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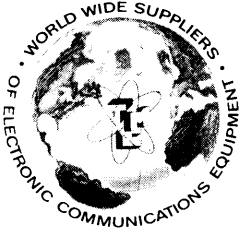
Issue Date: August 1989

## **TECHNICAL MANUAL**

**Antenna Terminator/Dummy Load (500W)**

**Model TER-500**

**The Technical Materiel Corporation**  
700 Fenimore Road  
Mamaroneck, New York 10543-0142 U.S.A.



**PLEASE READ THIS FIRST**

Dear TMC product user:

Thank you for purchasing the TMC Model TER-500 Antenna Terminator/Dummy Load. This model is one of a series of eight different types that provide high-purity resistive terminations for either routine off-the-air testing of transmitters or for such antenna arrays as rhombics or sloping-Vs. The complete series operate in the DC to 30MHz frequency range at power ratings from 500 watts to 300,000 watts.

The antenna terminator, or dummy load as it is frequently called, is described in detail in the enclosed technical manual. This publication provides important information about using TMC equipment. Please read it.

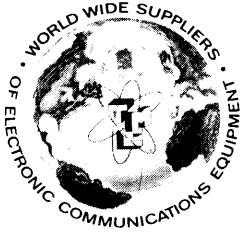
If you need additional data or some specific technical information, please give our Customer Service a call at (914) 698-4800 or return the business reply form provided in this package. Our FAX (facsimilie) number is (914) 698-4805.

If you are missing any items, please contact TMC directly or through your local TMC sales office.

Thank you for selecting the TMC Model TER-500 antenna terminator/dummy load.

**The Technical Materiel Corporation**  
Product Marketing

**THE TECHNICAL MATERIEL CORPORATION**



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## Warranty

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The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment - except electron tubes, semi-conductor devices, fuses, lamps, batteries, and articles made of glass or other fragile or expendable materials - purchased hereunder to be free from defect in workmanship and materials under normal use and service, when used for the purposes for which the same is designed, for a period of ONE YEAR from the date of delivery FOB factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, FOB factory, which may fail within the stated warranty period, provided:

- Any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction;
- The defect is not the result of damage incurred in shipment from or to the factory;
- The equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise; and
- Any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

At TMC's option, any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid and the TMC RETURN AUTHORIZATION number clearly marked on the package. Electron tube warranty claims should be made directly to the manufacturer of such tubes since tubes furnished by TMC bear only the manufacturer's warranty.

No warranties, expressed or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the purchaser's sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of such equipment, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

All inquiries should be directed to the following:

### **THE TECHNICAL MATERIEL CORPORATION**

Customer Service  
700 Fenimore Road  
Mamaroneck, New York 10543 U.S.A.

Telephone 914-698-4800  
Facsimile (FAX) 914-698-4805  
Telex 137-358 TECHMAT MECK

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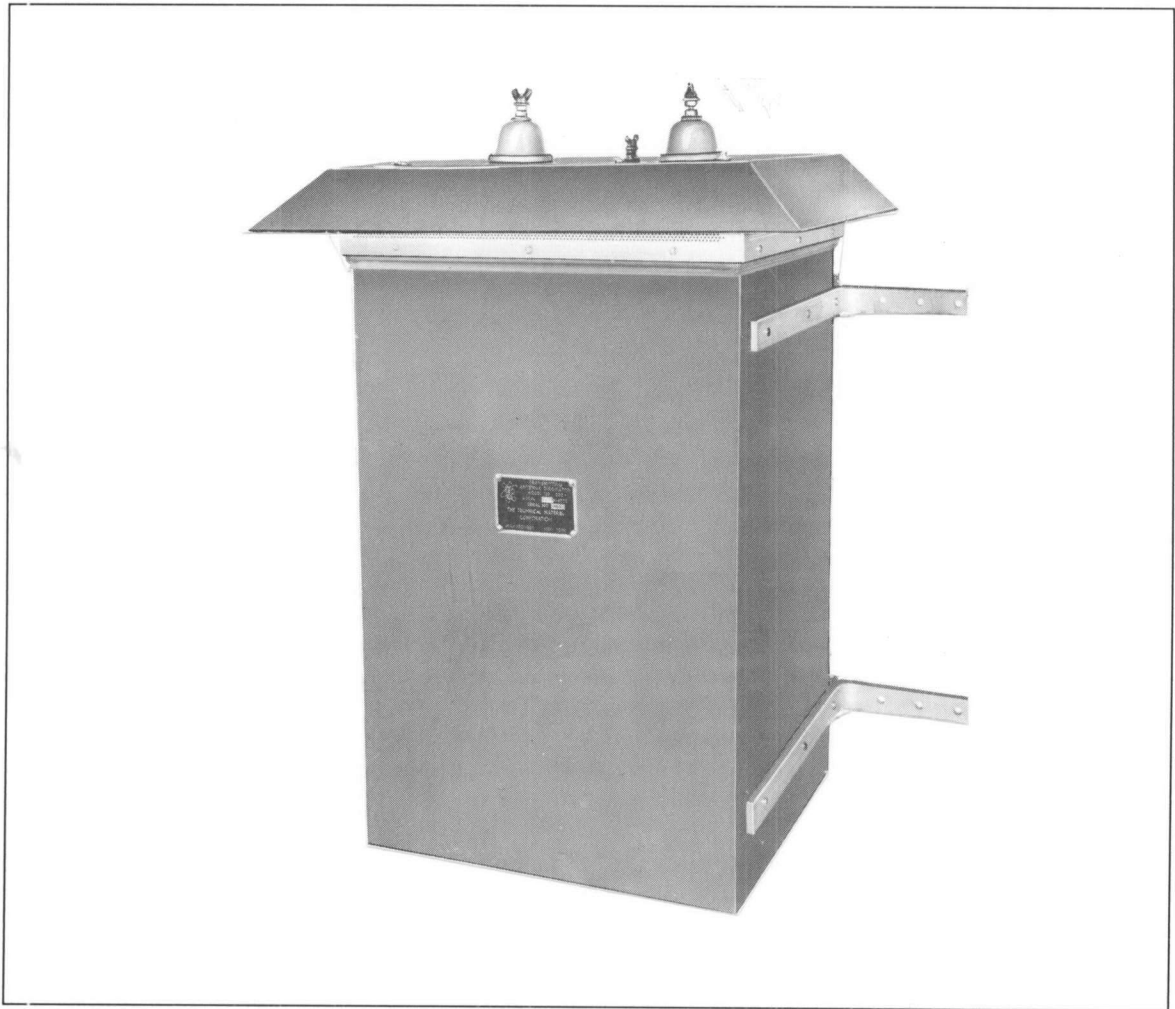
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**Model TER-500 Antenna Terminator/Dummy Load**



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## Section 1 - General Description

### 1.1 Functional Description

#### 1.1.1 Overview

The TER-500 Transmitting Antenna Coupler is a broadband, high-capacity dummy load used for routine off-the-air testing of a transmitter or as a purely resistive termination for rhombic or other antenna systems. The TER-500 provides a flat, resistive termination and is capable of dissipating RF energy in the order of 500 watts average or 1,000 watts PEP over the frequency range of DC to 30MHz. This power rating, however, is conservative since the TER-500 can be operated at higher levels on a limited duty cycle basis.

#### 1.1.2 Major Assemblies

The TER-500 coupler consists of two low-reactance glass resistors housed in a re-inforced fiberglass case for operation in any ambient environment from -50°C to +75°C. Spark gaps provide protection against static electricity on the antenna as well as lightning discharge. Mounts are provided for either pole or wall mounting. Since no maintenance is required, the dummy load may be placed in any isolated area, such as an antenna farm. Outline and mounting dimensions of the TER-500 are shown in Figure 2.2.

#### 1.1.3 Input/Output Characteristics

Several models of the TER-500 are available: a 600-ohm balanced version; 50-ohm unbalanced version; or 70-ohm unbalanced version. The models are differentiated by an option number added to the TER-500 designation. These options, listed in Section 1.4, reflect the type of internal resistor assembly used.

### 1.2 Physical Description

#### 1.2.1 Equipment Mounting

The TER-500 is designed for either pole or bulkhead mounting. Two mounting plates with the necessary lag bolts welded on are provided. These plates bolt directly to the pole or bulkhead and mate directly with two horizontal brackets welded to the TER enclosure.

#### 1.2.2 Balanced RF Connections (600-ohm model)

The balanced connectors consist of two Mycroy<sup>R</sup> bowls mounted on the top of the dummy load case. Standard threaded rods with stainless steel nuts and flat washers are used to secure the feed lines. The center-tapped ground lug is positioned between the two bowls.

#### 1.2.3 Unbalanced RF Connections

Several unbalanced connectors are available for the unbalanced TER units and are mounted at the top of the TER case. Although a standard QDL assembly is normally provided, different choices are available depending on the installation. Refer to Section 1.4 or the TMC Connector Products Catalog for other connector assemblies.

## 1.3

### Technical Specifications

#### Frequency Range

DC to 30MHz

#### RF Power Dissipation Rating

1,000W PEP/500W Average.

#### Terminating Impedance Ratings

600-ohm balanced, center-tapped is standard

50-ohm unbalanced or 70-ohm unbalanced optional.

Other ratings are available to suit specific applications.

#### RF Fittings - Unbalanced Coaxial

QDL-type standard. Optional C, HN, LC, QDS, UHF or EIA type assemblies with others available depending on application. (See chart Section 1.4)

#### RF Fittings - Balanced Bowls

Twin Mycroy<sup>R</sup> bowls on 12-inch centers. Center-tapped lug to ground.

#### Mean-Time-Between-Failure

In excess of 100,000 hours.

### Operating Features

#### Cooling

Convection, no fans or moving parts

#### Ambient Conditions

-50°C to +75°C; Up to 100% R.H. Storage -50°C to +80°C

#### Primary Power

Passive device. No external power is required.

#### Size and Weight

Main enclosure: 15W x 13D x 24.75H inches (38.1W x 33.0D x 62.9H cm)

Tapers 10% to 13W x 12D (33.0W x 30.5D cm) at base of enclosure.

Top hat: 20.25W x 16D x 2.24H inches (51.4W x 40.6D x 5.7H cm)

Bowls extend 6 inches off top hat; Mounting brackets extend 8 inches off sides.

16 pounds (7.3 Kg); Shipping weight approximately 23 pounds

Shipping cube approximately 10.6 cu.ft. (38W x 15.9D x 30.2H inches)

#### Mounting

Rear brackets (4) bolted to main enclosure for pole, platform or tower mounting.

### Special Features

#### Resistor Composition

Glass case cylinders with resistive element electrofused onto surface and covered with a baked silicone protective coating. Fired-on silver bands to assure positive connections. Each resistor is spiral cut to insure even heat dissipation.

#### Safety

External spark gap for protection against static charges and lightning.

#### Components and Construction

Totally solid state resistor assembly, mounted internally to a reinforced aluminum case that is protected from the environment. External hardware is stainless steel.

## 1.4 TER Product Group

<b>TER-500</b>	<b>Antenna Terminator/Dummy Load, 500W Average</b>
<b>TER-1.8K</b>	<b>Antenna Terminator/Dummy Load, 1.8KW Average</b>
<b>TER-4K</b>	<b>Antenna Terminator/Dummy Load, 4KW Average</b>
<b>TER-5K</b>	<b>Antenna Terminator/Dummy Load, 5KW Average</b>
<b>TER-18K</b>	<b>Antenna Terminator/Dummy Load, 18KW Average</b>
<b>TER-25K</b>	<b>Antenna Terminator/Dummy Load, 25KW Average</b>
<b>TER-100K</b>	<b>Antenna Terminator/Dummy Load, 100KW Average</b>
<b>TER-300K</b>	<b>Antenna Terminator/Dummy Load, 300KW Average</b>

### Terminating Assembly Options:

Note: Unless options are specified, all models except the TER-100K and TER-300K are 600-ohm balanced and use twin porcelain bowl assemblies. The TER-100K and TER-300K are 50-ohm unbalanced and are supplied with 6-1/8 inch EIA flange assemblies.

#### **Balanced 600-ohm Operation:**

- |                                 |       |  |
|---------------------------------|-------|--|
| ● Microy <sup>R</sup> Bowls (2) | /600B | For TER-500 and TER-1.8K                   |
| ● Porcelain Bowls (2)           | /600B | For all other models except TER-100K/-300K |

#### **Unbalanced 300-ohm Operation:**

- |                            |       |              |
|----------------------------|-------|--------------|
| ● Microy <sup>R</sup> Bowl | /300U | For TER-1.8K |
| ● Porcelain Bowl           | /300U | For TER-5K   |

#### **Unbalanced 50-ohm and 70-ohm Operation:**

- |                          |          | 50-ohm | 70-ohm |
|--------------------------|----------|--------|--------|
| ● C connector            | (Note 1) | /286-1 | /286-3 |
| ● HN connector           | (Note 1) | /285-1 | /285-3 |
| ● QDS connector          | (Note 1) | /289-1 | /289-3 |
| ● UHF connector          | (Note 1) | /281-1 | /281-3 |
| ● 1-5/8 inch EIA flange  | (Note 2) | /272-1 | /271-1 |
| ● LC -type connector     | (Note 2) | /287-1 | /287-5 |
| ● QDL-type connector     | (Note 2) | /273-1 | /273-3 |
| ● 3-1/8 to 1-5/8 adapter | (Note 3) | /278   | /279   |

- |        |   |
|--------|---|
| Note 1 | Model TER-500 only.                         |
| Note 2 | Models TER-500, TER-1.8K, TER-4K and TER-5K |
| Note 3 | Models TER-18K and TER-25K                  |

To order, specify both model and option. Example: TER-5K/272-1.
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## Section 2 - Installation

### 2.1 Initial Inspection

#### 2.1.1 General

The TER-500 is shipped in one container and is completely assembled at the time of delivery from the factory. Every TER-500 undergoes a thorough testing prior to shipment. Upon receipt of the unit, check the packing case and its contents for obvious damage. Unpack the equipment carefully to reduce the risk of damage and to avoid misplacing any parts shipped as loose items. See Table 2.1 for a list of the loose items.

#### 2.1.2 Damage By Carrier

With respect to equipment damage for which the carrier is liable, TMC will assist in describing methods of repair as well as furnishing replacement parts.

### 2.2 Electrical Installation

#### 2.2.1 General

Each unit has been factory tested and arrives ready for immediate installation and operation. No preliminary adjustments are necessary.

#### 2.2.2 Mounting

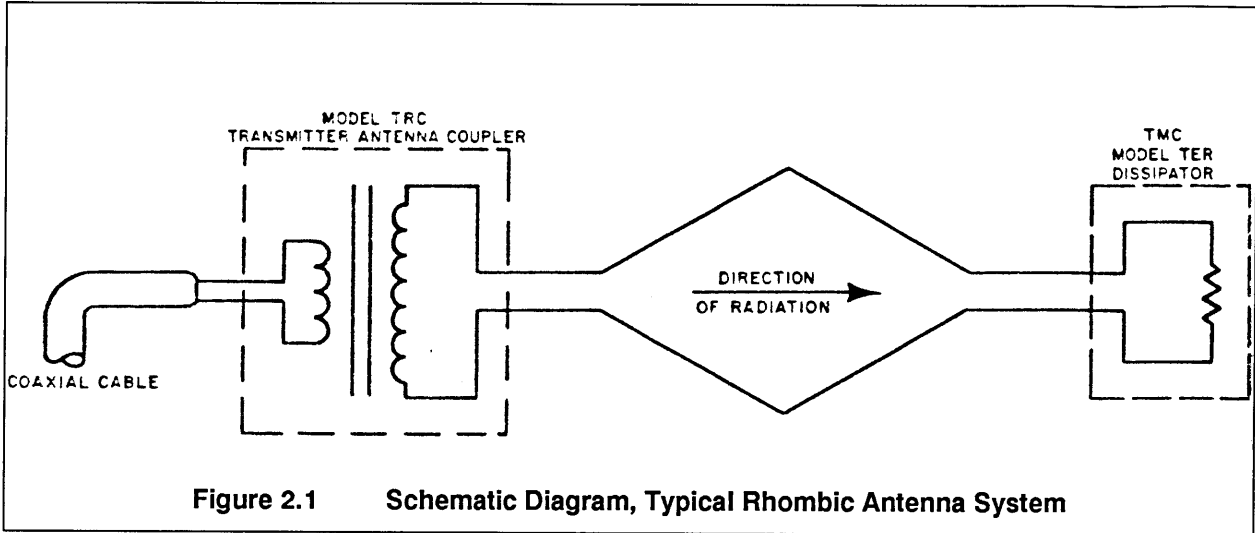
The TER-500 is designed for either pole or wall mounting. Two mounting brackets attached to the unit case are used to mount to a pole or bulkhead with four lag bolts. Figure 2.2 illustrates the necessary outline and mounting dimensions of the TER-500. Figure 2.1 is a schematic illustration of a typical rhombic antenna system in conjunction with the TER-500.

#### 2.2.3 External Balanced Connections

The two input leads are connected to the two insulator bowl terminal connectors of the TER-500. These bowls are located on the top of the TER case.

#### 2.2.4 External Unbalanced Connections

The coaxial lead-in cable is connected to the TER-500 RF connector assembly located on the top of the case.



**2.3 Performance Check**

**2.3.1 General**

When the appropriate RF connections to the antenna or the transmitter output have been made, the TER-500 is ready for use. No further steps are required.

**Table 2.1 - Loose Items Supplied**

<u>TMC Part Number</u>	<u>Description</u>	<u>Quantity</u>
SC111-2	Lag Bolt	12 each
FW50HBN	Flat Washer	12 each
203016	Technical Manual	1 each

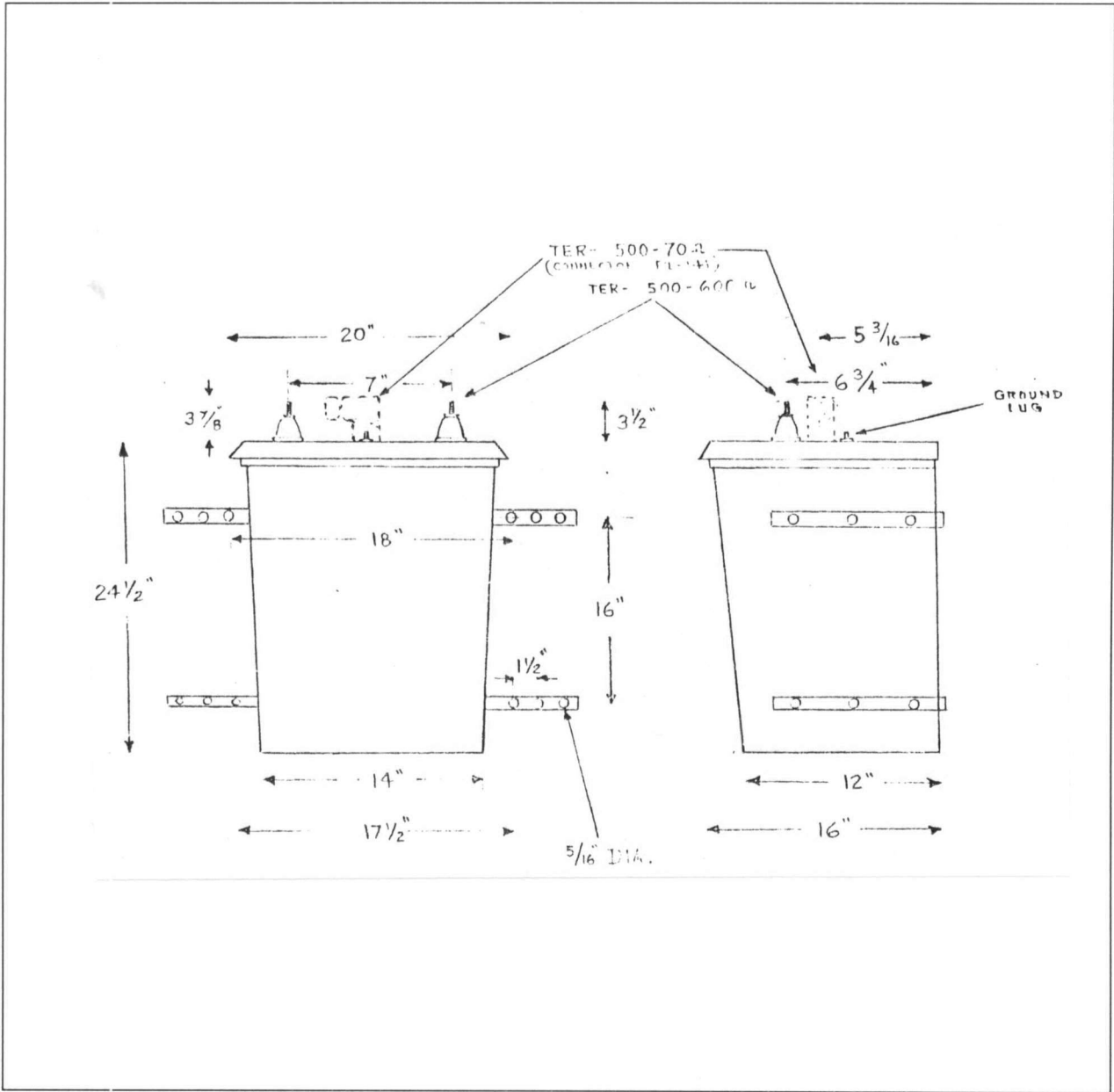


Figure 2.2 Outline Drawing with Mounting Dimensions

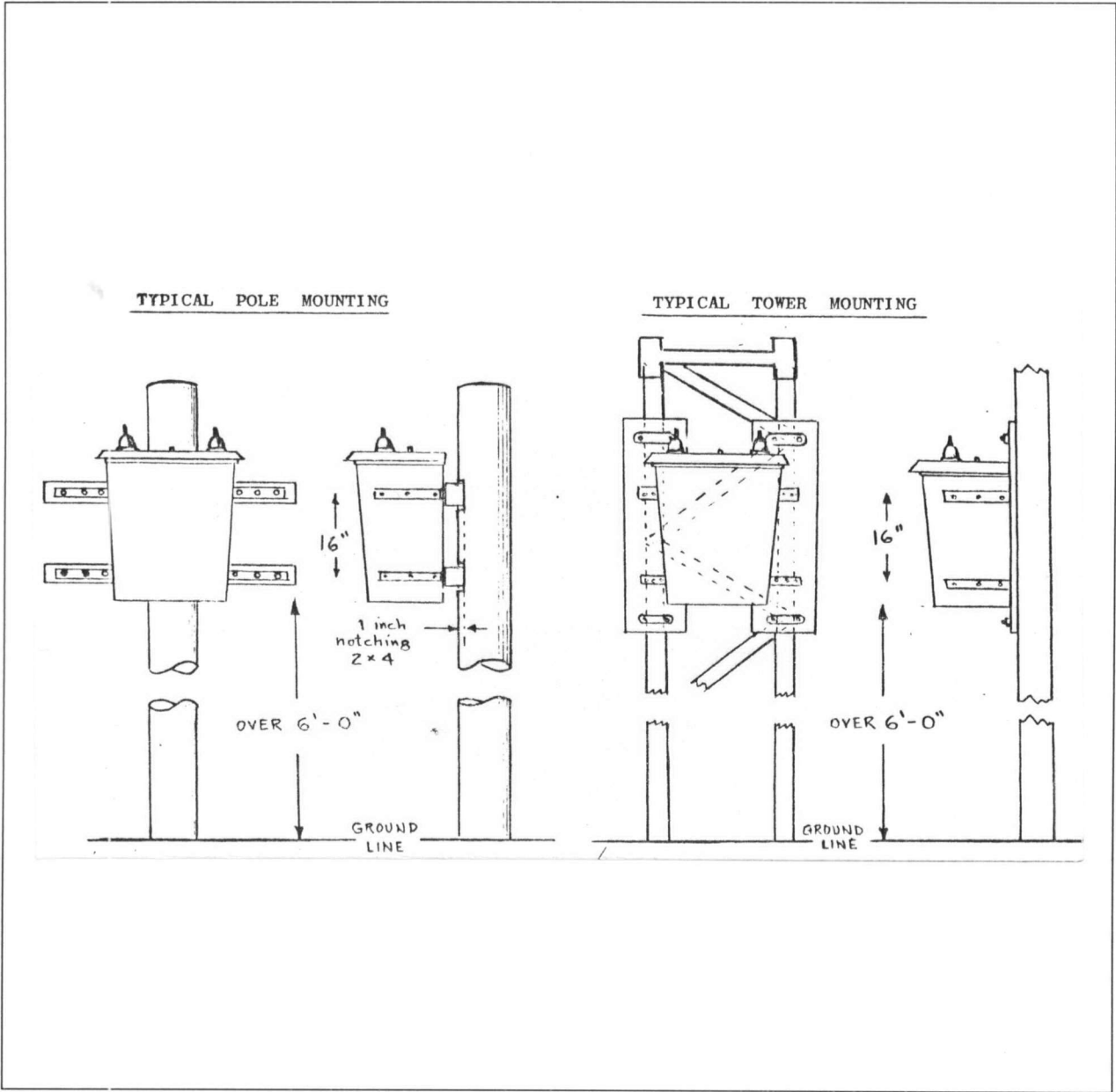


Figure 2.3 Typical Pole and Tower Mounting

## Section 3 - Operation

### 3.1 General

After connecting the balanced leads or coaxial lead-in cable, as described in **Section 2 - Installation**, no further operating procedures are required. The TER-500 is now fully operational without further adjustment.

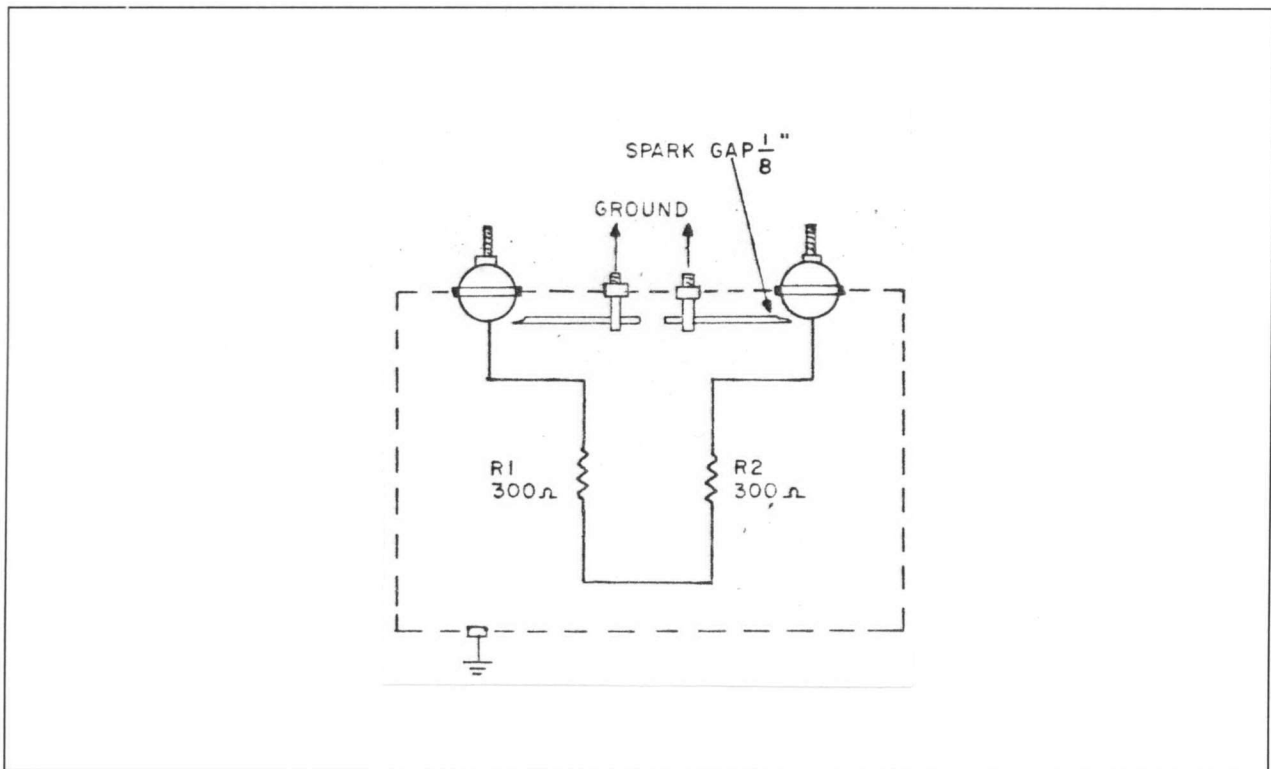


Figure 3.1 Schematic Diagram (Model TER-500/600B)



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## Section 4 - Maintenance

### 4.1 General

Due to the simplicity of construction and design of the TER-500, maintenance may simply consist of looking for secure connections and unit cleanliness.

### 4.2 Preventive Maintenance

#### 4.2.1 General Cleaning Methods

Preventive maintenance for the TER consists of routine functions such as visual inspection and cleaning. Periodic cleaning is recommended as dust may build up on components, reducing the efficiency of the coupler unit and possibly causing circuit failure. To facilitate cleaning the unit, use a vacuum cleaner or a low-pressure filtered compressed-air supply.

#### 4.2.2 Visual Check

A simple visual check of the unit when it is opened up for servicing or cleaning will often reveal potential trouble spots and thereby reduce downtime due to component failure. Signs of trouble may be found in discoloration, warped printed circuit boards and damaged wiring or cables. Any deteriorating component should be replaced immediately. All hardware should be checked for tightness during preventive maintenance inspections.

### 4.3 Troubleshooting

#### 4.3.1 General Failure Symptoms

During operation of the TER, the following failure symptom may be observed:

- High VSWR at the transmitter

Possible Cause:	Transmitter failure (Output affected)
Remedial Action:	Refer to transmitter or transceiver manual

Possible Cause:	Interconnection, dummy load to transmitter
Remedial Action:	Check the RF coaxial cable between the transmitter and load.

Possible Cause:	Interconnection, antenna termination
Remedial Action:	Check the twin RF leads between the load and the antenna.

Possible Cause:	Antenna fault
Remedial Action:	Check for a fault in the antenna system. Make certain all of the RF connections are securely fastened.

## 5.4 Repair

Repair work generally consists of replacing the defective component. The following cautions should be observed:

- Make sure the replacement component is an exact duplicate of the defective one.
- Place any new component in the same location as the component it replaces.

**The TER-500 is unique in that only one electrical assembly is used. Other than external components such as the spark gap protection assemblies and the hardware, repair is rarely needed. In the event the internal resistor bank fails - a direct lightning hit would do it - the case may be opened and the entire assembly replaced. Factory repair of the TER-500 is also available.**

## Section 5 - Parts Lists

Table 5.1 Replacement Spare Parts List

Part Number	Description	Used On	Qty
CU178	Retainer, Clip	TER500- 600	4
FP156	Case Mounting, Bracket	"	4
GA118	Gasket, Insulator	"	8
GA126	Gasket, Inner	"	4
GA137-1	Neoprene Gasket	"	1
GA137-2	" "	"	2
GA137-3	" "	"	1
GA138-1	Gasket	"	8
NS112-1	Insulator, Feed Thur	"	4
NS112-2	" "	"	4
NS115	Insulating, Cap	"	4
PM380	Post	"	2
PM381	Spark Rod	"	2
PX316	C.T. Insulator	"	1
PX344	Mount, Resistor Insulator	"	4
RR138-300	Resistor, Fixed 250 W	"	2
RY112	Rubber Bushing	"	4
SC111-2	Bolt, Lag	"	12
SC128-1024-8	Screw, Knurled Head	"	2
SC128-1024-12	" "	"	2