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INSTRUCTION BOOK

for

Model 8890 TERMALINE

Coaxial Load Resistor



## MODEL 8890 DUMMY LOAD

### SECTION I-GENERAL DESCRIPTION

The Model 8890 TERMALINE Dummy Load 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 rating. The specifications pertaining to the Model 8890 are given on the Summary Sheet, Page -A-.

The Model 8890 Dummy Load is fully self-contained. No additional equipment or outside power source is required. An accessory thermostwitch (Bird #8890-008) 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 optional fixed installation. 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 Bird special Quick-Change design, see Section V, MAINTENANCE. The Load unit is filled with a specially selected 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 8890 equipment consists essentially of a carbon-film-on-ceramic resistor immersed in a dielectric coolant. The resistor, which is individually selected for its accuracy, is enclosed in an exponentially tapered housing, providing a reduction in surge impedance directly proportional to the distance along the resistor. When the resistor unit is immersed in dielectric coolant, the characteristic impedance will be 50.0 ohms at the connector end and graduate down from there to 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.

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. The o-ring is pressed against the radiator face by the action of drawing up of radial v-band clamp around the enclosing beveled flanges.

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

### SECTION III - INSTALLATION

The Model 8890 Dummy Load is equipped for either fixed installations 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 slots, 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 hole 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 8890 Coaxial Load to the RF generator under test with 50-ohm coaxial transmission line such as RG-218/U or RG-213/U. Make sure all connections are properly tightened. Avoid the use of adapters and elbows whenever possible. 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.

## SECTION V - MAINTENANCE

### 1. General

The Model 8890 TERMALINE is rugged and simple. It should require only nominal routine attention. The Load will operate for long periods of time if its power handling capabilities are not exceeded.

The outside surface of the instrument should be wiped free of dust and dirt when necessary. Clean the RF input connector with Inhibisol, tetrachloroethylene, or its equivalent, on a cotton swab stick. Take special care to clean the metallic contact surface and the exposed faces of the teflon insulator.

#### CAUTION

Provide adequate ventilation and observe normal precautions when using dry cleaning solvents.

### 2. Load Resistor

Accurate dc measurement of the input resistance will provide a good check of the condition of the load resistor. For this measurement, a Resistance Bridge with an accuracy of one percent or better at 50 ohms should be used. Use low resistance leads, preferably a short piece of 50-ohm cable with clips which can attach to the input connector of the Dummy Load. When the resistor is checked at room temperature, the measured resistance should be within a range of 49.0 to 52.5 ohms. If the value 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 white 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. When lifting the radiator front, be careful its top side always faces up. Remove the clamping band, and lift load resistor assembly out of the tank - 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 is 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 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. Tighten clamping screw if required. Under very unusual conditions it might become necessary to replace Item 2, Load Resistor.

Check coolant level with breather removed from filler socket on the top of the unit. Coolant level should be within 3 to 3-1/4 inch below the top surface of the socket. The unit is factory-filled to this level with 1.6 gallons of dielectric fluid. NO OTHER COOLANT MAY BE USED.

When the coolant oil is heated, thermal expansion would cause an increase in internal pressure. The breather in the top of the radiator tank is provided to relieve this while protecting tank opening.

#### 4. RF Input Connector

The input connector is of a special Bird Quick-Change "QC" design which permits easy interchange of connectors with only simple tools. This process does not in any way disturb the coolant seal or interfere with the essential coaxial continuity of the Load Resistor input. Normally a Female LC connector is supplied with Model 8890.

If replacement of the RF input connector becomes necessary, 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 connector straight out.
- (3) Reverse the above procedure to install new connector, making certain that the projecting center contact pin of the "QC" connector is carefully engaged and properly aligned with the mating socket of the Load Resistor.

The "QC" connector may be readily replaced, as above, with other AN Standard Type connectors if specially obtained from Bird Electronic Corporation. Available "QC" connector types are as follows:

<u>TYPE</u>	<u>PART NO.</u>	<u>TYPE</u>	<u>PART NO.</u>	<u>TYPE</u>	<u>PART NO.</u>
Female N	4240-062	Female LC	4240-031	Female C	4240-100
Male N	4240-063	Male LC	4240-025	Male C	4240-110
Female HN	4240-268	Female LT	4240-018	Female UHF	4240-050
Male HN	4240-278	Male LT	4240-012	Male UHF	4240-179
		7/8" EIA	4240-002		



Model 8890

TABLE OF REPLACEABLE PARTS

<u>PART NUMBER</u>	<u>NAME AND DESCRIPTION</u>	<u>LOCATING FUNCTION</u>
2450-100-1	RADIATOR, COOLING: Rectangular shape, 22-1/4 lg x 10-3/4 h x 6-3/8 w. Fins brazed 1/2-inch apart along tank; integral construction. 4 in. dia. opening at front, filler hole at top; foot brackets front and back. Al. alloy, Light Navy Gray baked enamel (MIL-E-15090)	Houses RF Load Resistor assembly and the dielectric coolant.
8890-050	LOAD RESISTOR, RF: Tapered and perforated coaxial housing with 50-ohm center conductor. Fitted for Bird "QC" Connector. 4-1/2 dia. x 14 lg. Aluminum alloy.	Non-reflective RF power termination.
5-1070-3	COOLANT: Dielectric fluid, 5 gal. jug.	Coolant.**
5-230	O-RING, SEAL: 4 x 4-1/4 x 1/8 nom.	Seals Load Resistor mounting.
2430-055	CLAMPING BAND: 4-5/8 OD x 1/4 v-band with two clamping blocks (one threaded) and 10-32 x 1-1/4 Fil. Hd. M.S. Stainless steel, gray nickel plate.	Holds load resistor to radiator.
5-504	O-RING, SEAL: 7/16 ID x 1/16 nom.	Seals vent valve.
5-835	VALVE, VENT: 3/4 hex - 9/16 x 18 threads. Brass, gray nickel plate	Vapor pressure relief, weatherproof.
2450-049	PLUG, SHIPPING: 3/4 hex, 1/2-inch overall 9/16 x 18 thread. Al Alloy, Brite Red Anodize.	Replaces Vent Valve for shipping.
8890-008*	THERMOSWITCH, OVERLOAD: 1-1/8 Hex Plug, 5/8 Body, 9 lg oa. Brass, Ni. Plate, Includes Body #8890-005 and Conn. Assy. #2450-018	Transmitter interlock Cuts-off at 236 °C.

\*Optional equipment, provided only when specially ordered.

\*\*Provided in 1 gallon cans, 5-1070-2.