

INSTRUCTION BOOK
for
Model 8833 TERMALINE[®]
Load Resistor

MODEL 8833 TERMALINE[®] Load Resistor

SECTION I - GENERAL DESCRIPTION

The Model 8833 TERMALINE 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. Below are the electrical specifications pertaining to the Model 8833 Load Resistor: -

Characteristic Impedance	50 Ohms, nominal
Power Rating	1000 Watts continuous
Frequency Range.	DC - 2.5 GHz
VSWR	1.1 max. DC to 1.0 GHz 1.25 max. 1.0 to 2.5 GHz
Input Connector.	Female LC normally supplied, Bird "QC" type
Ambient Temp. Range.	-40°C to +45°C

The Model 8833 Load is self-contained. No additional equipment or outside power source is required. The radiator unit is rectangular in shape with transverse cooling fins spaced evenly along the entire length of the unit. Reinforced foot brackets fastened to front and rear fins are bent 90° at the bottom to form mounting flanges. These flanges act as supports for free standing use in portable applications, or as mounting brackets with fastening holes for optional fixed installation.

The RF input connector is located in the front face of the unit. The connector is of a special Quick-Change design, see Section IV, MAINTENANCE.

The Load unit is filled with a specially selected dielectric coolant. There is a vent hole at the top of the unit to relieve internal pressure. See caution note under Installation & Operation in Section III, pg. 4.

SECTION II - THEORY OF OPERATION

The Model 8833 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. This construction provides a linear reduction in surge impedance, directly proportional to the distance along the resistor. When the resistor and housing are surrounded by the dielectric coolant, the characteristic impedance is therefore 50.0 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 uniform, practically reflectionless line termination over the stated frequencies of the load resistor.

The dielectric coolant, GE 10C Transil Oil, is chosen for its desirable dielectric properties and thermal characteristics, 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 brazed to the tank transmit the heat of the dielectric coolant into the

surrounding air.

When the coolant oil E-702 (GE 10C Transil) is heated, thermal expansion causes an increase in internal pressure. A vent hole is provided in the top of the radiator tank to relieve this pressure.

SECTION III - INSTALLATION & OPERATION

1. Installation

The Model 8833 Load Resistor 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" holes, for use with screws up to 5/16" diameter, are arranged in a 5-3/8" x 21-1/4" rectangle.

The Load is designed for operation in a horizontal plane only, with mounting brackets down. NOTE: DO NOT OPERATE IN ANY OTHER POSITION.

CAUTION

Shipping plug 0-706 must be removed before the unit is placed in operation. Use 3/4-inch flat end wrench. Do not lose the O-ring seal, 0-704. This vent must remain open at all times when the unit is in operation or is cooling. Failure to do this could result in damage to equipment and danger to safety.

A specially shielded Breather Vent 0-705 is provided, and should be screwed into the filler hole after the shipping plug is removed. It is held captive to the filler socket by a short length of bead chain. Use of this plug 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 shipped.

2. Operation

Connect the Model 8833 to the power source under test with an appropriate 50-ohm coaxial power cable, such as RG-17A, -18A -218 or -219/U. Check that all coaxial power line connections are properly tightened. Avoid the use of adapters and elbows when ever possible. Proceed according to instructions pertaining to the specific transmitting equipment.

SECTION IV - MAINTENANCE

1. General

The Model 8833 TERMALINE is rugged and simple. It should require 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 J-701 with Inhibisol, its equivalent, or trichloroethylene, 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, E-701

Accurate measurement of the dc resistance between the inner and outer conductors of the input coupling will provide a good check of the condition of the load resistor, E-701. For this measurement, a Resistance Bridge with an accuracy of one percent 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, the measured resistance should not deviate more than one ohm from the value stamped on the blue tag attached to the Load. If the value obtained materially exceeds this allowance, the load resistor may need replacement.

To change the load resistor assembly E-701, place the unit on its back end (connector up) and loosen the #10-32 x 1-1/2 screw on the clamping band, 0-702. 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 0-701 is in 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 E-701, reverse procedure described in paragraph above.

3. Coolant, E-702

The level of the dielectric coolant E-702 should remain constant in the unit after prolonged usage under normal operating conditions. Inspect occasionally around lower portion of the clamping band, 0-702, for possible coolant leakage. Tighten clamping screw if required. Under very unusual conditions it might become necessary to replace the resistor housing seal O-ring, 0-701. Proceed as described in Paragraph 2, Load Resistor.

Check coolant level with shipping plug 0-706 removed from filler socket (Adapter) on the top surface of the unit. Coolant level should be within 3 to 3-1/4 inches below the top surface of the filler socket. The unit is factory-filled to the proper level with 1.7 gallons of GE 10C Transil Oil. NO OTHER COOLANT MAY BE USED.

4. RF Input Connector, J-701

The input connector is of a special 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 RF input.

If replacement of the RF input connector J-701 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 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. Other "QC" connector types may be obtained from the manufacturer as follows:

Female N	4240-062	Female LC	4240-031
Male N	4240-063	Male LC	4240-025
Female HN	4240-268	Female LT	4240-018
Male HN	4240-278	Male LT	4240-012
Male C	4240-100	Female UHF (SO-239)	4240-050
Female C	4240-110	Male UHF (PL-259)	4240-179

7/8" EIA-Airline 4240-002

TABLE OF REPLACEABLE PARTS

<u>Symbol</u>	<u>Name and Description</u>	<u>Locating Function</u>
A-701	Radiator, Cooling: Rectangular shape, 22-1/4 lg x 10-3/4 h x 6-3/8 w. Transverse vertical fins brazed at 1/2 in. intervals to central tank; integral construction. 4in. dia. opening at front, filler hole at top, with foot brackets front and back. Alum. alloy. Gray enamel part/dwg #2450-100-1	Houses RF load resistor assembly and dielectric coolant.
E-701	LOAD RESISTOR, RF: Tapered and slotted coaxial line with 50-ohm resistor center conductor. 4-1/2 dia x 13-1/2 lg Copper alloy, gray nickel plate. part/dwg. #8201-012	Housed in radiator A-701 non-reflecting terminator for RF power.
E-702	COOLANT: Dielectric fluid, GE 10C Transil Oil. part/dwg. #5-030	Dielectric coolant - 1.7 gal.
J-701	CONNECTOR, RF Input: Female Type LC post shape 2 in. lg with 1-1/4 in. square mounting flange. Four 3/16 in. mounting holes on 15/16 in. square 1-1/4 x 18 threads per inch. Brass Silver Plate. part/dwg #4240-031	Input connector - female LC type (or as ordered)
0-701	O-RING Seal: 4 x 4-1/4 x 1/8 nominal. Synthetic rubber (black) Linear #11-242 part/dwg #8110-039	Seal against coolant leakage around edge of RF sub-assembly.
0-702	CLAMPING BAND: 4-5/8 O.D. x 1/4 V-Band with two clamping blocks (one threaded) and 10-32 x 1-1/2 fil. Hd. Mach. Screw Stainless steel, gray nickel plate. part/dwg #2430-043	Holds load resistor E-701 to radiator A-701
0-704	O-RING: 7/16 x 1/16 nominal size Synthetic rubber (black) Linear #11-014 (2) required part/dwg #5-502	Seals Shipping Plug #0-706 & Breather Vent #0-705

TABLE OF REPLACEABLE PARTS CONT'D

<u>Symbol</u>	<u>Name and Description</u>	<u>Locating Function</u>
0-705	Vent, Breather, 3/4 Hex. 15/16 inch overall lg. 9/16 x 18 thd. Hooded top, captive chain anchor Brass, gray nickel plate part/dwg. 5-835	Relief Vent
0-706	PLUG, Shipping: 3/4 hex, 1/2 inch overall 9/16 x 18 thd. Brass, gray nickel plate part/dwg #2450-049	Plugs vent hole for shipping purposes. Must remove during operation.

Bird Electronic Corp.
Cleveland, Ohio