
INSTRUCTION BOOK

OPERATING INSTRUCTIONS

**SERIES 6730B
TERMALINE® WATTMETER**

BIRD

Electronic Corporation
Cleveland (Solon) Ohio USA

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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. These precautions must be thoroughly understood and apply to all phases of operation and maintenance.

KEEP AWAY FROM LIVE CIRCUITS

Operating personnel must at all times observe normal safety regulations. Do not replace components or make adjustments to the inside of the test equipment with the high voltage supply turned on. To avoid casualties, always disconnect power.

DO NOT SERVICE OR ADJUST ALONE

Operating personnel must at all times observe normal safety regulations. Do not attempt to replace parts or disconnect a 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.

SAFETY EARTH GROUND

An uninterruptible earth safety ground must be supplied from the main power source to test instruments. Grounding one conductor of a two conductor power cable is not sufficient protection. Serious injury or death can occur if this grounding is not properly supplied.

SHOCK HAZARD

HIGH VOLTAGE is used in the operation of this equipment. DEATH ON CONTACT may result if personnel fail to observe safety precautions. Learn the areas containing high voltages in each part of the equipment. Be careful not to contact high voltage connections when installing or operating this equipment.

CHEMICAL HAZARD

Solvents used to clean parts are potentially dangerous. Avoid inhalation of fumes and also prolonged skin contact.

RESUSCITATION

Personnel working with or near high voltages should be familiar with modern methods of resuscitation. Such information may be obtained from the Bureau of Medicine and Surgery.

SAFETY SYMBOLS

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.

6730B WARNING STATEMENTS

The following safety warnings appear in the text where there is danger to operating and maintenance personnel and are repeated here for emphasis.

WARNING

Before applying RF power to the Models 6735-300A, 6736-030A 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.

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 rated load levels. Damage to the equipment and injury to the 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.

6730B CAUTION STATEMENTS

The following equipment cautions appear in the text whenever the equipment is in danger of damage and are repeated here for emphasis.

CAUTION

Model 6735-300A is rated for 1200 W operation for a maximum of $\frac{1}{2}$ 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.

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.

About This Manual

This instruction book covers the models 6732B, 6734B, 6734B-030, 6735-300A, 6736A, 6736-030A, 6737A, and 6737-030A Termaline Wattmeter.

This instruction book is arranged so that essential information on safety is contained in the front of the book. Reading the Safety Precautions Section before operating the equipment is strongly advised.

The remainder of this Instruction Book is divided into Chapters and Sections. At the beginning of each chapter a general overview will be given, describing the contents of that chapter

OPERATION

First time operators should read Chapter 1 - Introduction, and Chapter 3 - Installation, to get an overview of equipment capabilities and how to install it. An experienced operator can refer to Chapter 4 - Operating Instructions. All instructions necessary to operate the equipment, are contained in this section.

MAINTENANCE

All personnel should be familiar with preventative maintenance found in Chapter 5 - Maintenance. If a failure should occur, the troubleshooting section will aid in isolating and repairing the failure.

PARTS

For location of major assemblies or parts refer to the part lists and associated drawings in Chapter 5.

CHANGES TO THIS MANUAL

We have made every effort to ensure this manual is accurate at the time of publication. If you should discover any errors or if you have suggestions for improving this manual, please send your comment to our factory. This manual may be periodically updated, when inquiring about updates to this manual refer to the part number and revision level on the title page.

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Chapter 1

Introduction

This instruction book is intended for use by operators of the Models 6732B, 6734B, 6734B030, 6735-300A, 6736A, 6736-030A, 6737A, and 6737-030A Termaline Wattmeter.

This chapter contains introductory information including product specifications, items supplied, and accessory items available.

Purpose and Function

A Series 6730B 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 the 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.

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 on page 3. The meter housings are 5 $\frac{9}{16}$ inch W x 6 $\frac{1}{2}$ inch H x 4 $\frac{11}{64}$ inch D (141 x 165 x 106 mm) for the Model 6735, 6736, and 6737 series and 3 $\frac{7}{8}$ inch W x 5 $\frac{5}{8}$ inch H x 3 $\frac{7}{8}$ inch D (98 x 143 x 98 mm) for the Model 6732 and 6734 series. The total weight for each wattmeter is also given in the specifications. The shipping weights will run approximately 20 percent higher.

Power and Utility Requirements

The Series 6730B Termaline Wattmeters require no external source of electrical power other than the RF input power for operation. The Models 6737A 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°C (-40°F and +113°F) for proper operation. Allow at least 6 inches (150 mm) of clearance around the units to permit unimpeded access of natural air convection currents for adequate heat dissipation.

Items Furnished

These models consist of a load with a line section/voltmeter assembly RF input. The meter assembly is connected to the voltmeter through a dc cable assembly. This instruction book, part number 920-6730B is the only other item furnished with these models.

Optional Items

The models 6734B030, 6736-030A, and 6737-030A are equipped with a special low frequency line section P/N 6734-034. This line section can also be ordered as an option to convert the models 6734B, 6736A, or 6737A to the low frequency (-030) version.

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.

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

Specifications

Impedance	50 ohms nominal
VSWR	
6734B030, 6736-030A 6737-030A	1.10:1.00 max. dc - 35MHz
6734B, 6736A, 6735-300A, 6737A	1.15:1.00 max. dc - 1000MHz
6732B	1.15:1.00 max. dc - 800MHz 1.20:1.00 max. 800 - 1000MHz
Accuracy	
6734B030	± 5% of full scale 2 - 32MHz
6736-030A	± 5% of full scale 2 - 30MHz ± 10% of full scale 1.5 - 2MHz 30 - 32MHz
6737-030A	± 5% of full scale 2 - 32MHz ± 10% of full scale 1.5 - 2MHz 32 - 35MHz
6732B, 6734B, 6736A, 6735-300A, 6737A	± 5% of full scale 25 - 512MHz ± 10% of full scale 512 - 1000MHz
Ambient Temperature	-40°C to +45°C (-40°F to +113°F)
Cooling Method	
All Models	Oil dielectric & air convection currents
6737A & 6737-030A	Supplemental water cooling
Operating Position	
6737A & 6737-030A	Vertical - connector down with water
All other models	Horizontal
Finish	Light navy gray baked enamel (MIL-E-15090)

—specifications continued on next page—

Model	Max. Power	Watts Scale	Freq MHz	Conn.	Overall Dimensions	Weight lbs/kg	Load Meter
6732B	250	10/50/250	25-1000	N-F	12-5/8L X 8-1/2H X 5-15/16"W (321 X 216 X 151MM)	13.7/6.2	8141 6732B002-1
6734B	500	25/100/500	25-1000	N-F	19-15/16L X 8-1/2H X 5-15/16"W (506 X 216 X 151MM)	23.7/10.8	8201 6732B002-2
6734B030	500	25/100/500	1.5-35	N-F	19-15/16L X 8-1/2H X 5-15/16"W (506 X 216 X 151MM)	23.7/10.8	8201 6732B002-3
6735-300A	1200*	120/600/1200	25-1000	LC-F	26-1/8L X 17-3/16H X 7-1/8"W (664 X 437 X 181MM)	63/28.6	8830- 300 6735-202-2
6736A	1000	50/250/1000	25-1000	LC-F	21-15/16L X 8-1/2H X 5-15/16"W (533 X 216 X 151MM)	30/13.6	8251 6735-202-5
6736-030A	1000	50/250/1000	1.5-35	LC-F	21-15/16L X 8-1/2H X 5-15/16"W (533 X 216 X 151MM)	30/13.6	8251 6735-202-8
6737A	200/500/2500**	100/500/2500	25-1000	LC-F	20-13/16L X 8-1/2H X 5-15/16"W (529 X 216 X 151MM)	33/15	8230 6735-202-3
6737-030A	200/500/2500**	100/500/2500	1.5-35	LC-F	20-13/16L X 8-1/2H X 5-15/16"W (529 X 216 X 151MM)	33/15	8230 6735-202-9

* For ½ hour only, for continuous operation: 1000W

** 200 Watts vertical position, no water flow

500 Watts horizontal position

2500 Watts vertical position, water flowing

Chapter 2

Principles of Operation

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 the schematic diagrams on the following pages.

The wattmeter measures three separate power ranges by selectively switching 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.

Mechanically, the wattmeter section consists of a 50 ohm line section mounted on the load. For the Models 6732B, 6734B, 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 6734B030, 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.

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 ½ 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.

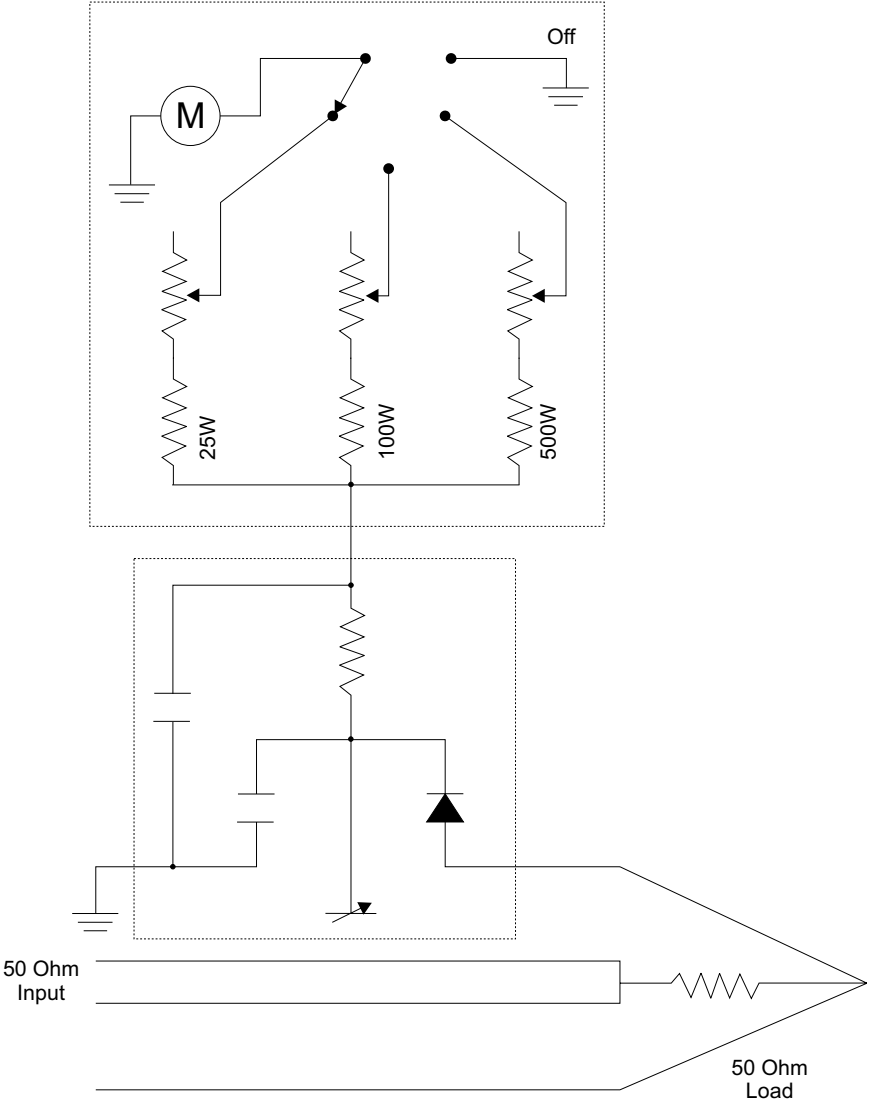
As an optional item, the Model 6735-300A load portion can be provided with a thermoswitch assembly, P/N 2450-056. When installed in the radiator, it will prevent possible damage occurring from accidental transmitter power overload or equipment malfunction. Being normally closed, the thermoswitch opens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

Cooling

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 6732B uses 0.35 gallon (1.3 liter) of coolant, the Model 6734B030 uses 0.9 gallon (3.4 liter), the Model 6735-300A uses 2.9 gallons (11 liter), the Model 6736/A/-030A uses 1.1 gallons (4.2 liter), and the Model 6737/A/-030A uses 0.9 gallon (3.4 liter) of coolant.

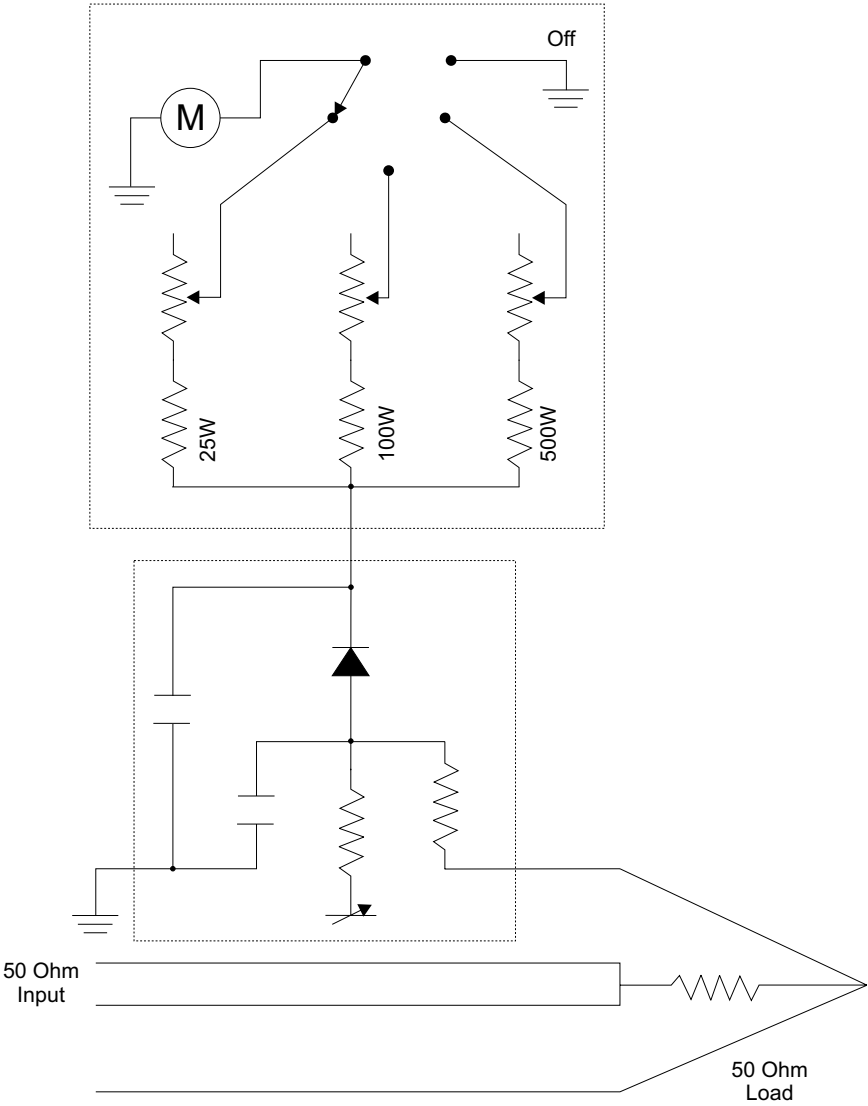
Expansion of the coolant, caused by the rise in its temperature, is allowed for by means of a synthetic rubber diaphragm (not visible) in the rear cover dome of the load for the Models 6732B, 6734B, 6734B030, 6737A and 6737-030A. In addition, the Models 6737A and 6737-030A are equipped with a cooling 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 1
Schematic Diagram for Models 6734B030, 6736-030A, and 6737-030A



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

Figure 2
Schematic Diagram for Models 6732B, 6734B, 6735-300A, 6736A, and 6737A



Note - Power ranges shown are for Model 6734B.

Installation

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.

Mounting Rectangle

The front and rear fins are made extra thick and bent outward 90 degrees 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:

	Width	Length
6732B	5 1/8" (130.2 mm)	7 15/32" (189.7 mm)
6734B & 6734B-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 & 6736-030A	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, 6736-030A 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.

Installing the Vent Plug

The 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

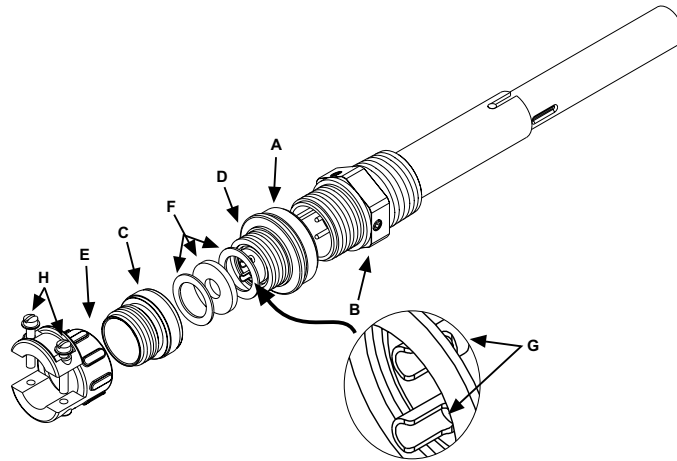
heated coolant rises by more than a few pounds above atmospheric pressure. By this means, the pressure is relieved while at the same time foreign materials are prevented from entering the tank and contaminating the dielectric coolant. When these wattmeters leave the factory, the vent opening is sealed with a shipping plug which is attached to the vent plug by a length of beaded chain. Before putting the unit 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.

Models 6734B030, 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 6734B, 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.

**Installing
the Thermo-
switch**

On the Model 6735-300A, an overtemperature thermoswitch, P/N 2450-056, is available as an accessory. If ordered as part of the original equipment it is factory installed. If ordered later it must be field installed; proceed as follows:

Figure 3
Thermo-
switch



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. Replace the plug with the thermoswitch. Use an acceptable pipe sealing compound, "Loctite with Teflon" or equivalent, sparingly on the external threads only. Do not use ordinary plumbers pipe dope as it will contaminate the coolant! Observe closely for coolant leaks.

Connecting the Thermo- switch

1. Unscrew the larger knurled ring nut (A) at the lower end of the coupling jack assembly and pull it off 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.

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.

Chapter 3

Operating Instructions

- Controls** The only operating control is the range selector switch on the lower right hand face of the meter unit. No adjustment or control settings are required.
- Start-Up** 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 6732B, 6734B and 6734B-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 be necessary to slightly adjust the transmitter due to possible differences in VSWR between the load and the antenna system.
- Normal Operation** 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 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 ½ gallon/minute (2 liter/minute).

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 rated load levels. Damage to the equipment and injury to operator may result.

**Operation
Under
Emergency,
Adverse, or
Abnormal
Conditions**

The loads of the Series 6700A/B Termline 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. 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.

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.

Shutdown

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.

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.

**Emergency
Shutdown**

Turn off the source of RF power.

Chapter 5

Maintenance

Troubleshooting

For corrections requiring repair or replacement of components, refer to the appropriate section for your specific model.

Problem	Possible Cause	Remedy
Coolant oil leaking around clamping band or radiator housing	Clamping bands not tight	Tighten slightly with a screwdriver
	Faulty O-Ring (front)	Replace O-ring
	Faulty diaphragm (rear)	Replace diaphragm
Excessive overheating of the radiator	Transmitter power too high	Reduce transmitter power
	Coolant oil level too low	Add more coolant oil to the radiator
	Accumulation of dirt on cooling fins	Clean the fins
	Faulty RF section assembly	Replace RF section assembly
High or low dc resistance values per para	Faulty RF connector	Replace RF connector
	Loose RF connector	Tighten with a screwdriver
	Faulty RF section assembly	Replace RF section assembly
Incorrect power reading	Defective diode	Return to authorized service facility for replacement and calibration
	Loose meter cable	Tighten cable connector

Cleaning

Outside Surfaces

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 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.

Radiator

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.

Inspection

With the rugged and simple construction of the Termaline Wattmeters inspection will only be necessary at six month intervals. 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 use the troubleshooting table and check the tightness of the clamping screw and the fasteners around the front cylinder.

Preventive Maintenance

Preventive maintenance is limited to cleaning the equipment, 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.

RF Assembly Test

The electrical condition of the load resistor itself may be ascertained generally from its dc resistance at room temperature. It must be remembered that VSWR and RF impedance are the prime requisites of a good dummy load, however, occasionally checking the dc resistance will offer an indication of a failing load.

Normally the dc resistance of the load will be a nominal 50 ohms. Stabilization of the resistive film or temperature can cause a change in the dc resistance. Always check

the load when its temperature is between 20 and 25 degrees Celsius.

Check and record the dc resistance value of the load before it is put into service. Use a resistance bridge or ohmmeter with an accuracy of 1 percent or better at 50 ohms for this purpose.

If the wattmeter is used frequently, daily to weekly, it is recommended to check the dc resistance on a monthly schedule. If the wattmeter is used more infrequently you may want to set up a six month to yearly schedule accordingly. If there is no change or even a slight change in dc resistance there is no cause for alarm. A change greater than two ohms could be an indication of a failing load.

These tests are by no means a necessity to the operation of the wattmeter but merely guidelines for the users information and advisement.

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.

Disassembly

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.

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:

1. Remove the four 8-32 x 5/16 round head machine screws from the corners of the RF connector.
2. Pull the connector straight out of its socket.

**Diaphragm
and Coolant
Oil**

Remove the diaphragm to replace or examine the coolant oil. For replacement of the diaphragm and coolant oil follow the steps below for the appropriate model.

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.

Models 6732B, 6734B, 6734B-030, 6737A and 6737-030A

1. Stand the load vertically, with the back end up.
2. Loosen the clamp screw until the clamp band is released.
3. 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.
4. The coolant oil level should be about one inch below the top of the radiator cylinder. The coolant should be clear to a light yellow color; if not, it may be contaminated and should be replaced.

Model 6735-300A (No Diaphragm);

1. Place the unit on its back, connector up, by lifting the radiator front. Do it carefully keeping the topside always face up. The vent hole is so positioned on the topside that when the unit is up-ended in this manner, the coolant level will remain just below the vent hole and not spill out.
2. Loosen the 10-32 x 1-1/2 inch screw on the clamping band.
3. 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.
4. 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.

Models 6736A and 6736-030A;

1. To check the coolant level, remove the vent plug from the top rear surface of the expansion tank.
2. 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 the load at 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.
3. To replace the diaphragm, stand the load on its front end with the connector facing down, if the coolant has not been drained previously.
4. Unscrew the four 10-32 truss head screws at the corners of the guard cover, P/N 2430-078, and remove the guard box.
5. Unscrew the tube nut from the tank nozzle and pull it free.
6. 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.
7. Inspect the diaphragm seal. If it is not 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.

RF Load Resistor

Models 6732B, 6734B, 6734B-030, 6737A and 6737-030A;

1. Stand the load vertically, connector end up, and brace it to avoid tipping 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 6732B and P/N 8110-039 for Models 6734B, 6734B-030, 6737A and 6737-030A.

Model 6735-300A;

1. 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.
2. Loosen the 10-32 x 1-1/2 inch screw on the clamping band.
3. 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.
4. 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.
5. 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 be soft and pliable and show no signs of surface cracks. If it has deteriorated, replace it with P/N 8110-039.

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.

Assembly

RF Connector

To install a new connector, reverse the disassembly procedure. Be sure that the projecting center pin on the connector is carefully engaged and properly seated within the mating socket of the load resistor input before pressing it home.

Diaphragm and Coolant Oil

Models 6732B, 6734B, 6734B-030, 6737A and 6737-030A.

1. Put the diaphragm back in place on the radiator tank.
2. 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.
3. Through the same opening add more oil, if necessary, until the oil level is flush with the top of the tank.
4. Replace the diaphragm cover and the clamping band.
5. Tighten the clamping screw.

Model 6735-300A

1. Replace the load assembly and the clamping band.
2. Tighten the clamping screw.
3. Carefully lower the load back onto its feet.

Model 6736A and 6736-030A

Reverse disassembly procedure.

RF Load Resistor

Reverse disassembly procedure.

Storage

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°C (-40F to +113F) working range of the wattmeter

Shipment

Load Portion

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 page 10 for instructions.

Meter Portion

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.

Low Frequency Line Section

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.

Customer Service

Any maintenance or service procedure beyond the scope of those provided in this section should be referred to a qualified service center. Bird Electronic Corporation maintains complete repair and calibration facilities at the following addresses:

Service Group

U.S.A. Sales and Manufacturing
Bird Electronic Corporation
30303 Aurora Road
Cleveland (Solon), Ohio 44139-2794
Phone: (440) 248-1200
Fax: (440) 248-5426

Sales Offices

European Sales Office
Bird Electronic Corporation
Berkhamsted House
121 High Street
Berkhamsted
Hertfordshire
HP4 2DJ England
Phone: 44 1 442 870097
Fax: 44 1 442 870148

Pan Asian Sales Office
Bird Electronic Ltd.
3A Unit 6 Tyrwhitt Road
Singapore 0820
Phone: 65 299 2537
Fax: 65 299 8509

Replacement Parts List Series 6730B

Item	Qty.	Description	Part Number
1	1	Rotary switch	6735-008
2	1	"QC" connector	*See Below
3	1	DC cable assembly	4220-097-25
4	1	DC connector shorting plug	7500-268
5	1	Range switching knob	4110-016

MODELS 6732B/34B/35-300A/36A/37A

6	1	Voltmeter cartridge assembly	6735-004
7	1	Diode	5-1180

MODELS 6734B-030/36-030A/37-030A

8	1	Input RF section assembly	6734-034
9	1	Voltmeter assembly	6735-004
10	1	Diode	5-1180

MODEL 6732B

11	1	Meter	2080A067
12	1	Cooling radiator	2440-015
13	1	RF section assembly	8141-002
14	0.35 gallon (1.3 liters)	Coolant (DC-200)	5-1070-2 (1 Gallon Container)
15	1	Clamp band assembly	2430-055
16	1	O-Ring seal	5-230
17	1	Diaphragm	2430-015
18	1	Diaphragm Cover	2430-148
19	1	Radiator handle	2400-017

MODELS 6734B and 6734B-030

20	1	Meter	2080A068
21	1	Radiator assembly	2430-050
22	1	RF section assembly	8205-002
23	0.9 gallon (3.4 liters)	Coolant (dielectric)	5-030-3 (1 Gallon Container)
24	1	Diaphragm	2430-015
25	1	Diaphragm cover	2430-148
26	1	Clamp band kit	2430-055

Maintenance

Item	Qty.	Description	Part Number
27	1	O-Ring seal	8110-039
28	1	Back cover assembly	6732-004
29	1	Radiator handle	2430-028

MODEL 6735-300A

30	1	Meter	2150-263
31	1	RF load resistor	8205-002
32	1	O-Ring, RF section	8110-039
33	1	Clamping band assembly	2430-055
34	1	Breather vent plug	2450-094
35	1	Shipping plug	2450-049
36	2	O-Ring, vent/shipping plug	5-504
37	1	Thermoswitch assembly, overtemperature	2450-056
38	2.9 gallon (11 liters)	Coolant (dielectric)	5-030-3 (1 Gallon Container)
39	1	Radiator assembly	2450-301

MODELS 6736A and 6736-030A

40	1	Meter	2150-267
41	1	RF section assembly	8890-050
42	1	O-Ring, RF section	5-230
43	1	Diaphragm cover guard	2430-088
44	1	Diaphragm seal	2430-089
45	2	Clamping band assembly	2430-055
46	1.1 gallon (4.1 liters)	Coolant (dielectric)	5-1070-2 (1 Gallon Container)
47	1	Breather vent plug	2450-094
48	1	Shipping plug	2450-049
49	2	O-Ring, vent/shipping plug	5-504
50	1	Radiator	2430-123
51	1	Expansion tank (part of radiator)	2430-080
52	1	Radiator handle	2430-028
53	1	Chain assembly	8180-094

MODELS 6737A and 6737-030A

54	1	Meter	2150-265
55	1	Radiator assembly	2430-050
56	1	RF section assembly	8230-002-2

Item	Qty.	Description	Part Number
57	0.9 gallon (3.4 liters)	Coolant (dielectric)	5-303-3 (1 Gallon Container)
58	1	Diaphragm	2430-015
59	1	Diaphragm cover	2430-148
60	2	Clamp band assembly	2430-055
61	1	O-Ring RF assembly	8110-039
62	1	Radiator handle	2430-028

*** Available QC Type Connectors**

N-Female [†]	4240-062	LT-Female	4240-018
N-Male	4240-063	LT-Male	4240-012
HN-Female	4240-268	C-Female	4240-100
HN-Male	4240-278	C-Male	4240-110
LC-Female [‡]	4240-031	UHF-Female	4240-050
LC-Male	4240-025	UHF-Male	4240-179
		7/8" EIA Air Line	4240-002

[†] Standard for Models 6532A/34A/-030

[‡] Standard for Models 6735-300A, 6736A/36-030/37/37-030

DECLARATION OF CONFORMITY

Manufacturer: Bird Electronic Corporation
30303 Aurora Road
Cleveland, Ohio 44139-2794

Product: Termaline Absorption Wattmeter
Models: 6732B 6736A
6734B 6736-030A
6734B030 6737A
6735-300A 6737-030A

The undersigned hereby declares, on behalf of Bird Electronic Corporation of Cleveland, Ohio, that the above-referenced product, to which this declaration relates, is in conformity with the provisions of the following standards:

1. European Standard EN 55011:1991-Emissions:Class B.
2. European Standard EN 50082-2:1992-Immunity; Residential, Commercial, and Light Industrial.

These standards are in accordance with Council Directive 89/336/EEC , on Electromagnetic Compatibility, as amended by Council Directive 92/31/EEC.

3. European Standard EN 61010-1:1993 - Safety, Group II.

This standard is in accordance with Council Directive 73/23/EEC and 93/68/EEC.

The technical documentation file required by this directive is maintained at the corporate headquarters of Bird Electronic Corporation, 30303 Aurora Road, Cleveland, Ohio.

If you are located in Europe and have any questions, please contact:

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Berkhamsted House
121 High Street
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HP4 2DJ England
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