INSTRUCTION BOOK FOR

BIRD

Series 8400

Termaline®

Load Resistor

LIMITED WARRANTY

We are proud of the high quality of our product and we warrant to the original purchaser that each new instrument of our manufacture will for a period of one year after original shipment be free from defects in material and workmanship under normal and proper operating conditions and that properly used during such period it will perform in accordance with our applicable specifications.

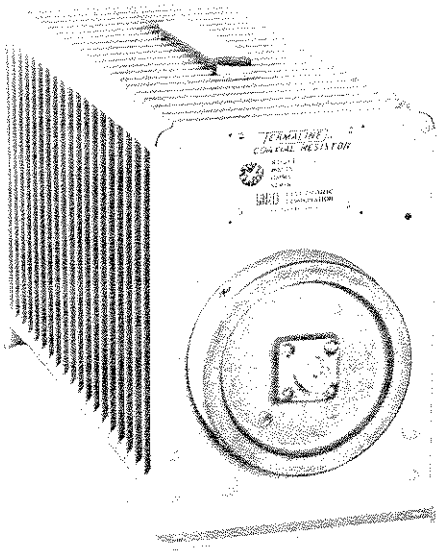
Our obligation and the purchaser's exclusive remedy for any defect or failure to meet specifications shall be limited, at our option, to repair or replacement, or if we determine said defect or failure to be so defective as to preclude remedying by repair or replacement, the purchaser's sole and exclusive remedy shall be limited to refund of the purchase price. We shall have no obligation if defects result from improper use, operation above rated capacities, repairs not made by us, or misapplication of the equipment. Our warranty does not extend to the failure of semiconductor devices and batteries, or to equipment and parts made by others except to the extent of the original manufacturer's warranty to us. No other warranty is expressed or implied. Bird Electronic Corporation is not liable for consequential damages.

Warranty returns must be first authorized by the factory office and are to be shipped prepaid.

MODELS COVERED IN THIS INSTRUCTION BOOK

8401
8402
8404

INSTRUCTION BOOK
Series 8400
Termaline® Load Resistor



BIRD

Electronic Corporation
30303 Aurora Road, Cleveland (Solon) Ohio 44139-2794

****
* C A U T I O N *
* *
* This equipment is designed for operation in a horizon- *
* tal position only, with mounting brackets down. Do not *
* operate in any other manner. *
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****
* C A U T I O N *
* *
* To avoid painful burns, be wary of touching the cooling *
* fins of the load if the equipment has been operating *
* for sometime in its upper ranges of power dissipation. *
****

****
* C A U T I O N *
* *
* Do not continuously operate this equipment above the *
* rated 600W. *
****

****
* C A U T I O N *
* *
* Never attempt to disconnect the load from the transmis- *
* sion line while RF power is being applied. Leaking RF *
* energy is definitely a dangerous health hazard. *
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INTRODUCTION

PURPOSE AND FUNCTION

The 8401, 8402 and 8404 TERMALINE® Load Resistors are portable, general purpose 50 ohm coaxial transmission line terminations. They are self-contained units requiring no outside power source or additional equipment. These loads provide accurate, dependable and practically nonreflective terminations for testing and adjusting transmitters under nonradiating conditions from dc to 3000MHz.

They are useful for the following purposes:

a. As a substitute antenna.

1. For tuning transmitters - under nonradiating conditions.

2. For making routine tests and adjustments.

b. As a substitute for any circuit loading element.

c. To measure with a suitable indicating device, the power output of any coaxially transmitted signal within their rating.

PERFORMANCE CHARACTERISTICS AND CAPABILITIES

The Models 8401, 8402 and 8404 will absorb up to 600W of RF energy continuously and dissipate it harmlessly as heat. As terminations they show a VSWR of 1.1:1.0 from dc to 1000MHz, 1.2:1.0 from 1000-2800MHz and 1.3:1.0 from 2800-3000MHz.

They are rectangular in shape with transverse fins encasing an oil filled coolant cylinder. A retractable handle is recessed in the radiator fins. Extra thick fins at front and rear are bent 90° to form bottom mounting flanges. These flanges are supports for free standing use or brackets for fixed mounting. Flange holes are provided for this purpose, see Section I - Installation.

The RF input connector on the front face is a patented "Quick-Change" design allowing rapid and easy interchange with other AN type connectors, see Section IV - Maintenance.

DIMENSIONS AND WEIGHT

All three models have the same dimensions: 16-1/16"L x 5-15/16"W x 8-1/2"H (408 x 151 x 216mm). They weigh 19.6 lbs. (8.9kg). Their shipping weight is about 25 lbs. (11.25kg).

POWER AND UTILITY REQUIREMENTS

The 8401, 8402 and 8404 load resistors are passive RF components that do not need any external source of power or utility to function.

ENVIRONMENTAL REQUIREMENTS

These loads are not intended for use outdoors where they would be exposed to the elements. They should be used indoors in a clean, dry, dust and vibration free environment. The ambient temperature should be maintained between -40°C and +45°C (-40°F and +113°F) for proper operation. At least a foot of clearance around the radiator should be provided so that the flow of convection air currents is not impeded.

ITEMS FURNISHED

The Model 8401 is normally supplied with a Female N type "QC" connector, P/N 4240-062. The Model 8402 is supplied instead with a Female C type "QC" connector, P/N 4240-100, equipped with a dust cap secured by a ball chain anchor. Also, the Model 8402 differs from the Models 8401 and 8404 by having no handle on the radiator. The Model 8404 differs from the Model 8401 in being supplied additionally with a Male N/Male N adaptor (with dust cap) attached by a ball chain anchor. This instruction book is the only other item furnished.

ITEMS REQUIRED

No additional items are needed other than to have the coaxial transmission line fitted with the proper mating connector.

TOOLS AND TEST EQUIPMENT

Only simple tools like screwdrivers are needed to disassemble an 8400 Series Load. A 1% or better resistance bridge such as the Leeds and Northrop 5305 Test Set is useful for checking the resistance value of the RF section assembly.

SPECIFICATIONS FOR SERIES 8400 TERMALINE® LOAD RESISTORS

Impedance	50 ohms nominal
VSWR	
dc-1000MHz	1.1:1.0 max.
1000-2800MHz	1.2:1.0 max.
2800-3000MHz	1.3:1.0 max.
Connectors	
Model 8401	Female N "QC" type normally supplied
Model 8402	Female C "QC" type with cap normally supplied
Model 8404	Same as 8401 plus UG-57G/U and cap
Power Range	Up to 600W continuous
Frequency Range	dc - 3000MHz
Dimensions	16-1/16"L (without input connector) x 5-15/16"W x 8-1/2"H (408 x 151 x 216mm)
Ambient Temperature	-40°C to +45°C (-40°F to +113°F)
Cooling Method	Oil dielectric and air convection currents
Weight	19.6 lbs. (8.9kg)
Operating Position	Horizontal only
Finish	Light navy grey baked enamel (MIL-E-15090B)

SECTION I - INSTALLATION

1-1. LOCATION

1-2. Locate the Model 8401, 8402 or 8404 TERMALINE® Load Resistor to provide at least a foot of free space around and above the unit. Place the load to permit the shortest possible cable length between the unit and the transmitting equipment. Operate these loads in a horizontal position only, with the handle on top.

1-3. MOUNTING

1-4. These loads may be used for portable operation or for fixed installation, that is, they may stand free or may be secured to a bench or any convenient flat surface. The front and rear fins are made of heavier gauge material bent outward 90° to form mounting flanges. If it is desired to fasten the load by means of its base mounting flanges, four 9/32" holes, are provided for use with screws up to 1/4" in diameter. These holes are arranged in a 5-1/8" x 14-5/8" rectangle (130.2 x 371.5mm).

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*                      C A U T I O N                     *
*                                                        *
* This equipment is designed for operation in a horizon- *
* tal position only, with mounting brackets down. Do not *
* operate in any other manner.                           *
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SECTION II - THEORY OF OPERATION

2-1. GENERAL

2-2. The 8401, 8402 and 8404 TERMALINE® Loads consist essentially of carbon film-on-ceramic resistors 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 50 ohms at the front (connector end), 25 ohms at the midpoint 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.

2-3. COOLING

2-4. The dielectric coolant is chosen for its desirable dielectric and thermal characteristics. Cooling of the Models 8401, 8402 and 8404 is accomplished by natural fluid and air convection currents. The .7 gallons of dielectric coolant carry 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 on to the cylinder. The heat from the dielectric oil is transferred to the surrounding air by the fins.

2-5. Expansion of the coolant with the rise in temperature is allowed for by means of a synthetic rubber diaphragm, not visible, in the rear cover dome of the unit.

SECTION III - OPERATING INSTRUCTIONS

3-1. USE AND FUNCTION OF CONTROLS

3-2. The 8401, 8402 and 8404 TERMALINE® Load Resistors, being passive devices, have no indicators or controls.

3-3. INITIAL ADJUSTMENTS AND CONTROL SETTINGS

3-4. As in Paragraph 3-2, no adjustments are required.

3-5. START-UP

3-6. Connect the load to the transmitting equipment under test with 50 ohm coaxial cable such as RG-8A/U, RG-9B/U, RG-213/U, or equal, and a Male plug which mates with the RF input connector of the load. After the transmitter has been connected to the load, proceed according to the equipment manufacturer's instruction. 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

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*                      C A U T I O N                     *
*                                                        *
* To avoid painful burns, be wary of touching the cooling *
* fins of the load if the equipment has been operating   *
* for sometime in its upper ranges of power dissipation. *
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3-8. Having no indicators or controls, the dummy load requires no special operating procedures or surveillance when properly used.

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

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*                      C A U T I O N                     *
*                                                        *
* Do not continuously operate this equipment above the   *
* rated 600W.                                            *
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3-10. The unit will sustain an input moderately greater than 600W for short periods of time. Such loading must be spaced at reasonable intervals to allow time for cooling to a safe temperature.

3-11. SHUTDOWN

3-12. Because a dummy load is a passive device there is no way to turn it off. RF power must be cut off at its source.

3-13. EMERGENCY SHUTDOWN

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**********************************************************
*                      C A U T I O N                     *
*                                                        *
* Never attempt to disconnect the load from the transmis- *
* sion line while RF power is being applied. Leaking RF  *
* energy is definitely a dangerous health hazard.        *
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3-14. Turn off the source of RF power.