

INSTRUCTION BOOK FOR

BIRO

**SERIES 6730A
TERMALINE® WATTMETER**

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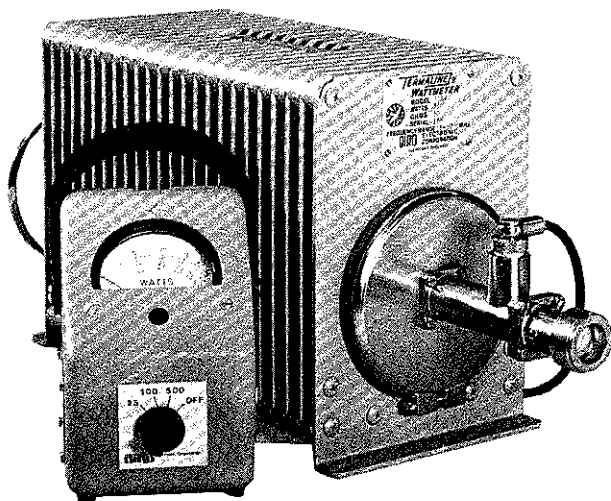
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MODELS COVERED IN THIS INSTRUCTION BOOK

6732A	6734A-030	6736A	6737A
6734A	6735-300A	6736-030A	6737-030A

INSTRUCTION BOOK FOR
SERIES 6730A
TERMALINE® WATTMETER



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SAFETY PRECAUTIONS

The following are general safety precautions that are not necessarily related to any specific part or procedure and do not necessarily appear elsewhere in this publication.

Keep away from live circuits.

Operating personnel must at all times observe normal safety regulations. Do not attempt to replace parts or disconnect an RF transmission or any other high voltage line while power is applied. When working with high voltage always have someone present who is capable of rendering aid if necessary. Personnel working with or near high voltage should be familiar with modern methods of resuscitation.

Warning: Warning notes call attention to a procedure which, if not correctly performed, could result in personal injury.

Caution: Caution notes call attention to a procedure which, if not correctly performed, could result in damage to the instrument.

The following will appear in the text of this publication and are shown here for emphasis.

WARNING

Before applying RF power to the Models 6735-300A or 6736A be sure to remove the shipping plug, P/N 2450-049 located near or on top of the radiator. Replace the shipping plug with the supplied breather vent plug, P/N 2450-094. This is important as internal pressure build-up, caused by expansion of the heated dielectric coolant, could cause damage to the equipment and injury to the operator.

CAUTION

Model 6735-300A is rated for 1200 W operation for a maximum of 1/2 hour only. For continuous operation, the maximum wattage should be restricted to 1000 W. It is recommended that if frequent use above 1000 W is contemplated, the instrument be equipped with the thermoswitch assembly.

WARNING

Do not attempt to operate the TERMALINE® Wattmeter for prolonged periods at higher than read load levels. Damage to the equipment and injury to operator may result.

WARNING

Never attempt to disconnect any RF equipment from the transmission line while RF power is being applied. Leaking RF energy is a potential health hazard.

CAUTION

Do not replace coolant with anything but the specified fluid. The inner shell of the resistor housing is contoured to the dielectric properties of this fluid. The use of any other type of coolant will affect the electrical performance of the load.

TABLE OF CONTENTS

	Page
SAFETY PRECAUTIONS	i
INTRODUCTION	
Purpose and Function	v
Performance Characteristics and Capabilities	v
Dimensions and Weight	v
Power and Utility Requirements	v
Environmental Requirements	v
Items Furnished	vi
Items Required	vi
Tools and Test Equipment	vi
SECTION I - INSTALLATION	
General	1
SECTION II - THEORY OF OPERATION	
General	4
Cooling	5
SECTION III - OPERATING INSTRUCTIONS	
Use and Function of Controls	8
Initial Adjustment and Control Settings	8
Start-Up	8
Normal Operation	8
Operation Under Emergency, Adverse or Abnormal Conditions	8
Shutdown	9
Emergency Shutdown	9
SECTION IV - MAINTENANCE	
Troubleshooting	10
Cleaning	11
Inspection	11
Preventive Maintenance	11
Load Evaluation	11
Disassembly	12
Reassembly	15
Repairs	15

TABLE OF CONTENTS [CONT.]

Page

SECTION V - PREPARATION FOR RESHIPMENT

Load Portion	17
Meter Portion	17
Low Frequency Line Section	17

SECTION VI - STORAGE

General	18
---------------	----

SECTION VII - REPLACEMENT PARTS LIST

Series 6730A	19
Models 6732A/34A/36A/37A	19
Models 6734A-030/36-030A/37-030A	19
Model 6732A	19
Models 6734A and 6734A-030	20
Model 6735-300A	20
Models 6736A and 6736-030A	20
Models 6737A and 6737-030A	21

ILLUSTRATIONS

Thermoswitch	3
Schematic Diagram for Models 6734A-030, 6736-030A, 6737-030A	6
Schematic Diagram for Models 6732A/34A/36A/37A and 6735-300A	7

TABLES

Specifications	vii
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SERIES 6730A TERMALINE® WATTMETERS

INTRODUCTION

PURPOSE AND FUNCTION

A Series 6730A TERMALINE® Wattmeter is a portable direct reading absorption wattmeter that both measures and dissipates RF power. It is a self-contained unit that requires no outside power source or additional equipment, except for Models 6737A and 6737-030A which must have auxiliary water cooling. The load portion forms an accurate, dependable and practically non-reflective 50 ohm termination for the adjustment, standby and testing of transmitters under nonradiating conditions.

PERFORMANCE CHARACTERISTICS AND CAPABILITIES

These TERMALINE® Wattmeters can safely measure and absorb their maximum rated RF power. The low frequency units will measure power to within ± 5 percent of full scale over the frequency band of 2 to 32 MHz. The rest of their frequency range permits power measurement to ± 10 percent of full scale. The high frequency units measure to ± 5 percent of full scale from 25 to 512 MHz and ± 10 percent of full scale from 512 to 1000 MHz. Each meter has three switch selectable scales and is housed separately from the load.

DIMENSIONS AND WEIGHT

The dimensions of the individual loads are given in the Specifications, see Page vii. The meter housings are 5-9/16 inch W x 6-1/2 inch H x 4-11/64 inch L (141 x 165 x 106 mm). The total weight for each wattmeter is also give in the Specifications. The shipping weights will run approximately 20 percent higher.

POWER AND UTILITY REQUIREMENTS

The Series 6730A TERMALINE® Wattmeters require no external source of electrical power, other than the RF input power, for operation. The Models 6730A and 6737-030A do however, depend on a supplemental water supply for cooling.

ENVIRONMENTAL REQUIREMENTS

These wattmeters should be operated in a dust and vibration free environment. The ambient temperature range should remain between -40°C and $+45^{\circ}\text{C}$ (-40F and $+113\text{F}$) for proper operation. Allow at least 6 inch (150 mm) of clearance around the units to permit an unimpeded access of natural air convection currents for adequate heat dissipation.

ITEMS FURNISHED

Each wattmeter, with the exception of the low frequency Models 6734A-030, 6736-030A and 6737-030A is furnished with a spare crystal diode assembly stored behind the "spare diode" cap on the lower left-hand front of the meter face. Because of their markedly different shape there is no way of storing a crystal assembly in a spare diode compartment of a low frequency model. Therefore, they are not supplied with a spare. Models 6734A-030, 6736-030A and 6737-030A are equipped; however, with a different type of line section, P/N 6734-034. This line section can also be ordered as an option to convert Models 6734A, 6736A or 6737A into the low frequency (-030A) versions. The load portion of all models is factory prefilled with the proper amount of coolant. Model 6735-300A can be equipped with an overtemperature thermoswitch, P/N 2450-056, if desired. This instruction book is the only additional item and is furnished with all models.

ITEMS REQUIRED

A matching connector to the wattmeter is needed on the coaxial transmission line. Water cooled Models 6737A and 6737-030A must also have a conveniently located water supply and a drain.

TOOLS AND TEST EQUIPMENT

Only simple tools such as screwdrivers will be necessary for disassembly of this equipment. A resistance bridge or ohmmeter with an accuracy of 1 percent, or better at 50 ohms is useful for checking the resistance value of the RF section assembly.

SPECIFICATIONS FOR 6730A SERIES TERMALINE® WATTMETER

Impedance	50 ohms nominal
VSWR	
Models 6734A-030, 6736-030A, 6737-030A	1.10:1.00 max. dc:35 MHz
Models 6732A, 6734A, 6735-300A, 6736A, 6737A	1.15:1.00 max. dc:1000 MHz
Accuracy	
Models 6734A-030, 6736-030A, 6737-030A	±5% of FS 2-32 MHz ±10% of FS 1.5-2 & 32-35 MHz
Models 6732A, 6734A, 6735-300A, 6737A .	±5% of FS 25-512 MHz ±10% of FS 512-1000 MHz
Ambient Temperature	-40°C to +45°C (-40F to +113F)
Cooling Method	
All Models	Oil dielectric & air convection currents---
Models 6737A & 6737-030A	---plus supplemental water cooling
Operating Position	
All Models (except 6737A & 6737-030A) ..	Horizontal
Models 6737A & 6737-030A	Vertical - connector down with water
Finish	Light navy grey baked enamel (MIL-E-15090)

SPECIFICATIONS FOR 6730A SERIES TERMINALINE® WATTMETER [CONT.]

MODEL	MAX PWR	WATTS SCALE	FREQ MHZ	CONN	OVERALL DIMENSIONS INCHES	WEIGHT LBS/KG	LOAD	METER
6732A	250	10/50/ 250	25-1000	N-F	12-5/8"L X 8-1/2"H X 5-15/16"W (321 X 216 X 151 mm)	16/7.3	8141	6732-002-1
6734A	500	25/100/ 500	25-1000	N-F	19-15/16"L X 8-1/2"H X 5-15/16"W (506 X 216 X 151 mm)	27/12.2	8201	6732-002-2
6734A-030	500	25/100/ 500	1.5-35	N-F	19-15/16"L X 8-1/2"H X 5-15/16"W (506 X 216 X 151 mm)	27.5/12.5	8201	6732-002-3
6735-300A	1200*	120/600/ 1200	25-1000	LC-F	26-1/8"L X 17-3/16"H X 7-1/8"W (664 X 437 X 181 mm)	63/28.6	8630- 300	6735-202-2
6736A	1000	50/250/ 1000	25-1000	LC-F	21"L X 8-1/2"H X 5-15/16"W (533 X 216 X 151 mm)	30/13.6	8251	6735-202-5
6736-030A	1000	50/250/ 1000	1.5-35	LC-F	21"L X 8-1/2"H X 5-15/16"W (533 X 216 X 151 mm)	30.5/13.8	8251	6735-202-8
6737A	200/500/2 500**	100/500/ 2500	25-1000	LC-F	20-13/16"L X 8-1/2"H X 5-15/16"W (529 X 216 X 151 mm)	33/15.0	8230	6735-202-3
6737-030A	200/500/2 500**	100/500/ 2500	1.5-35	LC-F	20-13/16"L X 8-1/2"H X 5-15/16"W (529 X 216 X 151 mm)	33.5/15.2	8230	6735-202-9

*For 1/2 hour only, for continuous operation: 1000 W.

**200 Watts vertical position, no water flow.

500 Watts horizontal position.

2500 Watts vertical position, water flowing.

SECTION I - INSTALLATION

1-1. GENERAL

1-2. Operate the load portion in the horizontal position only, with the handle or vent plug on top. The only exceptions are the Models 6737A and 6737-030A. When horizontally mounted and without supplemental water cooling, these loads will safely dissipate a maximum of 500 watts. Vertically mounted and without supplemental water cooling, they will dissipate 200 watts. Vertically mounted, with the RF connector down and with water cooling, they will dissipate up to 2500 watts continuously.

1-3. The front and rear fins are made extra thick and bent outward 90 degree to form mounting flanges. In each model, the mounting flanges have 9/32 inch (7 mm) holes near the corners to form a rectangle with the holes centered on the corners. The dimensions of the rectangle are given below:

MOUNTING LOCATION RECTANGLE

	Width	Length
6732A	5-1/8" (130.2 mm)	7-15/32" (189.7 mm)
6734A & 6734A-030	5-1/8" (130.2 mm)	12-17/32" (318.3 mm)
6735-300A	4-1/2" (114.3 mm)	20-23/32" (526.3 mm)
6736A & 6737-030A	5-1/8" (130.2 mm)	15" (381 mm)
6737A & 6737-030A	5-1/8" (130.2 mm)	12-17/32" (318.3 mm)

WARNING

Before applying RF power to the Models 6735-300A or 6736A be sure to remove the shipping plug, P/N 2450-049 located near or on top of the radiator. Replace the shipping plug with the supplied breather vent plug, P/N 2450-094. This is important as internal pressure build-up, caused by expansion of the heated dielectric coolant, could cause damage to the equipment and injury to the operator.

1-4. Models 6735-300A, 6736A and 6736-030A are supplied with special spring loaded vent plugs that are designed to open when the pressure developed by the heated coolant rises by more than a few pounds above atmospheric pressure. By this means, the pressure is relieved while at the same time foreign materials are prevented from entering the tank and contaminating the dielectric coolant. When these loads leave the factory, the vent opening is sealed with a shipping plug which is attached to the vent plug by a length of beaded chain. Before putting the load in operation, be sure to remove the shipping plug and replace it with the vent plug. Retain the shipping plug with its O-Ring for future use should it become necessary to transport the load again.

1-5. Models 6734A-030, 6736-030A and 6737-030A utilize a special low frequency line section, P/N 6734-034, which can also be ordered as an accessory to Models 6734A, 6736A and 6737A. To mount the 6734-034 in place, first remove the existing line section. Do this by unscrewing the dc cable from the voltmeter block. Next remove the four screws from the corners of the flange that is bolted to the face of the load portion. If the low frequency line section is not already equipped with its own "QC" connector, then remove the connector from the existing line section. Do this by loosening the four screws from the corners of the mounting flange and pull the connector straight out. Install it on the low frequency line section by carefully inserting the pin on the back end of the connector into the hole on the face of the line section. Then press the connector into place. Return the four mounting screws to fasten the connector in position. Now remount the line section onto the load and fasten it in place with its four mounting screws. Finally, reattach the dc cable from the meter to the voltmeter block.

1-6. On the Model 6735-300A, and overtemperature thermosthwitch, P/N 2450-056, is available as an accessory. If ordered as part of the original equipment it is factory installed.

a. If ordered subsequently it must be field installed; proceed as follows:

1. Stand the unit on its back end with the connector end up. In this position there is no danger of coolant spillage.

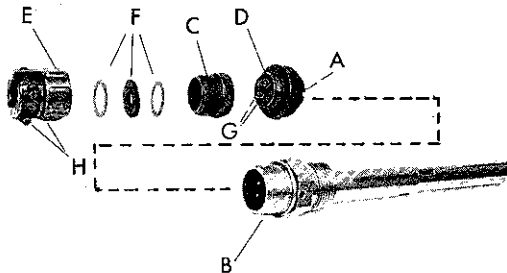
2. Use a 9/16 allen wrench to remove the socket plug on the front face of the radiator. Do this carefully to avoid damaging the threads in the plug hole.

3. With equal care replace the plug with the thermosthwitch. Use an acceptable pipe sealing compound, "Locktite with teflon" or equivalent, sparingly on the threads. Do not use ordinary plumbers pipe dope; it will contaminate the coolant! Observe closely for coolant leaks.

b. To connect the thermosthwitch, proceed as follows:

1. Unscrew the larger knurled nut (A) at the lower end of the coupling jack assembly and pull it off from the thermoswitch jack (B). Unscrew the small knurled cover fitting (C) from the base plug (D) of the connector to release the base.
 2. Thread the interlock wires through the clamp (E), with washers (F) inside, and with its threaded fitting in place. Service the interlock wire with short tips, use spaghetti sleeves over wire ends if needed. Then securely solder the interlock leads to the lugs (G) of the connector base. Note - Be sure that the larger captive clamping nut (A) is in place over the base plug (D) with the knurled end outward (towards the face).
 3. Screw on the cover ring (C) first, then fasten the cable clamp (E) in place and tighten the two yoke screws (H) on the cable. Push the plug back on the thermoswitch and tighten the captive knurled connecting ring.
- Do not attempt to operate the equipment without interlocking it with the transmitter or RF source.

FIGURE 1-1. THERMOSWITCH



1-7. Locate the load portion to provide at least six inches of free space around and above the unit. Place the load so that the shortest possible cable length connects it to the transmitting equipment.

SECTION II - THEORY OF OPERATION

2-1. GENERAL

2-2. The TERMALINE® Wattmeter circuit is basically a voltage capacitive divider with one of the capacitors being a probe whose distance from the center conductor determines its capacitive value. This probe spacing is adjusted at the factory in the calibration procedure to produce the required value and is then locked in place. The small voltage developed across the fixed capacitor is rectified by a diode. A simple RC filter eliminates any RF present and the rectified dc current is fed to the meter, see figure 2-1 or 2-2.

2-3. The wattmeter measures three separate power ranges by selectively switching in various values of resistance in series with the meter. One of the two resistors in each range is adjustable and is set and sealed at the factory during the calibration procedure. These resistors are mounted on the back of the meter itself and the range selector switch is located on the front panel of the meter housing.

2-4. The spare crystal that is supplied with Models 6732A, 6734A, 6735-300A, 6736A and 6737A is individually selected to match the characteristics of the installed crystal so that instrument calibration is not affected by substituting one for the other.

2-5. Mechanically, the wattmeter section consists of a 50 ohm line section mounted on the load. In the case of Models 6732A, 6734A, 6735-300A, 6736A and 6737A, a socket is used to hold the voltmeter cartridge that contains the crystal diode. The meter cable is screwed directly on top of the voltmeter cartridge to complete the assembly. The Models 6734A-030, 6736-030A and 6737-030A utilize a line section with an attached voltmeter block. The meter cable attaches directly on top of the voltmeter block.

2-6. The TERMALINE® load consists essentially of a carbon film resistor on a ceramic substrate immersed in a dielectric coolant. The resistor, individually selected for its accuracy, is enclosed in a special exponentially tapered housing. This provides a linear reduction in surge impedance directly proportional to the distance along the resistor. When surrounded by the dielectric coolant, the characteristic impedance is therefore; 50 ohms at the front (connector) end, 25 ohms at the mid-point, to compensate for the resistance already passed over, and zero ohms at the rear where the resistor joins the housing, forming the return conductor of the coaxial circuit. This produces a uniform, practically reflectionless line termination over the stated frequencies of the load resistor.

CAUTION

Model 6735-300A is rated for 1200 W operation for a maximum of 1/2 hour only. For continuous operation, the maximum wattage should be restricted to 1000 W. It is recommended that if frequent use above 1000 W is contemplated, the instrument be equipped with the thermosthich assembly.

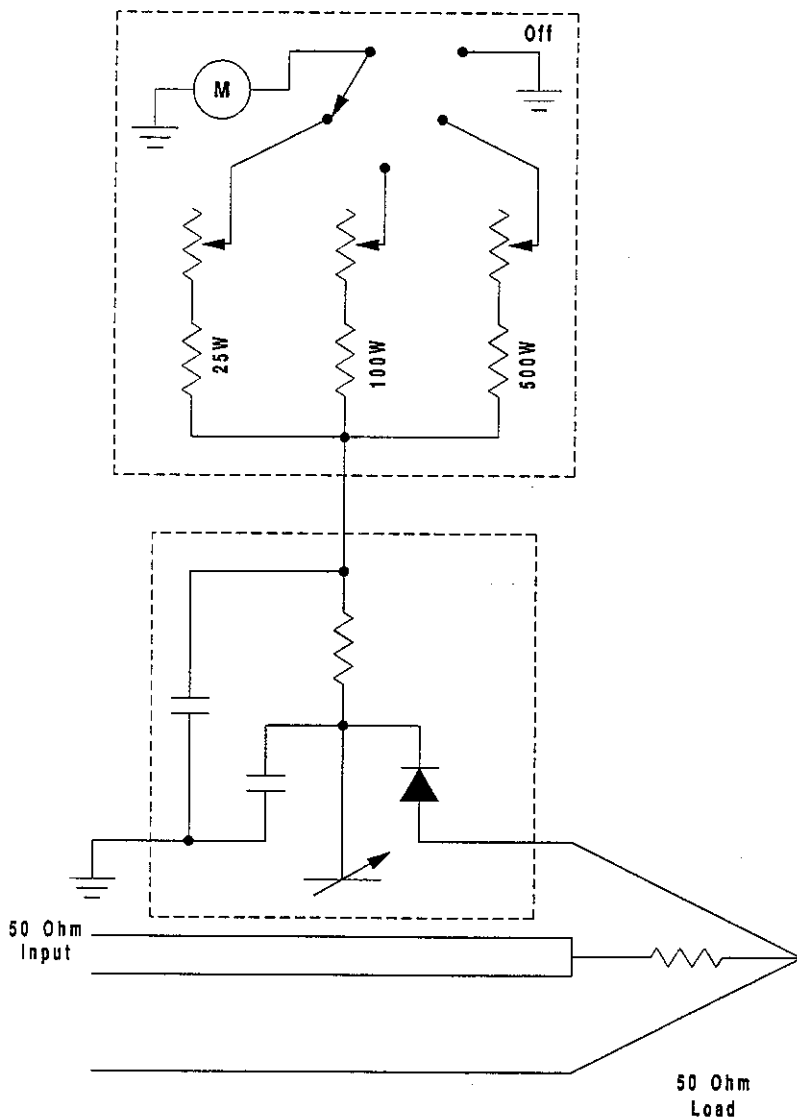
2-7. As an optional item, the Model 6735-300A load portion can be provided with a thermosthich assembly, P/N 2450-056. When installed in the radiator, it will prevent possible damage occurring from accidental transmitter power overload or equipment malfunction. Being normally closed, the thermosthich opens at a maximum safe temperature of +155°C (+311F). Connected in series with the transmitter interlock, it cuts off transmitter power if the load coolant temperature exceeds this value. The assembly consists of thermosthich body, P/N 2450-040, with coupling jack, P/N 2450-018, attached.

2-8. COOLING

2-9. The dielectric coolant is chosen for its desirable dielectric and thermal characteristics. Cooling of the load is accomplished by natural fluid and air convection currents. The dielectric coolant carries the electrically generated heat from the resistor to the walls of the cylindrical cooling tank. This tank is encased in a set of radiating fins, constructed from heavy gauge aluminum alloy, and firmly pressed onto the cylinder. The heat from the dielectric oil is transferred to the surrounding air by the fins. The Model 6732A uses 0.35 gallon (1.3 liter) of coolant. The Model 6734A/-030 uses 0.9 gallon (3.4 liter) of coolant. The Model 6735-300A uses 2.9 gallons (11 liter), the Model 6736/A/-030A uses 1.1 gallons (4.1 liter), and the Model 6737/A/-030A uses 0.9 gallon (3.4 liter) of coolant.

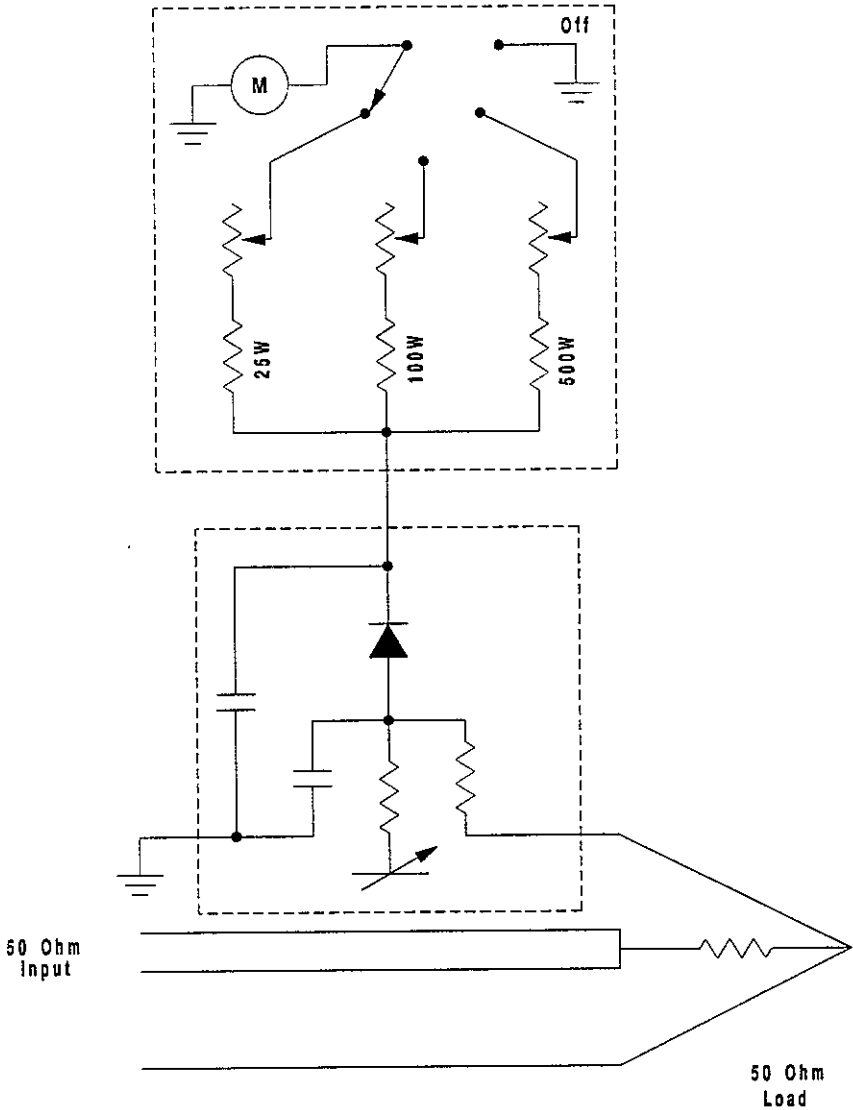
2-10. Expansion of the coolant, caused by the rise in its temperature, is allowed for by means of a synthetic rubber diaphragm (not visible) in the rear cover dome of the load for the Models 6732A, 6734A, 6734A-030, 6737A and 6737-030A. In addition, Models 6737A and 6737-030A are equipped with a cooling coil for circulating water that will remove most of the generated heat from the dielectric coolant. Models 6735-300A, 6737A and 6736-030A have a spring loaded vent plug rather than a diaphragm for relieving the excess pressure caused by the coolant expansion.

FIGURE 2-1. SCHEMATIC DIAGRAM FOR MODELS 6734A-030, 6736-030A, 6737-030A



Note - Power ranges shown are for Model 6734A-030.

**FIGURE 2-2. SCHEMATIC DIAGRAM FOR MODELS
6732A/34A/35-300A/36A/37A**



Note - Power ranges shown are for Model 6734A.

SECTION III - OPERATING INSTRUCTIONS

3-1. USE AND FUNCTION OF CONTROLS

3-2. The only operating control is the range selector switch on the lower right hand face of the meter unit.

3-3. INITIAL ADJUSTMENTS AND CONTROL SETTINGS

3-4. No adjustment or control settings are required.

3-5. START-UP

3-6. Connect the load to the transmitting equipment under test with 50 ohm coaxial cable (RG-8A/U, RG-9/U, RG-213/U or equal) equipped with a Male N type plug (UG-21E/U or equal) which mates with the RF input connector of the load for Models 6732A, 6734A and 6734A-030. For Models 6735-300A, 6736A, 6736-030A, 6737A and 6737-030A use a cable equipped with a Male LC type plug. After the transmitter has been connected to the load, proceed according to the transmitter manufacturer's instructions. When reconnecting the antenna, it may become necessary to slightly readjust the transmitter due to possible differences in VSWR between the load and the antenna system.

3-7. NORMAL OPERATION

3-8. Each TERMALINE[®] Wattmeter will continuously measure and safely dissipate RF power up to its maximum rating. To operate, set the range selector switch to the desired power range and turn on the RF power source. The RF power power absorbed by the load portion will be displayed on the meter. Read the power level from the scale that matches the range set by the range selector switch. For Models 6737A and 6737-030A set the water rate to at least 1/2 gallon/minute (2 liter/minute).

3-9. OPERATION UNDER EMERGENCY, ADVERSE, OR ABNORMAL CONDITIONS

WARNING

When the unit is used in the upper range of its power capacity, the radiator will become hot - care should be used in touching the equipment.

WARNING

Do not attempt to operate the TERMALINE® Wattmeter for prolonged periods at higher than read load levels. Damage to the equipment and injury to operator may result.

3-10. The loads of the Series 6700A TERMALINE® Wattmeters will withstand a temporary overload of up to 20 percent above their nominal maximum rating. The overload should be applied for no more than five to ten minutes. Allow at least a half-hour of cooling thereafter before subjecting the unit to another overload. For Models 6737A and 6737-030A, increase the water flow rate for extra protection. In any case, do not allow the water to reach the boiling point. If it does, the RF power must be immediately decreased and/or the water flow rate increased.

3-11. It should be understood that, although the load portion can accept a limited overload, the meter is restricted to the amount of overranging acceptable. Disconnect the meter lead from the voltmeter to avoid damage.

3-12. SHUTDOWN

3-13. It is not possible to cut off the flow of RF power into the load except by turning off the transmitter or RF source. Turning the range selector switch to OFF merely deactivates the meter without affecting the load.

3-14. EMERGENCY SHUTDOWN

WARNING

Never attempt to disconnect any RF equipment from the transmission line while RF power is being applied. Leaking RF energy is a potential health hazard.

3-15. Turn off the source of RF power.

SECTION IV - MAINTENANCE

4-1. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Leaking of coolant oil around clamping band or radiator housing	Clamping bands not tight	Tighten slightly with a screwdriver.
	Faulty O-Ring (front)	Replace per para 4-19 and 4-25.
	Faulty diaphragm (rear)	Replace per para 4-16 and 4-18.
Excessive overheating the radiator	Transmitter power too high	Reduce transmitter power.
	Coolant oil level too low	Add more coolant oil to the radiator per para 4-16 thru 4-18.
	Over accumulation of dirt on cooling fins	Clean the fins.
	Faulty RF section assembly	Replace per para 4-19 and 4-25.
High or low dc resistance values per para 4-10	Faulty RF connector	Replace per para 4-14.
	Loose RF connector	Tighten with a screwdriver.
	Faulty RF section assembly	Replace per para 4-19 and 4-25.
Incorrect power reading	Defective diode	Replace per para 4-28 and 4-29.
	Loose meter cable	Tighten cable connector.

4-2. CLEANING

4-3. The outside surface of these wattmeters should be wiped free of dust and dirt when necessary. The principle maintenance required by the operator will be to periodically wipe the accumulated dust and lint off of the radiator fins. Excessive collection of dust and lint on the cooling fins will interfere with the efficient dissipation of heat. If the teflon insulator or metallic contact surfaces of the connector should become dirty or grimy, wipe them off with a soft cloth. Use a contact cleaner that is self-drying and nonresidue forming to clean the inaccessible internal parts.

4-4. If any portions of the radiator are corroded or rusted, clean the areas with a fine flint sandpaper, and then touch them up with grey enamel.

4-5. INSPECTION

4-6. With the rugged and simple construction of the TERMALINE® Wattmeters, periodic inspection will be necessary only at about six month intervals. Inspection should include the items listed below:

a. Oil Leakage - Check for coolant oil seepage around the radiator tank, particularly at the front and back around the underside of the clamping band. If leakage is observed, see para 4-1, and check tightness of the clamping screw and the fasteners around the front cylinder.

b. Inspect the load for completeness and general condition of the equipment.

c. A Troubleshooting Chart, see para 4-1, lists the commonly encountered problems, their possible causes and remedies. Use this chart as a guide when analyzing symptoms.

4-7. PREVENTIVE MAINTENANCE

4-8. Due to the basic simplicity of construction, the major requirement for preventive maintenance is to keep the equipment clean, particularly the radiator fins. It is important to maintain the heat transfer efficiency of the cooling fins. Also, occasionally check the coolant level in the radiator tank.

4-9. LOAD EVALUATION

4-10. DC Resistance - Check the condition of the load resistor by accurate measurement of the dc resistance between the inner and outer conductors of the RF input connector. Use a resistance bridge or any ohmmeter with an accuracy of 1 percent or better at 50 ohms for this measurement. The measured resistance should be a nominal 50 ohms and it should not deviate by more than ± 2 ohms from this value.

4-11. Checking the wattmeter accuracy consists mainly of comparing its reading with the readings of similar wattmeters. If other wattmeters are not conveniently available then return the instrument to the factory for recalibration. Special calibration and calibration data can be provided at an additional cost. Consult the factory for details.

4-12. DISASSEMBLY

4-13. There are no special techniques required for the repair or replacement of components in these TERMALINE® Wattmeters. A screwdriver and a small wrench are the only tools needed. The paragraphs below outline component removal.

4-14. RF Connector - The connector is a "Quick-Change" design which permits easy interchange with the use of only a screwdriver. This process does not interfere with the essential coaxial continuity of the load resistor RF input or the coolant oil seal. For replacement, proceed as follows:

- a. Remove the four 8-32 x 5/16 round head machine screws from the corners of the RF connector.
- b. Pull the connector straight out of its socket.
- c. Install the connector per para 4-21.

4-15. Diaphragm and Coolant Oil - Remove the diaphragm to replace or examine the coolant oil. For replacement of the diaphragm and coolant oil proceed as follows:

CAUTION

Do not replace coolant with anything but the specified fluid. The inner shell of the resistor housing is contoured to the dielectric properties of this fluid. The use of any other type of coolant will affect the electrical performance of the load.

4-16. Models 6732A, 6734A, 6734A-030, 6737A and 6737-030A;

- a. Stand the load vertically, with the back end up.
- b. Loosen the clamp screw until the clamp band is released.
- c. Remove the diaphragm cover and lift the diaphragm from the back end of the radiator tank. Inspect the diaphragm. If it is no longer soft and pliable or shows signs of surface cracks it should be replaced.

d. The coolant oil level should be about one inch below the top of the radiator cylinder. The coolant should be a clear to a light yellow color, if not, it may be contaminated and should be replaced.

4-17. Model 6735-300A (No Diaphragm);

a. Place the unit on its back, connector up, by lifting the radiator front. Do it carefully keeping the topside always facing up. The vent hole is so positioned on the topside that when the unit is upended in this manner, the coolant level will remain just below the vent hole and not spill out. Loosen the 10-32 x 1-1/2 inch screw on the clamping band. Remove the clamping band and lift the load resistor assembly out of the tank. Allow the excess coolant to drip back into the tank before laying the assembly aside.

b. At ambient room temperature, the coolant level should be 4-3/4 inch (120 mm) below the top surface of the load resistor assembly mounting ring. The tank is factory filled to this level with 2.9 gallons (11 liter) of a specially selected dielectric fluid (P/N 5-030). The level of the fluid should remain constant, even after prolonged usage, under normal operating conditions.

4-18. Models 6736A and 6736-030A;

a. To check the coolant level, remove the vent plug from the top rear surface of the expansion tank. Unscrew the plug with a 3/4 wrench. The coolant level at room temperature should be no more than 1/8 inch above the bottom surface of the expansion tank. This can be verified by carefully lifting up the load by its front end and noting the presence of coolant on the bottom surface. The unit is factory filled to the proper level with 1.1 gallons (4.2 liter) of a specially selected dielectric fluid, P/N 5-1070.

b. To replace the diaphragm, stand the load on its front end with the connector facing down, if the coolant hasn't been drained previously. Unscrew the four 10-32 truss head screws at the corners of the guard cover, P/N 2430-078, and remove the guard box. Unscrew the tube nut from the tank nozzle and pull it free. Remove the clamp screw from the bottom of the V-band clamp, the same type as on the front side, and remove the clamp. The rear cover, including the attached escape tube with its captive nut, P/N 2430-088, and the diaphragm seal, P/N 2430-089, can now be easily removed. Inspect the diaphragm seal. If it is not still soft, pliable and free from surface cracks or other signs of deterioration, replace it (P/N 2430-015). At this point, if the coolant P/N 5-1070, shows signs of contaminations; i.e., not a crystal clear white color, replace it also.

4-19. RF Load Resistor Assembly - To replace load resistor assembly, proceed as follows:

a. Models 6732A, 6734A, 6734A-030, 6737A and 6737-030A;

1. Stand the load vertically, connector end up, and brace it to avoid tipping it over.
 2. Loosen the clamp screw until the clamping band is released.
 3. Hold the load assembly by the RF connector and pull the assembly slowly out of the radiator tank allowing the excess coolant to drain back into the radiator.
 4. Inspect the O-Ring seal which is located just inside the mounting flange of the radiator assembly. Do not reuse the O-Ring if it is no longer soft and pliable or shows signs of surface cracks.
 5. Replace it with P/N 5-230 for Model 6732A and P/N 8110-039 for Models 6734A, 6734A-030, 6737A and 6737-030A.
- b. Model 6735-300A;
1. To remove the load resistor assembly, proceed as in para 4-17. When removing the load resistor, inspect the O-Ring seal. It should be free of twists and positioned evenly all around the beveled flange of the resistor housing. The O-Ring should still be soft and pliable and show no signs of surface cracks. If it has deteriorated, replace it with P/N 8110-039.
- c. Models 6736A and 6736-030A;
1. Replace the vent plug, P/N 2450-094, with the shipping plug, P/N 2450-049. Make sure to use the O-Ring seal to avoid leakage.
 2. Stand the unit on its back end, with the connector up, and brace it if necessary to prevent it from tipping over.
 3. Loosen the 10-32 x 1-1/2 inch screw on the clamping band and remove the clamping band.
 4. Grasping the RF connector, slowly lift the load resistor assembly out of the radiator tank allowing the excess coolant to drip back in.
 5. Inspect the O-Ring seal to be sure it is free of twists and positioned evenly around the beveled flange of the resistor housing. If the O-Ring is not soft and pliable or shows signs of surface cracks, replace it with P/N 5-230.

4-20. REASSEMBLY

4-22. Diaphragm and coolant oil for Models 6732A, 6734A, 6734A-030, 6737A and 6737-030A. To reassemble the load after inspecting the diaphragm and coolant oil, see para 4-16 and proceed as follows:

- a. Put the diaphragm back in place on the radiator tank.
- b. Press the cuplike swelling in the center of the diaphragm down into the tank to remove the trapped air bubble. To allow the air to escape, pry the diaphragm away from the edge of the tank. Through the same opening add more oil, if necessary, until the oil level is flush with the top of the tank.
- c. Replace the diaphragm cover and the clamping band. Retighten the clamping screw.

4-23. For Model 6735-300A - To reassemble, see paragraph 4-17, replace the load assembly and the clamping band and tighten the clamping screw. Carefully lower the load back onto its feet.

4-24. For Model 6736A and 6736-030A - To reassemble, reverse the procedure in para 4-18.

4-25. RF Load Resistor Assembly:

- a. Models 6732A, 6734A, 6734A-030, 6737A and 6737-030A - To reassemble, reverse the procedures in subparagraph 4-19a.
- b. Model 6735-300A - To reassemble, reverse the procedure in Subparagraph 4-19b.
- c. Models 6736A and 6736-030A - To reassemble, reverse the procedure in Subparagraph 4-19c.

4-26. REPAIRS

4-27. Models 6732A, 6734A, 6735-300A, 6736A and 6737A.

4-28. Replacement of Diode - To replace the diode proceed as follows:

- a. Unscrew the dc cable plug from the voltmeter block.
- b. Remove the diode which sits loosely in the socket.
- c. Unscrew the black plastic cap from the socket on the front panel of the meter (marked "Spare Diode").
- d. Remove the spare diode.
- e. Insert the spare diode in the socket of the voltmeter block.

- d. Remove the spare diode.
- e. Insert the spare diode in the socket of the voltmeter block.
- f. Reattach the dc cable plug to the voltmeter block, screwing it firmly in place.
- g. Restore the black plastic cap to the "spare diode" socket.

4-29. Models 6734A-030, 6736-030A and 6737-030A - The diode for these models will not fit into the "spare diode" socket and must therefore be ordered separately. To install, follow the procedure in para 4-28, but omit steps c., d. and g.

4-30. Repairs beyond what are covered in this instruction book will require return of the equipment to Bird Electronic Corporation for service. Please consult the factory.

SECTION V - PREPARATION FOR SHIPMENT

5-1. LOAD PORTION

5-2. Wrap the RF connector with padding and tape the padding securely in place. Pack and brace the load in a suitable shipping container, a corrugated paper box should suffice. It is not necessary to remove the dielectric coolant before shipping. However, for Models 6735-300A, 6736A and 6736-030A replace the vent plug with the shipping plug, see para 1-4.

5-3. METER PORTION

5-4. Disconnect the dc cable from the voltmeter block and then wrap the meter with padding and tape securely in place. The meter can then be shipped in the same container as the load portion.

5-5. LOW FREQUENCY LINE SECTION

5-6. If the low frequency line section is part of the equipment as an extra accessory, wrap and tape it securely in padding before putting it in the container with the load and meter.

SECTION VI - STORAGE

6-1. GENERAL

6-2. No special preparations for storage are necessary other than to cover the equipment to keep out dust and dirt. Store these units in a dry and dust-free environment where the ambient temperature will remain within the -40°C to $+45^{\circ}\text{C}$ (-40F to $+113\text{F}$) working range of the loads.

SECTION VII - REPLACEMENT PARTS LIST

7-1. SERIES 6730A

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
1	1	Rotary switch	6735-008
2	1	"QC" connector	*See Below
3	1	DC cable assembly	6735-011
4	1	Cable clamp	2-249
5	1	DC connector shorting plug	6733-054
6	1	Range switching knob	5-1852

*Available QC Type Connectors

N-Female*	4240-062	LT-Female	4240-018
(*Standard For Models 6732A/34A/-030)		LT-Male	4240-012
N-Male	4240-063	C-Female	4240-100
HN-Female	4240-268	C-Male	4240-110
HN-Male	4240-278	UHF-Female (SO-239)	4240-050
LC-Female*	4240-031	UHF-Male (PL-259)	4240-179
(*Standard For Models 6735-300A, 6736A/36-030/37/37-030)			
LC-Male	4240-025	7/8" EIA Air Line	4240-002

7-2. MODELS 6732A/34A/35-300A/36A/37A

7	1	Voltmeter cartridge assembly	6733-009
8	1	Diode	5-1180
9	1	Spare crystal cap	6733-025

7-3. MODELS 6734A-030/36-030A/37-030A

10	1	Voltmeter assembly	6735-004
11	1	Diode	5-1180

7-4. MODEL 6732A

13	1	Meter	2080-067
14	1	Cooling radiator	2440-015
15	1	RF section assembly	8141-002
16	0.35 gallon (1.3 liters)	Coolant (DC-200)	5-1070-2 (1 Gallon Container)
17	1	Clamp band assembly	2430-043
18	1	O-Ring seal	5-230
19	1	Diaphragm	2430-015
20	1	Diaphragm cover	2430-148
21	1	Radiator handle	2400-017

REPLACEMENT PARTS LIST [CONT.]

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
7-5. MODELS 6734A and 6734A-030			
22	1	Meter	2080-068
23	1	Radiator assembly	2430-050
24	1	RF section assembly	8205-002
25	0.9 gallon (3.4 liters)	Coolant (dielectric)	5-030-3 (1 Gallon Container)
26	1	Diaphragm	2430-015
27	1	Diaphragm cover	2430-148
28	1	Clamp band	2430-055
29	1	O-Ring seal	8110-039
30	1	Acorn nut (eliminated)	8110-171
31	1	Radiator handle	2430-028
7-6. MODEL 6735-300A			
32	1	Meter	2150-263
33	1	RF load resistor	8205-002
34	1	O-Ring, RF section	8110-039
35	1	Clamping band assembly	2430-055
36	1	Breather vent plug	2450-094
37	1	Shipping plug	2450-049
38	2	O-Ring, vent and shipping plugs	5-504
39	1	Thermoswitch assembly, overtemperature	2450-056
40	2.9 gallons (11 liters)	Coolant (dielectric)	5-030-3 (1 Gallon Container)
41	1	Radiator assembly	2450-301
7-7. MODELS 6736A and 6736-030A			
42	1	Meter	2150-267
43	1	RF section assembly	8890-050
44	1	O-Ring, RF section	5-230
45	1	Diaphragm cover guard	2430-088
46	1	Diaphragm seal	2430-089
47	2	Clamping band assembly	2430-055
48	1.1 gallons (4.1 liters)	Coolant (dielectric)	5-1070-2 (1 Gallon Container)
49	1	Breather vent plug	2450-094
50	1	Shipping plug	2450-049
51	2	O-Ring, vent and shipping plugs	5-504
52	1	Radiator	2430-123

REPLACEMENT PARTS LIST [CONT.]

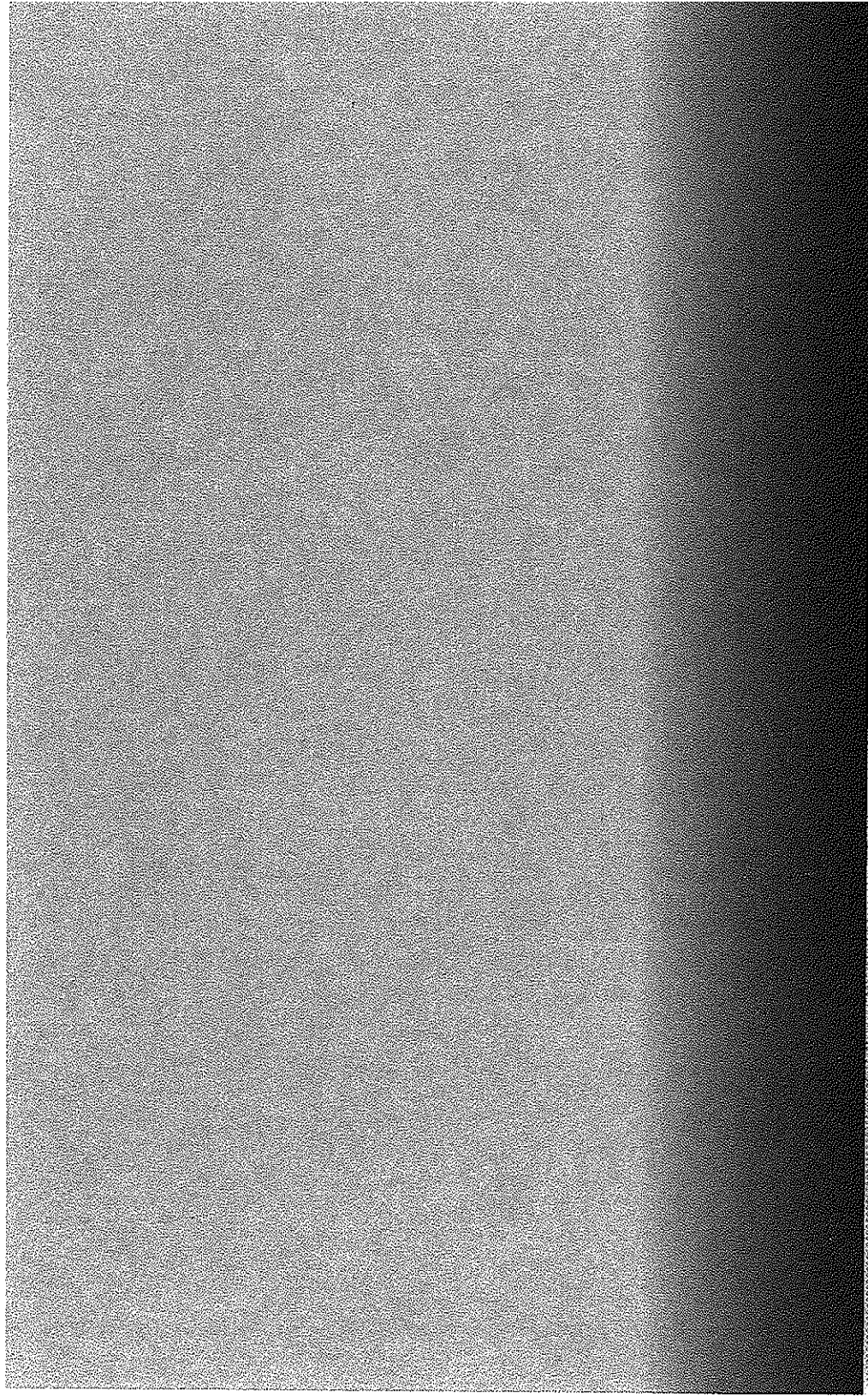
ITEM	QUANTITY	DESCRIPTION	PART NUMBER
53	1	Expansion tank (part of radiator)	2430-080
54	1	Radiator handle	2430-028
55	1	Chain assembly	8180-094

7-8. MODELS 6737A and 6737-030A

56	1	Meter	2150-265
57	1	Radiator assembly	2430-050
58	1	RF section assembly	8230-002-2
59	0.9 gallon (3.4 liters)	Coolant (dielectric)	5-030-3 (1 Gallon Container)
60	1	Diaphragm	2430-015
61	1	Diaphragm cover	2430-148
62	2	Clamp band assembly	2430-055
63	1	O-Ring RF assembly	8110-039
64	1	Radiator handle	2430-028

NOTES

NOTES



QUALITY INSTRUMENTS FOR RF POWER MEASUREMENT

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