline, 2-3/4 sq and 2-1/4 dia x 4-3/4 lg	Lower radiating element and feedline	N16-A-69491-1018	Bird Electronic B79045

TABLE 4-4 TABLE OF REPLACEABLE PARTS (Continued)

SYMBOL DESIGNATION	NAME OF PART AND DESCRIPTION	FUNCTION	STOCK NUMBER	MFGR. AND CONTRACTORS DRAWING NO.
E-205	INSULATOR, spacer; round; Teflon, white; 2-1/2 OD, 1 h, 1-5/8 ID, 2.246 CB .412 deep each end	Gap insulator	N17-I-67046-1601	Bird Electronic A79003
E-206	ANTENNA SECTION; tube with threaded cup on spacer disk, 2-1/4 dia x 4-5/8 lg	Upper radiating element	N16-A-69491-1017	Bird Electronic A79050
E-207	STUB, tuning; aluminum tube ass'y 9/16 dia x 3-15/16 lg	Tuning tie rod impedance	N16-S-88363-8650	Bird Electronic A79049
H-201	Same as H-101	p/o input connector		
H-202	Same as H-104	Tie rod seal		
H-203	Same as H-105	Lock washer alignment		
H-204	Same as H-106	Expansion compensator		
H-205	Same as H-107	Tie rod nut		
L-201	WRENCH: Special extension socket; hex socket 1/2 across flats; steel; 5 lg x 5 wd x 11/16 thk o/a; furnished with AS-390/SRC	Special extension wrench for tie rod nut	N41-W-2647-45	Bird Electronic A79024
O-201	COUNTERPOISE: radial type; eight 1/4 dia radial element protruding 5-3/4 down from 7-1/2 dia 1/4 thk plate at an angle of 37°	Antenna grounding	N16-C-91551-1007	Bird Electronic A79041
O-202	Same as O-101	Feedline seal protector		
O-202	Same as O-106	Tie rod seal		

TABLE 4-5 MAINTENANCE PARTS KIT

MAINTENANCE PARTS FOR AT-150/SRC LISTED BELOW AND SO MARKED ON BOX		
KEY SYMBOL	QUANTITY	STANDARD NAVY STOCK NUMBER
E-102	1	N17-C-78512-5501
E-103	1	N17-I-48979-8301
E-105	1	N17-I-57654-4401
E-109	2	N17-I-67046-1611
E-110	2	N17-I-57649-8101
H-101	1	N17-A-27451-1053
O-101	1	N17-I-77155-4951
One Spare parts box as described below: Steel box 4 x 4 x 3 inches size Marked "Maintenance Parts for AT-150/SRC Antenna Contract NObsr-43272 Date of Contract - 21 April, 1949 Gross 2-1/4 Box 1 of 1		

MAINTENANCE PARTS FOR AS-390/SRC LISTED BELOW AND SO MARKED ON BOX		
KEY SYMBOL	QUANTITY	STANDARD NAVY STOCK NUMBER
E-202	1	N17-C-78512-5501
E-203	1	N17-I-48979-8301
E-205	2	N17-I-67046-1601
H-201	1	N17-A-27451-1053
O-201	1	N17-I-77155-4951
One Spare parts box as described below: Steel box 4 x 4 x 3 inches size Marked "Maintenance Parts for AS-390/SRC Antenna Contract NObsr-43272 Date of Contract - 21 April, 1949 Gross 2 Box 1 of 1		

