TECHNICAL MANUAL

for

VERTICAL RECEIVING ANTENNA MODELS VRA-5, VRA-6 AND VRA-7

THE TECHNICAL MATERIEL CORPORATION

MAMARONECK, N.Y. OTTAWA, CANADA

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IN8004 Issue Date: 1 October, 1963

NOTICE

VERTICAL RECEIVING ANTENNA

MODELS VRA-9 and VRA-10

Vertical Receiver Antenna Models VRA-9 and VRA-10 are the same as Models VRA-5/6/7 with the exception of antenna height and transformer frequency range; the VRA-9 and VRA-10 will function as described in the technical manual for VRA-5/6/7 with the following differences:

	VRA-9	VRA-10
Transformer Frequency Range:	2-32 mc	3-15 mc
Antenna:	16 foot vertical fiberglass whip	32 foot vertical fiberglass whip

RECORD OF CORRECTIONS MADE

Change No.	Date of Change	Date Entered	Entered By

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF TABLES

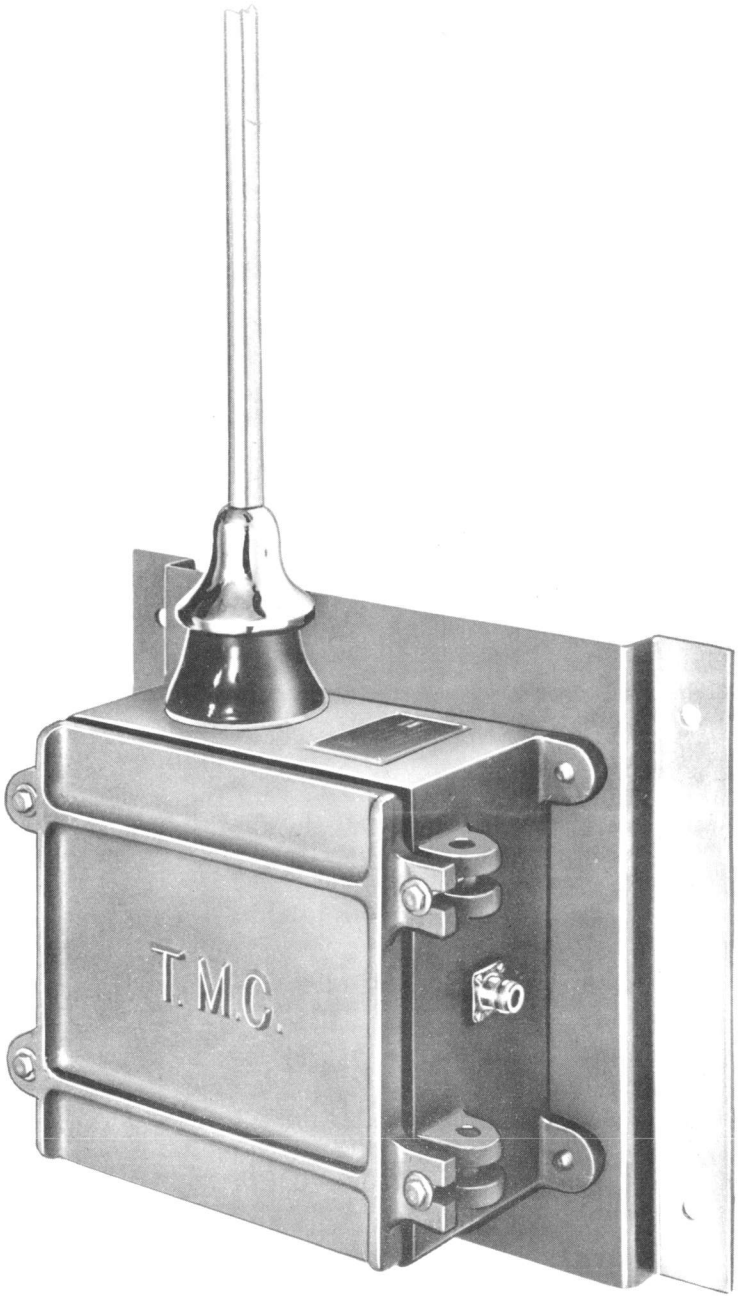


Figure 1. Model VRA, Vertical Receiving Antenna, Front Angle View

1. PURPOSE.

Vertical Receiving Antenna VRA, (figure 1) is a vertical receiving whip antenna unit designed to provide an antenna and proper impedance match for a monitor receiver.

The VRA is used in installations where a convenient broadband device is needed to provide an antenna and impedance match to a monitor receiver operating in various receiving ranges.

2. PHYSICAL DESCRIPTION.

The VRA whip antenna system consists of a broadband 70 ohm impedance matching transformer coupling an aluminum or fiberglass whip antenna to a weatherproof connector receptacle.

The VRA is housed in a weather resistant cast aluminum alloy case. It incorporates an internal spark gap to provide protection of the receiver and personnel from lightning hazards.

Connection of the VRA to a receiver is made through a standard weatherproof connector receptacle (UG-58A/U) mounted on the side of the case. A mating cable connector is also provided for connection of a coaxial cable from the VRA to the monitor receiver.

3. FUNCTIONAL DESCRIPTION.

a. Model VRA-5 - Model VRA-5 is a vertical receiving antenna and impedance matching device to be used with receivers operating in the 200-800 kc frequency range.

The antenna consists of 18 feet of seamless aluminum tubing in 3 sections or 16 feet of fiberglass rod in 4 sections.

The impedance matching transformer provides an input impedance of 50 ohms and an output impedance of 70 ohms to the receiver.

b. Model VRA-6 - Model VRA-6 is a vertical receiving antenna and impedance matching device to be used with receivers operating in the 2-32 mc frequency range.

The antenna consists of 18 feet of seamless aluminum tubing in 3 sections or 16 feet of fiberglass rod in 4 sections.

The impedance matching transformer provides an input impedance of 50 ohms and an output impedance of 70 ohms to the receiver.

c. Model VRA-7 - Model VRA-7 is a vertical receiving antenna and impedance matching device to be used with receivers operating in the 3-15 mc frequency range.

The antenna consists of 35 feet of seamless aluminum tubing in 6 sections.

The impedance matching transformer provides an input impedance of 150 ohms and an output impedance of 70 ohms to the receiver.

The coupling transformer in the model VRA-5 has a frequency response which is flat within plus or minus 1.5 db over the range of 200-800 kc. However, it should be noted that impedance matching over such a wide frequency range as this, using an 18 foot antenna, must of necessity, be a compromise. In this case, optimum match is provided at 400 kc and efficiency either side of this point is somewhat less.

Similar matching at an optimum point is provided in models VRA-6 and VRA-7.

4. TECHNICAL SPECIFICATIONS.

Transformer Frequency Range:	VRA-5 200-800 kc VRA-6 2-32 mc VRA-7 3-15 mc
Transformer Frequency Response:	VRA-5 Flat within ±1.5 db, optimum matching at 400 kc.
	VRA-6 Flat within ±1.5 db from 2-32 mcs.
Equipment Case:	Waterproof all weather cast aluminum alloy.
Antenna:	Vertical aluminum or fiberglass sections that extend to 18 feet (models VRA-5 and VRA-6) and 35 feet for model VRA-7.
Output Impedance:	70 ohms, nominal.
Standard Weatherproof Connection Provided:	UG-58A/U Receptacle mounted on case with mating cable connector, TMC Part No. AX-259-2.

Safety:	Receiver and personnel protected from lightning by means of an adjustable internal spark gap.
Mounting Kit:	Installation hardware provided: 4 LW537MSS Split Washers 1 MS543 Plate mounting unit 4 MS619 Brackets for mounting unit 16 SC-111-2 Bolts (lag) 4 SCHH37165516 Bolts (machine)
Construction:	Antenna base is screw fitted into a metal bell mounted on a porcelain insulator which is further supported on rubber bushings to withstand shock.
Installed Size: (Less Antenna)	18-1/2 inches x 16-1/8 inches x 7 inches.
Installed Weight:	27 lbs.
Shipping Weight & Cube:	50 lbs., 2.3 cu. ft.
Components and Construction:	Equipment is manufactured in accordance with JAN/MIL specifications wherever practicable.

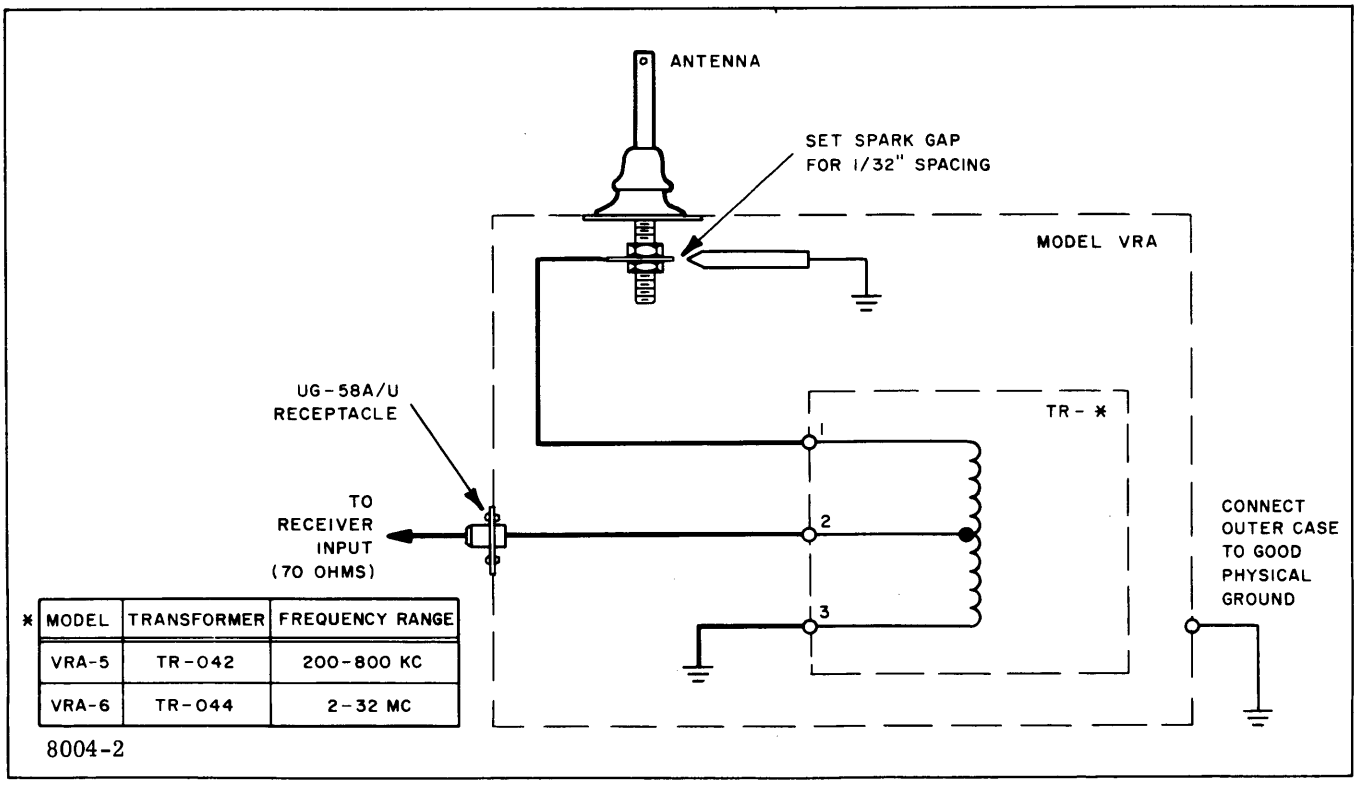
5. UNPACKING.

When the unit is uncrated, it should be inspected for any damage which may have incurred in transit. Inspect all packing material for parts which may have been shipped as "loose items".

With respect to damage to the equipment for which the carrier is liable, the Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

6. INSTALLATION.

The VRA is shipped in one crate. Each unit has been factory tested and arrives ready for immediate installation and operation. No preliminary adjustments are necessary other than the insertion of the whip antenna onto the antenna post located on the top of the case and connection of the outer case to a good physical ground. See figure 2 and 3.



* MODEL	TRANSFORMER	FREQUENCY RANGE
VRA-5	TR-042	200-800 KC
VRA-6	TR-044	2-32 MC

Figure 2. Simplified Schematic and Connection Diagram, Models VRA-5, VRA-6

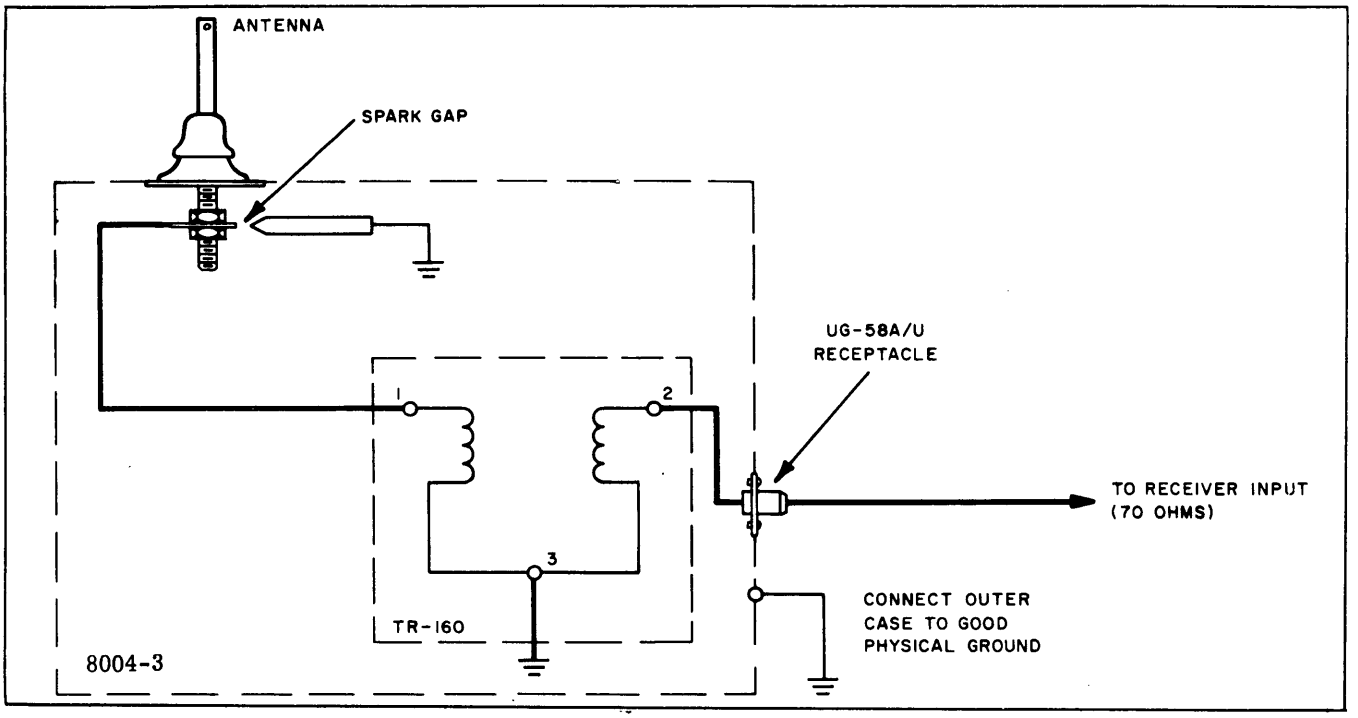


Figure 3. Simplified Schematic and Connection Diagram, Model VRA-7

The VRA has been designed for mounting on a wall, roof, pole or vehicle. For pole mounting, two straps and the necessary lag bolts are provided. For vertical plane mounting or horizontal plane mounting, a universal mounting plate is provided. See figure 4 for installation details of the VRA. See figure 5 for the outline dimensions of the VRA.

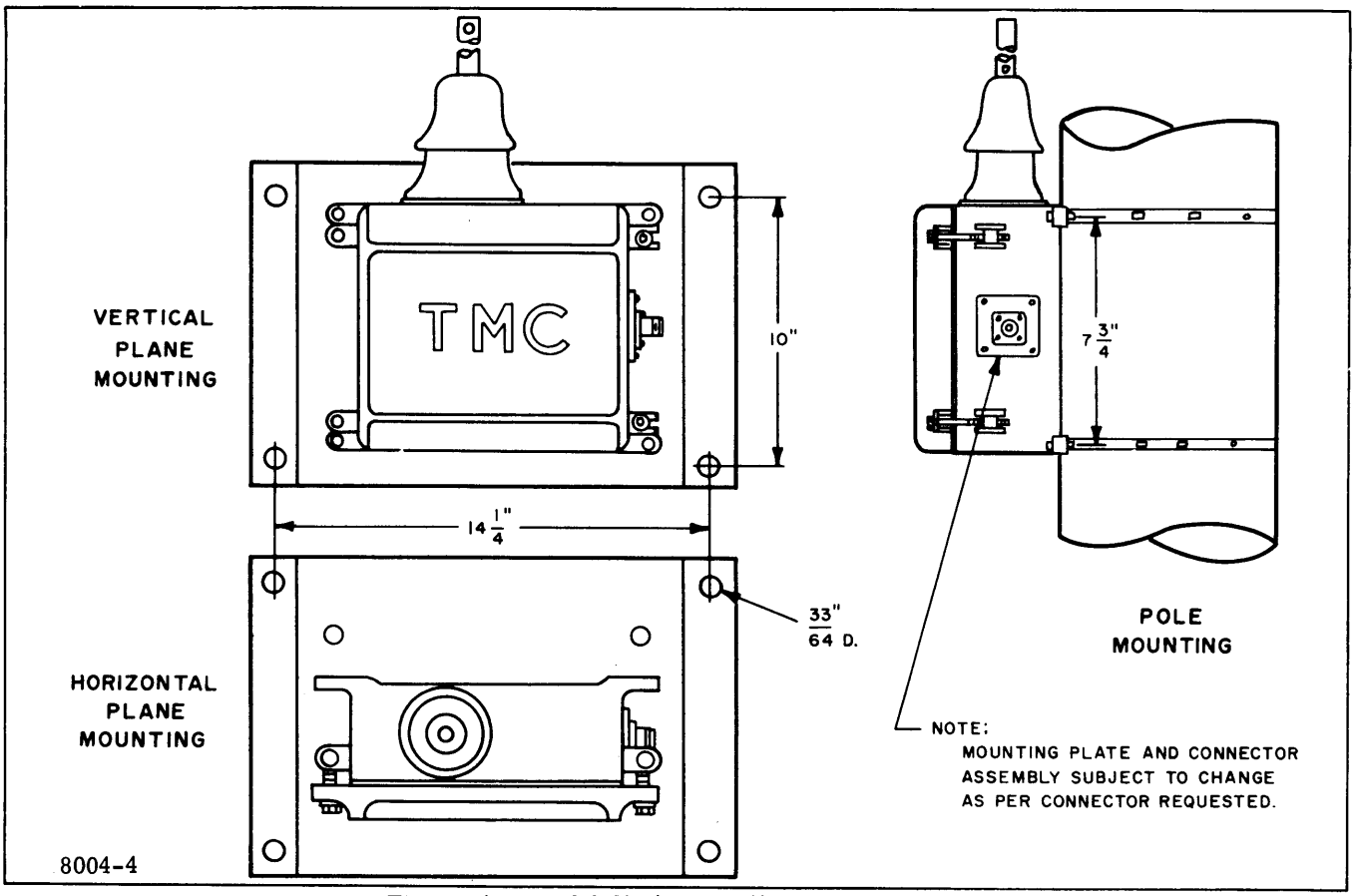


Figure 4. Model VRA, Installation Diagram

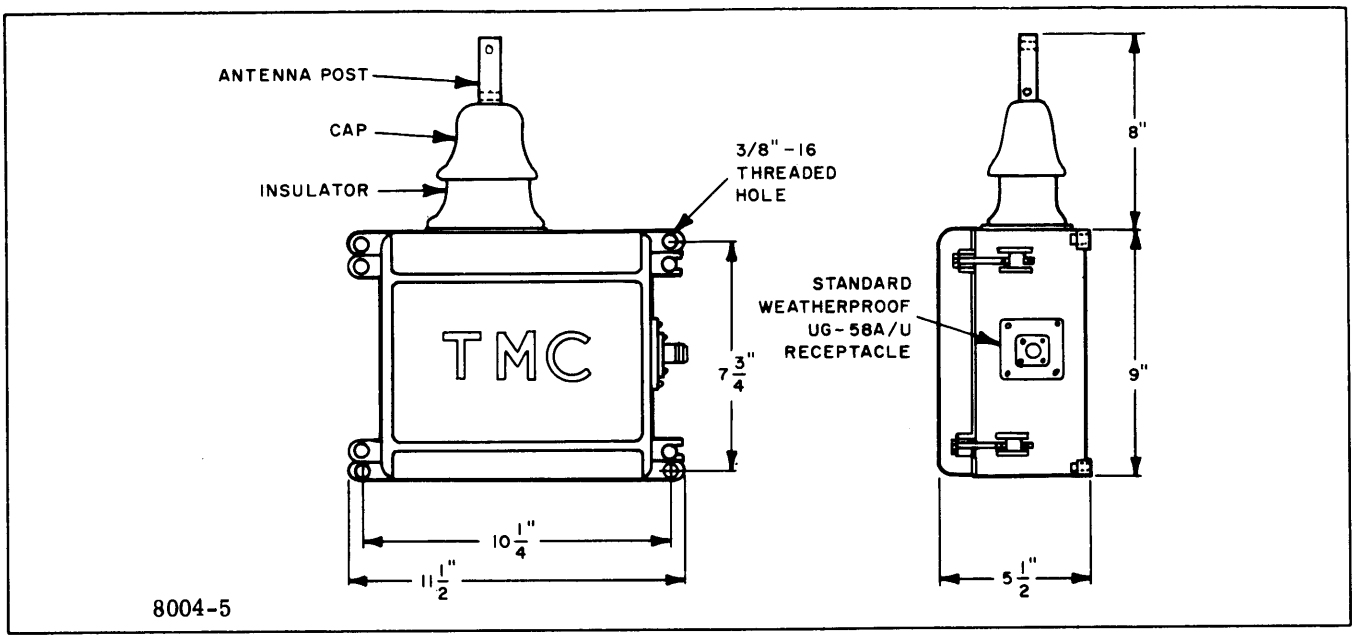


Figure 5. Outline Dimensional Drawing

7. MAINTENANCE.

Due to the simplicity of construction and design of the VRA, maintenance may consist of simply observing for secure connections and unit cleanliness.

The dessicant package should be changed at least every six months or sooner if required. Spark gap spacing should also be checked for 1/32" spacing.

Figures 6, 7 and 8 illustrate the test setup which may be used for unit troubleshooting.

Figure 9 provides an inside view of the VRA locating the various parts, to be used in conjunction with the Parts List.

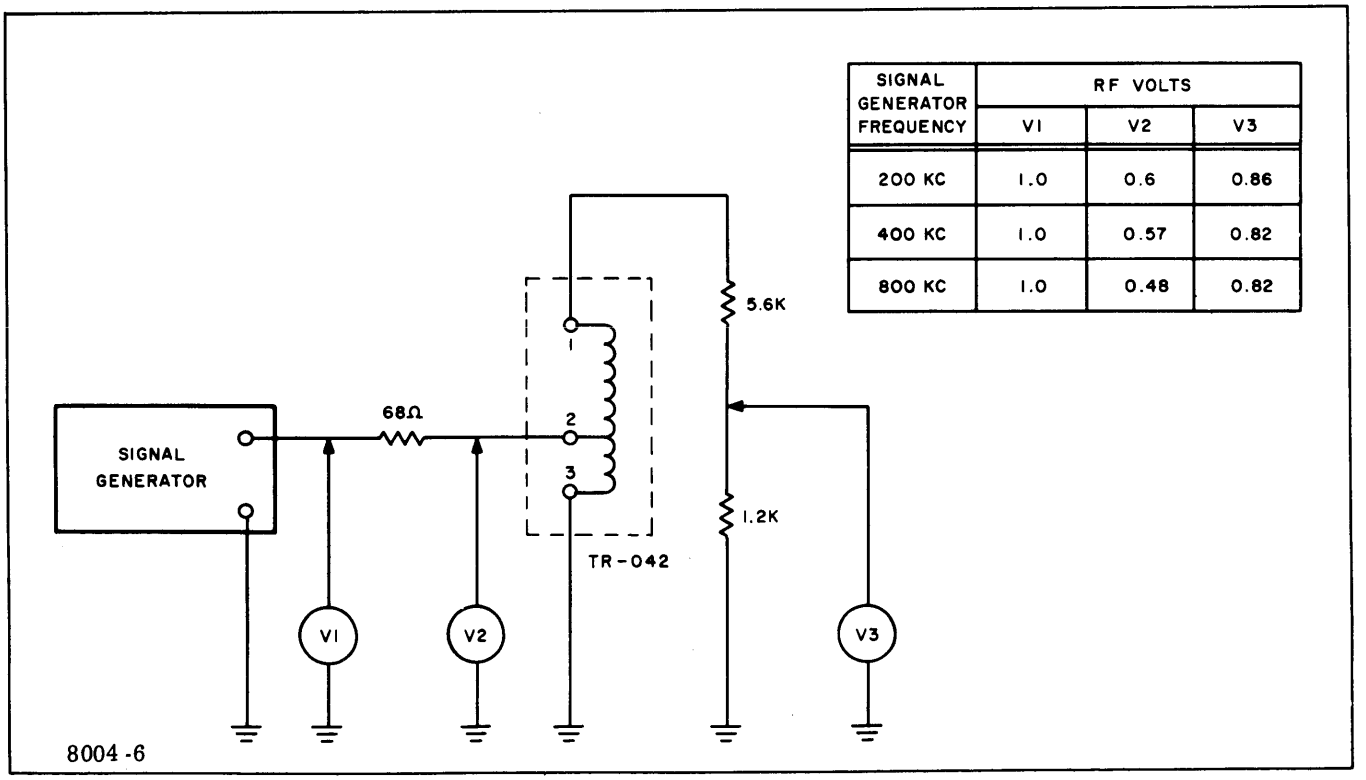


Figure 6. Model VRA-5, Test Setup

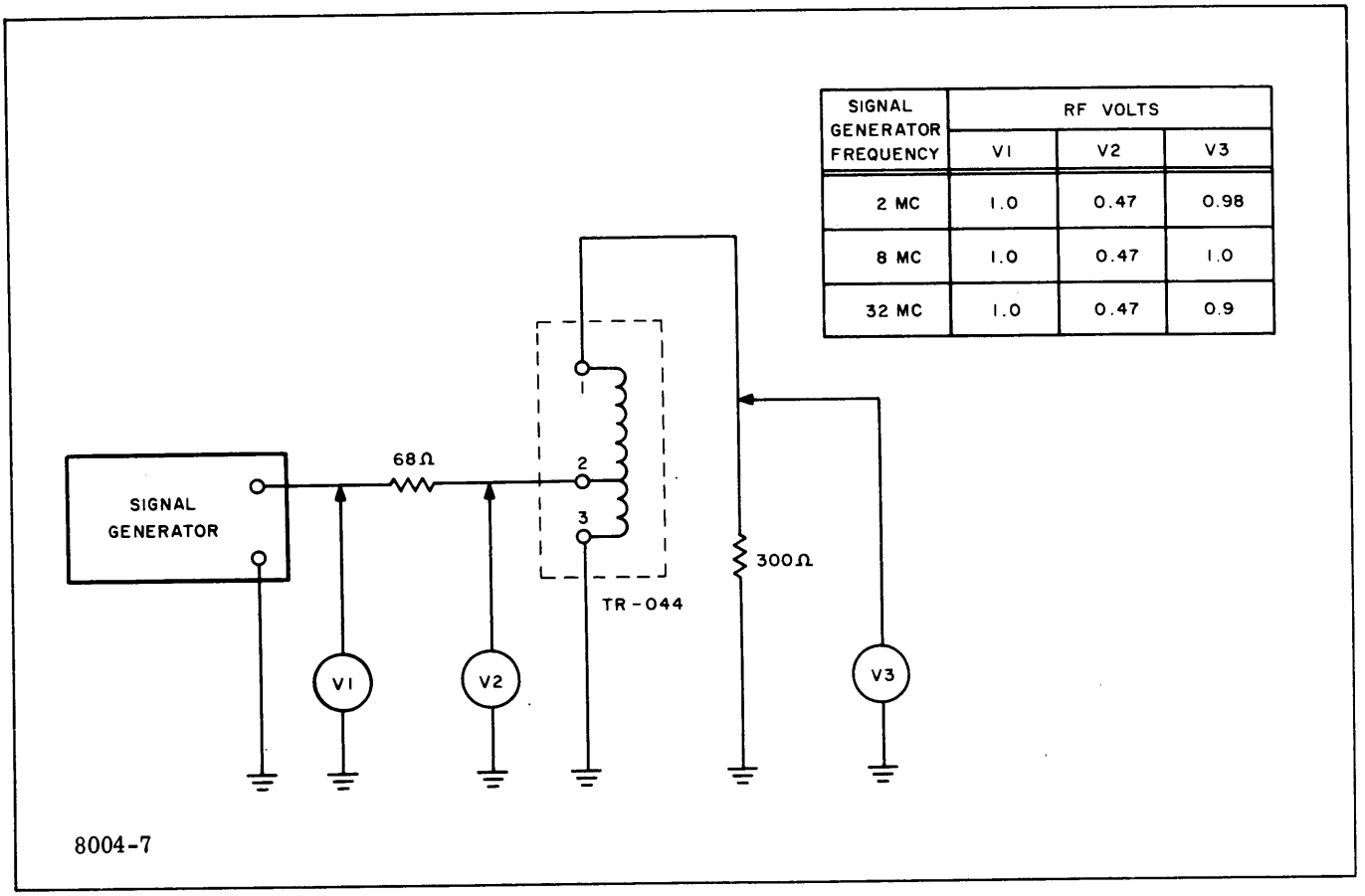


Figure 7. Model VRA-6, Test Setup

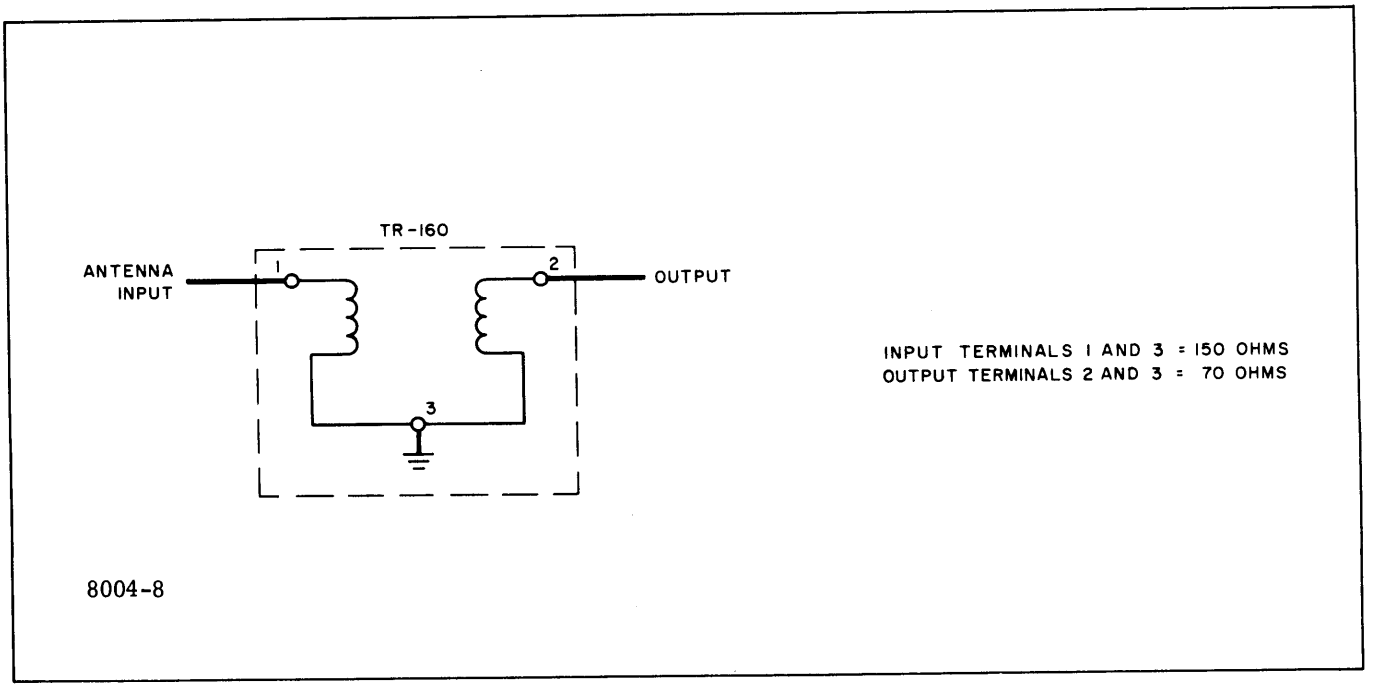


Figure 8. Model VRA-7, Test Setup

PARTS LIST

MODELS, VRA-5, VRA-6, VRA-7

ITEM (FIGURE 9)	DESCRIPTION	QUANTITY PER UNIT	TMC PART NO.
1	Cap	1	PO-215-3
2	Connector, Antenna	1	FP-143
3	Connector, Ground	1	FP-144
4	Connector, Output	1	UG-58A/U
5	Dessicant	1	AD-101-1/6
6	Gasket, Cover	1	GA-103
7	Gasket, Insulator	1	GA-138-4
8	Gasket, Insulator, Cap	1	GA-138-3
9	Gasket, Insulator, Support	1	GA-138-5
10	Holder, Dessicant	1	MS-933
11	Insulator, Mast Support	1	PX-612
12	Insulator, Porcelain	1	NS-131
13	Post, Antenna	1	PG-216-1
14	Post, Spark Rod	1	PM-102
15	Rod, Spark	1	PM-103
16	Stud, Insulator	1	SM-149
17	Transformer, RF (Model VRA-5)	1	TR-042
	Transformer, RF (Model VRA-6)	1	TR-044
	Transformer, RF (Model VRA-7)	1	TR-160

LOOSE ITEMS

MODELS VRA-5, VRA-6, VRA-7

DESCRIPTION	QUANTITY PER UNIT	TMC PART NO.
Antenna Whip, Aluminum (Models VRA-5, VRA-6)	1	AW-100-3
Antenna Whip, Aluminum (Model VRA-7)	1	AW-100-6
Bolt, Lag	3	SC-111-2
Bolt, Machine	4	SCHR57 16SS16
Bracket, Unit Mounting	4	MS-619
Plate, Unit	1	MS-545
Washer, Lock Split	4	LW37MSS

FIBERGLASS ANTENNA PARTS LIST

MODELS VRA-5, VRA-6

DESCRIPTION	TMC PART NO.	NOMENCLATURE	FEDERAL STOCK NO.
Adaptor, Antenna to Antenna base (Models VRA-5, VRA-6)	PM-1018		
Antenna Whip, Fiberglass (Models VRA-5, VRA-6)	AW-103		
Antenna, Element Fourth Section	PX-834-4	AT-1039/U	5985-733-6042
Antenna, Element Third Section	PX-834-3	AT-1040/U	5985-733-6043
Antenna, Element Second Section	PX-834-2	AT-1041/U	5985-733-6044
Antenna, Element Lower Section	PX-834-1	AT-1042/U	5985-733-6045

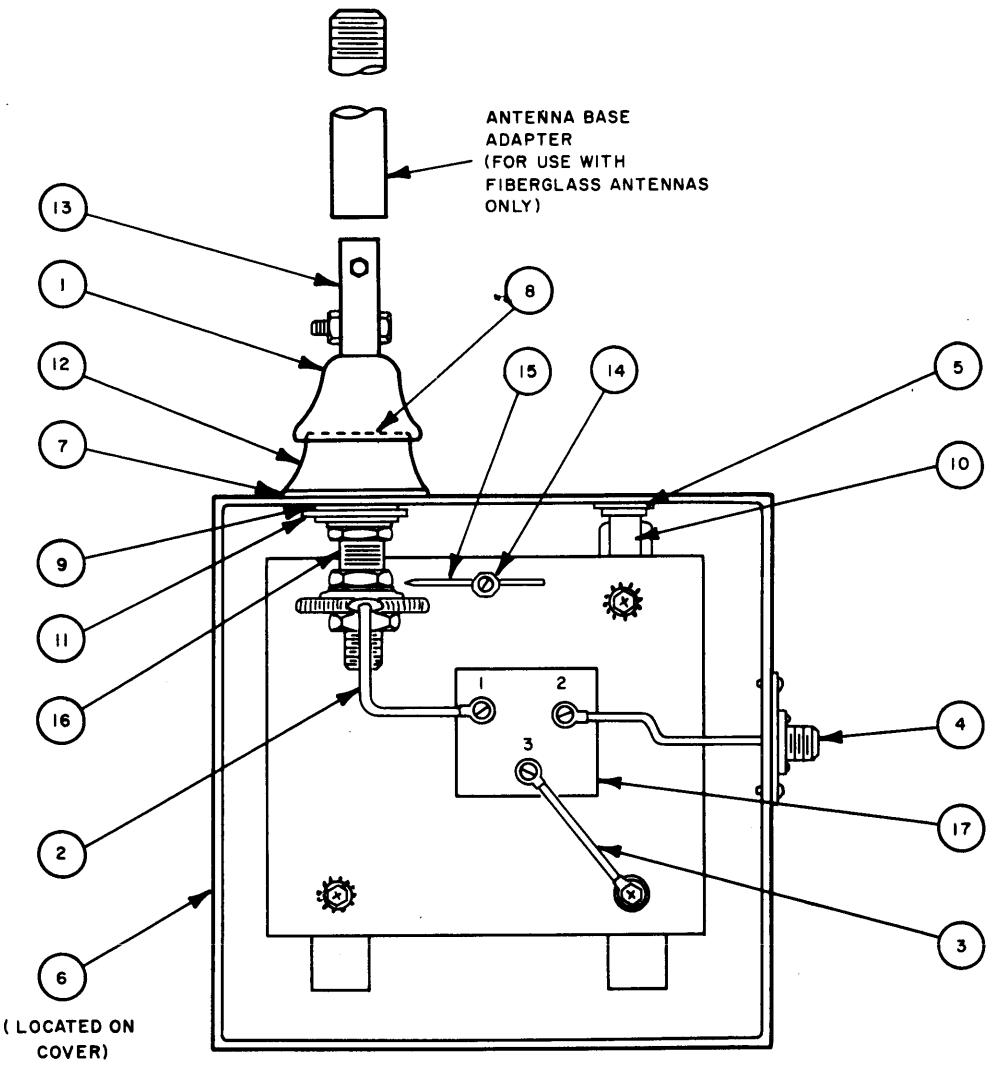


Figure 9. Model VRA, Cover Removed Showing Internal Parts