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MIL-R-23016(WEP)
Amendment 3
15 December 1964
Superseding
Amendment 2
15 March 1963

MILITARY SPECIFICATION

RADIO SET AN/ARC-94

This amendment forms a part of Military Specification MIL-R-23016(WEP) dated 16 October 1961 and has been approved by the Bureau of Naval Weapons, Department of the Navy.

*Page 1, paragraph 1.2: Delete and substitute:

"1.2 Classification: The equipment covered by this specification shall be one of four types consisting of the following items:

Type	Item	Designation	Maximum Allowable Wt. Lbs	Appl. Paragraph
I	Receiver-Transmitter	RT-648/ARC-94	52	3.3.4.1
	Control	C-3940/ARC-94	2	3.3.4.2
	Mounting	MT-2641/ARC-94	5.3	3.3.4.3
II	Receiver-Transmitter	RT-(*)/ARC-(*)	50	3.3.4.1
	Control	C-3940/ARC-94	2	3.3.4.2
	Mount, Retrofit Adapter	MX-(*)/ARC-(*)	5	3.3.4.3
	Cable, Special Adapter	CX-(*)/ARC-(*)	1.1	3.3.4.5
	Power Supply	PP-(*)/ARC-(*)	8.5	3.3.4.4
111	Receiver-Transmitter	RT-(*)/ARC-(*)	51	3.3.4.1
	Control	C-3940/ARC-94	2	3.3.4.2
	Mount, Retrofit Adapter	MX-(*)/ARC-(*)	6.5	3.3.4.3
	Cable, Special Adapter	CX-(*)/ARC-(*)	1.1	3.3.4.5
IV	Receiver-Transmitter	RT-(*)/ARC-(*)	51	3.3.4.1
	Control	C-3940/ARC-94	2	3.3.4.2
	Mounting	MT-2641/ARC-94	5.3	3.3.4.3

Note: See paragraph 6.1 for intended uses of each type of equipment. Where an asterisk appears in the designation under this and ensuing paragraphs, nomenclature has not been assigned and the contractor is required to obtain nomenclature assignment in accordance with MIL-N-18307."

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*Page 3, paragraph 2.1:

Add "MIL-R-23094 - Reliability Assurance for Production Acceptance of Avionics Equipment, General Specification For"

Page 7, paragraph 3.1.1.2.1.1: Delete and substitute:

"3.1.1.2.1.1 Electron tubes, transistors, and diodes utilized in reordered production equipment shall be identical to the tubes, transistors, and diodes listed in the Electron Tube Complement Report previously approved in accordance with Specification MIL-E-4682."

*Page 22, paragraph 3.1.31: Add the following additional sentence to the end of the paragraph:

"Washing of parts after subjection to the salt spray test shall be permitted prior to determining performance."

*Page 52, paragraph 3.2.9.3.4, first sentence: Delete and substitute:

" Interference resulting from manual operation of switches, including any electrical or electro mechanical operations resulting from manual switching, may deviate from the conducted interference limits specified herein by not more than 20 db on the a-c leads and by not more than 35 db on the d-c and interconnecting leads. Radiated interference under the same conditions shall not deviate by more than 14 db from the radiated interference limits specified herein. "

Page 69, paragraph 3.2.9.11.1, first sentence: Delete and substitute:

"Broadband Radio Interference voltages, in the frequency range of 0.15 to 0.30 mc, except the fundamental signal in the key down condition, generated by the equipment or system in excess of 12 db above the values shown in Figure 14, shall not appear on any conductor, external to the system, which could conduct interference to other equipment; all other interference shall not be in excess of the values indicated in Figures 13, 14, 15, and 16. "

Page 70, paragraph 3.2.9.12, first sentence: Delete and substitute:

"Radiated Interference fields in excess of 6 db above the values given in Figures 20, 21, 22, and 23, except the fundamental and the second harmonic signals in the key down position, shall not radiate from any unit, cable (including control, pulse, IF, video, antenna transmission, and power cables), or inter-connecting wiring over the frequency range of 0.15 to 10,000 mc for CW and pulsed CW interference, and 0.15 to 400 mc for broad band impulse interference; the fundamental shall not exceed 100 db above 1 microvolt and the second harmonic shall not exceed 20 db above the limits shown in Figures 20, 21, 22, and 23."

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*Page 74, paragraph 3.2.9.14.4, first sentence: Delete and substitute:

"The front-end rejection of the receiver shall be equal to or greater than the limit shown in Figure 29 except that the image frequencies above 25 mc shall be at least 40 db and the 1 mc spurious frequencies above 25 mc shall be at least 55 db."

*Page 97, paragraph 3.2.21.5.1: Add the following at the end of this paragraph:

"The maximum vibration time shall not exceed three (3) hours in each plane. Vibration shall consist of a resonant search and dwell at the major resonances found. Vibrate according to the table shown below. Cycle for the time shown, varying the input frequency between 10 and 500 cps at an approximately logarithmic rate of change. Complete cycle (10-500-10) shall consume approximately 15 minutes.

Vibration Schedule

No. of Resonances	0	1	2	3	4
Total Vibration Time at Resonance	--	½ hr.	1 hr	1½ hrs	2 hrs
Cycling Time	3 hrs	2½ hrs	2 hrs	1½ hrs	1 hr

*Page 97, paragraph 3.2.21.5.2: Add the following at the end of this paragraph:

"The total vibration time shall be 30 minutes in each plane. vibration shall consist of a ten (10) minute resonant search and vibration at the two frequencies of greatest amplitude for a period not to exceed ten (10) minutes for each resonance. The input frequency shall be varied from 10 to 500 cycles at an approximately logarithmic rate of change. If no resonances are found, the unit shall be cycled for thirty (30) minutes."

*Page 100, paragraph 3.3.1.1: Delete and substitute:

"The total weight of the equipment, excluding cables, shall be a minimum consistent with good design and shall not exceed the following limitations:

Type	Designation	Total Weight
I	AN/ARC-94	59.3 lbs.
II	AN/ARC-(*)	66.6
III	AN/ARC-(*)	60.6
IV	AN/ARC-(*)	58.3

*Page 101, paragraph 3.3.1.2.3: Delete and substitute:

"3.3.1.2.3 Reliability in Mean-Time-Between-Failures (MTBF) - For the test program under 4.4.5, the mean (operating) time between failures shall be 100 hours. Procedure II of Specification MIL-R-23094 shall be used except that no monthly shipment can be made without prior approval of the Bureau of Naval Weapons where the demonstrated MTBF is less than 90 hours."

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*Page 102, paragraph 3.3.1.6: Delete and substitute:

"3.3.1.6 Input Power Requirements - The power required by each equipment type shall not exceed the specified amounts under service conditions. The equipment shall not be damaged when subjected to the power transient limits of MIL-STD-704.

Type 1 - AN/ARC-94

(1)	AC Power (single phase)	115 volts
	Operating Voltage Limits	103.5 to 126.5 volts
	Operating Frequency	380-420 cps
	Power (1 0)	175 V.A.
(2)	AC Power (Three Phase)	115 volts line to grounded neutral
	Operating Voltage Limits	103.5 to 126.5 volts
	Operating Frequency	380-420 cps
	Power (3 0)	900 V.A.
(3)	DC Power	27.5 volts
	Operating Voltage Limits	24.75 to 30.25 volts
	Current	4 amps

Type II - AN/ARC-(*)

(1)	AC Power (Single Phase)	115 volts
	Operating Voltage Limits	103.5 to 126.5 volts
	Operating Frequency	380-420 cps
	Power (1 0)	175 V.A.
(2)	DC Power	27.5 volts
	Operating Voltage Limits	24.75 to 30.25 volts
	Current	37 amps

Type II - PP-(*)/ARC-(*)

(1)	DC Power (Input)	27.5 volts
	Operating Voltage Limits	24.75 to 30.25 volts
	Current Input	33 amps
(2)	AC Power (Single Phase Output)	400 volts
	Operating Voltage Limits	360 to 440 volts
	Operating Frequency	1300-2000 cps
	Power Output (1 0)	900 V.A.

Note: PP-(*)/ARC-(*) is a DC to AC converter and its input-output power characteristics are specified above in the event this power supply is manufactured and tested for acceptance independent of the remainder of Type II equipment with which it is used. In the latter event, satisfactory operation must be demonstrated, with sample Type II equipment, during preproduction and sampling tests.

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Types III and IV - AN/ARC-(*) and AN/ARC-(*)

(1) AC Power (Single Phase)	115 volts
Operating Voltage Limits	103.5 - 126.5 volts
Operating Frequency	380-420 cps
Power (1 0)	150 V. A.
(2) DC Power	27.5 volts
Operating Voltage Limits	24.75 to 30.25 volts
Current	40 amps

Page 104, paragraph 3.3.2.3, second paragraph: Delete and substitute:

"For an input level of 100 microvolt, 307. modulation, 1000 cps, the (S+N) to N ratio shall exceed 25 db."

Page 105, paragraph 3.3.2.8.1, last sentence: Delete and substitute:

"Under service conditions, the audio output shall be greater than 120 mw with an input voltage of 50 microvolt."

Page 109, paragraph 3.3.3.9, after first sentence: Add

"(i.e., 36 db below P.E.P.) in the frequency range of 2 to 25 mc and 25 db (i.e, 31 db below P.E.P.) in the frequency range of 25 to 30 mc."

*Page 109, paragraph 3.3.3.11,1: Add the following at the end of the paragraph:

"The maximum obtainable modulation level shall be limited to control-grid current threshold at the power amplifier tubes. At the low line voltage limits specified herein, where the requirements for modulation level and control-grid current threshold may be in conflict, control-grid current threshold shall govern but, under no circumstances, shall the sideband power output (single tone input of 1000 cps) be less than 72 watts. For the purpose of determining capability in accordance with these requirements, the transmit gain control may be overridden."

*Page 110, paragraph 3.3.3.11.2: Delete and substitute:

"3.3.3.11.2 Fidelity - The overall frequency response of the transmitter from its audio frequency input to its radio frequency output shall not be more than 5 db variation from 300 to 3000 cps. The total harmonic distortion at 85% modulation shall not exceed 22% (Not more than 12% when measured on the sidetone output). The noise modulation or, the AME carrier shall be at least 40 db below PEP (-34 db below 1 tone or carrier) except during solid mount vibration when the limit shall be at least 30 db below PEP (-24 db below 1 tone or carrier). The transmit gain control may be overridden during this test."

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*Page 110, paragraph 3.3.3.12.2: Change "20 per cent" in last sentence to "12 per cent."

Page 110, paragraph 3.3.3.13, first sentence: Delete and substitute:

"The equipment shall supply 25 ± 4 ma for an 82 ohm microphone input."

*Page 111, paragraph 3.3.4.1: Delete and substitute:

"3.3.4.1 Receiver-Transmitter Units: The receiver-transmitter units of each type shall be in accordance with the following requirements:"

*Page 111, paragraph 3.3.4.1.2: Delete and substitute:

"3.3.4.1.2 Form Factors and Mountings: The receiver-transmitter unit of each equipment type shall be contained in a single unit conforming to case size MS 91403-B1D2 of Specification MIL-C-L72. Type I and Type IV receiver-transmitter units shall be capable of being mounted in an aircraft by means of Mounting MT-2641/ARC-94. Retrofit of Type II and Type III receiver-transmitter units shall be enabled with Type II and Type III Retrofit Adapter Mounts in accordance with the provisions for intended use stipulated under 6.1 herein, The Mounting, MT-2641/ARC-94 shall conform to MX 91405-B1D2, with exception of connector location and fully extended position of spring loaded pin, and shall be suitable for attachment to a plane surface in an aircraft. The Type II and Type III Retrofit Adapter Mounts shall be capable of retrofitting into the Mounting MT-1415/ARC-38.

	Height	Width	Length
Overall dimensions of Types I or II receiver-transmitter and base	9.281 in.	10.265 in.	24.638in.
Overall dimensions of the Types I or II receiver-transmitter and base including sway space (see figure 30)	9.558	10.675	25.048
Overall dimensions of Types II or III receiver-transmitter and base (see Figures 34 and 35)	9.500	16.375	25.390
Overall dimensions of Types II or III receiver-transmitter and base including sway space	10.500	17.375	26.390

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*Page 112, paragraph 3.3.4.1.4: Delete and substitute:

"3.3.4.1.4 Weight with Mountings: The weight of the receiver-transmitter units, including mountings, shall not exceed the maximum allowable weight limitations specified in 1.2."

*Page 115, paragraph 3.3.4.3: Delete and substitute:

"3.3.4.3 Mountings:"

*Page 115, paragraph 3.3.4.3.1: Delete and substitute:

"3.3.4.3,1 Function: The Type I and Type IV equipment mounting, MT-2641/ARC-94, shall have the transmissibility shown in Figure 33 to allow the equipment to perform under the specified environmental requirements. The Type II and Type III equipment retrofit adapter mounts, MX (*)/ARC-(*) and MX (*)/ARC-(*), shall have the transmissibility shown in Figure 36 to allow the equipment to perform under the specified environmental requirements."

*Page 115, paragraph 3.3.4.3.2: Delete and substitute:

"3.3.4.3.2 Weight: The maximum allowable weight for Type I and Type IV mountings and Type II and Type III retrofit adapter mounts shall not exceed the limitations specified in 1.2."

*Page 115, add the following new paragraphs:

"3.3.4.4 Type II Power Supply, PP-(*)/ARC-(*):
The Type 11 Power Supply, PP-(*)/ARC-(*) shall fulfill the following requirements:
3.3,4.4.1 Function: This unit shall provide output power to the Type 11 receiver-transmitter unit in accordance with the applicable input-output power requirements of 3.3.1.6.

3.3.4.4.2 Form Factor and Mounting: The power supply unit shall be contained in a single unit conforming to Figure 37 and shall be capable of being mounted in an aircraft by means of Mounting MT-1414/ARC-38.

	Height	Width	Length
Overall dimensions of the Type II Power Supply (see Figure 37)	6.906 in.	4.953 in.	15.562 in.
Overall dimensions of the Type II Power Supply including sway space and Mounting MT-1414/ARC-38	10.125	7.062	20.061

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3.3.4.4.3 Contents of Unit: This unit shall contain all the circuits necessary to provide required power outputs to the Type II Receiver-Transmitter unit in accordance with the applicable input-output power characteristics specified in 3.3.1.6.

3.3.4.4.4 Weight: The weight of this unit, exclusive of mounting, shall not exceed 8.5 pounds.

3.3.4.4.5 Connections: All connections to this unit shall be made through one plug mounted on the rear of the unit and extending through the dust cover.

3.3.4.406 Controls: There shall be no internal or external adjustable controls.

3.3.4.5 Cable, Special Adapter CX-(*)/ARC-(*):
This cable adapter is a part of either Type II or Type III equipment and shall provide adaption of wiring aircraft connectors normally installed with C-1398/ARC-38 Radio Set Control to the interconnection wiring required for the C-3940/ARC-94 Radio Set Control."

*Page 117, paragraph 3.4.1: Add the following sentence to this paragraph:

"The prohibitions against manufacturer's symbols on front panels or dust covers (i.e. silk screened commercial model number or metal decal with manufacturer's trademark) is permissible to the extent permitted under prior contracts and the interchangeability requirements shall govern. However, the extension of this practice is undesired and is permitted to the extent specified above only in the interest of obviating the change costs for redesign and new tooling for the panels and dust covers whose production design was established under prior contracts."

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*Page 127, Add the following new paragraphs:

"4.4.5 Reliability Assurance Tests - Reliability assurance tests shall be conducted as required by Specification MIL-R-23094. Equipments selected for reliability assurance tests shall first have passed the individual tests."

"4.4.5.1 Reliability Procedure - For the Reliability Qualification Plan, as outlined in Specification MIL-R-23094, Procedure II shall be used."

"4.4.5.2 Test Level - The Test Level shall be III from Table I of specification MIL-R-23094 except the temperature limits shall be -40°C to +55°C and solid mount vibration limit shall be ±1g."

"4.4.5.3 Accept-Reject Criteria - Figure 13 of Specification MIL-R-23094 shall be used to determine the accept-reject criteria for the Reliability Qualification Test Plan. Figure 13 of Specification MIL-R-23094 shall be used to determine the accept-reject criteria for the Reliability Sampling Test Plan."

"4.4.5.4 Length of Heat Portion of Cycle - After stabliziation at the high temperature limit required by the test level, the equipment shall be operated eight (8) hours during each cycle."

"4.4.5.5 Performance Characteristics To Be Measured - The performance characteristics to be measured shall be stipulated in the proposed test procedures to be submitted for approval by the Bureau of Naval Weapons. In general, the characteristic, specification requirement therefor, and time in cycle that measurement is to be made shall be stipulated. Acceptance requirements, if lower than specification requirements, shall be stipulated and the difference justified."

"4.4.3.6 Failure Criteria - In addition to the requirements of Specification MIL-R-23094, the following requirements shall be used to determine when a failure has occurred during the test:

(1) Whenever performance characteristics fall below the Acceptance requirements approved by the Bureau of Naval Weapons, at least one failure has occurred. If subsequent analysis reveals that several parts have deteriorated, each shall be counted a failure, unless one caused the other parts to fail."

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*Page 130, paragraph 6.1: Add the following:

"(1) Type I equipment is intended for new installations where the primary power source for the high voltage power supply is 115V 400 cps 3 phase line to grounded neutral. 27.5 volts DC and 115 volts single phase AC 400 cps are also required.

(2) Type II equipment is intended for retrofit installations to replace the AN/ARC-38 Radio Set. The RT-311/ARC-38 is removed from its mounting MT-1415/ARC-38 and the Type II Retrofit Adapter Mount, MX(*)/ARC-(*) is installed in its place to accommodate the Type II Receiver Transmitter, RT-(*)/ARC-(*). The Type II Power supply, PP-(*)/ARC-(*), replaces the DY-118/ARC-38 Power Supply and is mounted in the same shockmount, MT-1414/ARC-38. The Special Cable Adapter, CX-(*)/ARC-(*) is connected to aircraft wiring in lieu of the C-1398/ARC-38 and accommodates installation of the C-3940/ ARC-94. The primary power source is 27.5V DC. 115V 10 400 cps AC is also required.

(3) Type III equipment is intended for retrofit installations to replace the AN/ARC-38 Radio Set. The RT-311/ARC-38 is removed from its mounting, MT-1415/ARC-38 and the Type III Retrofit Adapter Mount, MX-(*)/ARC-(*) is installed in its place to accommodate the Type III Receiver-Transmitter Unit, RT-(*)/ARC-(*). The DY-118/ARC-38 is removed from its mounting and the pendent cable of the Type III Retrofit Adapter Mount, MX-(*)/ARC-(*), is connected to the exposed connector on the MT-1414/ARC-38. The high voltage power supply is self-contained in the Type III Receiver-Transmitter. The Special Cable Adapter, CX-(*)/ARC-(*) is identical to that described above for Type II equipment and is used for the same purpose of replacing the C-1398/ARC-38 with the C-3940/ARC-94. The primary power source is 27.5v DC. 115V, 10, 400 cps power is also required.

(4) Type IV equipment is intended for new installations where the primary power source for the self-contained power supply is 27.5V DC. 115V, 10, 400 cps power is also required. The Type IV Receiver-Transmitter, RT-(*)/ARC-(*) is identical to the Type III receiver-transmitter unit."

*Page 136, Add the following new paragraph:

"6.7.20 Service Conditions: Service Conditions shall be defined as any one or combination thereof of the conditions listed under 3.2.30, 3.2.21, and subparagraphs thereto."

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*Page 116, Delete Figure 33 and substitute the following new Figures:

"Figure 33	Transmissibility vs Frequency -- Types I and IV
Figure 34	Type II Receiver Transmitter
Figure 35	Type II or III Receiver Transmitter
Figure 36	Transmissibility vs Frequency -- Retrofit in a MT-1415/ARC-38 - Types II or III
Figure 37	Type II Power Supply"

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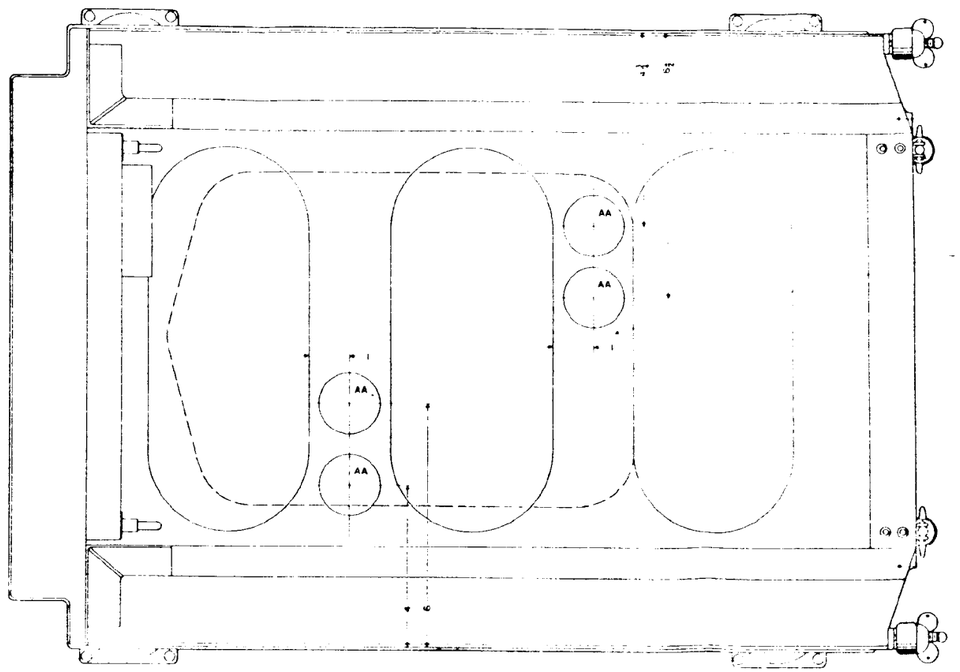
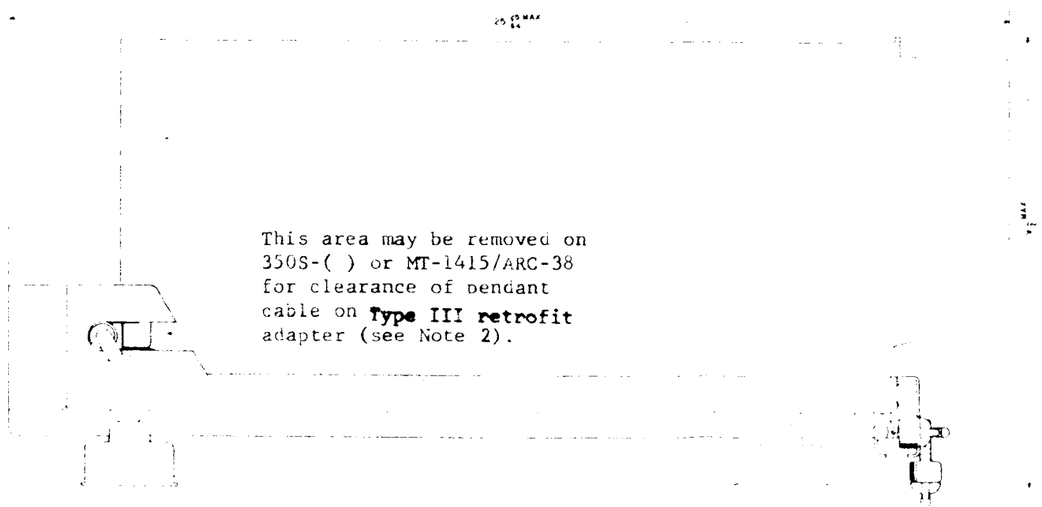


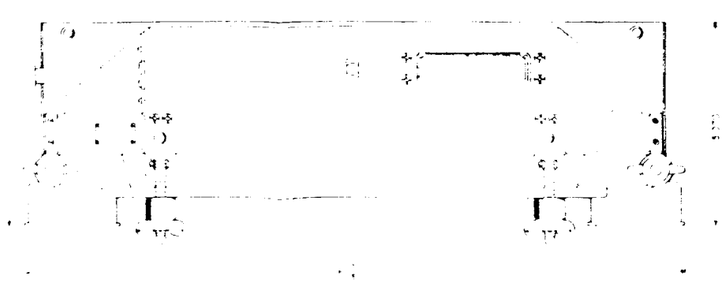
The 350S-1, 350S-3 and MT-1415/ARC-38 are produced with either a rectangular cut-out (not shown) or oval cut-outs as shown. Trays with rectangular cut-outs allow discharge of the exhaust air for proper operation of the Type II or III Rec.-Transmitter. The Type II or III units will operate on a reduced rating when adapted to mounts having oval cut-outs. The manufacturer strongly recommends that the (4) holes "AA" be punched in the positions shown using a 1-1/2 diameter Greenlee punch or equivalent for increased performance and maximum reliability of the Type II or III units. The cup portion of the Greenlee punch should be placed on the top side of the mount floor to avoid distorting the tray during punching operation.

NOTE:

1. Clearance for sway movement of unit on vibration mount equals 1/2 inch on all side.

2. Pendant cable as shown is part of Type III retrofit adapter only. The Type II retrofit adapter does not have pendant cable.





TYPES II or III REC/TRANS.

FIGURE 35

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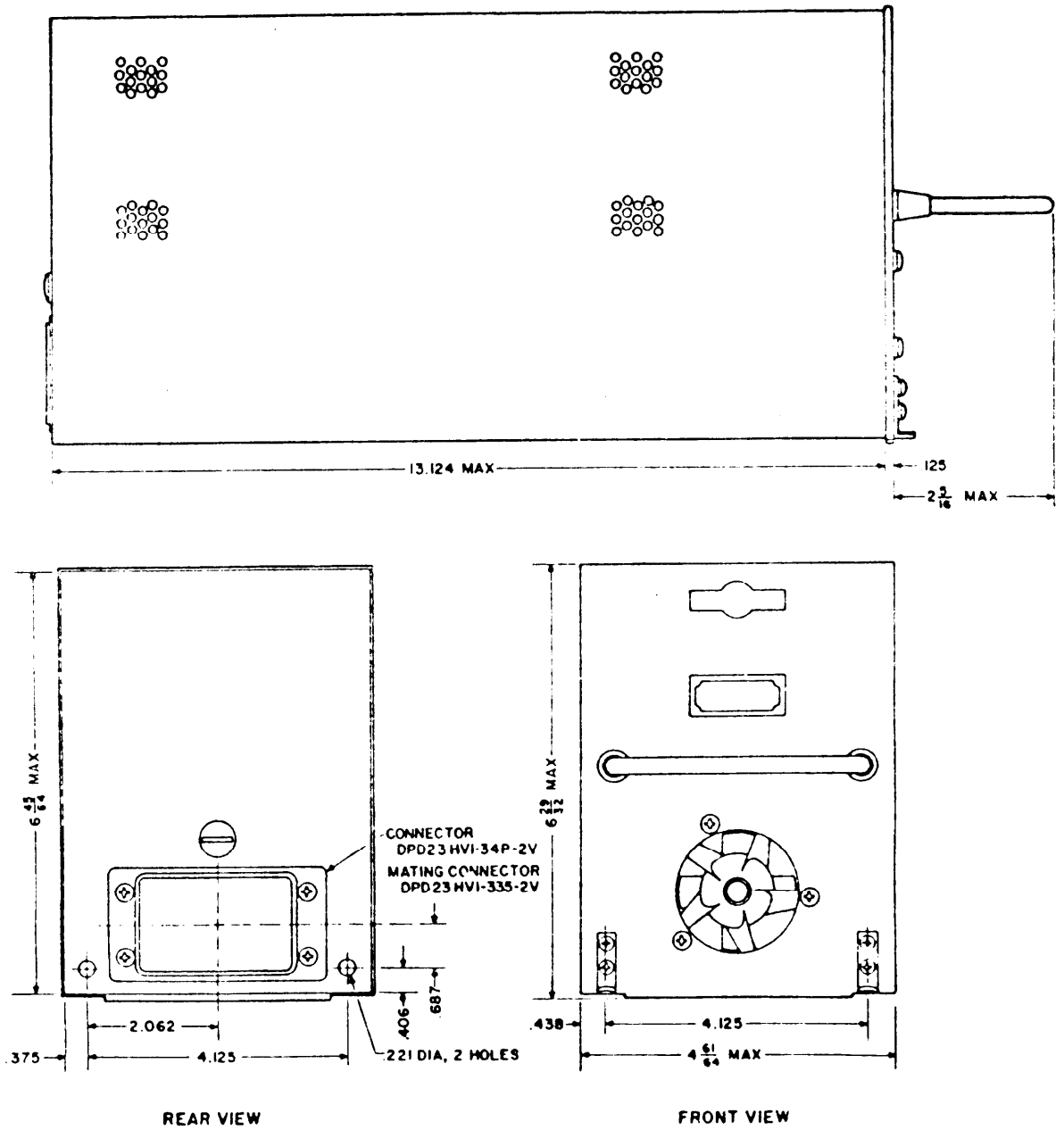

TYPE II POWER SUPPLY
FIGURE 37

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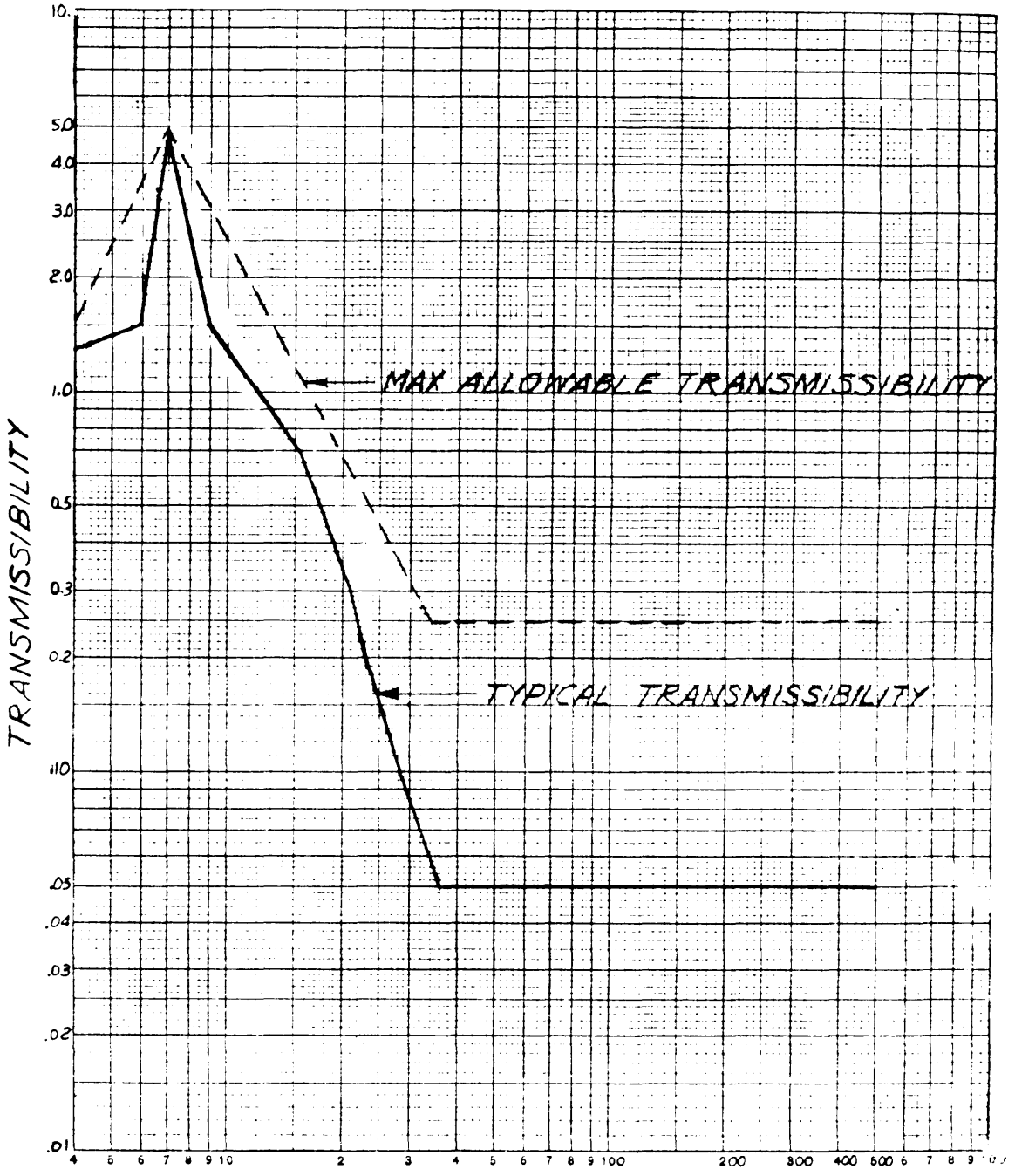

TRANSMISSIBILITY VS FREQUENCY
TYPE II + III RETROFIT IN A MT1415/ARC-38

FIGURE 38