

TECHNICAL MANUAL
OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND
GENERAL SUPPORT MAINTENANCE MANUAL
FOR
RADAR SET AN/SPS-64(V)5
(NSN 5840-01-034-3946)
(RELATIVE MOTION)

HEADQUARTERS, DEPARTMENT OF THE ARMY

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This volume contains Chapters 0 through 5 and Appendixes A through F. Chapter 6 is contained in TM 11-5840-360-14-1-2.

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to Commander, US Army Communications-Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

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

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CHAPTER 0. GENERAL

0-1. Scope

a. This chapter explains what Radar Set AN/SPS-64(V)5 is and how to use the manual for operation, maintenance, and repairs.

b. Radar Set AN/SPS-64(V)5 is a marine navigational radar with true motion capabilities. It uses units of the (V)1 system with the addition of the factory-installed True Motion/Anti-Collision (TM/AC) option.

c. The basic components of the AN/SPS-64(V)5 are:

(1) Indicator Azimuth Range IP-1302/SPS-64(V) (4, App D), which consists of:

(a) Indicator Azimuth Range IP-12831SPS64(V), similar to the IP-1282/SPS-64(V) with a 16inch indicator. The Variable Range Marker is wired to provide a three-digit readout in nautical miles.

(b) The TM/AC headset added above the indicator contains the controls for normal operation. Addition of TM/AC option includes the North Stabilization Kit (NSK) and Electronic Bearing Line (EBL).

(2) Receiver-Transmitter RT-1246/SPS-64(V) (1, App D) is similar to RT-1240/SPS-64(V), except it uses a tunable magnetron.

(3) Antenna AS-3194/SPS-64(V) (2, App D).

(4) Antenna Pedestal AB-12471SPS-64(V) (3, App D).

d. Technical Manuals 11-5840-360-14-1-1 and -1-2 (relative motion) provide the operation, maintenance, and repair coverage for the basic radar set, (V)1, with VRM, and NSK features. Other models mentioned in text do not apply to the (V)5. In some case, portions have been removed from the manuals.

e. Technical Manual 11-5840-360-14-2 (True Motion/Anti-Collision) provides the operation, maintenance and repair coverage for the radar operating as a true motion radar. It also provides instructions for emergency operation of the radar if the TM/AC unit fails.

f. Before starting troubleshooting or maintenance, the task must first be identified to determine if it is a basic (V)1 or a TM/AC function and then the appropriate manual consulted for procedures or tests. Basic alignments are covered in TM 11-5840-364-14-1-1 and -1-2. Alignments that are part of, or interact with, the TM/AC are covered in TM 11-5860360-14-2.

g. A laminated card with simplified operating instructions, TM 11-5860-360-14-LD, is available for mounting near the radar set.

h. All the material (text, illustrations, and tables) of chapter 6, Sections 6.5 through 6.13, pertain to the (V)2, (V)3, or (V)4 configuration and have not been included in the Department of the Army manuals.

0-2. Indexes of Publications

DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, modification work orders (MWO's) or additional publications pertaining to the equipment.

0-3. Maintenance Forms, Records, and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System.

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

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

0-4. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

0-5. Destruction of Army Electronics Materiel

Destruction of Army Electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

0-6. Reporting Equipment Improvement Recommendations (EIR)

If your AN/SPS-64(V)5 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

CHAPTER 1. GENERAL INFORMATION

SECTION I: INTRODUCTION

1.1 SCOPE OF MANUAL

This manual provides shipboard operating and maintenance instructions for Radar Sets AN/SPS-64 (V) 1, AN/SPS-64(V)2, AN/SPS-64(V)3, and AN/SPS64(V) 4.

The manual is divided into chapters and, where necessary, subdivided into sections. This chapter contains an introduction (Section I), system descriptions (Section II) and equipment descriptions (Section III). Installation instructions, operating instructions, a functional theory of operation, maintenance instructions, and drawings including detailed theory of operation and parts lists are contained in Chapters 2 through 6, respectively.

1.2 APPLICABILITY CODES

Unless noted by specific nomenclature, or as coded below, the information set forth in this manual is applicable to all systems/equipments. The systems and codes used in this manual are as follows:

<u>System</u>	<u>Code</u>
Radar Set AN/SPS-64(V) 1	(V1)
Radar Set AN/SPS-64 (V) 2	(V2)
Radar Set AN/SPS-64(V)3	(V3)
Radar Set AN/SPS-64(V)4	(V4)

The codes, indicating limited applicability of information, are given as a parenthetical suffix to the titles of appropriate paragraphs, figures and tables.

1.3 FUNCTIONS AND CAPABILITIES OF SYSTEMS

This radar system is specifically designed for navigational marine use. Advanced design techniques have minimized its size, weight, and power consumption and maximized reliability and performance. The equipment is designed to withstand long periods of vibration and shock and the extremes of weather encountered in marine service. This radar features high output power, high pulse-repetition rate, narrow antenna beam width, sensitive receiver, and computer enhanced display to provide an accurate, clearly-defined, and bright radar screen presentation on all ranges, even on a fast-moving vessel.

The radar is available in both S-band (10 cm) and X-band (3-cm) frequency models. The 50-kW S-band radar provides excellent target visibility in most adverse

weather conditions due to the inherent penetrating characteristics of the high-powered S-band transmitted energy. The 20-kW X-band radar, with its narrow horizontal beam width, features high target definition and superior bearing resolution.

In the normal mode of operation, the radar displays ships, buoys, and land around the ship's position, which is shown at the center of the display. In the offset mode of operation, the entire display is offset by 70 percent of the CRT radius (astern only). This permits an expanded view of the area ahead of the ship without giving up the advantages of being on the shortest range possible. No offset is available on the 48 or 64 mile ranges.

The indicator has selectable display ranges, subdivided by range rings, to enable the operator to quickly estimate the range of echoes. The indicator also has a variable range marker (VRM) function that permits direct digital readout of echo range. An electronic bearing line (EBL) feature is also available to aid in determining the exact relative bearing of any echo displayed. With this information, the ship's position can be fixed rapidly and reliably to provide for safe operation, day or night, regardless of atmospheric visibility.

Radar Set AN/SPS-64(V) is furnished in four (4) system configurations. They are called the Single configuration (V1), the Dual Partial configuration (V2), the Dual configuration (V3) and the Dual Special configuration (V4).

(V1) The Single system navigational radar operates on X-band at 20 kW with a single 12-inch indicator. Rapid antenna rotation permits a new target update every two (2) seconds. Improved reliability is achieved with solid state components which reduce noise and spikes to a minimum while providing for maximum isolation between the transmitter and balanced receiver mixer.

(V2) The Dual Partial system includes all the features of the Single system (V1), plus the advantage of increased reliability through redundancy. This is achieved through the introduction of a second receiver transmitter (RT-1240), a second azimuth range indicator (IP-1283) and a switching unit (SA-2156) that enables the radar system to function in any one of six (6) operating modes. The mode chosen determines which indicator shall be master (i.e., in control) and whether one or two receiver transmitter(s) will be operating.

(V3) In the Dual system configuration two (2) antennas (AS-3194) and three (3) or four (4) indicators (IP-1282/1283) are interconnected to provide up to sixteen (16) operating modes using two (2) switching units (SA-2139). This allows either receiver transmitter to drive all the indicators (3 or 4) or both receiver transmitters to operate simultaneously with divided control of the indicators. Amplification and isolation to drive the multiple indicators from one or both receiver transmitter(s) (RT-1240) is provided by the pair of video amplifiers (AM-6932).

This dual arrangement reduces the possibility of total system failure by providing alternate switching paths.

(V4) This configuration, called the Dual Special system, offers the maximum in options and reliability. It is a combination of the single X-band system and a 50-kW S-band all-weather radar permitting reliable navigation in all weather conditions. Two switching units interconnect the two receiver transmitters and three indicators. Under this option provision is made for interface with two additional indicators (AN/SPA-25) and (AN/SPA-66) via the signal data converter (CV-3442).

Either receiver transmitter can drive all the indicators or each receiver transmitter can operate independently, driving three indicators.

1.4 SAFETY PRECAUTIONS

1.4.1 High Voltage Warning

1.4.2 Instructions for Artificial Respiration¹

a. Take a deep breath, open your mouth wide, and make an airtight seal around the casualty's mouth. Seal the casualty's nose by using one of the techniques shown in Figure 1-1. Be sure to always keep the casualty's head tilted back to enable a maximum airway.

b. With your eyes focused on the casualty's chest, blow forcefully into his mouth. Rising of the casualty's chest indicates that the air is reaching his lungs. In this case the procedure is continued. If the chest does not rise, corrective action must be taken. First, hold the jaw up more forcefully and blow harder, making sure that the air is not leaking from the nose. If the chest still does not rise, recheck the mouth for foreign matter and, if necessary, turn the casualty on his side and strike him between the shoulders with considerable force, repeatedly if necessary, to dislodge obstruction in the airway; then inflate his lungs.

c. Remove your mouth from the casualty's mouth and listen for the return of air from his lungs. If the casualty's exhalation is noisy, elevate his jaw more.

d. After each exhalation of air from the casualty's lungs, blow another deep breath into his mouth. Make the first five to ten breaths deep and give them at a rapid rate in order to provide fast reoxygenation. Thereafter, give the breaths at a rate of 12 to 20 per minute until the casualty is able to breathe satisfactorily for himself. A smooth rhythm is desired but split second timing is not essential. As the casualty attempts to breathe, adjust the timing of your efforts to assist him.

WARNING

HIGH VOLTAGE IS USED IN THE OPERATION OF THIS EQUIPMENT

DEATH ON CONTACT MAY RESULT IF PERSONNEL FAIL TO OBSERVE SAFETY PRECAUTIONS I

NEVER WORK ON ELECTRONIC EQUIPMENT UNLESS THERE IS ANOTHER PERSON NEARBY WHO IS FAMILIAR WITH THE OPERATION HAZARDS OF THE EQUIPMENT AND WHO IS COMPETENT IN ADMINISTERING FIRST AID . WHEN THE TECHNICIAN IS AIDED BY OPERATORS, HE MUST WARN THEM ABOUT DANGEROUS AREAS.

WHENEVER POSSIBLE, THE POWER SUPPLY TO THE EQUIPMENT MUST BE SHUT OFF BEFORE BEGINNING WORK ON THE EQUIPMENT. TAKE PARTICULAR CARE TO GROUND EVERY CAPACITOR I LIKELY TO HOLD A DANGEROUS POTENTIAL. WHEN WORKING INSIDE THE EQUIPMENT, AFTER THE POWER HAS BEEN TURNED OFF, ALWAYS GROUND EVERY PART BEFORE TOUCHING IT.

BE CAREFUL NOT TO CONTACT HIGH-VOLTAGE CONNECTIONS OR 115, 280, 220 OR 440-VOLT AC INPUT CONNECTIONS WHEN INSTALLING OR OPERATING THIS EQUIPMENT.

WHENEVER THE NATURE OF THE OPERATION PERMITS, KEEP ONE HAND AWAY FROM THE EQUIPMENT TO REDUCE THE HAZARD OF CURRENT FLOWING THROUGH VITAL ORGANS OF THE BODY.

EXTREMELY DANGEROUS POTENTIALS

GREATER THAN 200 VOLTS EXIST IN SOME OF THE UNITS COVERED IN THIS MANUAL

POTENTIALS LESS THAN 200 VOLTS MAY CAUSE DEATH UNDER CERTAIN CONDITIONS. REASONABLE PRECAUTIONS SHOULD BE TAKEN AT ALL TIMES.

¹Modified from FM 21-11, First Aid for Soldiers