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 **BIRD**  
**INSTRUCTION**  
**book**

MODEL 8813

TERMALINE® Coaxial Load Resistor

INSTRUCTION MANUAL

for

Model 8813 TERMALINE

Coaxial Load Resistor

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# MODEL 8813 COAXIAL LOAD RESISTOR

## SECTION I - GENERAL DESCRIPTION

The Model 8813 TERMALINE Coaxial Load Resistor is designed as a low reflection and non-radiating termination for coaxial RF transmission lines to aid in the tuning and trouble-shooting of transmitting equipment within its ratings. Below are the electrical specifications pertaining to the Model 8813 Load:

Characteristic Impedance. . . . .	50 ohms, nominal
Power Rating. . . . .	1000W continuous
Frequency Range. . . . .	DC to 2000MHz
VSWR. . . . .	1.1 max. DC to 1000MHz 1.25 max. 1000 to 2000MHz
Input Connector. . . . .	1-5/8" Swivel Flange
Ambient Temperature Range. . . . .	-40 <sup>o</sup> C to +45 <sup>o</sup> C

The Model 8813 Load is self-contained, and requires no additional equipment or outside power source. An accessory thermoswitch (Bird #245056) may be used in conjunction with this load to prevent damage which could occur from accidental transmitter power overload.

Attached to the front and rear fins are mounting flanges. These flanges act as supports for free standing use in portable applications, or as mounting brackets for fixed installations. There are mounting holes provided in the flanges for this purpose, see INSTALLATION, Section III.

The RF input connector is located on the front face of the unit. The connector is a 1-5/8" EIA swivel flange, see Section V, MAINTENANCE.

The load unit is filled with a special high-temperature dielectric coolant. At the top of the Dummy Load is a vent plug to relieve internal pressure resulting from coolant expansion.

## SECTION II - THEORY OF OPERATION

The Model 8813 equipment consists essentially of a non-inductive carbon film type resistor immersed in a dielectric coolant. The resistor, individually selected for its accuracy, is enclosed in a tapered housing. This construction provides a linear reduction in surge impedance, directly proportional to the distance along the resistor, producing a uniform practically reflectionless line termination over the stated frequencies of the load resistor.

The dielectric coolant, a low volatility, high-flash point synthetic oil, is chosen for its desirable thermal characteristics and dielectric properties, to which the diameters of the resistor housing are matched.

A synthetic rubber O-ring around the outside of the resistor housing mount furnishes a seal for the radiator opening. A beveled flange retains the O-ring. This flange, with the O-ring between, is pressed against the radiator face by the resultant action of the drawing up of the radial V-band clamp around opposing beveled flanges of the radiator and the resistor housing.

When input power is applied, the resistor generates heat in the adjacent dielectric coolant. By convection, the heated oil flows through slotted openings in the coaxial shell to the walls of the fabricated metal tank. The series of radiating fins, which are brazed to the tank, transmit the heat of the dielectric coolant into the surrounding air.

When the coolant oil is heated, thermal expansion causes an increase in internal pressure. A vented plug is provided in the top of the radiator tank to relieve this pressure.

## SECTION III - INSTALLATION

The Model 8813 Dummy Load is equipped for either fixed installation or portable use. There are mounting brackets on the front and rear faces of the unit. The Load may stand free or be fastened to a bench, etc., by means of four suitable fasteners. Four 3/8" mounting holes, to be used with suitable screws up to 5/16" diameter, are arranged in a 5-3/8" x 21-1/4" rectangle.

This equipment is designed for operation in a horizontal position only, with mounting brackets down. Note: DO NOT OPERATE IN ANY OTHER MANNER.

CAUTION

Before placing the unit into operation, remove the shipping plug and substitute with the specially shielded breather plug. Use a 3/4" flat wrench for this purpose - do not lose the O-ring seal.

This vent must remain open at all times when the unit is in operation or cooling. Failure to do this could result in damage to the equipment and endanger the operator's safety. The use of this vent plug also protects the filler opening against intrusion of foreign material while allowing unobstructed venting of the tank. The shipping plug (with O-ring seal) should be replaced whenever the unit is to be transported.

## SECTION IV - OPERATION

Connect the Model 8813 to the power source under test. The input connector of the Dummy Load is designed to accept 50-ohm 1-5/8" UHF transmission lines. The center conductor will require an anchor bullet (Bird #471221). Secure the flanges with four 5/16" x 1-1/2" cap screws with 5/16" nuts and washers. Make sure the Model 8813 is kept in even alignment with the transmission line.

Proceed according to the instructions pertaining to the specific transmitting equipment. Due to the difference in VSWR between the Dummy Load and the transmitter's antenna, re-adjustment of the transmitter may be required when returning to the original antenna.

The Model 8813 may be used in conjunction with the Model 4712 THRULINE Wattmeter (coupled directly to it) for power measurements up to 1000 watts.

## SECTION V - MAINTENANCE

1. General

The Model 8813 TERMALINE is rugged and simple. It requires only nominal routine attention. The Load is designed to operate for long periods of time if care is taken not to exceed its power handling capabilities.

The outside surface of the instrument should be wiped free of dust and dirt when necessary. Clean the RF input connector with Inhibisol, its equivalent, or trichlorethylene, on a cotton swab stick. Take special care to clean the metallic contact surface and the exposed faces of the teflon insulator. Provide adequate ventilation and observe normal precaution when using dry cleaning solvents.

2. Load Resistor

Accurate measurement of the dc resistance between the inner and outer conductors of the input connector will provide a good check of the condition of the load resistor. For this measurement, a Resistance Bridge with an accuracy of one per cent or better at 50 ohms (such as the Leeds & Northrop Model 5305 Test Set) should be used. Use low resistance leads, preferably a short piece of 50-ohm cable attached to a plug which mates the input connector of the Dummy Load. When the resistor is checked at room temperature, this value should be within a range of 49.0 to 52.5 ohms. If the figure obtained materially exceeds this allowance, the load resistor may need replacement. The measured resistance should not deviate more than one ohm from the value stamped on the blue tag attached to the load.

To change the load resistor assembly, place the unit on its back end (connector up) and loosen the #10-32 x 1-1/2" screw on the clamping band. Remove the clamping band, and lift load resistor assembly out of the tank - be careful to allow coolant to drip back into the tank. This unit is not subject to further disassembly by field maintenance, and a defective unit should be replaced in its entirety. Before replacing a load resistor, be sure that the O-ring seal (Bird #81139) is in its proper place and in good condition. It should be free of twists and positioned evenly all around the beveled flange of the resistor housing.

To replace housing assembly, reverse procedure described in the paragraph above.

### 3. Coolant

The level of the dielectric coolant should remain constant in the unit after prolonged usage under normal operating conditions. Inspect occasionally around lower portion of the clamping band for possible coolant leakage. Carefully tighten clamping screw if required. Under very unusual conditions it might become necessary to replace the resistor housing seal O-ring. Proceed as described in Paragraph 2, Load Resistor.

Check coolant level with shipping plug removed from filler socket on the top surface of the unit. Coolant level should be within 3 to 3-1/4 inch below the top surface of the filler socket. The unit is factory-filled to the proper level with 1.7 gallons of dielectric fluid. **NO OTHER COOLANT MAY BE USED.**



REPLACEMENT PARTS LIST

<u>ITEM</u>	<u>PART NUMBER</u>
Radiator	2450-100-1
Vent Valve	5-835
O-Ring (Vent Valve & Shipping Plug-2)	5-502
Clamping Band & Screw, Assy.	2430-055
RF Section Assembly	3520-020
O-Ring (RF Section)	8110-039
Shipping Plug	2450-049
Coolant Oil (1 gallon cans)	5-030-3

Optional Equipment

BA-88 Blower Assembly	BA-88
Thermoswitch	2450-056

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Insertion Sheet  
for  
Overtemp Thermoswitch with 8800 Series Load Resistors

The Thermoswitch Assy. P/N 2450-056 is optional (extra) equipment designed for use with Bird 8800 Series terminations (10C oil dielectric). These comprise primarily the 8833 TERMALINE<sup>®</sup> and Model 6835 Wattmeter. Interlocked with the transmitter, it protects against load resistor burnout (and consequent damage) due to excessive temperatures.

To install the thermoswitch, proceed as follows:

1) Unscrew the Connector Assy (#2450-018) from the Thermoswitch Body (#2450-040), and similarly unscrew the clamp and Cover from the Connector Body. Thread the transmitter interlock wires (with sleeving) thru the clamp and solder wires to connector lugs in the Body. Restore the cover and tighten the wire clamp screws.

2) Lift the Load Unit carefully at the front end (only) and stand it straight up on its back, using blocks if necessary. Note: Do not at any time allow the top of radiator to lean sideways or downward - coolant will spill thru breather. Using a 9/16 hex socket wrench (or 1/2 square on older models) remove the 3/4 in. pipe thread plug fitted just above the RF input. Apply "Q" seal compound to threads of Thermoswitch plug and screw firmly in place. Use a 1-1/8 flat wrench. Carefully restore load to horizontal, reversing above, and check plug for seal. Screw on the connector with leads. Interlock circuit should now be closed and unit ready for operation, see Section 3 of regular Instruction Book.

The operating characteristics of #2450-056 Thermoswitch are:  
Closed below 154Degrees C, open above 155degreesC; Electrical rating is 10A at 115V, 5A at 230V AC, or 2A at 28V or 115V non-inductive, DC.